EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

APPENDIX F – FIELD MEASUREMENT DATA

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix F.1 – Calibration Log Sheets

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Expanded PFAS SI

Water Quality Meter Calibration Log
Expanded PFAS SI

Model: YSI 556 MPS

Serial Number: _____

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 5/30/19 Serial # 16D100479 Time: 9:24 Temp: 2pm 7: 22.4°C	pH (4.0)	4.01	4.02
	pH (7.0)	6.96	6.98
	pH (10.0)	9.97	9.97
	Spec Cond (µS/cm)	1465	1467
	DO (mg/L)	100%	100%
	ORP (mV)	240	239
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		

Expanded PFAS SI

Turbidity Calibration Log
Expanded PFAS SI

Model: MicroTPW 20000
Serial Number:

Date & Time & Temp	Manufacturer Calibration Standard	Calibration Reading	Acceptable (✓)
Date: 5/30/19 Ser # 20110174 Time: 9:22	1,000 10 0.03	1,000 10 0.02	✓ ✓ ✓
Date: Time:			
Date: Time:			
Date: Time:			
Date: Time:			
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Expanded PFAS SI

Water Quality Meter Calibration Log
Expanded PFAS SI

Model: YSI MPS 556
Serial Number: 11H100848

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 7/15/19	pH (4.0)	4.06	4.01
	pH (7.0)	6.99	7.01
Time: 1545	pH (10.0)	9.72	10.01
	Spec Cond (µS/cm)	1722	1437
Temp: 26°C	DO (mg/L)	7.33	7.83
	ORP (mV)	374.-	240.-
Date: 7/16/19	pH (4.0)	3.98	4.01
	pH (7.0)	7.03	7.01
Time: ~~1545~~ 1745	pH (10.0)	9.76	9.96
	Spec Cond (µS/cm)	1284	1384
Temp: ~~26°C~~ 23°C	DO (mg/L)	7.72	7.83
	ORP (mV)	242.5	240.-
Date: 7/17/19	pH (4.0)	~~2.88~~	4.02
	pH (7.0)	~~7.18~~	6.99
Time: 1712	pH (10.0)	10.05	~~9.96~~
	Spec Cond (µS/cm)	~~2368~~ 710	1494
Temp: 28°C	DO (mg/L)	~~9.43~~	2.88
	ORP (mV)	~~28.3~~	240.1
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		

Expanded PFAS SI

Water Quality Meter Calibration Log
Expanded PFAS SI

Model: YSI 556 MPS
Serial Number: 10D100479

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 7/15/19	pH (4.0)	3.97	4.01
	pH (7.0)	7.03	7.01
Time: 1530	pH (10.0)	9.90	9.97
	Spec Cond (µS/cm)	1579	1413
Temp: 27°C	DO (mg/L)	7.36	7.84
	ORP (mV)	371.4	240.-
Date: 7/16/19	pH (4.0)	3.85	4.01
	pH (7.0)	7.05	7.01
Time: 1745	pH (10.0)	10.20	10.01
	Spec Cond (µS/cm)	1359	1431
Temp: 26°C	DO (mg/L)	7.52	7.87
	ORP (mV)	241.9	240.-
Date: 7/17/19	pH (4.0)	3.98	4.02
	pH (7.0)	7.03	6.99
Time: 1312	pH (10.0)	9.74	9.94
	Spec Cond (µS/cm)	1315	1458
Temp: 28°C	DO (mg/L)	7.99	7.95
	ORP (mV)	233.8	240.0
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		

Turbidity Calibration Log
Expanded PFAS SI

Model: Micro TPW Scientific, Inc.
Serial Number: 2017 03512

Date & Time & Temp	Manufacturer Calibration Standard (NTU)	Calibration Reading	Acceptable (✓)
Date: 7/15/19	0.02	0.01	✓
	10.0	12.71	✓
Time: 1530	1000	999.1	✓
Date: 7/16/19	0.02	0.15	✓
	10.0	14.63	✓
Time: 1745	1000	1012	✓
Date: 7/17/19	0.02	0.08	✓
	10.0	9.92	✓
Time: 1212	1000	1004	✓
Date:			
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Turbidity Calibration Log
Eielson AFB, Alaska

Model: MicroTPW Scientific Inc.
Serial Number: 20140 3321

Date & Time & Temp	Manufacturer Calibration Standard (NTU)	Calibration Reading	Acceptable (✓)
Date: 7/15/19	0.02	0.13	✓
	10.0	12.22 ~~10.08~~ (AE)	✓
Time: 1540	1000	990.2	✓
Date: 7/16/19	0.02	0.98	✓
	10.0	13.42	✓
Time: 1740	1000	999.8	✓
Date: 7/17/19	0.02	0.04	✓
	10.0	10.06	✓
Time: 1712	1000	1002	✓
Date:			
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Expanded PFAS SI

Water Quality Meter Calibration Log
Expanded PFAS SI

Model: PRODSS
Serial Number: 045597 (PINE)

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 10/15/19	pH (4.0)	4.01	4.00
	pH (7.0)	7.1	7.00
Time: 1101	pH (10.0)	10.0	10.0
	Spec Cond (µS/cm)	1,413	1,413
Temp: 26° F	DO (mg/L)	12.24	12.24
	ORP (mV)	240	240
Date: 10/16/19	pH (4.0)	4.02	4.00
	pH (7.0)	7.00	7.00
Time: 0850	pH (10.0)	10.1	10.00
	Spec Cond (µS/cm)	1,413	1413
Temp: 16° F	DO (mg/L)		
	ORP (mV)	240	240
Date: 10/18/19	pH (4.0)	4.03	4.0
	pH (7.0)	7.10	7.0
Time: 0700	pH (10.0)	10.98	10.0
	Spec Cond (µS/cm)	1,413	1.413
Temp: 70° F	DO (mg/L)		
	ORP (mV)	240	240
Date: 10/19/19	pH (4.0)	3.80	4.0
	pH (7.0)	7.02	7.0
Time: 0635	pH (10.0)	9.97	10.0
	Spec Cond (µS/cm)	12.96	12.24
Temp: 70° F	DO (mg/L)	8.82	8.82
	ORP (mV)	238.2	240
Date: 10/20/19	pH (4.0)	4.02	4.0
	pH (7.0)	7.08	7.0
Time: 0645	pH (10.0)	10.05	10.0
	Spec Cond (µS/cm)	12.34	12.34
Temp: 70° F	DO (mg/L)	8.68	8.68
	ORP (mV)	234.7	240.0
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		

Turbidity Calibration Log
Expanded PFAS SI

Model: HF Scientific Micro TPW
Serial Number: 201103409

Date & Time & Temp	Manufacturer Calibration Standard (NTU)	Calibration Reading (NTU)	Acceptable (✓)
Date: 4/15/2020	10.0	11.76	✓
	0.02	0.01	✓
Time: 1345	1000	903.9	✓
Date:			
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Expanded PFAS SI

Water Quality Meter Calibration Log
Expanded PFAS SI

Model: YSI MPS 556
Serial Number: 15H102751

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 4/15/2020	pH (4.0)	3.99	4.01
	pH (7.0)	7.09	7.00
Time: 1530	pH (10.0)	9.81	9.97
	Spec Cond (µS/cm)	1424	1381
Temp: 26°C	DO (mg/L)	6.45	7.98
	ORP (mV)	227.0	240.—
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		

Turbidity Calibration Log
Expanded PFAS SI

Model: MicroTPW
Serial Number: 2017 03512

Date & Time & Temp	Manufacturer Calibration Standard	Calibration Reading	Acceptable (✓)
Date: 7/12/2020	0.02	0.03	✓
	10.0	12.73	✓
Time: 0720	1000	1001	✓
Date:			
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Expanded PFAS SI

Water Quality Meter Calibration Log
Expanded PFAS SI

Model: YSI MPS 556
Serial Number: 09G1016665

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 5/12/2020	pH (4.0)	3.88	4.00
	pH (7.0)	7.11	7.01
Time: 0705	pH (10.0)	9.76	10.01
	Spec Cond (µS/cm)	1436	1413
Temp: 20°C	DO (mg/L)	7.73	8.71
	ORP (mV)	252.7	240.0
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		

Expanded PFAS SI

Photoionization Detector Calibration Log
Expanded PFAS SI

Model: MiniRAE 3000
Serial Number: 19935

Date & Time & Temp	Manufacturer Calibration Standard	Calibration Reading	Acceptable (✓)
Date: 26 May 2020	Zero	0.00	✓
	100 ppm	100.00	✓
Time:			
Date: 27 May 2020	Zero	0.00	✓
	100 ppm	100.1	✓
Time:			
Date: 28 May 2020	Zero	0.00	✓
	100 ppm	100.0	✓
Time:			
Date: 29 May 2020	Zero	0.00	✓
	100 ppm	100.1	
Time:			
Date: 30 May 2020	Zero	0.00	✓
	100 ppm	100.1	✓
Time:			
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Checked: AA

Expanded PFAS SI

Water Quality Meter Calibration Log
Expanded PFAS SI

Model: 046714 YSI

Serial Number: 19H106174

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: MAY 26, 2020	pH (4.0)	5.71	4.09
	pH (7.0)	7.13	7.07
Time: 0818	pH (10.0)	7.71	9.92
	Spec Cond (µS/cm)	1.17	1.25
Temp: 13.2°C	DO (mg/L)	11.16	10.04
	ORP (mV)	131.7	248.7
Date: MAY 27, 2020	pH (4.0)	4.26	4.13
	pH (7.0)	7.07	7.06
Time: 0618	pH (10.0)	10.35	9.99
	Spec Cond (µS/cm)	1.19	1.26
Temp: 21.3°C	DO (mg/L)	10.92	10.81
	ORP (mV)	247.2	235.1
Date: MAY 28, 2020	pH (4.0)	3.98	4.0
	pH (7.0)	6.99	7.0
Time: 0544	pH (10.0)	9.81	10.03
	Spec Cond (µS/cm)	0.68	1.22
Temp: 21.0 °C	DO (mg/L)	9.97	9.61
	ORP (mV)	248.1	237.1
Date: MAY 29, 2020	pH (4.0)	4.16	4.14
	pH (7.0)	7.78	7.04
Time: 0740	pH (10.0)	9.12	9.75
	Spec Cond (µS/cm)	1.24	1.24
Temp: 15.1 °C	DO (mg/L)	10.64	10.29
	ORP (mV)	246.1	238.1
Date: MAY 30, 2020	pH (4.0)	3.95	4.01
	pH (7.0)	6.73	B 7.00
Time: 0820	pH (10.0)	9.62	10.07
	Spec Cond (µS/cm)	1.26	1.413
Temp: 18°C	DO (mg/L)	9.67	9.67
	ORP (mV)	233.7	240.1
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		

Checked: MH

Turbidity Calibration Log
Expanded PFAS SI

Model: Hach 2100Q
Serial Number: 17110C062382 / 041636

Date & Time & Temp	Manufacturer Calibration Standard	Calibration Reading	Acceptable (✓)
Date: 26 May 2020	10	9.29	✓
	20	18.9	✓
Time:	100	97.8	✓
Date: 27 May 2020	20	20.7	✓
	100	101	✓
Time:	800	781	✓
Date: 28 May 2020	20	19.6	✓
	100	103	✓
Time:	800	813	✓
Date: 29 May 2020	20	20.6	✓
	100	99.6	✓
Time:	800	819	✓
Date: 30 May 2020	20	19.9	✓
	100	101	✓
Time:	800	794	✓
Date: 31 May 2020	20	20.1	✓
	100	99.3	✓
Time:	800	804	✓
Date:			
Time:			
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Time:			

Checked: MH

Expanded PFAS SI

Water Quality Meter Calibration Log
Expanded PFAS SI

Model: YSI 556
Serial Number: 14B103510

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 6/3/20	pH (4.0)	4.46	3.99
	pH (7.0)	7.11	7.00
Time: 0730	pH (10.0)	9.28	9.98
	Spec Cond (µS/cm)	1431	1413
Temp:	DO ~~(mg/L)~~ %	97.3%	98.2%
	ORP (mV)	226.9	240.1
Date: 6/4/20	pH (4.0) CC620441	3.87	4.01
	pH (7.0) CC610590	7.11	7.00
Time: 0740	pH (10.0) CC635213	9.97	10.01
CC18930	Spec Cond (µS/cm)	1322	1413
Temp:	DO (~~mg/L~~) %	128.8 %	98.9 %
14341	ORP (mV)	240.0	240.0
Date: 6/5/20	pH (4.0)	4.21	4.01
	pH (7.0)	7.04	7.00
Time:	pH (10.0)	9.72	10.01
0716	Spec Cond (µS/cm) SN	~~95.0~~ 1495	1377
Temp: 54°F	DO (mg/L)	95.0% ~~113.0~~ SN ~~8.50~~ SN	98.8%
	ORP (mV)	244.0	240.0
Date: 6/6/20	pH (4.0)	3.94	4.01
	pH (7.0)	7.08	7.00
Time:	pH (10.0)	9.88	9.99
0728	Spec Cond (µS/cm)	1,380	1413
Temp: 54°F	DO (mg/L)	96.0%	98.7%
	ORP (mV)	237.7	240.0
Date: 6/7/20	pH (4.0)	4.37	4.01
	pH (7.0)	7.15	7.00
Time: 0738	pH (10.0)	9.35	10.02
	Spec Cond (µS/cm)	1371	1435
Temp: 51°F	DO ~~(mg/L)~~ %	99.2%	99.7%
	ORP (mV)	214.9	240.1
Date: 6/8/20	pH (4.0)	3.87	4.01
	pH (7.0)	7.11	7.00
Time: 0708	pH (10.0)	9.93	10.01
	Spec Cond (µS/cm)	~~1.55~~ 1395	1413
Temp: 54° F	DO (mg/L)	97.3 %	98.3 %
	ORP (mV)	240.5	240.1

Expanded PFAS SI

Water Quality Meter Calibration Log

Expanded PFAS SI

Model: YSI 556

Serial Number: 14B103510

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 6/9/20	pH (4.0)	4.0	4.01
	pH (7.0)	7.12	7.00
Time: 0603	pH (10.0)	9.93	10.00
	Spec Cond (µS/cm)	1418	1414
Temp: 56°F	DO (mg/L)	88.6%	98.4%
	ORP (mV)	239.9	240.1
Date: 6/10/20	pH (4.0)	~~3.97~~ 3.97	4.01
	pH (7.0)	7.01	7.00
Time: 0700	pH (10.0)	9.96	10.00
	Spec Cond (µS/cm)	1426	1413
Temp: 55°F	DO (mg/L)	88.7%	98.1%
	ORP (mV)	243.0	240.0
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		

Turbidity Calibration Log
Expanded PFAS SI

Model: 20000 - Micro TPW
Serial Number: 20160606094

Date & Time & Temp	Manufacturer Calibration Standard	Calibration Reading	Acceptable (✓)
Date: 06/03/2020	1000 NTU	1000	✓
	10.0 NTU	10.0	✓
Time: 0724	0.02 NTU	0.02	✓
Date: 6/4/2020	1000 NTU	1000	✓
	10.0 NTU	10.0	✓
Time: 0751	0.02 NTU	0.02	✓
Date: 6/5/20	1000 NTU	~~999.2~~ 1000 NTU	✓
	10.0 NTU	10.0 NTU	✓
Time: 0716	0.02 NTU	0.02 NTU	✓
Date: ~~6/5~~ 6/6/20	1000.0 NTU	1000 NTU	✓
	10.0 NTU	10.0 NTU	✓
Time: 0757	0.02 NTU	0.02 NTU	✓
Date: 6/7/20	1000 NTU	1000 NTU	✓
	10.0 ↓	10.0 ↓	✓
Time: 0735	0.02 ↓	0.02 ↓	✓
Date: 6/8/20	1000 NTU	1000 NTU	✓
	10.0 NTU	10.0 NTU	✓
Time: 0722	0.02 NTU	0.02 NTU	✓
Date: 6/9/20	1000 NTU	1000 NTU	✓
	10.0 NTU	10.0 NTU	✓
Time: 0609	0.02 NTU	0.02 NTU	✓
Date: 6/10/20	1000 NTU	1000 NTU	✓
	10.0 NTU	10.0 NTU	✓
Time: 0700	0.02 NTU	0.02 NTU	✓
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
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Time:			
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Time:			
Date:			
Time:			

Expanded PFAS SI

Water Quality Meter Calibration Log
Expanded PFAS SI

Model: YSI MPS 556
Serial Number: 16A101486

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 6/8/20	pH (4.0)	4.00	4.01
	pH (7.0)	7.06	7.01
Time: 0807	pH (10.0)	9.90	10.01
	Spec Cond (µS/cm)	1420	1314
Temp: 23.6 °C	DO (mg/L)	7.27	8.26
	ORP (mV)	226.30	240.-
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		

Turbidity Calibration Log
Expanded PFAS SI

Model: MicroTPW I+F Scientific
Serial Number: 20170351Z

Date & Time & Temp	Manufacturer Calibration Standard	Calibration Reading	Acceptable (✓)
Date: 6/8/20	0.02	0.01	✓
	10.0	11.05	✓
Time: 0746	1000.	1014	✓
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
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Time:			
Date:			
Time:			
Date:			
Time:			

Expanded PFAS SI

Water Quality Meter Calibration Log
Expanded PFAS SI

Model: YSI
Serial Number: 0848

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 6/27/2020	pH (4.0)	3.97	4.01
	pH (7.0)	7.11	7.01
Time: 0900	pH (10.0)	9.77	9.97
	Spec Cond (µS/cm)	~~1499~~ 1405	1413
Temp: 55° F	DO (mg/L)	94%	98.6%
	ORP (mV)	234.4	240.0
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		

Photoionization Detector Calibration Log
Expanded PFAS SI

Model: Mini RAE 3000
Serial Number: 592 - 917283

Date & Time & Temp	Manufacturer Calibration Standard	Calibration Reading	Acceptable (✓)
Date: 6/27/2020	0.0	0.0	✓
	100.0	100.0	✓
Time: 0715			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
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Time:			
Date:			
Time:			

Turbidity Calibration Log
Expanded PFAS SI

Model: Micro TPW
Serial Number: 20160693

Date & Time & Temp	Manufacturer Calibration Standard	Calibration Reading	Acceptable (✓)
Date: 6/27/2020	1000	1000	✓
	10	10	✓
Time: 0700	0.02	0.02	✓
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
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Time:			
Date:			
Time:			

Expanded PFAS SI

Water Quality Meter Calibration Log
Expanded PFAS SI

Model: YSI 556

Serial Number:

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 9/14/2020	pH (4.0)	4.02	4.01
	pH (7.0)	7.01	7.00
Time: 0832	pH (10.0)	10.00	10.00
	Spec Cond (µS/cm)	1,613	1,413
Temp:	DO (mg/L)		
	ORP (mV)	241.1	240.0
Date: 9/15/2020	pH (4.0)	3.97	4.01
	pH (7.0)	7.06	7.01
Time: 0705	pH (10.0)	9.86	9.99
	Spec Cond (µS/cm)	1.394	1,413
Temp: 20.19°C	DO (mg/L)	9.78 mg/L	9.23 mg/L
	ORP (mV)	236.6	240
Date: 9/16/2020	pH (4.0)	3.98	4.01
	pH (7.0)	7.02	7.00
Time: 0715	pH (10.0)	9.89	9.99
	Spec Cond (µS/cm)	~~1373~~ 1,497	1,413
Temp: 21.98°C	DO (mg/L)	9.32	9.15
	ORP (mV)	246.8	240.0
Date:	pH (4.0)	4.02	4.01
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date: 9/18/2020	pH (4.0)	3.87	4.01
	pH (7.0)	6.95	7.00
Time: 0709	pH (10.0)	9.82	9.99
	Spec Cond (µS/cm)	1387	1413
Temp: 45°F	DO (mg/L)	93.8%	100.0%
	ORP (mV)	227.8	240
Date: 9/19/2020	pH (4.0)	4.02	4.01
	pH (7.0)	7.13	7.00
Time: 0712	pH (10.0)	9.82	10.01
	Spec Cond (µS/cm)	1335	1413
Temp: 43°F	DO (mg/L)	100.5%	100.0%
	ORP (mV)	234.9	240

Expanded PFAS SI

Water Quality Meter Calibration Log

Expanded PFAS SI

Model: YSI 556

Serial Number: _____

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 9-20-2020	pH (4.0)	4.07	4.01
	pH (7.0)	7.00	7.00
Time: 0721	pH (10.0)	9.90	10.01
	Spec Cond (µS/cm)	1412	1413
Temp: 36°F	DO (mg/L)	97.6	100
	ORP (mV)	241.7	240.0
Date: 9/21/2020	pH (4.0)	3.98	4.01
	pH (7.0)	7.08	7.00
Time: 0715	pH (10.0)	9.96	10.01
	Spec Cond (µS/cm)	1263	1278
Temp: 32°F	DO (mg/L)	8.68	9.16
	ORP (mV)	240.4	240.0
Date: 9/22/2020	pH (4.0)	3.98	4.01
	pH (7.0)	7.07	7.01
Time: 0716	pH (10.0)	9.98	10.01
	Spec Cond (µS/cm)	~~1493~~ DC 1187	~~1187~~ DC 1207
Temp: 32°F	DO (mg/L)	9.49	10.39
	ORP (mV)	243.5	240.0
Date: 9/23/2020	pH (4.0)	4.04	4.01
	pH (7.0)	6.96	7.00
Time: 0711	pH (10.0)	9.99	10.01
	Spec Cond (µS/cm)	1285	1124
Temp: 48°F	DO (mg/L)	9.89	8.92
	ORP (mV)	228.6	240.0
Date: 9/24/2020	pH (4.0)	3.98	4.00
	pH (7.0)	6.98	7.01
Time: 0700	pH (10.0)	9.99	10.05
	Spec Cond (µS/cm)	1128	1272
Temp: 19.80°C	DO (mg/L)	9.31	9.17
	ORP (mV)	234.9	240.0
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		

Expanded PFAS SI

Water Quality Meter Calibration Log
Expanded PFAS SI

Model: YSI Pro Series.

Serial Number: _____

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 9/14/2020	pH (4.0)	3.75	3.74
	pH (7.0)	6.72	7.02
Time: 0832	pH (10.0)	9.85	10.01
	Spec Cond (µS/cm)	1333	1413
Temp:	DO (mg/L)		
	ORP (mV)	239.9	240.0
Date: 9/16/2020	pH (4.0)	~~4.06~~ 3.97	4.01
	pH (7.0)	7.05	7.0
Time: 0715	pH (10.0)	10.05	10.01
	Spec Cond (µS/cm)	1634	1293
Temp: 20.0°C	DO (mg/L)	~~11.7~~ 9.32	9.14
	ORP (mV)	216.2	240.3
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date: 9/18/2020	pH (4.0)	~~4.01~~ 4.05	4.01
	pH (7.0)	7.01	7.00
Time: 0709	pH (10.0)	9.83	10.01
	Spec Cond (µS/cm)	1448	1413
Temp: 45°F	DO (mg/L)	108.2%	100.0%
	ORP (mV)	244.7	240
Date: 9/19/2020	pH (4.0)	3.73	4.01
	pH (7.0)	6.78	7.00
Time: 0712	pH (10.0)	9.71	10.01
	Spec Cond (µS/cm)	1447	1413
Temp: 43°F	DO (mg/L)	101.1%	100.0%
	ORP (mV)	238.7	240.0
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp: ~~43°F~~	DO (mg/L)		
	ORP (mV)		

Expanded PFAS SI

Water Quality Meter Calibration Log

Expanded PFAS SI

Model: YSI Pro Plus

Serial Number: _____

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 9-20-2020	pH (4.0)	4.32	4.01
	pH (7.0)	7.06	7.00
Time: 0721	pH (10.0)	9.95	10.01
	Spec Cond (µS/cm)	1451	1413
Temp: 36°F	DO (mg/L)	99.2	100.0
	ORP (mV)	208.9	240.0
Date: 9/21/2020	pH (4.0)	3.76	4.01
	pH (7.0)	7.07	7.00
Time: 0715	pH (10.0)	10.27	10.30
	Spec Cond (µS/cm)	1566	1272
Temp: 32°F	DO (mg/L)	8.88	9.25
	ORP (mV)	232.2	240.2
Date: 9/22/2020	pH (4.0)	3.95	4.01
	pH (7.0)	6.98	7.00
Time: 0716	pH (10.0)	10.07	10.01
	Spec Cond (µS/cm)	1139	1203
Temp: 32°F	DO (mg/L)	9.35	9.36
	ORP (mV)	232.3	240.3
Date: 9/23/2020	pH (4.0)	4.07	4.01
	pH (7.0)	6.87	7.02
Time: 0711	pH (10.0)	9.94	10.01
	Spec Cond (µS/cm)	1380	1156
Temp: 43°F	DO (mg/L)	91.9	98.0
	ORP (mV)	250.1	240.1
Date: 9/24/2020	pH (4.0)	4.11	4.00
	pH (7.0)	7.01	7.02
Time: 0700	pH (10.0)	9.92	10.08
	Spec Cond (µS/cm)	1292	1278
Temp: 19.80°C	DO (mg/L)	9.47	9.31
	ORP (mV)	239.7	240.3
Date: 9/25/2020	pH (4.0)	4.38	4.00
	pH (7.0)	6.68	7.00
Time: 1243	pH (10.0)	9.88	10.00
	Spec Cond (µS/cm)	1234	1275
Temp: 39°F	DO (mg/L)	7.67	7.66
	ORP (mV)	236.2	240.0

Expanded PFAS SI

Turbidity Calibration Log
Expanded PFAS SI

Model: 2100Q
Serial Number: 20110340

Date & Time & Temp	Manufacturer Calibration Standard (NTU)	Calibration Reading (NTU)	Acceptable (✓)
Date: 9/14/2020	1000 NTU	1000	✓
	10 NTU	10	✓
Time: 0735	0.2 NTU	0.2	✓
Date: 9/15/2020	1000	1000	✓
	10	10	✓
Time: 0725	0.2	0.2	✓
Date: 9/16	1000	1017	✓
	10	13.10	✓
Time: 0751	0.02	0.05	✓
Date: 9/16	1017 1000	1017	✓
	~~9.96~~ 10.0	~~9.96~~ 9.96	✓
Time: 0752	0.02	0.03	✓
Date: 9/17/2	1000	1000	✓
	10.0	10.0	✓
Time: 0725	0.2	0.2	✓
Date: 9/18	1000	1000	✓
	10.0	10.0	✓
Time: 0715	0.2	0.2	✓
Date: 9/19	1000	1000	✓
	10.0	10.0	✓
Time: 0717	0.02	0.02	✓
Date: 9/20	1000	1000	✓
	10.0	10.0	✓
Time: 0721	0.02	0.02	✓
Date: 9/21	1000	1000	✓
	10.0	10.0	✓
Time: 0725	0.02	0.02	✓
Date: 9/22	1000	1000	✓
	10.0	10.0	✓
Time: 0710	0.02	0.02	✓
Date: 9/23	1000	1000	✓
	10.0	10.0	✓
Time: 0710	0.02	0.02	✓
Date: 9/24	1000	1000	✓
	10.0	10.0	✓
Time: 0712	0.02	0.02	✓
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			

Expanded PFAS SI

Turbidity Calibration Log
Expanded PFAS SI

Model: 2000 Micro TPW
Serial Number: 20200 8377

Date & Time & Temp	Manufacturer Calibration Standard (NTU)	Calibration Reading (NTU)	Acceptable (✓)
Date: 9/14/2020	1000	1000	✓
	10	10	✓
Time: 0735	0.2	0.2	✓
Date: 9/15/2020	1000	1000	✓
	10	10	✓
Time: 0725	0.2	0.2	✓
Date: 9/16/2020	1000	1017	✓
	10	9.96	✓
Time: 0757	0.02	0.03	✓
Date: 9/18	1000	1000	✓
	10.0	10.0	✓
Time: 0715	0.02	0.02	✓
Date: 9/19	1000	1000	✓
	10.0	10.0	✓
Time: 0717	0.02	0.02	✓
Date: 9/20	1000	1000	✓
	10.0	10.0	✓
Time: 0721	0.02	0.02	✓
Date: 9/21	1000	1000	✓
	10.0	10.0	✓
Time: 0725	0.02	0.02	✓
Date: 9/22	1000	1000	✓
	10.0	10.0	✓
Time: 0722	0.02	0.02	✓
Date: 9/23	1000	1000	✓
	10.0	10.0	✓
Time: 0710	0.02	0.02	✓
Date: 9/24	1000	1000	✓
	10.0	10.0	✓
Time: 0712	0.02	0.02	✓
Date: 9/25	1000	1000	✓
	10.0	10.0	✓
Time: 1158	0.02	0.02	✓
Date:			
Time:			
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Date:			
Time:			

Expanded PFAS SI

Water Quality Meter Calibration Log
Expanded PFAS SI

Model: YSI 556

Serial Number:

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 9/14/2020	pH (4.0)	4.02	4.01
	pH (7.0)	7.01	7.00
Time: 0832	pH (10.0)	10.00	10.00
	Spec Cond (µS/cm)	1,613	1,413
Temp:	DO (mg/L)		
	ORP (mV)	241.1	240.0
Date: 9/15/2020	pH (4.0)	3.97	4.01
	pH (7.0)	7.06	7.01
Time: 0705	pH (10.0)	9.86	9.99
	Spec Cond (µS/cm)	1.394	1,413
Temp: 20.19°C	DO (mg/L)	9.78 mg/L	9.23 mg/L
	ORP (mV)	236.6	240
Date: 9/16/2020	pH (4.0)	3.98	4.01
	pH (7.0)	7.02	7.00
Time: 0715	pH (10.0)	9.89	9.99
	Spec Cond (µS/cm)	~~1373~~ 1,497	1,413
Temp: 21.98°C	DO (mg/L)	9.32	9.15
	ORP (mV)	246.8	240.0
Date:	pH (4.0)	4.02	4.01
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date: 9/18/2020	pH (4.0)	3.87	4.01
	pH (7.0)	6.95	7.00
Time: 0709	pH (10.0)	9.82	9.99
	Spec Cond (µS/cm)	1387	1413
Temp: 45°F	DO (mg/L)	93.8%	100.0%
	ORP (mV)	227.8	240
Date: 9/19/2020	pH (4.0)	4.02	4.01
	pH (7.0)	7.13	7.00
Time: 0712	pH (10.0)	9.82	10.01
	Spec Cond (µS/cm)	1335	1413
Temp: 43°F	DO (mg/L)	100.5%	100.0%
	ORP (mV)	234.9	240

Expanded PFAS SI

Water Quality Meter Calibration Log

Expanded PFAS SI

Model: YSI 556

Serial Number: _____

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 9-20-2020	pH (4.0)	4.07	4.01
	pH (7.0)	7.00	7.00
Time: 0721	pH (10.0)	9.90	10.01
	Spec Cond (µS/cm)	1412	1413
Temp: 36°F	DO (mg/L)	97.6	100
	ORP (mV)	241.7	240.0
Date: 9/21/2020	pH (4.0)	3.98	4.01
	pH (7.0)	7.08	7.00
Time: 0715	pH (10.0)	9.96	10.01
	Spec Cond (µS/cm)	1263	1278
Temp: 32°F	DO (mg/L)	8.68	9.16
	ORP (mV)	240.4	240.0
Date: 9/22/2020	pH (4.0)	3.98	4.01
	pH (7.0)	7.07	7.01
Time: 0716	pH (10.0)	9.98	10.01
	Spec Cond (µS/cm)	~~1493~~ DC 1187	~~1187~~ DC 1207
Temp: 32°F	DO (mg/L)	9.49	10.39
	ORP (mV)	243.5	240.0
Date: 9/23/2020	pH (4.0)	4.04	4.01
	pH (7.0)	6.96	7.00
Time: 0711	pH (10.0)	9.99	10.01
	Spec Cond (µS/cm)	1285	1124
Temp: 48°F	DO (mg/L)	9.89	8.92
	ORP (mV)	228.6	240.0
Date: 9/24/2020	pH (4.0)	3.98	4.00
	pH (7.0)	6.98	7.01
Time: 0700	pH (10.0)	9.99	10.05
	Spec Cond (µS/cm)	1128	1272
Temp: 19.80°C	DO (mg/L)	9.31	9.17
	ORP (mV)	234.9	240.0
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		

Expanded PFAS SI

Water Quality Meter Calibration Log
Expanded PFAS SI

Model: YSI Pro Series.

Serial Number: _____

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 9/14/2020	pH (4.0)	3.75	3.74
	pH (7.0)	6.72	7.02
Time: 0832	pH (10.0)	9.85	10.01
	Spec Cond (µS/cm)	1333	1413
Temp:	DO (mg/L)		
	ORP (mV)	239.9	240.0
Date: 9/16/2020	pH (4.0)	~~4.06~~ 3.97	4.01
	pH (7.0)	7.05	7.0
Time: 0715	pH (10.0)	10.05	10.01
	Spec Cond (µS/cm)	1634	1293
Temp: 20.0°C	DO (mg/L)	~~11.7~~ 9.32	9.14
	ORP (mV)	216.2	240.3
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date: 9/18/2020	pH (4.0)	~~4.01~~ 4.05	4.01
	pH (7.0)	7.01	7.00
Time: 0709	pH (10.0)	9.83	10.01
	Spec Cond (µS/cm)	1448	1413
Temp: 45°F	DO (mg/L)	108.2%	100.0%
	ORP (mV)	244.7	240
Date: 9/19/2020	pH (4.0)	3.73	4.01
	pH (7.0)	6.78	7.00
Time: 0712	pH (10.0)	9.71	10.01
	Spec Cond (µS/cm)	1447	1413
Temp: 43°F	DO (mg/L)	101.1%	100.0%
	ORP (mV)	238.7	240.0
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp: ~~43°F~~	DO (mg/L)		
	ORP (mV)		

Expanded PFAS SI

Water Quality Meter Calibration Log

Expanded PFAS SI

Model: YSI Pro Plus

Serial Number: _____

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 9-20-2020	pH (4.0)	4.32	4.01
	pH (7.0)	7.06	7.00
Time: 0721	pH (10.0)	9.95	10.01
	Spec Cond (µS/cm)	1451	1413
Temp: 36°F	DO (mg/L)	99.2	100.0
	ORP (mV)	208.9	240.0
Date: 9/21/2020	pH (4.0)	3.76	4.01
	pH (7.0)	7.07	7.00
Time: 0715	pH (10.0)	10.27	10.30
	Spec Cond (µS/cm)	1566	1272
Temp: 32°F	DO (mg/L)	8.88	9.25
	ORP (mV)	232.2	240.2
Date: 9/22/2020	pH (4.0)	3.95	4.01
	pH (7.0)	6.98	7.00
Time: 0716	pH (10.0)	10.07	10.01
	Spec Cond (µS/cm)	1139	1203
Temp: 32°F	DO (mg/L)	9.35	9.36
	ORP (mV)	232.3	240.3
Date: 9/23/2020	pH (4.0)	4.07	4.01
	pH (7.0)	6.87	7.02
Time: 0711	pH (10.0)	9.94	10.01
	Spec Cond (µS/cm)	1380	1156
Temp: 43°F	DO (mg/L)	91.9	98.0
	ORP (mV)	250.1	240.1
Date: 9/24/2020	pH (4.0)	4.11	4.00
	pH (7.0)	7.01	7.02
Time: 0700	pH (10.0)	9.92	10.08
	Spec Cond (µS/cm)	1292	1278
Temp: 19.80°C	DO (mg/L)	9.47	9.31
	ORP (mV)	239.7	240.3
Date: 9/25/2020	pH (4.0)	4.38	4.00
	pH (7.0)	6.68	7.00
Time: 1243	pH (10.0)	9.88	10.00
	Spec Cond (µS/cm)	1234	1275
Temp: 39°F	DO (mg/L)	7.67	7.66
	ORP (mV)	236.2	240.0

Expanded PFAS SI

Turbidity Calibration Log
Expanded PFAS SI

Model: 2100Q
Serial Number: 20110340

Date & Time & Temp	Manufacturer Calibration Standard (NTU)	Calibration Reading (NTU)	Acceptable (✓)
Date: 9/14/2020	1000 NTU	1000	✓
	10 NTU	10	✓
Time: 0735	0.2 NTU	0.2	✓
Date: 9/15/2020	1000	1000	✓
	10	10	✓
Time: 0725	0.2	0.2	✓
Date: 9/16	1000	1017	✓
	10	13.10	✓
Time: 0751	0.02	0.05	✓
Date: 9/16	1017 1000	1017	✓
	~~9.96~~ 10.0	~~9.96~~ 9.96	✓
Time: 0752	0.02	0.03	✓
Date: 9/17/2	1000	1000	✓
	10.0	10.0	✓
Time: 0725	0.2	0.2	✓
Date: 9/18	1000	1000	✓
	10.0	10.0	✓
Time: 0715	0.2	0.2	✓
Date: 9/19	1000	1000	✓
	10.0	10.0	✓
Time: 0717	0.02	0.02	✓
Date: 9/20	1000	1000	✓
	10.0	10.0	✓
Time: 0721	0.02	0.02	✓
Date: 9/21	1000	1000	✓
	10.0	10.0	✓
Time: 0725	0.02	0.02	✓
Date: 9/22	1000	1000	✓
	10.0	10.0	✓
Time: 0710	0.02	0.02	✓
Date: 9/23	1000	1000	✓
	10.0	10.0	✓
Time: 0710	0.02	0.02	✓
Date: 9/24	1000	1000	✓
	10.0	10.0	✓
Time: 0712	0.02	0.02	✓
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			

Expanded PFAS SI

Turbidity Calibration Log
Expanded PFAS SI

Model: 2000 Micro TPW
Serial Number: 20200 8377

Date & Time & Temp	Manufacturer Calibration Standard (NTU)	Calibration Reading (NTU)	Acceptable (✓)
Date: 9/14/2020	1000	1000	✓
	10	10	✓
Time: 0735	0.2	0.2	✓
Date: 9/15/2020	1000	1000	✓
	10	10	✓
Time: 0725	0.2	0.2	✓
Date: 9/16/2020	1000	1017	✓
	10	9.96	✓
Time: 0757	0.02	0.03	✓
Date: 9/18	1000	1000	✓
	10.0	10.0	✓
Time: 0715	0.02	0.02	✓
Date: 9/19	1000	1000	✓
	10.0	10.0	✓
Time: 0717	0.02	0.02	✓
Date: 9/20	1000	1000	✓
	10.0	10.0	✓
Time: 0721	0.02	0.02	✓
Date: 9/21	1000	1000	✓
	10.0	10.0	✓
Time: 0725	0.02	0.02	✓
Date: 9/22	1000	1000	✓
	10.0	10.0	✓
Time: 0722	0.02	0.02	✓
Date: 9/23	1000	1000	✓
	10.0	10.0	✓
Time: 0710	0.02	0.02	✓
Date: 9/24	1000	1000	✓
	10.0	10.0	✓
Time: 0712	0.02	0.02	✓
Date: 9/25	1000	1000	✓
	10.0	10.0	✓
Time: 1158	0.02	0.02	✓
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			

Expanded PFAS SI

Started 10/28/2020

Turbidity Calibration Log
Expanded PFAS SI

Model: Micro TPW
Serial Number: 20140321

Date & Time & Temp	Manufacturer Calibration Standard	Calibration Reading	Acceptable (✓)
Date: 10/28/2020	0.02	0.03	✓
	10.0	10.06	✓
Time: 0735	1000	987.2	✓
Date: 10/29/2020	0.02	0.02	✓
	10.0	10.0	✓
Time: 0700	1000	1000	✓
Date: 10/30/2020	0.02	0.02	✓
	10.0	10.0	✓
Time: 0900	1000	1000	✓
Date: 10/31/2020	0.02	0.33	
	10.0	12.28	
Time: 0830	1000	1008	✓
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			

started 10/28/2020

Expanded PFAS SI

Water Quality Meter Calibration Log
Expanded PFAS SI

Model: YSI 556 MPS
Serial Number: 15H102751

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 10/28/2020	pH (4.0)	4.02	4.01
	pH (7.0)	7.03	BNL 10/29/20 ~~7.02~~ 7.00
Time: 0700	pH (10.0)	10.00	10.01
	Spec Cond (µS/cm)	1343	1413
Temp: 70°F	DO (mg/L)	7.32	8.25
	ORP (mV)	229.2	240.0
Date: 10/29/2020	pH (4.0)	4.00	4.01
	pH (7.0)	7.02	7.00
Time: 0700	pH (10.0)	9.98	10.01
	Spec Cond (µS/cm)	1419	1413
Temp: 70°F	DO (mg/L)	8.43	8.63
	ORP (mV)	240.2	240.0
Date: 10/30/2020	pH (4.0)	4.03	4.01
	pH (7.0)	6.99	7.00
Time: 0700	pH (10.0)	10.03	10.01
	Spec Cond (µS/cm)	242.6	240.0
Temp: 70°F	DO (mg/L)	1347	1413
	ORP (mV)	6.41	8.06
Date: 10/31/2020	pH (4.0)	BNL ~~7.00~~ 3.99	BNL ~~7.01~~ 4.00
	pH (7.0)	7.00	7.01
Time: 0810	pH (10.0)	10.00	10.06
	Spec Cond (µS/cm)	1434	1313
Temp: 21°C	DO (mg/L)	8.90	9.58
	ORP (mV)	239.3	240
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		

EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix F.2 – Monitoring Well Integrity Checklists

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Well Integrity Checklist

Well ID: OSAP-11 Inspector's name: Gilbert Manning
Date: 2/18/19
Time: 1045 Inspector's signature:

Before opening well

1. Is well cement Pad or stickup in good condition? Yes
2. Is the well lid/vault secure? Yes. Well lock cut.
3. Is well clearly labeled? Yes
4. Photograph well

After removing lid before sampling well

1. Is gasket worn or damaged? No well cap
2. Is vault flooded? No
3. Any odors? No
4. Photograph well with lid off

During sampling

1. Is well operational? Yes
2. Were there any issues in collecting samples?
   No

Comments: Replaced lock with combolock set to 1900.

Well Integrity Checklist

Well ID: MWBK609 Inspector's name: Gilbert Manning

Date: 7/12/19

Time: _____ Inspector's signature: [signature]

Before opening well

1. Is well cement Pad or stickup in good condition? No pad.
2. Is the well lid/vault secure? Yes
3. Is well clearly labeled? No
4. Photograph well Not taken

After removing lid before sampling well

1. Is gasket worn or damaged? NO gasket
2. Is vault flooded? No
3. Any odors? No
4. Photograph well with lid off Photo 0007

During sampling

1. Is well operational? Yes
2. Were there any issues in collecting samples?
   No

Comments: None

Well Integrity Checklist

Well ID: DSAP-13 Inspector's name: Gilbert Manning
Date: 7/18/19
Time: 1530 Inspector's signature:

Before opening well

1. Is well cement Pad or stickup in good condition? Yes
2. Is the well lid/vault secure? Yes
3. Is well clearly labeled? Yes
4. Photograph well

After removing lid before sampling well

1. Is gasket worn or damaged? No well cap
2. Is vault flooded? Water to 1 ft below casing
3. Any odors? No
4. Photograph well with lid off

During sampling

1. Is well operational? Yes
2. Were there any issues in collecting samples?

No.

Comments: None

Well Integrity Checklist

Well ID: PSAP-14 Inspector's name: Gilbert Manning
Date: 7/18/19
Time: 1654 Inspector's signature:

Before opening well

1. Is well cement Pad or stickup in good condition? Yes
2. Is the well lid/vault secure? lid not locked
3. Is well clearly labeled? Yes
4. Photograph well

After removing lid before sampling well

1. Is gasket worn or damaged? No well cap
2. Is vault flooded? No
3. Any odors? No
4. Photograph well with lid off

During sampling

1. Is well operational? Yes
2. Were there any issues in collecting samples?
   Sample Not colleced

Comments: Transducer (Onset Hobo logger (U20-001-01) present. Not sampled as logger contains parts w/ PFAS (Viton O-Rings).

Well Integrity Checklist

Well ID: DSAP-10 Inspector's name: Gilbert Manning
Date: 7/18/19
Time: 1505 Inspector's signature:

Before opening well

1. Is well cement Pad or stickup in good condition? Yes
2. Is the well lid/vault secure? Yes. Cut lock.
3. Is well clearly labeled? Yes
4. Photograph well

After removing lid before sampling well

1. Is gasket worn or damaged? No well cap
2. Is vault flooded? No
3. Any odors? No
4. Photograph well with lid off

During sampling

1. Is well operational? Yes
2. Were there any issues in collecting samples?
   No

Comments: Lock was replaced with USACE Supplied lock.

Well Integrity Checklist

Well ID: OSAP-3D Inspector's name: Gilbert Manning
Date: 7/18/19
Time: _____ Inspector's signature: [signature]

Before opening well

1. Is well cement Pad or stickup in good condition? Yes
2. Is the well lid/vault secure? Yes
3. Is well clearly labeled? Yes
4. Photograph well

After removing lid before sampling well

1. Is gasket worn or damaged? N/A
2. Is vault flooded? N/A
3. Any odors? N/A
4. Photograph well with lid off N/A

During sampling

1. Is well operational? N/A
2. Were there any issues in collecting samples? N/A

Comments: Lock could not be opened (USACE did not have key) and lock could not be cut w/ hand tools.

Well Integrity Checklist

Well ID: DSAP-85 Inspector's name: Gilbert Manning
Date: 7/18/19
Time: Inspector's signature:

Before opening well

1. Is well cement Pad or stickup in good condition? Yes
2. Is the well lid/vault secure? No lock
3. Is well clearly labeled? Yes
4. Photograph well 34-36

After removing lid before sampling well

1. Is gasket worn or damaged? No well cap
2. Is vault flooded? No
3. Any odors? No
4. Photograph well with lid off

During sampling

1. Is well operational? Not Sampled
2. Were there any issues in collecting samples?
   Sample Not collected due to transducer present

Comments: None

Well Integrity Checklist

Well ID: MW-BKG-05 Inspector's name: George Garner
Date: 07/16/2019
Time: 1000 Inspector's signature:

Before opening well

1. Is well cement Pad or stickup in good condition? No. broken
2. Is the well lid/vault secure? No broken
3. Is well clearly labeled? No
4. Photograph well Yes P7163208 - P7163211

After removing lid before sampling well

1. Is gasket worn or damaged? ~~No~~ Yes Gasket torn
2. Is vault flooded? Yes
3. Any odors? No
4. Photograph well with lid off Yes

During sampling

1. Is well operational? No
2. Were there any issues in collecting samples?
   Well broken and filled with bentonite.

Comments: Well was damaged. Bentonite seal was broken and plugged well.

Well Integrity Checklist

Well ID: USAP-2 Inspector's name: George Garner
Date: 07/17/2019
Time: 1500 Inspector's signature: [signature]

Before opening well

1. Is well cement Pad or stickup in good condition? Yes
2. Is the well lid/vault secure? Yes locked
3. Is well clearly labeled? Yes
4. Photograph well Not photographed

After removing lid before sampling well

1. Is gasket worn or damaged? No gasket or well cap
2. Is vault flooded? unknown
3. Any odors? No
4. Photograph well with lid off Not photgraphed

During sampling

1. Is well operational? unknown
2. Were there any issues in collecting samples?
   locked but has transducer, ▽

Comments: Has transducer therefore not sampled.

Well Integrity Checklist

Well ID: USAP-1 Inspector's name: George Garner
Date: 07/17/2018
Time: 1400 Inspector's signature:

Before opening well

1. Is well cement Pad or stickup in good condition? Yes
2. Is the well lid/vault secure? Yes
3. Is well clearly labeled? Yes, inside cap
4. Photograph well Not photographed

After removing lid before sampling well

1. Is gasket worn or damaged? No gasket or well cap
2. Is vault flooded? No
3. Any odors? No
4. Photograph well with lid off Not photographed

During sampling

1. Is well operational? Yes
2. Were there any issues in collecting samples?
   Not from well

Comments:

Well Integrity Checklist

Well ID: 02 MW11 Inspector's name: George Garner
Date: 07/17/2019
Time: 1130 Inspector's signature:

Before opening well

1. Is well cement Pad or stickup in good condition? Yes
2. Is the well lid/vault secure? Yes
3. Is well clearly labeled? Yes
4. Photograph well

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photograph well with lid off Roto 0031

During sampling

1. Is well operational? Yes
2. Were there any issues in collecting samples?
   No issues

Comments:

Well Integrity Checklist

Well ID: 51MB2B
Date: 07/16/2019
Time: 1345

Inspector's name: George Garner
Inspector's signature: [signature]

Before opening well

1. Is well cement Pad or stickup in good condition? Yes, flush mount
2. Is the well lid/vault secure? Yes
3. Is well clearly labeled? Yes
4. Photograph well 024-026

After removing lid before sampling well

1. Is gasket worn or damaged? N
2. Is vault flooded? No
3. Any odors? No
4. Photograph well with lid off 026

During sampling

1. Is well operational? _____
2. Were there any issues in collecting samples?
   Yes, transducer ~~included~~ inside well.

Comments: Not sampled due to transducer.

Well Integrity Checklist

Well ID: 51MB4 Inspector's name: George Garner
Date: 07/16/2019
Time: 1330 Inspector's signature: [signature]

Before opening well

1. Is well cement Pad or stickup in good condition? No
2. Is the well lid/vault secure? No
3. Is well clearly labeled? Yes
4. Photograph well 021 - 023

After removing lid before sampling well

1. Is gasket worn or damaged? Yes
2. Is vault flooded? No
3. Any odors? No
4. Photograph well with lid off

During sampling

1. Is well operational? No
2. Were there any issues in collecting samples?

Comments: Well is destroyed, unsampleable. Frostjacked or struck by vehicle.

Well Integrity Checklist

Well ID: MW-BKG-07 Inspector's name: George Garner
Date: 7/16/2019
Time: 1030 Inspector's signature:

Before opening well

1. Is well cement Pad or stickup in good condition? Yes
2. Is the well lid/vault secure? Yes
3. Is well clearly labeled? Yes
4. Photograph well Photo 009

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photograph well with lid off Photo 010

During sampling

1. Is well operational? Yes
2. Were there any issues in collecting samples?
   No

Comments:

Well Integrity Checklist

Well ID: MW-BKG-04 Inspector's name: George Garner

Date: 7-16-2019

Time: 0800 Inspector's signature:

Before opening well

1. Is well cement Pad or stickup in good condition? Yes
2. Is the well lid/vault secure? Yes
3. Is well clearly labeled? Not labeled
4. Photograph well Photo 001

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photograph well with lid off Photo 002

During sampling

1. Is well operational? Yes
2. Were there any issues in collecting samples?

No

Comments: Needs label

Well Integrity Checklist

Well ID: MW-BKG-10 Inspector's name: George Garner
Date: 07/17/2019
Time: 0800 Inspector's signature:

Before opening well

1. Is well cement Pad or stickup in good condition? Yes
2. Is the well lid/vault secure? Yes
3. Is well clearly labeled? Yes
4. Photograph well 0027

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photograph well with lid off 0028

During sampling

1. Is well operational? Yes
2. Were there any issues in collecting samples?

   No issues

Comments:

Well Integrity Checklist

Well ID: MW BKG-01 Inspector's name: George Garner

Date: 07/16/2019

Time: 1445 Inspector's signature: [signature]

Before opening well

1. Is well cement Pad or stickup in good condition? Yes
2. Is the well lid/vault secure? Yes
3. Is well clearly labeled? Yes
4. Photograph well

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photograph well with lid off

During sampling

1. Is well operational? Yes
2. Were there any issues in collecting samples?

   No Issues

Comments:

Well Integrity Checklist

Well ID: DSAP-14
Date: 4/16/2020
Time: 0930

Inspector's name: N. Stoecklein
Inspector's signature: [signature]

Before opening well

1. Is well cement Pad or stickup in good condition? Yes
2. Is the well lid/vault secure? No
3. Is well clearly labeled? Yes
4. Photograph well ✓

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photograph well with lid off ✓

During sampling

1. Is well operational? Yes
2. Were there any issues in collecting samples?

   No

Comments: There is no well cap on well casing.

Well Integrity Checklist

Well ID: DSAP-85 Inspector's name: N. Stoeckle
Date: 4/16/2020
Time: 1250 Inspector's signature:

Before opening well

1. Is well cement Pad or stickup in good condition? Yes
2. Is the well lid/vault secure? No
3. Is well clearly labeled? No
4. Photograph well ✓

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photograph well with lid off ✓

During sampling

1. Is well operational? Yes
2. Were there any issues in collecting samples?

No

Comments: ~~Very turbid~~ @

Well Integrity Checklist

Well ID: USAP-3 Inspector's name: Benjamin Leach

Date: 5/12/2020

Time: 1029 Inspector's signature: [signature]

Before opening well

1. Is well cement Pad or stickup in good condition? Possibly Frost Jacked
2. Is the well lid/vault secure? No Lid.
3. Is well clearly labeled? No.
4. Photograph well Yes.

After removing lid before sampling well

1. Is gasket worn or damaged? _____
2. Is vault flooded? Standing Water in Outer protective casing.
3. Any odors? No oders.
4. Photograph well with lid off Yes.

During sampling

1. Is well operational? Yes
2. Were there any issues in collecting samples?
   No

Comments: _____

Well Integrity Checklist

Well ID: USAP - 2 Inspector's name: Benjamin Leach
Date: 6/8/2020
Time: 1023 Inspector's signature: [signature]

Before opening well

1. Is well cement Pad or stickup in good condition? No, Frostjacked.
2. Is the well lid/vault secure? Nope.
3. Is well clearly labeled? No.
4. Photograph well Yes.

After removing lid before sampling well

1. Is gasket worn or damaged? Possibly due to frostjacking.
2. Is vault flooded? No.
3. Any odors? None.
4. Photograph well with lid off Yes.

During sampling

1. Is well operational? Yes
2. Were there any issues in collecting samples? No

Comments:

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix F.3 – Monitoring Well Development Forms

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SUNDANCE-EA II, LLC

Well Development Record

Well ID: 19PS-MW01A.

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/28/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/28/19
Source Area:	WC#1, FC	Field Personnel:	N. Stoeckelein

☒ Original Well Development ☐ Redevelopment

4" = 0.33

58.81 bgs TD
58.48

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 8"
Depth to Water (DTW) (ft btoc):	5.06	Total Depth (TD) (ft btoc):	61.64
Screen Interval (ft):	51.31 – 61.31 bgs	Saturated Screen Interval (ft):	10'
Water Column in Well (ft):	$WC_w = TD - DTW$	56.58 = WC_w	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	4 X 0.04079 X 56.58 =	V_W = 9.23 e
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$	60 X 0.01224 X 10 = ~~0.1224~~ =	V_{FP} = 7.34
Total Well Volume (gal):	$V_w + V_{FP} = V_T$ = ~~9.47~~ e	9.23 + 7.34 = 16.57	

d_w=well diameter (inches) d_b= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method Surge Block Purge Method Submersible pump

79.71 = 3 well V w/added water

X add 25 gals to remove from hole as added during drilling

Field Testing Equipment

Water Quality Meter:	Model YSI Pro 556	Serial No.	16M100077
Turbidity Meter:	Model Micro TPW	Serial No.	20110617
Water Level Meter:	WLM – 07.052017		
Pump:	SS Mega Monsoon Pro SN 24776		
Bailer:	NA		

Work Plan Criteria

Min purge volume (3 well volumes) ~~27.33~~ e total gal
Max purge volume (10 well volumes) ~~91.10~~ e total gal
→ 49.71 → 165.70

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

Start pump 1030

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: ~~19A~~ 19B - MW01A

Date: 10/28/19.

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1035	5.72	15	2.5	4.72	428.4	817.5	256.3	18.60	very turbid, chocolate in color
1040	5.80	25	2.5	5.81	348.1	349.4	206.2	5.08	
1045	5.80	35	2.4	6.22	344.9	199.9	167.7	2.70	
1050	5.81	43	2.4	6.34	342.6	119.1	151.6	3.18	
1057	5.84	60	2.4	6.61	341.7	50.95	135.0	3.96	cleary clouder
1103	5.84	75	2.4	6.79	340.9	32.36	118.6	6.56	
1108	5.85	85	2.4	6.90	340.6	20.32	110.8	4.99	
1115	5.85	100	2.4	7.03	340.5	14.19	99.5	7.20	
1121	5.85	120	2.4	7.10	340.1	10.27	95.5	9.47	very clear turbidity
1127	5.85	125	2.4	7.28	340.0	10.06	99.7	13.20	
1135	5.85	135	2.4	7.18	339.7	8.35	89.3	2.62	
1140	5.85	145	2.4	7.15	339.6	7.90	88.7	8.84	
1145	5.85	155	2.4	7.22	339.3	7.24	85.3	6.82	

Additional Comments:

DTW = 4.85

TD = 113.42

SUNDANCE-EA II, LLC

Well Development Record

started @ 1100

Well ID: ~~PMW~~ 19PS-MW01B

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/29/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/29/19
Source Area:	CFC, WC#1	Field Personnel:	N. Stoeckelein H. Peterson

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 8"
Depth to Water (DTW) (ft btoc):	4.85	Total Depth (TD) (ft btoc):	113.42
Screen Interval (ft):	~~to~~ 99.92 bgs – 109.92 bgs	Saturated Screen Interval (ft):	10
Water Column in Well (ft):	$WC_w = TD - DTW$	113.42 – 4.85 = 108.57 ft	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	$2^2 \times 0.04079 \times 108.57 =$ ~~8.857 gal~~ HP 17.71 gal	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$	$(8^2 - 2^2) \times 0.01224 \times 10 = 60 \times 0.01224 \times 10 = 7.34$ gal	
Total Well Volume (gal):	$V_w + V_{FP} = V_T$	HP ~~8.857 gal~~ + 17.71 gal + 7.34 gal = 25.05 gal	

d_w=well diameter (inches) d_b= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$ ~~17.71 + 1.72 = 19.43~~ HP

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method Surge block Purge Method submersible pump

Field Testing Equipment

Water Quality Meter:	Model YSI Pro 556	Serial No.	
Turbidity Meter:	Model Micro TPW	Serial No.	
Water Level Meter:	WLM-07.052017		
Pump:	SS Mega-Monsoon Pro SN: 24776		
Bailer:	NA		

Work Plan Criteria pump out min 100 gal (drilling water)

Min purge volume (3 well volumes) 75 total gal
Max purge volume (10 well volumes) 250 total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

[minimum 175 gal
maximum 350 gal]

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: 19PS – MW01B

Date: 10/29/19

Start pumps at 1132

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1137	5.35	20	4.5	5.13	386.4	409.4	193.1	1.91	
1147	5.39	35	3.9	6.23	275.5	816.27	65.7	2.45	
1155	5.39	45	3.8	6.53	269.3	39.78	-5.4	2.30	
1200	5.39	55	3.8	6.76	267.2	43.46	-0.2	2.05	
1210	5.39	75	3.8	6.95	265.5	25.91	50.4	2.61	
1218	5.39	90	3.8	7.06	265.0	17.44	13.8	2.67	
1223	5.40	100	3.8	7.12	264.6	15.59	23.9	2.56	
1228	5.40	110	3.8	7.14	265.1	15.22	27.2	2.44	
1235	5.40	125	3.7	7.13	264.0	11.74	69.9	4.41	
1245	5.40	145	3.8	7.24	263.5	9.79	54.4	2.81	
1253	5.40	175	3.8	7.26	263.4	7.61	63.7	4.58	
1300	5.40	185	3.8	7.27	263.2	7.79	56.0	2.30	

Additional Comments:

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 19PS-MW02A

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10.24.19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10.25.19
Source Area:	Chena River Flood channel cluster #2	Field Personnel:	N. Stoecklein R. Wortman.

☑ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 8"
Depth to Water (DTW) (ft btoc):	6.33 @ 5b-	Total Depth (TD) (ft btoc):	~~61.55~~ RW ~~59.20~~ 61.55
Screen Interval (ft):	~~49-59~~ bgs 60'	Saturated Screen Interval (ft):	~~49-59~~ bgs 10'
Water Column in Well (ft):	$WC_w = TD - DTW$ = ~~59.20~~	61.55 - 6.33 = 55.22	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$ =	$2^2 \times 0.04079 \times 55.22 = 9.01$ gal	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$ =	$8^2 - 2^2 \times 0.01224 \times 10 = 7.344$ gal	
Total Well Volume (gal):	$V_w + V_{FP} = V_T$ =	9.01 + 7.34 = 16.35 = 17 gal	

d_w=well diameter (inches) d_b= borehole diameter (inches) WC_w= water column in well (feet) **SSI**=saturated screen interval (feet) V_T=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method Surge Block Purge Method Submersible Pump

Field Testing Equipment

Water Quality Meter:	Model YSI Pro 556	Serial No.	16M10077
Turbidity Meter:	Model MicroTPW	Serial No.	20110617
Water Level Meter:	WLM - 07.05.2017		
Pump:	SS Mega - Monsoon Pro		
Bailer:	NA		

Work Plan Criteria

+55 gallons that were added during drilling

Min purge volume (3 well volumes) 51 total gal

Max purge volume (10 well volumes) 170 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10-24-19

Well ID: 19PS-MW02A

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1105	6.36	0	NA						Begin to surge well with surge block
1115	NA	0	"	"	"	"	"		Begin surging Bottom 5ft of screen
1141	6.51	3 gal	2.0	7.46	357.6	OR	165.6	2.30	1.8 L/min start Pump
1203	6.76	20 gal	2.1	7.55	340.7	OR	152.4	1.50	"
1226	6.58	44 gal	2.2	7.47	334.0	428.7	85.1	1.65	3.2 L/min
1240	6.55	60 gal	2.0	7.46	334.4	87.17	83.1	2.01	
1256	6.56	80 gal	2.0	7.40	333.6	76.34	85.1	2.60	
1320	NA	100 gal							Begin surging screen.
1338	6.58	103 gal	2.2	7.37	337.0	789.0	75.6	2.44	Start purging again w/ pump
1401	6.46	123 gal	2.2	7.46	333.2	124.5	58.-	1.05	clearing but cloudy.
1430	6.50	140 gal	2.8	7.51	335.8	68.2	57.9	1.87	
10-25-19 1317	6.55	142 gal	4.5	7.64	341.4	504.2	209.6	4.89	
1333	6.53	160 gal	2.1	7.53	345.1	27.14	179.6	1.81	
1336	6.57	163 gal	2.1	7.55	342.6	5.62	165.9	2.15	
1340	6.54	185 gal	2.0	7.55	341.9	1.97	160.2	2.20	
1345	6.55	200 gal	2.0	7.55	341.6	1.05	159.9	2.43	

Additional Comments: 4 gallon Buckets Removed: 𝍸 𝍸 𝍸

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 19PS-MW02B

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10.26.19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10.27.19
Source Area:	Chena River Flood Channel Well Cluster #2	Field Personnel:	Ryan W., Nicole S.

☑ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 8"
Depth to Water (DTW) (ft btoc):	6.35' @	Total Depth (TD) (ft btoc):	112.9 (2.5ft stick up, 0.2ft endcap)
Screen Interval (ft):	~~100.2 – 110.2~~ 101.75-111.75	Saturated Screen Interval (ft):	10ft
Water Column in Well (ft):	$WC_w = TD - DTW$	112.9 - 6.35 = 106.55	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	$2^2 \times 0.04079 \times 106.55 = 17.38$	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$	$(8^2-2^2) \times 0.01224 \times 10 = 7.34$	
Total Well Volume (gal):	$V_w + V_{FP} = V_T$	17.38 + 7.34 = 24.72 ≈ 25 gal	

d_w=well diameter (inches) d_b= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method Surge Block Purge Method Submersible Pump

Field Testing Equipment

Water Quality Meter:	Model YSI Pro 556	Serial No.	16M100077
Turbidity Meter:	Model MicroTPW	Serial No.	20110170
Water Level Meter:	WLM-07.052017		
Pump:	SS Mega-Monsoon Pro S/N 24776		
Bailer:	NA		

Work Plan Criteria Added 100 gal during drilling

Min purge volume (3 well volumes) 75 total gal
Max purge volume (10 well volumes) 250 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10-26-19

Well ID: 19PS-MW02B

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
0910	6.35	0						RU	Start to Surge, Top 5' of screen
0920	NA	0						RU	Surge Bottom 5' of screen
0947	7.47	2 gal	2.4	7.70	345.0	OR	108.9	3.12	5 L/m pumping
0958	7.52	30 gal	2.3	7.68	334.0	805.8	-13.5	1.71	Moving pump along screen
1010	8.30	40 gal	2.3	7.57	325.5	162.2	-4.8	1.53	Set pump @ mid-screen
1021	8.31	55 gal	2.3	7.54	324.9	9.42	-26.3	1.70	
1030	8.31	65 gal	2.4	7.53	324.4	6.68	-19.5	1.67	
1040	8.31	85 gal	2.4	7.53	323.2	3.66	-15.5	1.16	
1050	8.31	105 gal	2.4	7.52	323.2	2.59	-11.0	1.45	
1100	8.31	125 gal	2.4	7.52	323.3	2.23	-11.2	1.43	
~~1105~~ 1110	8.31	145 gal	2.4	7.51	322.8	1.24	-8.7	1.56	
1120	8.39	165 gal	2.4	7.51	322.6	1.52	-7.7	1.16	
1130	8.40	185 gal	2.3	7.51	322.6	0.81	-5.5	1.50	

Additional Comments:

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20PS-MW01C

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	05/30/2020 @ 1252
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	05/30/2020 @ 1555
Source Area:	Chena Flood Channel WL#1	Field Personnel:	H. Peterson, S. Newman N. Stecklein

☑ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.): (2") 4" Other ____		Borehole Dia (in.): 4.25" 6.25" Other 3.75"	
Depth to Water (DTW) (ft btoc):	3.19	Total Depth (TD) (ft btoc):	160.50 + 2.5 = 163
Screen Interval (ft):	150.3 - 160.3 = (10)	Saturated Screen Interval (ft):	150.3 - 160.3 = (10)
Water Column in Well (ft): $WC_w = TD - DTW$	163 - 3.19 = (159.81)		
Volume in Well (gal): $V_w = d_w^2 \times 0.04079 \times WC_w$	$2^2 \times 0.04079 \times 159.81 =$ (26.07)		
Volume in Filter Pack (gal): $V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$	$(3.75^2 - 2^2) \times 0.01224 \times 10 =$ (1.23)		
Total Well Volume (gal): $V_w + V_{FP} = V_T$	26.07 + 1.23 = (27.30)		

d_w=well diameter (inches) d_b= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method Surge Block Purge Method SS Mega Monsoon Pro Pump

Field Testing Equipment

Water Quality Meter:	Model YSI 556 MPS	Serial No.	15H102751
Turbidity Meter:	Model Micro TPW #20000	Serial No.	20160525
Water Level Meter:	WLM-07.052107		
Pump:	SS Mega Monsoon Pro Pump		
Bailer:	N/A		

Work Plan Criteria

Min purge volume (3 well volumes) 81.90 total gal + 100 = 181.90

Max purge volume (10 well volumes) 273 total gal + 100 = 373

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

* water added during drilling = 100 gal → this will be added to minimum + maximum purge volumes

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: 20PS-MW01C

Date: 05/31/2020

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1330	3.53	10	10.63	6.49	297	393.1	-63.8	18.13	
1340	3.50	25	7.98	6.77	281	375.5	-74.8	7.86	
1350	3.50	40	7.47	6.87	285	371.7	-95.8	6.09	
1400	3.47	55	7.41	6.87	274	295.8	-82.0	5.05	
1410	3.47	70	6.97	6.87	275	248.7	-83.4	5.06	
1420	3.45	85	7.36	6.86	277	238.1	-69.3	5.74	
1430	3.49	95	8.52	6.85	283	146.3	-62.7	4.68	
1440	3.62	110	8.01	6.87	276	51.56	-59.4	4.38	
1450	3.62	125	7.71	6.88	280	33.71	-66.7	3.87	
1500	3.60	135	8.52	6.86	278	20.64	-60.4	3.88	
1510	3.59	150	7.90	6.90	278	16.11	-55.7	5.05	~~Cup was in sun~~ SN
1520	3.59	165	11.68	6.89	278	15.36	-31.2	4.80	Cup was in sun
1530	3.46	180	14.65	6.87	276	16.91	-29.2	4.46	Cup was in sun
1540	3.46	195	6.85	6.93	272	4.76	-44.4	3.66	
1545	3.46	~~200~~ SN 205	6.64	6.97	269	8.23	-49.7	3.38	
1550	3.46	215	5.93	6.93	270	6.76	-46.0	3.86	

Additional Comments:

30 May 2020

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20PS-MW01D

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	5/29/20 @ ~~1055~~ 1340
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	5/29/20 @ ~~1810~~ 1725
Source Area:	Chena Flood Channel Well Cluster #1	Field Personnel:	Nicole Stocklein, Hallie Peterson, Stephen Newman

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 3.75
Depth to Water (DTW) (ft btoc):	3.24	Total Depth (TD) (ft btoc):	212.03
Screen Interval (ft):	10	Saturated Screen Interval (ft):	10
Water Column in Well (ft):	$WC_w = TD - DTW$ = 208.79 ft		
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$ = 34.07 ~~ft³~~ gal		
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$ = 1.23 ~~ft³~~ gal		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$ = ~~34.30 ft³~~ 35.30 gal		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method Surge block Purge Method SS Mega Monsoon Pro Pump

Field Testing Equipment

Water Quality Meter:	Model YSI 556 MPS	Serial No.	15H102751
Turbidity Meter:	Model Micro TPW #20000	Serial No.	20160525
Water Level Meter:	WLM-07.052107		
Pump:	~~6" submersible~~ SS Mega Monsoon Pro Pump		
Bailer:	N/A		

Work Plan Criteria

Min purge volume (3 well volumes) 105.9 total gal +150 = 255.9

Max purge volume (10 well volumes) 353.0 total gal +150 = 503.0

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

Note: water added during drilling ~150 gal

SUNDANCE-EA II, LLC

1214 Pump proved not to work - going to pick up SS Pro Mega Monsoon and resume development then.

Well Development Record

Purging Data

Date: 5/29/20

Well ID: 20PS-MW01D

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH ✓	Specific Conductivity (µS/cm) ✓	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1420	3.51	15	10.46	6.52	323	658.5	-356.5	9.57	
1425	3.51	25	8.62	6.73	304	456.4	-303.0	6.29	
1435	3.50	40	7.64	7.01	299	184.1	-158.4	9.12	
1445	3.50	50	9.27	6.96	309	74.91	-207.1	6.40	
1455	3.50	60	9.21	6.95	298	44.06	-181.8	4.78	
1505	3.50	75	9.46	6.91	299	21.68	-145.2	4.16	
1515	3.50	85	8.16	6.99	295	16.64	-143.8	7.01	
1525	3.50	105	8.41	6.96	290	14.57	-123.5	4.46	
1535	3.50	115	8.75	6.95	293	11.64	-106.7	4.54	
1545	3.50	135	8.40	6.94	290	10.38	-95.2	4.03	
1555	3.50	145	9.83	6.95	292	8.98	-91.0	4.02	
1605	3.50	155	7.96	6.97	289	8.95	-94.1	3.62	
1615	3.57	165	8.39	6.96	289	8.62	-75.3	3.57	
1625	3.57	175	9.47	6.95	289	17.72	-70.6	3.74	
1635	3.56	200	8.12	6.97	284	14.16	-70.9	3.65	
1645	3.54	215	7.94	6.97	284	13.65	-68.1	3.34	
1655	3.47	225	7.68	6.97	286	45.63	-85.5	3.56	
1705	3.46	235	7.59	6.98	281	10.01	-80.6	2.91	
1715	3.47	245	7.20	7.01	278	8.81	-79.9	2.98	
1720	3.47	255	7.35	7.01	278	6.44	-81.7	2.92	
1725	3.46	265	6.80	7.01	280	5.84	-77.1	3.06	

Additional Comments:

05/29/2020

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20PS-MW02C

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	5/20/2020 @ 1210
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	5/20/2020
Source Area:	Chena Flood Channel, Well Cluster #2	Field Personnel:	N. Stoeckle H. Peterson

0925

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 3.75"
Depth to Water (DTW) (ft btoc):	4.47'	Total Depth (TD) (ft btoc):	164.37'
Screen Interval (ft):	151-161' bgs.	Saturated Screen Interval (ft):	151-161' bgs.
Water Column in Well (ft):	$WC_w = TD - DTW$	159.90'	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	4 x 0.04079 x 159.90 =	26.09 = V_w
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$	(3.75² - 4) x 0.01224 x 10 =	10.06 x 0.01224 x10 = 1.23 = V_{FP}
Total Well Volume (gal):	$V_w + V_{FP} = V_T$	26.09 + 1.23 =	27.32 V_T

d_w=well diameter (inches) d_b= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) V_T=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method Surge block / SS mega^pro Monsoon^pro Pump Purge Method SS mega^pro Monsoon^pro Pump

Field Testing Equipment

Water Quality Meter:	Model YSI ProPS SSC6	Serial No.	15H102751
Turbidity Meter:	Model MicroTPW @	Serial No.	20160552S
Water Level Meter:	WLM	SN#: ~~MT~~ WLM-07.052107	
Pump:	SS Monsoon		
Bailer:	SS Monsoon Pump		

Work Plan Criteria

Min purge volume (3 well volumes) 81.96 total gal
Max purge volume (10 well volumes) 273.20 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

181.96 min.
~100 gal. of water was added to the hole. We purge out in addition to above or 3 readings
When readings stabilize, >10 NTU turbidity

3 readings < 10 NTU!

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: 20PS-MW02C

Date: 5/20/2020

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1313	~~4.90~~	23	5.75	5.87	299	425.9	-51.7	153.05	
1320	~~4.92~~	30	5.36	6.51	293	744.9	-29.5	31.46	
1325	~~4.91~~	35	4.56	6.71	290	270.5	-16.5	30.09	
1330	~~4.91~~	45	4.30	7.03	285	143.9	-228.3	16.55	
1335	4.88	55	4.28	7.19	307	416.3	-34.9	15.40	
1340	4.88	60	4.04	7.25	285	81.65	-216.8	94.7	
1345	4.88	70	4.41	7.23	284	77.89	-212.8	12.00	
1350	4.88	78	4.43	7.28	281	159.3	-172.8	10.04	
1355	4.88	87	4.70	7.31	282	59.65	-232.2	~~4.68~~ 8.26	
1400	4.88	95	4.72	7.30	279	50.72	-227.0	8.04	
~~1405~~ 1407	4.88	105	3.72	7.33	284	58.88	-209.9	~~8.~~ 7.88	
1412	4.88	115	3.99	7.31	286	48.42	-196.3	7.47	
1417	4.88	123	4.25	7.33	282	33.26	-217.8	6.68	
1423	4.88	130	3.77	7.35	289	29.56	-210.4	6.74	
1430	4.89	140	3.88	7.36	285	14.14	-197.0	12.74	
1435	4.89	150	3.62	7.34	288	15.21	-155.0	6.17	
1440	4.89	155	3.70	7.36	289	9.18	-202.4	5.68	
1445	4.89	165	3.70	7.35	289	7.91	-197.5	6.04	
1450	4.89	176	3.80	7.37	290	9.01	-187.5	6.59	
1455	4.88	183	3.60	7.35	289	6.02	-80.9	5.39	
1500	4.88	190	3.60	7.36	287	6.42	-180.6	6.21	

Additional Comments:

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20PS-MW02D

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	5/23/2020 @ 0820
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	5/23/2020 @ 1140
Source Area:	Chena Flood Channel, Well Cluster #2	Field Personnel:	N. Stocklein, H. Peterson

☑ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 3.75"
Depth to Water (DTW) (ft btoc):	4.43	Total Depth (TD) (ft btoc):	212.80
Screen Interval (ft):	199.8 - 209.8 ft bgs = 10	Saturated Screen Interval (ft):	199.8 - 209.8 ft bgs = 10
Water Column in Well (ft):	$WC_w = TD - DTW$	212.80 - 4.43 =	208.37
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	$(2)^2 \times 0.04079 \times 208.37$ =	33.99
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$	$(3.75^2 - 2^2) \times 0.01224 \times 10$ =	1.23
Total Well Volume (gal):	$V_w + V_{FP} = V_T$	33.99 + 1.23 =	35.22

d_w=well diameter (inches) d_b= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method Surge Block/SS Mega Monsoon Pro Pump Purge Method SS Mega Monsoon Pro Pump

Field Testing Equipment

Water Quality Meter:	Model YSI MPS 556	Serial No.	15H102751
Turbidity Meter:	Model Micro TPW	Serial No.	20160552S
Water Level Meter:	WLM	SN#	WLM-07, 052107
Pump:	SS Monsoon		
Bailer:	SS Monsoon Pump		

Work Plan Criteria

Min purge volume (3 well volumes) 105.66 total gal
Max purge volume (10 well volumes) 352.20 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

~ 100 gals of water used during deep well installation, therefore min amt purged = 205.66 gals

Form Version: December 2018

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 05/23/2020

Well ID: 20PS-MW02D

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH ✓	Specific Conductivity (µS/cm) ✓	Turbidity (NTU) ✓	ORP (mV)	DO (mg/L)	Comments
0915	8.81	20	5.89	7.03	275	602.6	-175.8	11.77	
0920	9.31	30	5.46	7.22	268	612.6	-134.0	7.18	
0925	9.41	40	4.86	7.27	272	516.8	-130.4	8.14	
~~0930~~ 0935	10.14	50	5.47	7.30	262	535.5	-131.2	6.18	
0940	11.01	60	4.47	7.26	261	346.1	-86.2	7.81	
0945	11.28	65	5.09	7.29	260	283.1	-103.7	6.24	
0950	12.05	70	5.34	7.29	261	364.8	-103.6	5.81	
0955	12.33	80	5.35	7.29	260	200.0	-97.7	5.51	
1000	12.79	85	5.85	7.31	257	137.1	-98.4	5.02	
1005	11.72	90	5.21	7.29	259	115.1	-94.9	5.12	
1010	12.09	95	5.34	7.29	259	90.47	-93.1	4.94	
1015	12.56	100	5.33	7.32	260	46.80	-93.2	5.27	
1020	13.15	105	6.65	7.31	253	7.78	-83.5	4.60	
1025	12.22	110	5.74	7.33	254	33.54	-90.2	4.83	
1030	12.46	115	5.67	7.33	255	18.89	-89.8	5.18	
1035	12.37	125	5.48	7.33	256	10.39	-85.9	4.69	
1040	12.37	135	4.86	7.34	259	5.32	-77.6	4.77	
1045	13.41	145	5.56	7.35	256	6.97	-83.3	4.60	
1050	13.49	150	5.59	7.34	255	6.36	-77.9	4.81	
1055	13.74	160	4.78	7.34	258	8.70	-73.7	5.15	
1100	13.71	175	5.07	7.35	256	7.55	-70.5	5.29	
1105	13.99	185	5.10	7.35	257	8.01	-74.6	4.95	
1110	14.03	195	4.88	7.35	260	9.50	-83.1	4.22	
1115	14.01	200	4.58	7.36	260	6.89	-76.7	4.92	

(120gal)

Additional Comments:

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 05/23/2020

Well ID: 20PS-MW02D

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C) ✓	pH ✓	Specific Conductivity (µS/cm) ✓	Turbidity (NTU) ✓	ORP (mV)	DO (mg/L)	Comments
1120	13.79	205	5.39	7.37	253	9.03	-69.8	4.46	
1125	14.12	215	5.07	7.35	255	9.65	-83.2	3.34	
1130	14.27	225	5.21	7.36	259	7.83	-86.8	4.00	
1135	14.71	235	4.91	7.36	257	7.80	-84.2	4.14	

Additional Comments:

HP 5/23/2020

SUNDANCE-EA II, LLC

Well Development Record

Well ID: MW01

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9-22-2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9-22-2020
Source Area:	MC	Field Personnel:	J. PARSON, G. KORNOUSK, GEOTEK AK

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" (6.25") Other____
Depth to Water (DTW) (ft btoc):	8.61	Total Depth (TD) (ft btoc):	16.61
Screen Interval (ft):	3-13	Saturated Screen Interval (ft):	8 ft.
Water Column in Well (ft):	$WC_w = TD - DTW$	8.00	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	= 1.31	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method SURGE BLOCK Purge Method MEGA MONSOON PUMP

Field Testing Equipment

Water Quality Meter:	Model YSI 556 MPS	Serial No.	09G101665
Turbidity Meter:	Model HF SCIENTIFIC MICRO TPI	Serial No.	20170123
Water Level Meter:	SOLINST 102		
Pump:	MEGA MONSOON		
Bailer:			

Work Plan Criteria

Min purge volume (3 well volumes) 3.92 total gal
Max purge volume (10 well volumes) 13.1 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 9-22-2020

Well ID: MW01

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
0944	X	X 0							START PURGING
0948	9	3	4.14	6.13	258	725	14.6	7.50	
0953	9	5	3.98	3.37	248	311	81.7	0.33	
0958	9	7	3.99	3.88	247	247	49.9	0.27	
1003	9	9	3.98	4.54	245	123.7	2.0	0.14	
1008	9	11	3.99	4.96	245	120.9	0	0.19	
1013	9	13	3.99	5.20	244	62.88	0	0.16	
1014	9	13.1	3.99	5.36	244	43.75	0	0.17	10 VOLUMES
									DEVELOPMENT COMPLETE

Additional Comments:

SUNDANCE-EA II, LLC

Well Development Record

Well ID: MW-03

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9-22-2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9-22-2020
Source Area:	MC	Field Personnel:	J. PARSON, G. KORNOWSKE

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" (6.25") Other ____
Depth to Water (DTW) (ft btoc):	4.33	Total Depth (TD) (ft btoc):	16.1
Screen Interval (ft):	3-13 ft.	Saturated Screen Interval (ft):	10
Water Column in Well (ft):	$WC_w = TD - DTW$	11.56	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	~~0.41~~ 1.88	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method SURGE BLOCK Purge Method MEGA MONSOON PUMP

Field Testing Equipment

Water Quality Meter:	Model YSI 556 MPS	Serial No.	09G101665
Turbidity Meter:	Model HF SCIENTIFIC MICRO TPI	Serial No.	20170623
Water Level Meter:	SOLINST 102		
Pump:	MEGA MONSOON		
Bailer:			

Work Plan Criteria

Min purge volume (3 well volumes) 5.66 total gal

Max purge volume (10 well volumes) 18.86 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 9-22-2020

Well ID: MW-03

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1059	4.1	X	X	X					
1105	4.1	2.5	5.37	6.92	190	235.3	−70.0	0.58	
1110	4.1	5	5.34	6.86	184	505.3	−125.	0.22	
1115	11	7.5	5.34	6.91	182	211.8	−141.6	0.17	
1120	11	10	5.34	6.94	182	141.6	−148.9	0.14	
1125	11	12.5	5.34	6.97	180	75.74	−154.3	0.13	
1130	11	15.0	5.36	6.99	180	49.68	−158.5	0.13	
1136	11	17.5	5.39	7.00	180	34.42	−162.0	0.08	
1140	11	20	5.34	7.02	180	29.83	−163.4	0.10	

Additional Comments:

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20PS – MW07

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9-20-2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9-20-2020
Source Area:		Field Personnel:	Travis H.

[X] Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 4.50
Depth to Water (DTW) (ft btoc):	10.26	Total Depth (TD) (ft btoc):	17.44
Screen Interval (ft):	≈ 7.4 - 17.4	Saturated Screen Interval (ft):	10.2 – 17.4
Water Column in Well (ft):	$WC_w = TD - DTW$	7.18 ft. water column	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	2" well = 0.163 gal/ft = 1.2 gal/well volume	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ (Purge Method) _____

Field Testing Equipment

Water Quality Meter:	Model YSI Pro Plus	Serial No.	0581
Turbidity Meter:	Model Micro TPW	Serial No.	20200837 7
Water Level Meter:	Solinst		
Pump:	Mega Monsoon		
Bailer:			

Work Plan Criteria

Min purge volume (3 well volumes) 3.5 total gal

Max purge volume (10 well volumes) 12 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 9-20-2020

Well ID: 20PS-MW07

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
0959	10.26	—	5.0	7.19	332.7	396.4	167.2	9.28	0.5 gal/min
1004	10.38	2.5	4.7	6.89	333.0	361.7	165.5	4.90	pump @ 2 ft from bottom of screen
1009	10.38	5.0	4.6	6.94	333.8	36.39	159.6	4.69	
1014	10.38	7.5	4.6	7.02	331.4	12.94	153.4	5.71	
1019	10.38	10.0	4.7	7.05	~~822.9~~	822.9	146.7	4.35	*Surge pump * at 1015
TM					TM 330.6				
1024	10.39	12.5	4.7	7.07	332.2	65.80	142.4	5.26	
1029	10.39	15.0	4.8	7.09	TM ~~1060.0~~ 332.5	1660.0	138.2	4.58	*Surge pump at 1025
1034	10.39	17.5	4.9	7.09	333.1	28.20	135.3	4.49	
1039	10.39	20.0	4.8	7.09	332.1	14.92	132.5	4.51	
1044	10.39	22.5	4.8	7.11	331.2	6.49	131.0	5.15	Development Complete.

Additional Comments: Mega Monsoon Pro. Purge flow rate approx 0.5 gal/min.

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20PS-MW08

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9-20-2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9-20-2020
Source Area:		Field Personnel:	TRAVIS H (EA)

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 4.50"
Depth to Water (DTW) (ft btoc):	8.96 ft.	Total Depth (TD) (ft btoc):	16.45 ft.
Screen Interval (ft):	≈ 6-16 ft.	Saturated Screen Interval (ft):	≈ 9-16 ft.
Water Column in Well (ft):	$WC_w = TD - DTW$	≈ 7.5 feet	2" = 0.163 gal/ft. · 7.5 ft. = 1.25 gal
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ (Purge Method) _____

Field Testing Equipment

Water Quality Meter:	*Model* YSI Pro Plus	*Serial No.*	0581
Turbidity Meter:	*Model* Micro TPW	*Serial No.*	202008377
Water Level Meter:	Solinst		
Pump:	Mega Monsoon Pro		
Bailer:			

Work Plan Criteria

Min purge volume (3 well volumes) 3.75 total gal
Max purge volume (10 well volumes) 12.50 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: 20PS-MW08

Date: 9-20-2020

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU) M	ORP (mV)	DO (mg/L)	Comments
~~1113~~ 1117	8.96	—	7.4	7.08	434.9	989.24	127.2	3.74	Flow rate ≈ 0.5 gal/min
TM ~~1118~~ 1122	9.12	2.5	7.2	7.08	403.0	954.2	93.2	4.02	
TM ~~1123~~ 1127	9.09	5.0	7.2	7.09	396.5	132.2	44.9	2.38	*Surge pump at 1128.
TM ~~1128~~ 1132	9.04	7.5	7.8	7.06	408.2	640.4	15.6	2.00	
TM ~~1133~~ 1137	9.04	10.0	7.7	7.06	409.2	111.1	9.2	2.40	
1142	9.04	12.5	7.7	7.05	411.8	18.83	6.2	1.90	*Surge pump at 1143
1147	9.04	15.0	7.9	7.02	427.3	911.7	10.5	1.97	
1152	9.10	17.5	7.2	6.98	411.5	2060.9	5.9	2.03	
1157	9.10	20.0	6.9	7.00	402.1	58.62	9.7	2.44	
~~1202~~ 1202	9.10	22.5	7.0	7.00	404.4	16.55	15.2	2.98	Development Complete

Additional Comments:

purge rate ≈ 0.5 gal/min.

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20PS-MW09

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9-20-2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9-20-2020
Source Area:		Field Personnel:	Travis H. (EA) Noah R. (EA)

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 4.50"
Depth to Water (DTW) (ft btoc):	12.30 ft.	Total Depth (TD) (ft btoc):	19.57 ft.
Screen Interval (ft):	~~19.57 ft.~~ ≈9.5-19.5	Saturated Screen Interval (ft):	12.3-19.5 ft.
Water Column in Well (ft):	$WC_w = TD - DTW$	7.2 feet @ 0.163 gal/ft. = 1.2 gal per volume	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ (Purge Method) _____

Field Testing Equipment

Water Quality Meter:	Model YSI Pro Plus	Serial No.	0581
Turbidity Meter:	Model Micro TPW	Serial No.	20200837 7
Water Level Meter:	Solinst		
Pump:	Mega Monsoon Pro		
Bailer:			

Work Plan Criteria

Min purge volume (3 well volumes) 3.6 total gal
Max purge volume (10 well volumes) 12.0 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: 20PS-MW09

Date: 9-20-2020

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1240	12.30	—	5.1	7.40	307.9	232.9	96.3	5.03	
1251	13.41	2.5	4.6	7.14	344.3	681.2	77.1	2.64	
1256	13.42	5.0	4.6	6.93	374.3	178.4	50.8	1.59	
1301	13.42	7.5	4.6	6.89	406.5	42.41	44.8	3.29	*Surge pump at 1302
1306	13.43	10.0	4.7	6.92	427.9	111.1	42.3	1.84	
1311	13.42	12.5	4.7	6.87	432.2	41.94	44.5	1.86	
1316	13.43	15.0	4.6	6.87	434.0	18.08	47.8	1.14	*Surge pump at 1317
1321	13.43	17.5	4.7	6.83	434.8	150.3	52.0	1.82	
1326	13.43	20.0	4.7	6.83	437.9	36.41	54.8	1.78	
1331	13.43	22.5	4.7	6.86	436.2	95.34	57.3	1.62	Development Complete

Additional Comments:

purge rate ≈ 0.5 gal/min

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20PS-MW10

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9-20-2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9-20-2020
Source Area:		Field Personnel:	Travis H. (EA) Noah R. (EA)

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 4.50"
Depth to Water (DTW) (ft btoc):	9.17 ft. from TOC	Total Depth (TD) (ft btoc):	16.27 ft. from TOC
Screen Interval (ft):	≈ 6-16 ft.	Saturated Screen Interval (ft):	≈ 9-16 ft.
Water Column in Well (ft):	$WC_w = TD - DTW$	7.1 ft. @ 0.163 gal/ft = 1.16 gal	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ (Purge Method) _____

Field Testing Equipment

Water Quality Meter:	Model YSI Pro Plus	Serial No.	0581
Turbidity Meter:	Model MicroTPW	Serial No.	20200837 7
Water Level Meter:	Solinst		
Pump:	Mega Monsoon Pro.		
Bailer:			

Work Plan Criteria

Min purge volume (3 well volumes) 3.5 total gal
Max purge volume (10 well volumes) 11.6 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: 20PS-MW10

Date: 9-20-2020

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1404	9.17	—	6.6	7.23	317.9	821.7	92.3	5.81	
1409	9.54	2.5	6.6	7.36	371.3	102.9	55.0	2.73	
1414	9.73	5.0	6.6	7.42	413.3	50.34	6.2	2.60	*Surge pump at 1415
1419	9.93	7.5	6.5	7.32	457.4	167.6	-9.7	3.12	
1424	9.96	10.0	6.4	7.25	501	46.93	-4.3	3.66	
1429	9.80	12.5	6.5	7.20	522	21.03	7.1	3.95	*Surge pump at 1430
1434	9.75	15.0	6.5	7.18	524	85.37	18.5	3.93	
1439	9.78	17.5	6.5	7.18	538	30.31	25.7	4.18	
1444	9.79	20.0	6.5	7.18	542	14.52	30.8	4.44	
1449	9.75	22.5	6.5	7.17	545	7.37	36.5	4.56	Development Complete.

Additional Comments: purge rate ≈ 0.5 gal/min.

SUNDANCE-EA II, LLC

Well Development Record

Well ID: MW11

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9-21-2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9-21-2020
Source Area:	MC	Field Personnel:	J. PARSON, G. KORNOWSKE, D. COOKSTON

☑ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" (6.25") Other ____
Depth to Water (DTW) (ft btoc):	6.89	Total Depth (TD) (ft btoc):	14.78
Screen Interval (ft):	10	Saturated Screen Interval (ft):	7.11
Water Column in Well (ft):	$WC_w = TD - DTW$	7.11	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	= 1.16	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$	0.729	
Total Well Volume (gal):	$V_w + V_{FP} = V_T$	1.9	

d_w=well diameter (inches) d_b= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method SURGE BLOCK Purge Method MEGA MONSOON PUMP

Field Testing Equipment

Water Quality Meter:	*Model* YSI 556 MPS	*Serial No.* 09E101665	
Turbidity Meter:	*Model* HF SCIENTIFIC MICRO TPI	*Serial No.* 20170613	
Water Level Meter:	SOLINST 102		
Pump:	MEGA MONSOON		
Bailer:			

Work Plan Criteria

Min purge volume (3 well volumes) ~~3.48~~ 3.48 total gal
Max purge volume (10 well volumes) ~~11.6~~ 11.6 total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 9-21-2020

Well ID: MW #1

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1641	7.05	0							START PURGING
1646	7.05	2	8.48	5.28	420	893	0.7	0.41	
1651	"	4	8.54	5.52	421	149.	-25.5	0.44	
1656	"	6	8.49	5.76	420	51.93	-50.8	0.32	
1701	"	8	8.47	6.01	420	33.4	-75.9	0.26	
1706	7.05	10	8.47	6.10	419	18.57	-87.3	0.26	
1711	7.05	11.6	8.48	6.27	420	13.01	-109.4	0.24	10 VOLUMES
									DEVELOPMENT COMPLETE

Additional Comments:

SUNDANCE-EA II, LLC

Well Development Record

Well ID: MW12

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9-21-2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9-21-2020
Source Area:	MC	Field Personnel:	J. PARSON, G. KORNOWSKE

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" (6.25") Other ____
Depth to Water (DTW) (ft btoc):	~~8.28~~ 8.42	Total Depth (TD) (ft btoc):	16.31
Screen Interval (ft):	10 ~~(3-13)~~	Saturated Screen Interval (ft):	~~8.31 - 13~~ 7.89
Water Column in Well (ft):	$WC_w = TD - DTW$	7.89	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	4.77 L → 1.26 GAL	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) d_b= borehole diameter (inches) WC_w= water column in well (feet) **SSI**=saturated screen interval (feet) V_T=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method SURGE BLOCK Purge Method MEGA MONSOON PUMP

Field Testing Equipment

Water Quality Meter:	Model YSI 556 MPS	Serial No.	09G101665
Turbidity Meter:	Model HF SCIENTIFIC MICROTPI	Serial No.	20170623
Water Level Meter:	SOLINST 102		
Pump:	MEGA MONSOON		
Bailer:			

Work Plan Criteria

Min purge volume (3 well volumes) 3.78 total gal
Max purge volume (10 well volumes) 12.6 total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 9-21-20

Well ID: MW12

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove ~~GAL~~ ~~Bbls~~ ~~%~~	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1504	8.5	0	X	X	X	X	X	X	START PURGING
1510	8.5	~~3~~ 1	7.67	6.05	165	681	0	8.42	
1515	8.5	~~5~~ 4	7.2	6.65	305	641	0	1.06	
1520	8.5	~~8~~ 5	7.08	6.59	304	470	0	0.64	
1525	8.5	~~10~~ 6	7.08	4.11	304	206.3	12.0	0.26	
1528	8.5	7 ~~8~~	6.92	4.50	301	105.4	0	0.21	
1531	8.5	8	6.89	4.84	302	60.17	0	0.17	
1536	8.5	9	6.99	5.21	307	53.78	0	0.19	
1541	8.5	10	6.91	5.83	306	18.71	0	0.16	
1546	8.5	11	6.91	6.22	306	8.44	0	0.18	TURBIDITY X10
1551	8.5	12	6.94	6.48	307	6.76	0	0.19	
1554	8.5	12.6	6.93	6.59	308	4.77	0	0.19	10 VOLUMES, DEVELOPMENT COMPLETE

Additional Comments:

SUNDANCE-EA II, LLC

Well Development Record

Well ID: EOPS-MW13

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9/24/2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9/24/2020
Source Area:	CFC	Field Personnel:	D. Cookston, J. Parson, G. Kornowske

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 4.5
Depth to Water (DTW) (ft btoc):	11.20	Total Depth (TD) (ft btoc):	18.00
Screen Interval (ft):	5-15	Saturated Screen Interval (ft):	6.80
Water Column in Well (ft):	$WC_w = TD - DTW$	18.00 - 11.20 = 6.80	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	$(2^2) \times 0.04079 \times 6.80 = 1.109488$	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$	$(4.5^2 - 2^2) \times 0.01224 \times 6.80 = 1.35252$	
Total Well Volume (gal):	$V_w + V_{FP} = V_T$	1.11 + 1.35 = 2.46	2.46

d_w=well diameter (inches) d_b= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method Hand Purge Method ____

Field Testing Equipment

Water Quality Meter:	Model YSI 556	Serial No.	04F10639AB
Turbidity Meter:	Model MicroTPW	Serial No.	20110340
Water Level Meter:	Solinst		
Pump:	Mega Monsoon		
Bailer:	N/A		

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal

Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: 20PS - MW13

Date:

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1735	11.20	0	3.20	5.33	271	474.5	152.5	11.95	
1740									Missed Collection
1745	13.52	5	3.19	5.02	272	143.5	-126.8	11.33	
1750	13.52	7	3.19	5.02	274	40.59	-122.5	11.24	
1755	13.58	8	3.19	5.23	277	14.41	-129.2	10.71	
1800	13.56	10	3.20	5.52	278	10.85	-140.6	10.08	
1805	13.61	12	3.19	5.78	278	5.99	-151.9	9.61	

Additional Comments:

SUNDANCE-EA II, LLC

Well Development Record

Well ID: MW14

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9-22-2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9-22-2020
Source Area:	MC	Field Personnel:	J. PARSON, G. KORNOWSKE

☑ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" (6.25") Other ____
Depth to Water (DTW) (ft btoc):	6.52	Total Depth (TD) (ft btoc):	16.42
Screen Interval (ft):	3-13	Saturated Screen Interval (ft):	9.9
Water Column in Well (ft):	$WC_w = TD - DTW$	9.9	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w =$	1.615	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method SURGE BLOCK Purge Method MEGA MONSOON PUMP

Field Testing Equipment

Water Quality Meter:	Model YSI 556 MPS	Serial No.	09G101665
Turbidity Meter:	Model HF SCIENTIFIC MICRO TPI	Serial No.	20170612 3
Water Level Meter:	SOLINST 102		
Pump:	MEGA MONSOON		
Bailer:			

Work Plan Criteria

Min purge volume (3 well volumes) 4.85 total gal
Max purge volume (10 well volumes) 16.15 total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 9-22-2020

Well ID: MW-14

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1252	6.65	—	—	—	—	—	—	—	
1258	"	3	7.93	6.72	462	599.2	-113.5	0.84	
1303	"	5.5	7.86	6.49	491	98.73	-143.4	0.36	
1308	"	8	7.86	6.13	514	24.65	-136.0	0.37	
1313	"	10.5	7.86	6.34	525	11.71	-149.9	0.29	
1318	"	13	7.88	6.49	529	9.18	-152.6	0.24	
1323	"	15.5	7.90	6.59	540	5.59	-160.7	0.23	
1326	"	16.5	7.94	6.60	540	5.36	-160.9	0.25	Shut off

Additional Comments:

SUNDANCE-EA II, LLC

Well Development Record

Well ID: MW-15

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9/24/2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9/24/2020
Source Area:	CFC	Field Personnel:	D. Cookston, J. Parson, G. Kornowske

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.): (2") 4" Other ____		Borehole Dia (in.): 4.25" 6.25" Other 4.50	
Depth to Water (DTW) (ft btoc):	12.51	Total Depth (TD) (ft btoc):	18.30
Screen Interval (ft): ~~to~~ 5-15		Saturated Screen Interval (ft):	2.49
Water Column in Well (ft): $WC_w = TD - DTW$	18.30 - 12.51		
Volume in Well (gal): $V_w = d_w^2 \times 0.04079 \times WC_w$	5.79		
Volume in Filter Pack (gal): $V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$	$(4.5^2 - 2^2) \times 0.01224 \times 2.49 = 0.495261$		
Total Well Volume (gal): $V_w + V_{FP} = V_T$	5.79 + 0.495261 = 6.285		

d_w=well diameter (inches) d_b= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$ 2.47

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ Purge Method _____

Field Testing Equipment

Water Quality Meter:	Model YSI 556	Serial No.	04F10639AD
Turbidity Meter:	Model MicroTPW	Serial No.	201103409
Water Level Meter:	Solinst		
Pump:	Mega Monsoon		
Bailer:	N/A		

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: MW-15

Date:

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
~~1524~~	12.48	0	7.04	7.88	1	>Limit	115.7	15.51	pc
1536	12.63	0	6.83	8.01	209	126.9	30.2	8.84	
1541	13.84	2	7.32	8.01	229	609.3	-112.3	2.46	
1546	14.08	3	7.31	7.28	217	629.2	-255.4	1.41	
1551	14.12	4	7.32	7.08	216	176.1	-262.4	1.21	
1556	14.12	5	7.33	6.92	215	99.94	-262.3	1.10	
1601	14.13	6	7.30	6.83	212	78.03	-267.6	1.02	
1606	14.14	7	7.31	6.78	211	55.11	-260.4	0.94	
1611	14.10	8	7.34	6.75	210	57.56	-241.3	0.88	
1616	14.13	10	7.33	6.74	210	49.24	-238.9	0.84	
1621	14.24	12	7.32	6.72	209	51.60	-233.0	0.86	
1626	13.74	13	7.29	6.73	206	54.30	-233.4	1.27	
1631	13.64	14	7.36	6.70	212	50.92	-226.4	0.89	
1636	13.66	15	7.34	6.68	214	42.40	-226.5	0.77	
1641	13.67	16	7.35	6.67	214	38.19	-215.1	0.73	
1646	14.12	17	7.35	6.67	216	31.91	-210.5	0.76	
1651	14.97	18	7.35	6.67	208	51.71	-210.0	0.84	
1656	15.23	20	7.33	6.77	194	50.33	-244.2	0.58	
1701	15.21	23	7.33	6.77	196	51.39	-218.5	0.68	
1706	15.21	25	7.32	6.75	197	32.29	-191.7	0.78	

Additional Comments:

Turbidity remained consistent around 50 NTU. ~~close to pump well dry~~ pc

SUNDANCE-EA II, LLC

Well Development Record

Well ID: MW-17

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9/24/2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9/24/2020
Source Area:	CFC	Field Personnel:	J. Coolston, T. Parson, G. Kornowske

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.): (2") 4" Other ____		Borehole Dia (in.): 4.25" 6.25" Other 4.50	
Depth to Water (DTW) (ft btoc):	3.81	Total Depth (TD) (ft btoc):	15.62
Screen Interval (ft):	10 ft.	Saturated Screen Interval (ft):	10
Water Column in Well (ft): $WC_w = TD - DTW$	11.81		
Volume in Well (gal): $V_w = d_w^2 \times 0.04079 \times WC_w$	$(2)^2 \times 0.04079 \times 11.81 =$	1.93	
Volume in Filter Pack (gal): $V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$	$(4.5^2 - 2^2) \times 0.01224 \times 10 =$	1.989	
Total Well Volume (gal): $V_w + V_{FP} = V_T$	1.93 + 1.99 = 3.92		

d_w=well diameter (inches) d_b= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ Purge Method _____

Field Testing Equipment

Water Quality Meter:	Model YSI 556	Serial No.	04F10639AD
Turbidity Meter:	Model MicroTPW	Serial No.	20110340 9
Water Level Meter:	Solinst		
Pump:	Monsoon Pro Active		
Bailer:	NA		

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal

Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date:

Well ID: MW-17

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1323	3.96	0	4.02	6.79	~~0.358~~ 208	22.5	-11.9	3.13	
1328	3.93	1	3.68	5.27	205	219.2	-62.7	2.32	
1333	3.93	3	3.63	4.93	202	86.61	-116.2	0.20	
1338	3.93	7	3.59	5.12	202	41.56	-205.2	0.0	
1343	3.93	9	3.57	5.48	201	27.02	-291.4	0.11	
1348	3.93	11	3.58	5.74	201	12.96	-335.6	0.12	
1353	3.93	13	3.59	5.94	201	8.84	-361.0	0.11	
1358	3.93	15	3.57	6.9	201	7.38	-384.5	0.12	
1403	3.93	17	3.58	6.34	201	6.43	-399.5	0.12	
1408	3.93	19	3.57	6.42	201	6.42	-404.0	0.11	
1413	3.93	21	3.56	6.57	201	6.52	-411.6	0.12	
1418	3.93	23	3.57	6.76	200	6.45	-418.8	0.14	

Additional Comments:

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20PS-MW18

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9-22-2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9-22-2020
Source Area:		Field Personnel:	Noah R. Dave C.

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 4.52"
Depth to Water (DTW) (ft btoc):	10.24 ft.	Total Depth (TD) (ft btoc):	16.97 ft.
Screen Interval (ft):	≈ 6.5-16.5	Saturated Screen Interval (ft):	≈ 10-17 ft.
Water Column in Well (ft):	$WC_w = TD - DTW$	6.73 ft. @ 0.163 gal/ft. = 1.1 gal per volume	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	1.1 gal	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ Purge Method _____

Field Testing Equipment

Water Quality Meter:	Model YSI Pro Plus	Serial No.	0581
Turbidity Meter:	Model MicroTPW	Serial No.	20200837 7
Water Level Meter:	Solinst		
Pump:	Mega Monsoon Pro.		
Bailer:			

Work Plan Criteria

Min purge volume (3 well volumes) 3.3 total gal

Max purge volume (10 well volumes) 11.0 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 9-22-2020

Well ID: 20PS-MW18

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
0949	10.24	—	4.0	6.81	277.6	313.3	185.5	10.83	
0954	10.47	2.5	4.1	6.52	295.5	300.4	175.6	3.64	*Surge pump at 0957
0959	10.48	5.0	4.5	6.50	299.0	491.0	170.2	1.34	
1004	10.47	7.5	4.2	6.52	297.8	61.86	170.5	4.54	
1009	10.47	10.0	4.2	6.60	296.6	18.23	164.7	4.23	
1014	10.47	12.5	4.2	6.63	299.1	8.98	162.6	2.79	
1019	10.47	15.0	4.2	6.68	301.1	5.63	159.5	3.48	Development Complete

Additional Comments:

purge flow rate ≈ 0.5 gal/min

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20PS-MW19

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9-22-2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9-22-2020
Source Area:		Field Personnel:	Travis H.
			Noah R.
			Dave C.

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 4.5"
Depth to Water (DTW) (ft btoc):	9.31 ft.	Total Depth (TD) (ft btoc):	16.5
Screen Interval (ft):	≈ 6.5-16.5	Saturated Screen Interval (ft):	≈ 9.3-16.5
Water Column in Well (ft):	$WC_w = TD - DTW$	7.2 ft. @ 0.163 gal/ft. =	≈ 1.2 gal
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	1.2 gal / well volume	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ (Purge Method) _____

Field Testing Equipment

Water Quality Meter:	Model YSI Pro Plus	Serial No.	0581
Turbidity Meter:	Model Micro TPW	Serial No.	20200837 7
Water Level Meter:	Solinst		
Pump:	Mega Monsoon Pro		
Bailer:			

Work Plan Criteria

Min purge volume (3 well volumes) 3-6 total gal

Max purge volume (10 well volumes) 12 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: 20PS-MW19

Date: 9-22-2020

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1145	9.31	—	3.6	7.43	413.9	1042	166.1	7.24	
1150	9.39	2.5	3.7	7.06	418.4	152.6	167.2	1.40	
1155	9.44	5.0	3.4	7.01	349.8	79.7	162.9	3.29	
1200	9.42	7.5	3.3	6.97	343.3	39.27	162.3	3.72	
1205	9.40	10.0	3.3	6.93	343.4	17.28	160.8	3.06	
1210	9.40	12.5	3.4	6.89	343.8	11.91	158.2	3.21	
1215	9.41	15.0	3.4	6.91	343.3	9.17	159.6	3.08	Development Complete

Additional Comments:

Development purge rate ≈ 0.5 gal/min.

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20PS-MW20

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9-22-2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9-22-2020
Source Area:		Field Personnel:	Travis H. Dave C. Noah R.

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 4.50"
Depth to Water (DTW) (ft btoc):	9.46'	Total Depth (TD) (ft btoc):	16.92'
Screen Interval (ft):	≈6.5-16.5	Saturated Screen Interval (ft):	~~≈6.5~~ ≈9.5-16.5 ft.
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	7.46 ft. @ 0.163 gal/ft. = 1.2 gal/volume	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ (Purge Method) _____

Field Testing Equipment

Water Quality Meter:	Model YSI Pro Plus	Serial No.	0581
Turbidity Meter:	Model MicroTPW	Serial No.	20208377
Water Level Meter:	Solinst		
Pump:	Mega Monsoon Pro		
Bailer:			

Work Plan Criteria

Min purge volume (3 well volumes) 3.6 total gal

Max purge volume (10 well volumes) 12 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 9-22-2020

Well ID: 20PS-MW20

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1048	9.46	—	5.0	7.03	403.3	279.2	165.0	3.13	
1053	11.84	2.5	4.7	6.99	399.4	773.4	162.0	3.04	
1058	13.52	5.0	4.8	7.01	399.0	155.9	161.6	5.31	
1103	13.07	7.5	4.9	7.02	399.2	16.29	161.4	4.30	
1108	12.89	10.0	4.9	7.04	401.9	3.41	160.9	4.30	
1113	13.04	12.5	4.9	7.06	403.7	5.70	160.6	4.48	
1118	13.36	15.0	4.8	7.05	402.9	9.69	161.1	4.32	Development complete

Additional Comments: purge development flow rate ≈ 0.5 gal/min

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20RS-MW23

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9/15/2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9/15/2020
Source Area:	CFC	Field Personnel:	D. Cookston

☐ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.): (2") 4" Other ____		Borehole Dia (in.): 4.25" 6.25" Other 4.50	
Depth to Water (DTW) (ft btoc):	7.73	Total Depth (TD) (ft btoc):	23.82
Screen Interval (ft):	10	Saturated Screen Interval (ft):	10.
Water Column in Well (ft): $WC_w = TD - DTW$	16.09		
Volume in Well (gal): $V_w = d_w^2 \times 0.04079 \times WC_w$	$2^2 \times 0.04079 \times 16.09 = 2.63$		
Volume in Filter Pack (gal): $V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$	$(4.50^2 - 2.^2) \times 0.01224 \times 4.35 = 0.86$		
Total Well Volume (gal): $V_w + V_{FP} = V_T$	$2.63 + 0.86 = 3.49$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$ 4.35

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ Purge Method _____

Field Testing Equipment

Water Quality Meter:	Model	YSI 556	Serial No.	04E1063AD	
Turbidity Meter:	Model	MicroTPW	Serial No.	20200837	
Water Level Meter:	Solinst				
Pump:	Mega Monsoon SS				
Bailer:					

Work Plan Criteria

Min purge volume (3 well volumes) 10.47 total gal
Max purge volume (10 well volumes) 34.9 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: DOPS-MW22

Date:

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1601	7.73	0	9.96	7.20	0.700	>Limit	-250.9	0.44	
1606	7.94	2	9.31	5.50	0.650	>Limit	-180.4	0.85	
1611	7.94	4	8.25	5.80	0.683	642.7	-245.3	1.71	
1616	7.94	6	8.57	5.77	0.701	575.2	-278.7	2.05	Pump was clogged. Made adjustm
1621	7.82	7	7.94	~~7.94~~ 6.59	0.707	359.2	-330.2	1.73	
1626	7.81	10	7.87	6.59	0.745	113.6	-332.0	1.51	
1631	7.81	12	7.68	6.40	0.742	76.36	-313.2	2.00	
1636	7.82	14	7.65	6.41	0.744	48.19	-317.0	1.43	
1641	7.80	16	7.96	6.59	0.744	31.82	-325.2	1.53	
1646	7.84	18	7.95	6.73	0.747	396.0	-330.5	1.69	
1651	7.84	20	7.89	6.80	0.753	40.61	-338.6	1.32	
1655	7.86	23	7.86	6.80	0.751	18.25	-327.4	1.66	
1701	7.87	25	7.62	6.81	0.746	11.46	-323.9	1.55	
1706	7.85	29	7.65	6.67	0.748	6.16	-301.7	1.52	
1711	7.86	32	7.48	6.72	0.747	5.92	-305.2	1.87	
1716	7.85	35	7.58	6.63	0.750	3.30	-286.4	2.27	

Additional Comments:

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20PS-MW23

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9-22-2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9-22-2020
Source Area:		Field Personnel:	Travis H. Noah R. Dave C.

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 4.5"
Depth to Water (DTW) (ft btoc):	3.60	Total Depth (TD) (ft btoc):	12.80
Screen Interval (ft):	≈ 2.5 – 12.5	Saturated Screen Interval (ft):	3.6 – 12.5 ft.
Water Column in Well (ft):	$WC_w = TD - DTW$	12.8 – 3.6 = 9.2 ft.	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	9.2 ft @ 0.163 gal/ft. = ≈ 1.5 gal per volume	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ (Purge Method) _____

Field Testing Equipment

Water Quality Meter:	*Model*	YSI Pro Plus	*Serial No.*	0581
Turbidity Meter:	*Model*	MicroTPW	*Serial No.*	20200837
Water Level Meter:	Solinst			
Pump:	Mega Monsoon Pro.			
Bailer:				

Work Plan Criteria

Min purge volume (3 well volumes) 4.5 total gal
Max purge volume (10 well volumes) 15 total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: 20PS-MW23

Date: 9-22-2020

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1313	3.60	—	14.8	7.25	292.9	330.1	152.5	1.48	
1318	3.70	2.5	15.1	7.15	288.2	603.9	141.1	1.75	
1323	3.67	5.0	15.2	7.13	289.4	194.9	136.3	1.45	
1328	3.68	7.5	15.1	7.08	294.2	85.46	135.6	1.51	
1333	3.68	10.0	15.2	7.07	290.5	26.43	133.3	1.50	
1338	3.68	12.5	15.1	7.08	289.9	20.77	130.9	1.90	
1343	3.68	15.0	15.1	7.08	289.0	20.23	127.3	1.94	
1348	3.68	17.5	15.2	7.10	291.4	10.60	124.8	1.35	
1353	3.68	20.0	15.2	7.08	289.0	3.44	123.8	1.78	Development complete

Additional Comments:

Development purge rate ≈ 0.5 gal/min.

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20PS-MW24 (MW24)

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9-16-2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9-16-2020
Source Area:		Field Personnel:	Travis M.

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 4.50
Depth to Water (DTW) (ft btoc):	12.63 ft	Total Depth (TD) (ft btoc):	17.60 ft.
Screen Interval (ft):	7.6 - 17.6	Saturated Screen Interval (ft):	
Water Column in Well (ft):	$WC_w = TD - DTW$	4.97 ft water column (0.163 gal/ft.)	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	0.81 gal	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ (Purge Method) _____

Field Testing Equipment

Water Quality Meter:	*Model*	YSI Pro Plus	*Serial No.*	0581
Turbidity Meter:	*Model*	Micro TPW	*Serial No.*	20200837 7
Water Level Meter:	Solinst			
Pump:	Waterra Monsoon			
Bailer:				

Work Plan Criteria

Min purge volume (3 well volumes) 2.43 total gal
Max purge volume (10 well volumes) 8.1 total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 9-16-2020

Well ID: 20PS-MW24

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1129	12.63	—	4.8	7.07	278.7	OVER	108.4	7.29	
1134	13.11	2.5	4.9	7.21	284.6	1075	28.0	4.18	
1139	13.10	5.0	4.9	7.26	283.4	252.8	7.5	4.78	
1144	13.12	7.5	4.6	7.34	281.8	49.43	-3.0	5.04	
1149	13.11	10.0	4.7	7.35	282.8	21.46	-0.4	5.96	
1154	13.16	12.5	4.5	7.31	281.8	17.41	3.5	4.98	
1159	13.15	15.0	4.4	7.33	280.7	15.09	12.1	6.19	
~~1204~~		~~17.5~~							
~~1204~~		~~20.0~~							
1204	13.15	17.5	4.5	7.30	281.9	7.38	16.2	5.72	

Additional Comments:

flow rate ≈ 0.5 gal/min.

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20PS-MW25

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9-16-2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9-16-2020
Source Area:		Field Personnel:	Trans M.

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 4.50
Depth to Water (DTW) (ft btoc):	11.70 ft.	Total Depth (TD) (ft btoc):	16.55 ft.
Screen Interval (ft):	6.5-16.5	Saturated Screen Interval (ft):	
Water Column in Well (ft):	$WC_w = TD - DTW$	4.85ft @ 0.163 Gal/ft = 0.79 gal	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ (Purge Method) _____

Field Testing Equipment

Water Quality Meter:	*Model*	YSI Pro Plus	*Serial No.*	0581
Turbidity Meter:	*Model*	Micro TPW	*Serial No.*	20200837
Water Level Meter:	Solinst			
Pump:	Mega Monsoon			
Bailer:				

Work Plan Criteria

Min purge volume (3 well volumes) 2.37 total gal
Max purge volume (10 well volumes) 7.9 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 9-16-2020

Well ID: 20PS-MW25

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1230	11.70	—	4.8	7.41	246.8	OVER	83.4	11.37	
1235	13.53	2.5	5.0	7.26	213.1	110.5	34.6	2.17	
1240	13.42	5.0	4.7	7.20	207.4	46.23	27.3	2.94	
1245	13.59	7.5	4.5	7.21	205.4	46.07	9.6	2.14	
1250	14.09	10.0	4.4	7.18	199.1	49.10	1.1	2.36	
1255	14.04	12.5	4.5	7.14	200.0	17.60	5.9	2.72	
1300	13.97	15.0	4.6	7.12	198.7	11.11	11.3	2.50	
1305	13.85	17.5	4.4	7.09	199.0	5.97	15.0	2.22	
1310	14.04	20.0	4.5	7.10	198.0	7.59	15.5	2.80	

Additional Comments: flow/purge rate ≈ 0.5 gal/min

SUNDANCE-EA II, LLC

Well Development Record

Well ID: MW-13 DC 26

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9/10/2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9/12/2020
Source Area:		Field Personnel:	D. Cookston

☑ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 4.50
Depth to Water (DTW) (ft btoc):	11.49	Total Depth (TD) (ft btoc):	24.65
Screen Interval (ft):	10	Saturated Screen Interval (ft):	10
Water Column in Well (ft):	$WC_w = TD - DTW$	13.16	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	2.15	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$	1.99	
Total Well Volume (gal):	$V_w + V_{FP} = V_T$	2.15 + 1.99 = 4.14	

d_w=well diameter (inches) d_b= borehole diameter (inches) WC_w= water column in well (feet) **SSI**=saturated screen interval (feet) V_T=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ Purge Method _____

Field Testing Equipment

Water Quality Meter:	Model YSI 556	Serial No.	04F10639AD
Turbidity Meter:	Model MicroTPW	Serial No.	20150409
Water Level Meter:	Solinst		
Pump:	Monsoon Pro Active		
Bailer:			

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal

Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: MW-13DC26

Date:

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1055	11.49	0	4.03	7.37	0.579	7 Limit	-513.8	1.26	
1100	11.61	3	3.75	6.56	0.570	1005	-379.0	3.13	
1105	11.61	6	3.52	6.63	0.565	476.3	-349.2	3.21	
1110	11.60	9	3.30	6.48	0.560	194.8	-367.0	3.79	
1115	11.61	12	3.62	6.72	0.556	57.37	-370.4	4.01	
1120	11.15	15	3.33	6.81	0.554	76.34	-383.3	2.82	
1125	11.16	18	3.33	6.91	0.551	65.66	-360.4	3.29	
1130	11.15	21	3.51	6.89	0.553	42.01	-353.5	3.24	
1135	11.15	24	3.35	7.00	0.551	27.93	-354.6	2.93	
1140	11.13	27	3.26	6.92	0.552	34.91	-317.3	4.46	
1145	11.13	30	3.39	6.96	0.552	24.31	-311.2	3.03	
1150	11.14	33	3.35	7.04	0.552	11.81	-340.7	3.01	
1155	11.14	36	3.35	6.99	0.553	17.42	-286.2	3.23	
1200	11.14	40	3.35	7.05	0.554	15.46	-284.6	3.28	
1205	11.14	43	3.60	7.05	0.554	19.12	-288.9	2.86	

Additional Comments:

SUNDANCE-EA II, LLC

Well Development Record

Well ID: MW-14DC27

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9/12/2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9/12/2020
Source Area:		Field Personnel:	1) Cockston

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.): (2") 4" Other ____		Borehole Dia (in.): 4.25" 6.25" Other 4.50	
Depth to Water (DTW) (ft btoc):	5.94	Total Depth (TD) (ft btoc):	23.80
Screen Interval (ft):	10	Saturated Screen Interval (ft):	10
Water Column in Well (ft): $WC_w = TD - DTW$	17.86		
Volume in Well (gal): $V_w = {d_w}^2 \times 0.04079 \times WC_w$	2.91		
Volume in Filter Pack (gal): $V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$	1.99		
Total Well Volume (gal): $V_w + V_{FP} = V_T$	2.91 + 1.99 = 4.9		

d_w=well diameter (inches) d_b= borehole diameter (inches) WC_w= water column in well (feet) **SSI**=saturated screen interval (feet) V_T=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ Purge Method _____

Field Testing Equipment

Water Quality Meter:	*Model* YSI 556	*Serial No.*	04E106394D
Turbidity Meter:	*Model* MicroTPW	*Serial No.*	20113409
Water Level Meter:	Solinst		
Pump:	Monsoon Pro Active		
Bailer:			

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: MW-14DC27

Date:

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1330	5.94	0	6.49	7.87	0.454	>Limit	-531.4	0.99	
1341	6.05	2	6.62	7.29	0.440	438.0	-440.3	2.44	
1346	6.10	4	6.81	7.23	0.436	913.4	-394.4	2.44	
1351	6.10	5	7.49	7.44	0.434	1100	-431.7	1.52	
1356	6.10	6	~~6.43~~	7.56	0.429	1100	-450.5	1.53	
1401	6.10	9	6.41	7.45	0.425	169.2	-419.2	1.05	
1406	6.11	11	6.26	7.44	0.425	745.7	-434.9	2.23	
1411	6.12	14	6.20	7.48	0.421	310.9	-401.6	2.27	
1416	6.15	16	6.13	7.44	0.421	218.3	-413.1	1.89	
1421	6.12	20	6.16	7.47	6.425	674.5	-409.0	2.12	
1426	6.11	23	6.31	7.49	0.414	24.13	-403.8	1.99	
1431	6.15	27	6.20	7.52	0.413	71.06	-404.9	1.93	
1436	6.16	30	5.97	7.51	0.414	28.25	-384.4	2.11	
1441	6.16	34	5.92	7.38	0.416	44.77	-369.9	2.30	
1446	6.20	37	5.84	7.41	0.407	47.61	-388.5	1.34	
1451	6.20	41	5.87	7.46	0.410	61.35	-376.0	1.60	
1456	6.20	46	5.90	7.50	0.405	17.86	-351.9	1.58	
1500	6.20	50	5.93	7.50	0.404	14.98	-347.4	1.45	

Additional Comments:

SUNDANCE-EA II, LLC

Well Development Record

Well ID: MW-15DC28

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9/2/2020 DC 9/10/2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	
Source Area:		Field Personnel:	D. Cookston

☑ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 4.50"
Depth to Water (DTW) (ft btoc):	11.76'	Total Depth (TD) (ft btoc):	23.79'
Screen Interval (ft):	10'	Saturated Screen Interval (ft):	10
Water Column in Well (ft):	$WC_w = TD - DTW$	12.03	
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$	1.96	
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$	1.99	
Total Well Volume (gal):	$V_w + V_{FP} = V_T$	1.96 + 1.99 = 3.95	

d_w=well diameter (inches) d_b= borehole diameter (inches) WC_w= water column in well (feet) **SSI**=saturated screen interval (feet) V_T=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ Purge Method _____

Field Testing Equipment

Water Quality Meter:	*Model* YSI 556	*Serial No.*	04F10639AD
Turbidity Meter:	*Model* MicroTPW	*Serial No.*	20110340 9
Water Level Meter:	Solinst		16.050616
Pump:	SS Mega Monsoon Pro		
Bailer:	N/A		

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date:

Well ID: MW-15R 28

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
0918	11.76	0	6.90	4.66	0.360	>Limit	-144.0	1.37	
0923	12.01	3	6.51	4.31	0.386	376.6	-220.7	1.38	
0928	12.16	5	6.46	4.53	0.386	1110	-266.2	1.22	
0933	12.16	8	6.33	4.77	0.389	1110	-300.6	1.18	
0938	12.17	12	6.32	5.19	0.388	584.2	-307.1	2.11	
0943	12.14	16	6.38	5.94	0.385	283.1	-350.9	1.52	
0948	12.16	20	6.33	6.55	0.382	263.0	-379.9	1.06	
0953	12.16	24	6.34	6.68	0.384	175.0	-386.7	0.99	
0958	12.17	27	6.41	7.05	0.381	91.13	-392.1	1.28	
1003	12.17	31	6.39	7.06	0.383	126.5	-398.2	1.31	
1008	12.17	34	6.38	7.03	0.378	119.5	-390.2	1.43	
1013	12.17	37	6.48	7.11	0.379	68.32	-385.0	1.17	
1018	12.17	40	6.47	7.11	0.379	75.52	-367.3	1.41	

Additional Comments:
Removed 10 well volumes.

SUNDANCE-EA II, LLC

Well Development Record

20PS-MW29 (WR) 9/22/2020

Well ID: ~~20PS-MW16~~

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9-11-2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9-11-2020
Source Area:		Field Personnel:	Travis H. (EA)

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.): (2") 4" Other ____		Borehole Dia (in.): 4.25" 6.25" Other 4.50"	
Depth to Water (DTW) (ft btoc):	0.0 water is at grand level	Total Depth (TD) (ft btoc):	17.2'
Screen Interval (ft):	7.2' - 17.2'	Saturated Screen Interval (ft):	10 ft.
Water Column in Well (ft):	$WC_w = TD - DTW$	17.2'	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	0.163 gal/ft. • 17.2' = 2.80 gal	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$	2.80 gal	

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ (Purge Method) pump

Field Testing Equipment

Water Quality Meter:	Model YSI Pro Plus	Serial No.	0581
Turbidity Meter:	Model MicroTPW	Serial No.	20208377
Water Level Meter:	Solonist		
Pump:	Mega Monsoon Pro		
Bailer:			

Work Plan Criteria

Min purge volume (3 well volumes) 8.4 total gal

Max purge volume (10 well volumes) 28 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

2" well volume = 0.163 gal/ft.

SUNDANCE-EA II, LLC

Well Development Record

20PS-AAW29 (NR) 9/22/2020

Purging Data

Date: 9/11/2020

Well ID: ~~20PS-MW16~~

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1424	0.0	—	5.2	7.21	291.3	729.6	136.1	3.95	
1429	0.0	2.5	5.2	7.27	290.8	642.6	66.3	2.37	
1434	0.0	5.0	5.0	7.25	286.3	217.7	27.8	1.61	
1439	0.0	7.5	5.0	7.24	283.8	127.0	3.6	2.25	
1444	0.0	10.0	5.0	7.24	282.9	60.51	-15.1	1.55	
1449	0.0	12.5	5.0	7.24	280.5	67.00	-36.2	1.66	
1454	0.0	15.0	4.9	7.24	279.2	57.46	-38.1	2.61	
1459	0.0	17.5	4.9	7.23	278.5	66.27	-37.8	1.61	
1504	0.0	20.0	4.9	7.22	277.9	81.63	-37.3	1.57	
1509	0.0	22.5	4.9	7.21	276.9	10.52	-37.2	1.48	
1514	0.0	25.0	4.9	7.21	276.1	11.62	-37.0	1.36	
1519	0.0	27.5	4.9	7.21	275.6	6.34	-37.2	1.21	
1524	0.0	30.0	4.9	7.20	275.0	8.78	-35.7	1.34	

Additional Comments: Purge flow rate ≈ 0.5 gpm / flush mount well, TOC is at ground level. easi

SUNDANCE-EA II, LLC

Well Development Record

Well ID: ~~20PS-MW17~~ 20PS-MW30 (NR) 9/22/2020

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9-11-2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9-11-2020
Source Area:		Field Personnel:	Travis H. (EA)

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 4.5"
Depth to Water (DTW) (ft btoc):	3.7 ft.	Total Depth (TD) (ft btoc):	27.1
Screen Interval (ft):	17.1 – 27.1	Saturated Screen Interval (ft):	10 ft.
Water Column in Well (ft):	$WC_w = TD - DTW$	0.1163 gal/ft. @ 23.4 ft.	= 3.81 gal/volume.
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$	3.81 gal	

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ Purge Method pump.

Field Testing Equipment

Water Quality Meter:	Model YSI Pro Plus	Serial No.	0581
Turbidity Meter:	Model Micro TPW	Serial No.	20200837 7
Water Level Meter:	Solonist		
Pump:	Mega Monsoon Pro		
Bailer:			

Work Plan Criteria

Min purge volume (3 well volumes) 11.43 total gal
Max purge volume (10 well volumes) 38.1 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

20PS-MW30 DB 9/22/2020

Purging Data

Date: 9-11-2020

Well ID: ~~20PS-MW17~~ 20PS

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1649	3.7	—	4.4	7.61	237.4	OVER	92.6	3.07	muddy water
1654	3.7	2.5	3.8	7.53	239.2	620.7	54.1	3.10	
1659	3.7	5	3.5	7.44	235.3	568.6	10.0	2.67	
1704	3.7	7.5	3.5	7.42	233.8	214.7	-28.9	2.25	
1709	3.7	10	3.5	7.38	233.3	94.19	-21.4	3.32	
1714	3.7	12.5	3.5	7.37	232.4	65.22	-30.4	3.26	
1719	3.7	15.0	3.4	7.35	231.7	48.47	-38.4	3.64	
1724	3.7	17.5	3.5	7.35	231.6	40.66	-30.6	3.22	
1729	3.7	20	3.5	7.32	231.2	44.59	-40.9	2.32	
1734	3.7	22.5	3.5	7.33	231.0	33.28	-48.6	2.66	
1739	3.7	25	3.5	7.32	230.1	30.91	-49.3	1.92	
1744	3.7	27.5	3.5	7.31	230.0	27.19	-41.1	2.18	
1749	3.7	30	3.5	7.31	229.8	19.22	-41.7	2.20	
1754	3.7	32.5	3.5	7.32	229.6	16.85	-42.0	2.31	
1759	3.7	35.0	3.5	7.31	229.2	14.12	-43.1	2.20	
1804	3.7	37.5	3.5	7.31	229.4	13.88	-43.7	2.16	
1809	3.7	40.0	3.5	7.30	228.9	13.90	-38.2	2.10	

Additional Comments:

- purge rate ≈ 0.5 GPM
- Static water is at grand level.
- Stickup casing is 3.7 ft. above grand surface

SUNDANCE-EA II, LLC

Well Development Record

Well ID: MW-18 31

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9/15/2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9/15/2020
Source Area:	CFC	Field Personnel:	D. Cookston

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 4.50
Depth to Water (DTW) (ft btoc):	11.63	Total Depth (TD) (ft btoc):	22.16
Screen Interval (ft):	10	Saturated Screen Interval (ft):	10
Water Column in Well (ft):	$WC_w = TD - DTW$	10.53	
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$	1.72	
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$	0.70	
Total Well Volume (gal):	$V_w + V_{FP} = V_T$	1.72 + 0.70 = 2.42	

d_w=well diameter (inches) d_b= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$ 3.53

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ Purge Method _____

Field Testing Equipment

Water Quality Meter:	*Model*	YSI 556	*Serial No.*	04F10639AD
Turbidity Meter:	*Model*	MicroTPW	*Serial No.*	20200837 7
Water Level Meter:	Solinst			
Pump:	SS Mega Monsoon			
Bailer:	NA			

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date:

Well ID: MW-18DC 31

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1123	11.63	0	6.61	6.40	0.484	>Limit	-56.0	1.07	
1128	11.63	4	4.92	5.66	0.474	288.3	-1.3	1.77	
1133	11.69	8	4.47	5.32	0.472	419.2	21.8	1.41	
1138	11.68	11	4.52	5.88	0.472	347.8	-4.2	1.60	
1143	11.70	14	4.82	6.29	0.469	225.0	-29.0	1.37	
1148	11.65	17	4.65	6.65	0.472	162.7	-42.6	1.66	
1153	11.66	20	4.66	6.73	0.473	116.3	-51.8	1.72	
1158	11.66	23	4.67	6.78	0.473	68.23	-51.6	1.78	
1203	11.67	26	4.60	6.77	0.474	42.97	-51.2	1.73	
1208	11.68	29	4.63	6.78	0.473	29.30	-48.7	1.73	
1213	11.69	32	4.81	6.84	0.474	16.35	-53.5	1.63	
1218	11.68	36	5.00	6.89	0.474	10.50	-55.1	1.72	
1223	11.67	40	4.81	6.92	0.476	7.83	-55.8	1.63	

Additional Comments: Removed an extra 15 gallons of water added during installation

SUNDANCE-EA II, LLC

Well Development Record

Well ID: MW-28DC 32

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9/15/2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9/15/2020
Source Area:	CFC	Field Personnel:	D. Cookston

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.): (2") 4" Other ____		Borehole Dia (in.): 4.25" 6.25" Other 4.50	
Depth to Water (DTW) (ft btoc):	5.70	Total Depth (TD) (ft btoc):	23.55
Screen Interval (ft):	10	Saturated Screen Interval (ft):	10
Water Column in Well (ft):	$WC_w = TD - DTW$	23.55 - 5.70 = 17.85	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	$2^2 \times 0.04079 \times 17.85 = 2.91$	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$	$= (4.50^2 - 2^2) \times 0.01224 \times 10 = 1.99$	
Total Well Volume (gal):	$V_w + V_{FP} = V_T$	2.91 + 1.99 = 4.90	

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ Purge Method _____

Field Testing Equipment

Water Quality Meter:	*Model*	YSI 556	*Serial No.*	04F10639AD
Turbidity Meter:	*Model*	MicroTPW	*Serial No.*	20200837?
Water Level Meter:	Solinst			
Pump:	Mega Monsoon SS			
Bailer:				

Work Plan Criteria

Min purge volume (3 well volumes) 14.7 total gal
Max purge volume (10 well volumes) 49.0 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: MW-20DC 32

Date:

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1240	5.70	0	5.49	7.11	0.435	>Limit	-131.2	1.34	
1245	5.85	4	4.99	6.64	0.429	271.8	-114.2	2.15	
1250	5.83	7	4.97	5.90	0.428	633.5	-92.9	1.52	
1255	5.82	10	5.38	6.83	0.428	289.8	-133.9	2.42	
1300	5.82	13	5.04	6.92	0.429	143.8	-136.8	2.11	
1305	5.83	16	4.78	6.94	0.429	96.17	-145.2	1.48	
1310	5.87	20	5.09	6.94	0.431	71.81	-127.3	2.31	
1315	5.87	23	4.92	6.92	0.429	48.48	-128.4	1.77	
1320	~~4.81~~ 5.83 DC	27	4.81	6.90	0.430	30.32	-132.9	1.36	
1325	5.83	31	5.11	6.98	0.429	23.27	-139.8	1.49	
1330	5.83	34	4.94	6.87	0.429	14.60	-127.3	1.42	
1335	5.88	37	4.99	6.88	0.429	9.95	-124.5	1.34	
1340	5.83	40	4.98	6.91	0.430	7.19	-119.3	1.86	
1345	5.82	43	4.83	6.93	0.429	5.08	-121.1	1.81	
1350	5.83	46	5.01	6.94	0.427	3.23	-105.5	2.53	

Additional Comments:

SUNDANCE-EA II, LLC

Well Development Record

20PS-MW33 @ 9/22/2020

Well ID: ~~20PS-MW23~~

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	9/16-2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	9-16-2020
Source Area:		Field Personnel:	Trans H.

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other 4.50
Depth to Water (DTW) (ft btoc):	13.83	Total Depth (TD) (ft btoc):	19.50
Screen Interval (ft):	9.5 - 19.5	Saturated Screen Interval (ft):	
Water Column in Well (ft):	$WC_w = TD - DTW$	2" = 0.163 gal/Ft	5.67 ft.
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	0.924 gal	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method _____ Purge Method _____

Field Testing Equipment

Water Quality Meter:	*Model* YSI Pro Plus	*Serial No.*	0581
Turbidity Meter:	*Model* Micro TPW	*Serial No.*	20200837 7
Water Level Meter:	~~Solonist~~ Solinst		
Pump:	Mega Monsoon.		
Bailer:			

Work Plan Criteria

~~15.72~~ 2.77

Min purge volume (3 well volumes) ~~2.77~~ total gal

Max purge volume (10 well volumes) 9.24 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

20PS-MW33 (NR) 9/22/2020

Purging Data

Date: 9-16-2020

Well ID: ~~20PS-MW23~~

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
0923	13.83	—	6.1	6.88	303.3	OVER	148.1	3.02	
0928	~~13.83~~	2.5	5.4	6.83	349.8	977.3	138.3	2.85	
0933	~~13.83~~	5.0	5.4	6.77	442.2	354.6	136.6	2.71	
0938	~~13.83~~	7.5	5.6	6.84	505.0	221.2	133.6	3.42	
0943	~~13.83~~	10.0	5.6	6.78	519.0	586.6	126.2	2.04	
0948	~~13.83~~	12.5	5.3	6.81	540.0	550.44	122.8	2.58	
0953	16.41	15.0	5.1	6.80	544.0	439.1	120.6	1.85	
0958	16.51	17.5	5.2	6.80	547.0	55.11	117.9	2.35	
1003	16.79	20.0	5.0	6.87	549.0	210.9	116.2	2.80	
1008	16.84	22.5	5.1	6.79	551.0	104.8	116.6	1.70	
1013	16.82	25.0	5.2	6.82	550	29.94	~~29.94~~	1.87	ORP = 116.5
1018	16.94	27.5	5.2	6.82	552	126.9	116.3	2.10	
1023	16.50	30.0	5.3	6.76	561	49.52	117.1	2.18	
1028	16.31	32.5	5.3	6.85	555	41.00	115.2	3.10	

Additional Comments: Flow rate ≤ 0.5 gal/min.

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20PS-MW02

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/27/2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/28/2020
Source Area:	Eielson AFB	Field Personnel:	B. Leach J. Parsons

☑ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" (6.25") Other ____
Depth to Water (DTW) (ft btoc):	5.36	Total Depth (TD) (ft btoc):	15.89
Screen Interval (ft):	2.8' - 12.8'	Saturated Screen Interval (ft):	7.44
Water Column in Well (ft):	$WC_w = TD - DTW$	10.53	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	1.78 gallons	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$	3.20 gallons	
Total Well Volume (gal):	$V_w + V_{FP} = V_T$	4.91 gallons	

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

5 gallons water added during well installation. Removed prior to development

Surge Method Monsoon Pro Purge Method Monsoon Pro

Field Testing Equipment

Water Quality Meter:	Model	YSI 556 MPS	Serial No.	15H102751
Turbidity Meter:	Model	MicroTPW	Serial No.	20140321
Water Level Meter:		WLM-100		16.050616
Pump:		Monsoon Pro		24694
Bailer:		none		

Work Plan Criteria

Min purge volume (3 well volumes) 5.16 total gal

Max purge volume (10 well volumes) 17.20 total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: MW02

Date: 10/28/2020

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1714	6.22	0	2.88	6.91	214	Limit	13.5	2.01	
1719	6.50	1.5 gallons	2.93	6.83	214	394.4	-23.7	0.49	
1724	6.41	3.0 gallons	2.94	6.81	210	254.6	-45.3	0.23	
1729	6.58	4.5 gallons	2.96	6.80	208	201.8	-52.9	0.18	
1734	6.65	6.0 gallons	2.93	6.77	204	204.3	-59.6	0.10	
1739	6.62	8.0 gallons	2.93	6.76	202	200.6	-65.9	0.09	
1744	6.64	9.5 gallons	2.95	6.77	201	122.5	-72.4	0.05	
1749	6.65	11.0 gallons	2.95	6.76	200	115.8	-76.5	0.06	
1754	6.65	13.0 gallons	2.97	6.73	198	100.1	-78.5	0.04	
1759	6.64	14.5 gallons	2.96	6.74	197	83.14	-81.7	0.04	
1804	6.65	16.0 gallons	2.98	6.76	198	91.43	-84.0	0.00	
1809	6.65	17.5 gallons	2.98	6.73	196	88.38	-83.1	0.02	1cx well volumes Removed
1810									stopped well Development

Additional Comments:

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20PS-MW04

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/29/2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/30/2020
Source Area:	Eielson AFB	Field Personnel:	J. Parson B. Lenz

☑ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.): (2") 4" Other ____		Borehole Dia (in.): 4.25" (6.25") Other____	
Depth to Water (DTW) (ft btoc):	7.92	Total Depth (TD) (ft btoc):	16.25
Screen Interval (ft):	3-13' bgs	Saturated Screen Interval (ft):	7.92-13' bgs
Water Column in Well (ft): $WC_w = TD - DTW$	8.33		
Volume in Well (gal): $V_w = d_w^2 \times 0.04079 \times WC_w$	1.36		
Volume in Filter Pack (gal): $V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$	2.18		
Total Well Volume (gal): $V_w + V_{FP} = V_T$	3.54 gal		

d_w=well diameter (inches) d_b= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method Monsoon Pro Purge Method Monsoon Pro

Field Testing Equipment

Water Quality Meter:	Model	YSI 556 MPS	Serial No.	15H102751
Turbidity Meter:	Model	MicroTPW	Serial No.	201403321
Water Level Meter:		WLM-100		16.050616
Pump:		Monsoon Pro		24694
Bailer:		none		

Work Plan Criteria

Min purge volume (3 well volumes) 4.08 total gal
Max purge volume (10 well volumes) 13.59 total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: MW04

Date:

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1058	7.97	0	3.53	6.99	378	Limit	-78	1.21	
1103	7.96	1.25 gal	3.55	7.02	376	Limit	-83	0.83	
1108	7.99	2.5 gal	3.56	7.03	373	Limit	-86	0.79	
1113	7.97	4.5 gal	3.81	7.01	375	814.8	-104.1	0.36	
1118	7.98	5.0 gal	3.62	7.01	376	714.1	-108.4	0.21	
1123	7.96	6.0 gal	3.94	6.98	383	642.5	-113.3	0.15	
1128	7.97	7.5 gal	3.88	6.97	383	603.7	-117.5	0.09	
1133	8.02	9.0 gal	3.91	6.98	380	361.6	-119.9	0.08	
1138	8.10	~~10.0~~ gal	3.91	6.93	379	215.7	-119.3	0.05	
1143	8.12	12.5 gal	3.95	6.92	379	109.2	-118.9	0.05	
1148	8.13	~~14.0 gal~~ BR	4.09	6.90	379	48.15	-115	0.05	Concluded well development after 10X well casings Removed.
		15 gal							

Additional Comments:

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20PS-MW06

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/27/2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/28/2020
Source Area:	Eielson AFB	Field Personnel:	B. Leach, J. Parsons

☑ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.): (2") 4" Other ____		Borehole Dia (in.): 4.25" (6.25") Other ____	
Depth to Water (DTW) (ft btoc):	6.77	Total Depth (TD) (ft btoc):	15.30
Screen Interval (ft):	5.5'-15.5'	Saturated Screen Interval (ft):	8.73'-15.50'
Water Column in Well (ft):	$WC_w = TD - DTW$ 8.53		
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$ 1.39 gallons		
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$ 2.91 gallons		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$ 4.29 gallons		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method monsoon pro submersible pump Purge Method monsoon pro submersible pump

Field Testing Equipment

Water Quality Meter:	Model	YSI 556 MPS	Serial No.	15H102751
Turbidity Meter:	Model	MicroTPW	Serial No.	20140332I
Water Level Meter:		WLM-100		16.050616
Pump:		Mega monsoon pro		24694
Bailer:		none		

Work Plan Criteria

Min purge volume (3 well volumes) 4.18 total gal
Max purge volume (10 well volumes) 13.92 total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/28/2020

Well ID: MW06

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1524	7.16	0	6.68	6.89	346	Limit	102.4	2.64	flow rate difficult
1529	7.22	1.5 gallons	6.53	6.97	345	Limit	83.4	0.78	to measure, Adjusted
1534	7.23	3.0 gallons	6.56	6.97	344	Limit	76.6	0.55	to How long it took to
1539	7.15	4.5 gallons	6.47	6.97	344	Limit	71.6	0.43	fill 6.5 gallon bucket.
1544	7.12	6.0 gallons	6.49	6.98	342	593.50	52.1	0.25	↓
1549	7.12	6.5 gallons	6.55	6.99	343	798.50	40.8	0.19	
1554	7.16	7.0 gallons	6.55	7.00	346	927.90	31.0	0.16	
1559	7.16	8.0 gallons	6.52	7.00	345	643.40	25.5	0.11	
1604	7.26	9.5 gallons	6.54	6.97	351	501.20	21.9	0.09	
1609	7.35	11.5 gallons	6.51	6.98	346	343.00	17.6	0.08	
1614	7.24	12.5 gallons	6.50	6.96	342	217.00	14.2	0.06	
1619	7.34	13.5 gallons	6.48	6.95	343	124.30	9.5	0.05	
1624	7.37	14.5 gallons	6.47	6.94	342	94.75	5.6	0.02	10x well casings purged
1625									Ended purging.

Additional Comments:

SUNDANCE-EA II, LLC

Well Development Record

Well ID: 20AS- MW05

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/28/2020
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/29/2020
Source Area:	Eielson AFB	Field Personnel:	B. Leach J. Parson

☑ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	(2") 4" Other ____	Borehole Dia (in.):	4.25" (6.25") Other ____
Depth to Water (DTW) (ft btoc):	8.53	Total Depth (TD) (ft btoc):	16.16
Screen Interval (ft):	3' - 13'	Saturated Screen Interval (ft):	8.53' - 13.00'
Water Column in Well (ft):	$WC_w = TD - DTW$	7.63	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	1.25	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$	1.92	
Total Well Volume (gal):	$V_w + V_{FP} = V_T$	3.17	

d_w=well diameter (inches) d_b= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method Monsoon Pro Submersible Pump Purge Method Monsoon Pro Submersible pump

Field Testing Equipment

Water Quality Meter:	*Model*	YSI 556 MPS	*Serial No.*	15H102751
Turbidity Meter:	*Model*	MicroTPW	*Serial No.*	20140332I
Water Level Meter:		WLM - 100		16.050616
Pump:		Mega Monsoon Pro		24694
Bailer:		none		

Work Plan Criteria

Min purge volume (3 well volumes) 3.73 total gal
Max purge volume (10 well volumes) 12.45 total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: MW05

Date: 10/29/2020

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV) 3.6	DO (mg/L)	Comments
1118	8.63	0	4.75	6.97	300	Limit	~~65.8~~	45.0	
1123	8.67	2.00 gal	4.40	6.94	291	663.6	-27.0	22.9	
1128	8.65	4.00 gal	4.30	6.92	285	970.4	-55.0	2.04	
1133	8.68	6.00 gal	4.40	6.92	285	912.5	-68.0	1.49	
1138	8.62	7.50 gal	4.38	6.92	282	525.6	-76.4	1.29	
1143	8.67	9.00 gal	4.37	6.92	288	288.7	-82.4	0.21	
1148	8.66	11.00 gal	4.37	6.99	283	115.1	-88.7	0.14	
1153	8.67	12.50 gal	4.35	6.98	282	59.01	-91.4	0.11	
1158	8.67	14.00 gal	4.41	6.93	282	39.48	-93.8	0.10	Reached 10x well volumes
1159									Concluded Development

Additional Comments:

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix F.4 – Groundwater Sample Collection Logs, and Low-Flow Groundwater Sampling & Stabilization Forms

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SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	AP-6078
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	5/30/19	**Samplers:**	G Manning
Time Start:	1030		
Time Finish:	1700	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	18.90 ft	**Screened Interval (ft.):**	UNK
DTW (ft. bTOC):	15.55 ft		
Water Column:	3.45 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	2.09 L	Water Column x L/ft	
Three Well Volumes:	6.27 L	Liters in Well x 3	
Sample Depth:	16.80 ft	Depth of Pump Intake	

Casing 2.89 Ft above ground surface

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	10D100479
Water Level Meter:	Solinst Model 100	**Serial No.:**	24219
Turbidity Meter:	MicroTPW 20000	**Serial No.:**	20110617 4
Pump Type:	Geopump 1	**Serial No.:**	304002668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☑ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	8	Ice	537M QSM 5.1	500mL HDPE	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: AP-6078	Sample ID: 19PS-AP-6078-0530	Sample Time: 1647
Date: 5/30/19	Dup. Sample ID: 19PS-MW99-0530	Dup. Sample Time: 0800
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1625	START PURGING									
1627	2	12.96	417	7.1	6.39	131.7	731.5	15.58	1	Cloudy, no odor
1632	7	9.26	351	5.39	6.56	162.8	640.4	15.58	1	
1637	12	8.51	333	3.80	6.69	78.3	463.2	15.58	1	
1642	17	9.30	346	3.55	6.60	70.5	240.7	15.58	1	
1647										Sample

Sampled? : Yes ☒ No ☐

Initial of Sampler: [signature]

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	MW-BKG-01
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	7/16/19	**Samplers:**	N. Steckelein.
Time Start:	1450		G. Garner
Time Finish:	1615	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	23.41	ft	23.14, **Screened Interval (ft.):**	7.5-17.5 bgs.
DTW (ft. bTOC):	12.80	ft		
Water Column:	10.61	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	6.42	L	Water Column x L/ft	
Three Well Volumes:	19.26	L	Liters in Well x 3	
Sample Depth:	19.20	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI MPS 556	**Serial No.:**	11H100848
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	20140332l
Pump Type:	Geo Pump	**Serial No.:**	J0400 26668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFOS/PFOA	2	NA	EPA 537	250mL HDPE	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW-BKG-01	Sample ID: 19-MW-BKG-01-0716	Sample Time: 1605
Date: 07/16/2019	Dup. Sample ID: —	Dup. Sample Time: —

Notes: existing tubing down hole. Unable to get out of casing.

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1510	START PURGING									
1515	2.5	6.67	234	3.90	7.13	153.1	170.9	12.82	0.50	
1520	5	5.95	228	3.45	7.26	141.2	118.4	12.82	0.50	
1525	7.5	5.73	227	3.05	7.32	126.9	138.3	12.82	0.50	
1530	10	5.64	226	2.93	7.33	120.6	176.1	↓	0.50	
1535	12.5	5.64	226	2.94	7.34	113.6	79.5	↓	0.50	
1540	15	5.65	226	2.82	7.33	107.7	158.2	↓	↓	
1545	17	5.47	225	2.64	7.33	106.0	57.9	↓	↓	
1550	19	5.68	226	2.80	7.33	102.2	128.4	↓	↓	
1555	20	5.73	227	2.89	7.32	99.9	107.8	↓	↓	
1600	21	5.77	227	3.01	7.33	99.4	148.7	12.82	0.50	
1605	—	—	—	—	—	—	—	—	—	Sample

Sampled? : Yes ☒ No ☐

Initial of Sampler: GG

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	MW-BKG-04
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	07/16/2019	**Samplers:**	G.Garner
Time Start:	0845		
Time Finish:		**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	~~22.3~~ 24.82 ft	**Screened Interval (ft.):**	10-20 ft
DTW (ft. bTOC):	11.60 ft		
Water Column:	13.22 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters In Well:	8.00 L	Water Column x L/ft	
Three Well Volumes:	24 L L	Liters in Well x 3	
Sample Depth:	~18 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	10D 100 479
Water Level Meter:	Solinst 101	**Serial No.:**	306416
Turbidity Meter:	Micro TPW	**Serial No.:**	20170351R
Pump Type:	GeoPump 2 Peristaltic	**Serial No.:**	6360

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFOS/PFOA	2	None	Low Flow	Nalgene Bottle	Duplicate
PFOS/PFOA	2	None		250mL	Y

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW-BKG-04	Sample ID: 19-MW-BKG-04-0716	Sample Time: 0930
Date: 07/16/2019	Dup. Sample ID: 19PS-MW99-0716	Dup. Sample Time: 0935
Notes: tubing visible in well from a previous sampling; Well ID not marked on well.		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
0845	START PURGING								0.5	
0855	~~4~~ 4	3.07	0.344	3.53	6.91	31.6	20.07	11.60	0.4	
0905	8	3.12	0.347	2.92	6.92	29.8	23.43	↓	0.4	
0915	12	3.18	0.346	2.70	6.92	25.2	5.53	↓	0.4	
0920	14	3.17	0.345	2.99	6.95	15.7	6.85	↓	0.4	
0930	16	3.15	0.346	2.99	6.97	19.5	3.58	↓	0.4	Sampled

Sampled? : Yes ☑ No ☐

Initial of Sampler: CC

SUNDANCE-EA II, LLC

Well is broken/compromised.

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	MW-BKG-05
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	7/16/19	**Samplers:**	N. Stoeckle
Time Start:	1030		
Time Finish:	1045	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	ft	**Screened Interval (ft.):**	4.0-14.0 bgs
DTW (ft. bTOC):	ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:		**Serial No.:**	
Water Level Meter:		**Serial No.:**	
Turbidity Meter:		**Serial No.:**	
Pump Type:		**Serial No.:**	

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID:	Sample ID:	Sample Time:
Date:	Dup. Sample ID:	Dup. Sample Time:

Notes: lid is broken to access well. Once opened, seal on well is compromised & bentonite is inside of riser.

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☐ No ☐

Initial of Sampler: _____

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	MW-BKG-07
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	07/16/2019	**Samplers:**	GG
Time Start:	1055		
Time Finish:		**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	23.3	ft	**Screened Interval (ft.):**	11-21
DTW (ft. bTOC):	14.1	ft		
Water Column:	9.2	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	5.6	L	Water Column x L/ft	
Three Well Volumes:	16.8	L	Liters in Well x 3	
Sample Depth:	20	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	10 D 100479
Water Level Meter:	Solinst 101	**Serial No.:**	306416
Turbidity Meter:	Micro TPW	**Serial No.:**	20170312
Pump Type:	GeoPump 2 Peristaltic	**Serial No.:**	6368

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFOS/PFOA	2	None	Low Flow	Nalgene 250mL	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW-BKG-07	Sample ID: 19-MW-BKG-07-0716	Sample Time: 1205
Date: 7/16/2019	Dup. Sample ID: NA	Dup. Sample Time: NA

Notes: LDPE tubing removed from well prior to sampling.

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1055	START PURGING									
1105	4	3.51	0.225	10.46	6.44	230.2	10.98	14.1	0.4	
1110	6	4.21	0.224	11.06	6.57	221.3	10.39		0.4	
1115	8	4.85	0.223	11.38	6.63	213.7	7.40		0.4	
1120	10	6.11	0.224	11.58	6.76	204.6	6.44		0.4	Pump hose loosened. Lost suction
1130	12	3.81	0.229	12.66	6.58	207.5	13.78		0.4	
1135	16	2.88	0.228	11.10	6.53	209.1	11.13		0.4	
1140	18	2.72	0.224	9.18	6.53	208.8	6.15		0.4	
1145	20	3.01	0.225	8.72	6.55	209.9	8.62		0.4	
1155	22	4.41	0.226	11.13	6.67	208.3	7.77	↓	0.4	
1200	24	4.42	0.224	11.19	6.68	208.0	6.01		0.4	
1205										Sampled

Sampled? : Yes ☒ No ☐

Initial of Sampler: GG

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	MW-BKG-11
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	7/16/19	**Samplers:**	N. Stoecklein
Time Start:	0745		
Time Finish:	1020	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	22.44	ft	+ **Screened Interval (ft.):**	7.5-17.5 bgs
DTW (ft. bTOC):	9.28	ft	22.17 + 3.29 = 10.79 - 20.79 bTOC	+ 39.5" bTOC = 3.29'
Water Column:	13.16	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	7.96	L	Water Column x L/ft	
Three Well Volumes:	23.89	L	Liters in Well x 3	
Sample Depth:	15.04 bTOC	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI MPS 556	**Serial No.:**	11H100848
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW Scientific Inc.	**Serial No.:**	20140321
Pump Type:	Peristaltic Geo Pump	**Serial No.:**	J04002668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☒ No ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFOS/PFOA	6	NA	EPA 537 MOD	250mL HDPE	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW-BKG-11	Sample ID: 19-MW-BKG-11-0716	Sample Time: 0955
Date: 7/16/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
0915		✓	✓	X START PURGING						
0920	2.25	4.12	152	2.65	7.02	262.5	122.6	9.32	0.45	turbid, pulled some organic material into tubing
0925	4.5	4.37	154	2.09	7.03	261.7	89.70	9.32		
0930	6.75	4.41	153	1.97	7.04	260.—	59.77			turbidity is clearing, still cloudy
0935	9.—	4.50	153	1.23	7.05	258.1	28.68			
0940	11.25	4.39	153	0.90	7.07	255.7	18.31			clearing
0945	13.5	4.27	154	0.86	7.07	255.1	16.87			
0950	15.75	4.29	152	0.72	7.08	253.4	13.56			
0955	18.—	4.20	152	0.61	7.09	251.9	10.11	9.32	0.45	Sample well 4/6 readings stabilized

Sampled? : Yes ☑ No ☐

Initial of Sampler: NS

4/6 1.35

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	MW-BLG-12
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	7/16/19	**Samplers:**	N. Stoeckle
Time Start:	1100		
Time Finish:	1305	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	13.15	ft	**Screened Interval (ft.):**	2.5-12.5 bgs
DTW (ft. bTOC):	4.54	ft		
Water Column:	8.61	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	5.20	L	Water Column x L/ft	
Three Well Volumes:	15.63	L	Liters in Well x 3	
Sample Depth:	8.84	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI MPS 556	**Serial No.:**	11A100848
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	~~TRUE Meter~~ Micro TPW Turb@(m	**Serial No.:**	2014D3321
Pump Type:	Geo Pump	**Serial No.:**	J040026668

Purge Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFOS/PFOA	2	NA	EPA 537 mod	250 mL HDPE	

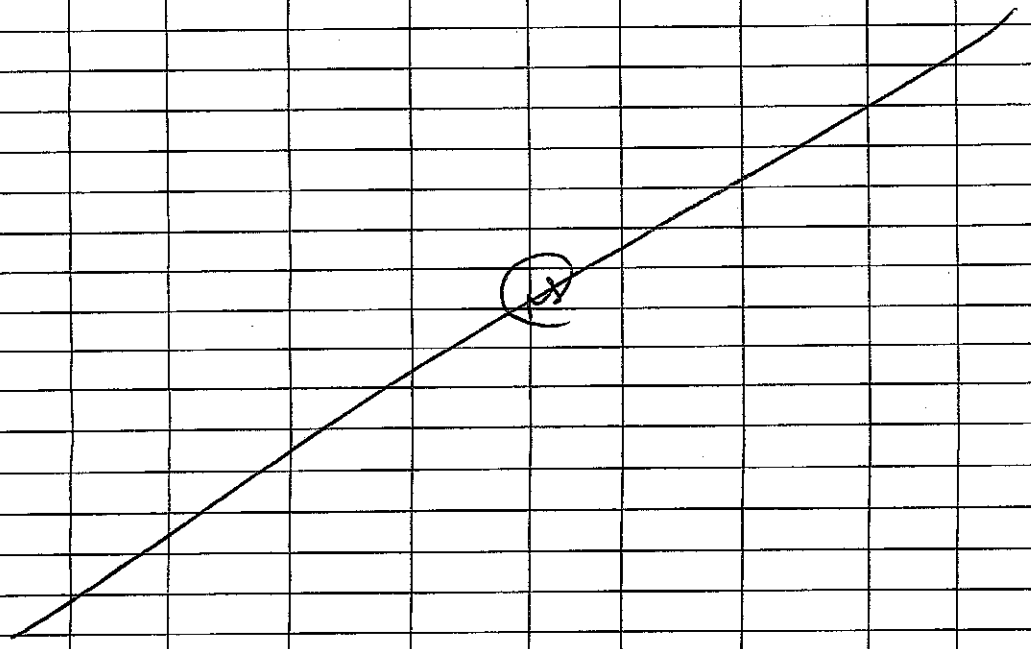
Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW-BKG-12	Sample ID: 19-MW-BKG-12-0716	Sample Time: 1242
Date: 7/16/19	Dup. Sample ID: —	Dup. Sample Time: —

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1152		✓	✓	START PURGING						very turbid, orange
1157	2	8.06	288	1.31	7.19	147.5	402.7	4.53	0.40	
1202	4	8.07	249	0.98	7.18	114.7	245.7	4.53		
1207	6	8.06	231	0.80	7.16	101.5	160.5			
1212	8	7.92	216	0.69	7.16	90.2	110.5			
1217	10	7.78	201	0.53	7.15	75.6	68.36			
1222	12	7.59	195	0.49	7.15	67.3	46.55			clearing up in turbidity
1227	14	7.70	191	0.45	7.15	60.9	39.04			
1232	16	7.70	188	0.42	7.16	53.7	29.79			
1237	18	7.51	186	0.40	7.16	49.3	22.55	↓	↓	
1242	20	7.40	184	0.40	7.16	44.4	21.74	4.53	0.40	



Sampled? : Yes ☒ No ☐

Initial of Sampler: MS

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Transducer in well, not sampled

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	51MB2B
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	7/16/19	**Samplers:**	N. Stoeckleri
Time Start:	1345		G. Garner
Time Finish:	1400	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	ft	**Screened Interval (ft.):**	6.0 - 16.0
DTW (ft. bTOC):	ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:		**Serial No.:**	
Water Level Meter:		**Serial No.:**	
Turbidity Meter:		**Serial No.:**	
Pump Type:		**Serial No.:**	

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID:	Sample ID:	Sample Time:
Date:	Dup. Sample ID:	Dup. Sample Time:

Notes: well is frost jacked/broken. Not able to sample.

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☐ No ☐

Initial of Sampler: _____

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	MW-BK6-09
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	7/12/19	**Samplers:**	G Manning
Time Start:	8:41		
Time Finish:	9:45	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	20.91	ft	**Screened Interval (ft.):**	9-19
DTW (ft. bTOC):	9.15	ft		
Water Column:	11.76	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	7.11	L	Water Column x L/ft	
Three Well Volumes:	21.34	L	Liters in Well x 3	
Sample Depth:	14	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	11H100844
Water Level Meter:	Solinst Model 101	**Serial No.:**	24219
Turbidity Meter:	HF MicroTPW	**Serial No.:**	20140332
Pump Type:	Geopump I	**Serial No.:**	J0400 2668

Purge Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : *Yes* ☐ *No* ☑

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	Ice	537	250mL HDPE	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW-BKG-09	Sample ID: 19-MW-BKG-09-0717	Sample Time: 9:40
Date: 7/17/19	Dup. Sample ID: NA	Dup. Sample Time: NA
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
9:09	START PURGING									
9:14	2.5	6.99	236	7.36	6.91	178.0	135.2	9.19	0.5	Noder cloudy w/ black sediment
9:19	5.0	6.81	236	6.44	7.03	182.6	60.06	9.19	0.5	
9:24	7.5	7.01	237	6.44	7.05	186.5	54.40	9.19	0.5	
9:29	10.0	7.31	239	6.83	7.06	189.6	27.55	9.19	0.5	
9:34	12.5	7.22	239	6.54	7.05	191.9	18.93	9.19	0.5	
9:39	15.00	7.09	240	6.52	7.04	193.4	7.05	9.19	0.5	

Sampled? : Yes ☑ No ☐

Initial of Sampler: GM

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	MW-BKG-10
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	07/17/2019	**Samplers:**	G. Garner
Time Start:	0800		G. Manning
Time Finish:	0945	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	23.05	ft	**Screened Interval (ft.):**	7.5-17.5
DTW (ft. bTOC):	13.78	ft		
Water Column:	9.27	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	5.6	L	Water Column x L/ft	
Three Well Volumes:	16.8	L	Liters in Well x 3	
Sample Depth:	21	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	10D 100479
Water Level Meter:	Solinst 101	**Serial No.:**	306416
Turbidity Meter:	Micro TPW	**Serial No.:**	20170 3512
Pump Type:	GeoPump 2	**Serial No.:**	6360

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFOS / PFOA	~~HDPE~~ 4	None	Low Flow	250 mL Nalgene	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW-BKG-10	Sample ID: 19-MW-BKG-10-0717	Sample Time: 0935
Date: 07/17/2019	Dup. Sample ID: 19P5-MW99-0717	Dup. Sample Time: 0940

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
0845	START PURGING									
0855	0.5	5.34	365	12.06	7.49	212.2	354.1	13.78	0.2	very turbid, dark brown
0900	1.5	4.85	364	12.06	7.30	193.4	180.0	13.78	0.2	clearing
0905	2.5	4.62	364	12.20	7.33	173.3	150.5	13.78	0.2	clearing
0910	3.5	4.20	365	12.06	7.33	140.5	128.4	13.78	0.2	
0915	4.5	4.01	365	11.73	7.32	121.5	106.8	13.78	0.2	
0920	5.5	4.26	365	11.69	7.35	103.3	86.15	13.78	0.2	
0925	6.5	4.31	364	11.72	7.35	95.1	16.20	13.78	0.2	
0930	7.5	4.18	365	11.56	7.36	89.1	12.36	13.78	0.2	
0935	8.5	4.16	365	11.45	7.39	85.8	8.58	13.78	0.2	Sample collected @ 0935 Duplicate @ 0940

Sampled? : Yes ☒ No ☐

Initial of Sampler: MH

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	02 MW11
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	07/17/2019	**Samplers:**	G. Garner
Time Start:	1055		G. Manning
Time Finish:	1200	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	27.07	ft	**Screened Interval (ft.):**	
DTW (ft. bTOC):	16.51	ft		
Water Column:	10.56	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	6.39	L	Water Column x L/ft	
Three Well Volumes:	19.2	L	Liters in Well x 3	
Sample Depth:	25	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	10D100479
Water Level Meter:	Solinst 101	**Serial No.:**	306416
Turbidity Meter:	Micro TPW	**Serial No.:**	20170512
Pump Type:	GeoPump 2	**Serial No.:**	6360

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☒ No ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFOS/PFOA	2	None	Low Flow	250mL Nalgene	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 02MW11	Sample ID: 19-02MW11-0717	Sample Time: 1146
Date: 07/17/2019	Dup. Sample ID:	Dup. Sample Time:
Notes: MS/MSD		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1115	START PURGING									Clear
1120	2.5	6.84	483	1.63	7.12	-12.8	3.54	16.51	0.5	
1125	5	6.64	481	0.96	7.16	0.3	1.67	16.51	0.5	
1130	7.5	6.66	478	0.74	7.20	0.1	1.83	16.51	0.5	
1135	10	6.56	479	0.59	7.22	-18.3	1.44	16.51	0.5	
1140	12.5	6.56	480	0.49	7.24	-55.9	1.41	16.51	0.5	
1145	15	6.52	482	0.47	7.24	-19.1	1.55	16.51	0.5	4 of 6 stabilized
1146										Sample + MS/MSD

Sampled? : Yes ☒ No ☐

Initial of Sampler: HE/RM

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	USAP-1
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	7/18/19	**Samplers:**	G. Garner
Time Start:	1125		G. Manning
Time Finish:	1320	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	29.79 ft	**Screened Interval (ft.):**	14-16 (assume bgs)
DTW (ft. bTOC):	20.12 ft		
Water Column:	9.67 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	5.85 L	Water Column x L/ft	
Three Well Volumes:	17.55 L	Liters in Well x 3	
Sample Depth:	~~22.0~~ 25.0 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	19J100479
Water Level Meter:	Solinst Model 101	**Serial No.:**	24219
Turbidity Meter:	HF MicroTPW	**Serial No.:**	20170512
Pump Type:	SS MegaMonsoon Pro	**Serial No.:**	24776

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☒ Other: Monsoon

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☒ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD?: Yes ☒ No ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	8	Ice	537M	250 HDPE	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: USAP-1	Sample ID: 19-USAP-1-0718	Sample Time: 1245
Date: 7/18/19	Dup. Sample ID: 19PS-MW99-0718	Dup. Sample Time: 1300

Notes: Sampled with foot valve due to issues with pump-

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1130	START PURGING									
1135	~~3.7~~ 16	3.72	433	4.38	7.12	49.5	6.48	20.15	1L	Clear, no odor Initial flow rate ~ 5L
1140	16									Issues w/ battery
1145	21	3.45	434	4.00	7.09	42.3	13.13	20.15	1L	Battery swapped
1150	31	3.40	435	3.67	7.15	29.5	6.22	20.15	2L	
1155	41	3.36	436	0.22	7.14	13.1	1.11	20.15	2L	
1200	46	—	—	—	—	—	0.50	20.15	2L	— Not measured
1245										Sample w/ tubing + foot valve

Sampled?: Yes ☒ No ☐

Initial of Sampler: SPM

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	DSAP-10
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	7/18/19	**Samplers:**	G. Garner
Time Start:	~~1305~~ 1505		G. Manning
Time Finish:	1600	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	17.15 ft	**Screened Interval (ft.):**	(10-25 ft bgs)
DTW (ft. bTOC):	11.81 ft		
Water Column:	5.34 ft	TD-DTW=Water Column	
Liter/Foot:	0.606 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	3.23 L	Water Column x L/ft	
Three Well Volumes:	9.69 L	Liters-in-Well-x 3	
Sample Depth:	14.5 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	10 D 100479
Water Level Meter:	Solinst 101	**Serial No.:**	306416
Turbidity Meter:	Micro TPW	**Serial No.:**	20170351Z
Pump Type:	Geo Pump 2	**Serial No.:**	6360

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFOS/PFOA	2	None	Low Flow	250mL HDPE	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: DSAP-10	Sample ID: 19-DSAD-10-0718	Sample Time: 1552
Date: 7/18/19	Dup. Sample ID: NA	Dup. Sample Time: NA
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1515	Dup. 7/18/19	START PURGING								Issues with Flowrate
1536	~~1~~ 1	7.96	567	11.36	7.33	-19.1	61.04	11.85	0.2	Clear, Reddish tinge, no odor
1541	2	7.34	567	11.30	7.34	-18.5	53.61	11.85	0-2	
1546	3	6.66	568	11.10	7.31	-18.5	34.02	11.85	0-2	
~~1551~~ 1551	4	6.00	570	10.69	7.32	-17.7	16.39	11.85	0-2	
1552										Sampled

Sampled? : Yes ☒ No ☐

Initial of Sampler: GG

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	DSAP-11
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	7/18/19	**Samplers:**	G Manley
Time Start:	1410		G Gagnec
Time Finish:	1500	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	21.18	ft.	**Screened Interval (ft.):**	9-2-19.2
DTW (ft. bTOC):	15.25	ft		
Water Column:	5.93	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	3.59	L	Water Column x L/ft	
Three Well Volumes:	10.76	L	Liters in Well x 3	
Sample Depth:	18	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	10D100479
Water Level Meter:	Solinst	**Serial No.:**	306416
Turbidity Meter:	HF Micro TPW	**Serial No.:**	2017 03512
Pump Type:	Geopump2	**Serial No.:**	6360

Purge Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	Ice	537M	250mL HDPE	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: DSAP-11	Sample ID: 19-DSAP-11-0718	Sample Time: 1946
Date: 07/18/19	Dup. Sample ID: NA	Dup. Sample Time: NA
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1420	START PURGING									Cloudy brown, No odor
1425	2	5.94	563	6.29	6.73	206.1	158.6	15.28	0.4	
1430	4	5.38	560	5.07	6.75	198.9	27.41	15.28	0.4	
1435	6	5.32	546	4.91	6.79	183.1	6.37	15.28	0.4	
1440	8	5.26	536	4.85	6.81	171.4	5.28	15.28	0.4	
1445	10	5.18	531	4.98	6.83	160.6	2.74	15.28	0.4	
1446										Sample

Sampled? : Yes ☑ No ☐

Initial of Sampler: JGG

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	DSAP-13
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	7/18/2019	**Samplers:**	G. Garner
Time Start:	1620		G. Manning
Time Finish:	1700	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	14.86	ft	**Screened Interval (ft.):**	5
DTW (ft. bTOC):	8.68	ft		
Water Column:	6.18	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	3.74	L	Water Column x L/ft	
Three Well Volumes:	11.2	L	Liters in Well x 3	
Sample Depth:	10	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	19D 100479
Water Level Meter:	Solinst 101	**Serial No.:**	306416
Turbidity Meter:	Micro TPW	**Serial No.:**	20170 3512
Pump Type:	GeoPump 2	**Serial No.:**	6360

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFOS/PFOA	2	None	Low Flow	250mL HDPE	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: DSAP-13	Sample ID: 19-DSAP-13-0718	Sample Time: 1651
Date: 07/18/2019	Dup. Sample ID: NA	Dup. Sample Time: NA

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1630	START PURGING									
1635	3	4.15	494	8.87	7.22	102.4	8.82	8.83	0.6	
1640	6	4.08	493	8.10	7.23	100.2	4.96	8.83	0.6	
1645	9	4.03	492	7.28	7.24	99.2	4.04	8.83	0.6	
1650	12	4.04	490	6.58	7.23	98.8	2.74	8.83	0.6	
1651										Sampled

Sampled? : Yes ☒ No ☐

Initial of Sampler: JR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW02
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10-15-2019	**Samplers:**	J. Garner, B. Davis, B. Hendricks
Time Start:	1220		
Time Finish:	1235	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25	ft	**Screened Interval (ft.):**	21-24.3 ft
DTW (ft. bTOC):	14.61	ft		
Water Column:	10.39	ft	TD-DTW=Water Column	
Liter/Foot:	0.06	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	0.62	L	Water Column x L/ft	
Three Well Volumes:	1.87	L	Liters in Well x 3	
Sample Depth:	24	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRODSS	**Serial No.:**	PINE D495597
Water Level Meter:	SOLINST	**Serial No.:**	SUNDANCE
Turbidity Meter:	HACH 2100	**Serial No.:**	PINE ~~005623~~
Pump Type:	PERI	**Serial No.:**	PINE 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	GEL ICE	537 Mod	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW02

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10-15-2019
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	
Source Area:		Field Personnel:	Garner, Davis, Hendrixs

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other ____	Borehole Dia (in.):	4.25" 6.25" Other____
Depth to Water (DTW) (ft btoc):	14.61	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	3'8" 21-24.6 ft btoc	Saturated Screen Interval (ft):	3'8"
Water Column in Well (ft):	$WC_w = TD - DTW$	10.39	
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$	0.62	
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$	NA	
Total Well Volume (gal):	$V_w + V_{FP} = V_T$	0.62	

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method N/A Purge Method Peri Pump

Field Testing Equipment

Water Quality Meter:	*Model*	YSI PRODSS	*Serial No.*	PINE	045597
Turbidity Meter:	*Model*	HACH 2100	*Serial No.*	PINE	
Water Level Meter:	SOLINST 102				
Pump:	PERI	PINE 005623			
Bailer:	—				

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/15/19

Well ID: TW02

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1221	14.61	0.50	3.9	6.41	344.3	240.93	87.3	9.28	
1226		0.75	4.8	6.55	339.7	225.34	4.0	8.32	
1231		1.00	5.2	6.82	334.5	100.96	-33.2	8.01	1231 SAMPLE TIME

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW02	Sample ID: MPS-TW02-1015	Sample Time: 1231
Date: 10-15-2019	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Samp. BJ

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW03
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/15/19	**Samplers:**	BETH DAVIS
Time Start:	1301		BECKY HENDRICKS
Time Finish:	1343	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	13.5	ft		
Water Column:	11.5	ft	TD-DTW=Water Column	
Liter/Foot:	0.06	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	0.69	L	Water Column x L/ft	
Three Well Volumes:	2.07	L	Liters in Well x 3	
Sample Depth:	24	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRO DSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRO DSS	**Serial No.:**	PINE 045597
Pump Type:	PERI	**Serial No.:**	PINE 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : (Yes ☒) No ~~☒~~ (☐)

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	~~2~~ 6 (FD)	GEL ICE	1637 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW03

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10-15-2019
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	
Source Area:		Field Personnel:	Glenn, Davis, Henderson

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	13.5'	Total Depth (TD) (ft btoc):	25'
Screen Interval (ft):	3' 8"	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method N/A Purge Method Peri Pump

Field Testing Equipment

Water Quality Meter:	*Model*	YSI PRODSS	*Serial No.*	PINE 045597	
Turbidity Meter:	*Model*	YSI PRODSS	*Serial No.*	045597	
Water Level Meter:	SOLINST 102				
Pump:	PINE 005023				
Bailer:	—				

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: TW03

Date:

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1313		0.5	6.5	8.01	379.3	930.20	-73.4	6.02	
1318		1.0	6.7	7.66	376.2	980.15	-99.8	5.26	
1323		1.5	6.7	7.52	373.3	616.65	-111.4	5.09	
									1325 Sampled

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW03	Sample ID: 19PS-TW03-1015	Sample Time: ~~1325~~ 1325
Date: 10/15/19	Dup. Sample ID: 19PS-TW99-1015	Dup. Sample Time: 1328
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Sampler: BJ

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW04
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10-15-2019	**Samplers:**	G. Garner, B. Davis, B. Hendricks
Time Start:	1418		
Time Finish:	1440	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25 ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	12.47 ft		
Water Column:	12.53 ft	TD-DTW=Water Column	
Liter/Foot:	0.75 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	9.42 L	Water Column x L/ft	
Three Well Volumes:	28.26 L	Liters in Well x 3	
Sample Depth:	24.0 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro DSS	**Serial No.:**	Pine 045597
Water Level Meter:	Solinst 102	**Serial No.:**	Sundance
Turbidity Meter:	YSI Pro DSS	**Serial No.:**	Pine 045597
Pump Type:	Peri Pump	**Serial No.:**	Pine 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	ICE ONLY	537 MOD	Poly	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW84

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/15/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/15/19
Source Area:		Field Personnel:	B DAVIS, B HENDRICKS, G GARNER

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	12.47'	Total Depth (TD) (ft btoc):	25'
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21'-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) d_b= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method ——— Purge Method PERI PUMP

Field Testing Equipment

Water Quality Meter:	Model Pro DSS	Serial No.	045597
Turbidity Meter:	Model Pro DSS	Serial No.	045597
Water Level Meter:	Solinst 102		
Pump:	Peri pump	Pino	005623
Bailer:	———		

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/15/19

Well ID: TW04

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1425		0.5	5.2	8.00	377.2	1482.33	-74.4	7.81	
1430		0.75	5.8	7.63	375.7	940.29	-90.4	5.93	
1435	12.47	1.10	5.9	7.56	372.2	414.80	-77.2	5.45	1437 SAMPLE

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW04	Sample ID: 19PS-TW04-1015	Sample Time: 1437
Date: 10-15-2019	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☑ No ☐

Initial of Sampler: BD

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW05
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10-15-2019	**Samplers:**	G. Turner, B. Davis, B. Hendricks
Time Start:	1500		
Time Finish:	1545	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25 ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	12.93 ft		
Water Column:	12.07 ft	TD-DTW=Water Column	
Liter/Foot:	0.06 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	0.72 L	Water Column x L/ft	
Three Well Volumes:	2.17 L	Liters in Well x 3	
Sample Depth:	24 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Pump Type:	PERI	**Serial No.:**	PINE 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	GEL ICE	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW05

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10-15-2019
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10-15-2019
Source Area:		Field Personnel:	Garner, Davis, Hendricks

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	17.90'	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-243	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) d_b= borehole diameter (inches) WC_w= water column in well (feet) **SSI**=saturated screen interval (feet) V_T=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method Peri Pump

Field Testing Equipment

Water Quality Meter:	*Model*	YSI PRODSS	*Serial No.*	PINE	045597
Turbidity Meter:	*Model*	YSI PRODSS	*Serial No.*		045597
Water Level Meter:	SOLINST 102				
Pump:	PINE PERI 005623				
Bailer:	—				

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/15/19

Well ID: TW05

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1518		0.6	5.1	7.99	344.6	1938.60	-24.8	3.18	
1523		1.0	5.1	7.68	342.8	1777.03	-91.4	0.75 #	PROBABLY BUBBLES IN FC
1528		1.5	5.1	7.61	341.8	1526.22	-99.0	3.8	
1533	12.93	1.8	4.9	7.56	341.2	1193.11	-100.8	3.9	SAMPLE 1535

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW05	Sample ID: 19PS-TW05-1015	Sample Time: 1535
Date: 10-15-2019	Dup. Sample ID: ———	Dup. Sample Time: ———
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Sampler: [signature]

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW07
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/15/19	**Samplers:**	Beth Davis
Time Start:	1615		Becky Hendricks
Time Finish:	1640	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25.0	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	11.0	ft		
Water Column:	14.0	ft	TD-DTW=Water Column	
Liter/Foot:	0.84	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	11.76	L	Water Column x L/ft	
Three Well Volumes:	35.28	L	Liters in Well x 3	
Sample Depth:	24.0	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro DSS	**Serial No.:**	Pine 045597
Water Level Meter:	Solinst 102	**Serial No.:**	Sundance
Turbidity Meter:	YSI Pro DSS	**Serial No.:**	Pine 045597
Pump Type:	Pari Pump	**Serial No.:**	Pine 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	ICE/HDPE	537 MOD	poly	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW07

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/15/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/15/19
Source Area:		Field Personnel:	Beth Davis Becky Hendricks George Garner

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	11.00	Total Depth (TD) (ft btoc):	25'
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method ~~_____~~ Purge Method PERI PUMP

Field Testing Equipment

Water Quality Meter:	*Model*	Pro DSS	*Serial No.*	045597
Turbidity Meter:	*Model*	Pro DSS	*Serial No.*	045597
Water Level Meter:	Solinst 102			
Pump:	Peri Pump	Pine 005623		
Bailer:	~~_____~~			

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/15/19

Well ID: TW07

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1631 → 1631	11.00	1.0	4.9	7.96	322.3	317.23	0.8	3.77	
1634 → 1634		2.0	4.8	7.66	321.0	111.36	-38.1	1.42	
1638 → 1638		3.0	4.7	7.61	320.2	193.62	-53.4	1.16	1640 SAMPLE

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW07	Sample ID: 19PS-TW07-1015	Sample Time: 1040
Date: 10/15/19	Dup. Sample ID: ———	Dup. Sample Time: ~~1045~~
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Sampler: BAA

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW08
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/15/19	**Samplers:**	Beth Davis
Time Start:	1705		Becky Hendricks
Time Finish:	1725	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	10.75	ft		
Water Column:	14.25	ft	TD-DTW=Water Column	
Liter/Foot:	0.86	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	12.18	L	Water Column x L/ft	
Three Well Volumes:	36.55	L	Liters in Well x 3	
Sample Depth:	24.0	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro DSS	**Serial No.:**	Pine 045597
Water Level Meter:	Solinst 102	**Serial No.:**	Sundance
Turbidity Meter:	YSI Pro DSS	**Serial No.:**	Pine 045597
Pump Type:	Peri Pump	**Serial No.:**	Pine 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	ICE 6BL	537 MOD	poly	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW08

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/13/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/13/19
Source Area:		Field Personnel:	Beth Davis Becky Hendricks George Garner

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	10.74	Total Depth (TD) (ft btoc):	25'
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method ~~_____~~ Purge Method Peri pump

Field Testing Equipment

Water Quality Meter:	Model Pro DSS	Serial No.	645597
Turbidity Meter:	Model Pro DSS	Serial No.	645597
Water Level Meter:	Solinst 102		
Pump:	Peri pump		Pine 005623
Bailer:	~~_____~~		

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/15/19

Well ID: TW08

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1710		.75	3.8	7.76	320.4	1281.78	-31.2	8.70	
1714		1.0	3.7	7.66	315.7	797.58	-79.7	4.13	
1718		1.5	3.7	7.57	312.5	477.20	-82.6	3.98	
1721	10.74	2.0	3.6	7.51	313.0	337.03	-81.1	2.71	1728 SAMPLE

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW08	Sample ID: 19PS-TW08-1015	Sample Time: 1728
Date: 10/15/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW06
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/16/19	**Samplers:**	BETH DAVIS
Time Start:	1545		BECKY HENDRICKS
Time Finish:	1610	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25'	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	10.03	ft		
Water Column:	14.97	ft	TD-DTW=Water Column	
Liter/Foot:	0.06	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	0.90	L	Water Column x L/ft	
Three Well Volumes:	2.69	L	Liters in Well x 3	
Sample Depth:	24	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRO DSS	**Serial No.:**	PINE 045597
Pump Type:	PERI	**Serial No.:**	PINE 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	GEL ICE	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW06

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/16/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/16/19
Source Area:		Field Personnel:	BETH DAVIS BECKY HENDRICKS GEORGE GALNER

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	10.03	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI

Field Testing Equipment

Water Quality Meter:	Model YSI PRODSS	Serial No.	PINE 045594
Turbidity Meter:	Model YSI PRODSS	Serial No.	PINE 045594
Water Level Meter:	SOLINST 102		
Pump:	PINE 005623		
Bailer:	—		

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/16/19

Well ID: TW06

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1550		1.0	2.2	8.43	325.8	1256.01	9.9	6.15	
1554		1.5	2.1	8.05	324.2	916.49	-30.2	2.63	
1558		2.0	2.1	7.92	323.4	907.99	-52.5	1.26	
1602	10.03'	2.5	2.0	7.85	323.0	695.62	-66.8	1.90	
									1600 Sampling Time

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW06	Sample ID: 19PS-TW06-1016	Sample Time: 1600
Date: 10/16/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Sampl BD

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW09
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/16/19	**Samplers:**	Beth Davis
Time Start:	0850		Becky Hendricks
Time Finish:		**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25.0	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	10.23	ft		
Water Column:	14.77	ft	TD-DTW=Water Column	
Liter/Foot:	0.89	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	13.09	L	Water Column x L/ft	
Three Well Volumes:	39.27	L	Liters in Well x 3	
Sample Depth:	24.0	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro DSS	**Serial No.:**	Pine 045597
Water Level Meter:	Solinst 102	**Serial No.:**	Sandance
Turbidity Meter:	YSI Pro DSS	**Serial No.:**	Pine 045597
Pump Type:	Pine Peri	**Serial No.:**	Pine 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	ICE/5FL	537 MOD	Poly	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW09

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/16/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/16/19
Source Area:		Field Personnel:	Beth Davis Becky Hendricks George Garner

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	10.23	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method ~~_____~~ Purge Method Peri pump

Field Testing Equipment

Water Quality Meter:	*Model*	Pro DSS	*Serial No.*	Pine 045597
Turbidity Meter:	*Model*	Pro DSS	*Serial No.*	Pine 045547
Water Level Meter:	Solinst 102			
Pump:	Pine Peri Pump			Pine 005623
Bailer:	~~_____~~			

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/16/19

Well ID: TW09

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1015	10.23	.75	4.0	9.97	386.1	744.06	-33.3	5.50	
1018		1.0	3.7	8.75	379.9	347.0	-44.9	3.94	
1021		1.5	3.6	8.31	379.3	350.05	-70.6	2.80	
									1022 Sample time

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW09	Sample ID: 19PS-TW09-1016	Sample Time: 1022
Date: 10/16/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Sampler: [signature]

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW10
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/18/19	**Samplers:**	BETH DAVIS
Time Start:	1130		BECKY HENDRICKS
Time Finish:	1150	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25 ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	7.41 ft		
Water Column:	17.59 ft	TD-DTW=Water Column	
Liter/Foot:	0.06 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	1.06 L	Water Column x L/ft	
Three Well Volumes:	3.17 L	Liters in Well x 3	
Sample Depth:	24 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRO DSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRO DSS	**Serial No.:**	PINE 045597
Pump Type:	PERI	**Serial No.:**	PINE 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	GEL ICE	537 Mod	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW10

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/18/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/18/19
Source Area:		Field Personnel:	BETH DAVIS BECKY HENDRICKS GEORGE GARNER

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	7.41	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI

Field Testing Equipment

Water Quality Meter:	Model	YSI PRO DSS	Serial No.	PINE	045597
Turbidity Meter:	Model	YSI PRO DSS	Serial No.		045597
Water Level Meter:	SOLINST 102				
Pump:	PINE PERI 005623				
Bailer:	—				

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal

Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/18/19

Well ID: TW10

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
~~1235~~ 1135		0.5	4.1	7.85	311.3	1058.39	1.2	7.78	
~~1238~~ 1138		1.0	4.1	7.59	310.3	834.85	-33.7	3.17	
~~1241~~ 1141		1.5	4.1	7.57	309.9	816.39	-59.2	2.44	1145
~~1244~~ 1144	7.41	2.0	4.1	7.55	309.6	805.12	-68.3	2.44	~~1245~~ SAMPLE TIME

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW10	Sample ID: 19PS TW10-1018	Sample Time: 1145
Date: 10/18/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☑ No ☐

Initial of Sampler: BT

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW11
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/18/19	**Samplers:**	Beth Davis
Time Start:	1045		Becky Hendricks
Time Finish:	1105	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25'	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	5.66	ft		
Water Column:	19.34	ft	TD-DTW=Water Column	
Liter/Foot:	1.16	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	22.44	L	Water Column x L/ft	
Three Well Volumes:	67.33	L	Liters in Well x 3	
Sample Depth:	24.0	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro DSS	**Serial No.:**	Pine 045597
Water Level Meter:	Solinst 102	**Serial No.:**	Sundance
Turbidity Meter:	YSI Pro DSS	**Serial No.:**	Pine 045597
Pump Type:	Peri Pump	**Serial No.:**	Pine 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	Ice Gel	537 Mod	poly	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW11

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/18/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/18/19
Source Area:		Field Personnel:	Beth Davis, Becky Hendricks, George Garner

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	5.66'	Total Depth (TD) (ft btoc):	25'
Screen Interval (ft):	21-24.3'	Saturated Screen Interval (ft):	21-24.3'
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method ✓ Purge Method Peri pump

Field Testing Equipment

Water Quality Meter:	*Model*	Pro DSS	*Serial No.*	045597
Turbidity Meter:	*Model*	Pro DSS	*Serial No.*	045597
Water Level Meter:	Solinst 102			
Pump:	Peri pump		Pine	0051623
Bailer:	—			

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal

Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/18/19

Well ID: TW7

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1050		.75	3.3	8.21	326.3	1035.10	8.6	6.84	
1054		1.0	3.6	7.66	326.3	967.49	-55.8	4.20	
1057		1.5	3.5	7.59	325.9	911.31	-73.4	3.88	
1100	5.66	2.0	3.5	7.57	323.7	774.68	-75.5	4.14	1100 SAMPLE TIME

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW11	Sample ID: 19RS-TW11-1018	Sample Time: 1100
Date: 10/18/19	Dup. Sample ID: ———	Dup. Sample Time: ———
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Sampler: BD

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW12
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/18/19	**Samplers:**	Beth Davis
Time Start:	1000		Becky Hendricks
Time Finish:	1020	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25'	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	8.53	ft		
Water Column:	16.47	ft	TD-DTW=Water Column	
Liter/Foot:	0.99	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	16.28	L	Water Column x L/ft	
Three Well Volumes:	48.83	L	Liters in Well x 3	
Sample Depth:	24'	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro DSS	**Serial No.:**	Pine 045597
Water Level Meter:	Solinst 102	**Serial No.:**	Sundance
Turbidity Meter:	YSI Pro DSS	**Serial No.:**	Pine 045597
Pump Type:	Peri Pump	**Serial No.:**	Pine 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	Ice Cel	537 mod	poly	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW12

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/18/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/18/19
Source Area:		Field Personnel:	Beth Davis, Becky Hendricks, George Garner

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	8.53	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3'
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method Peri pump

Field Testing Equipment

Water Quality Meter:	*Model* Pro DSS	*Serial No.* 045597	
Turbidity Meter:	*Model* Pro DSS	*Serial No.* 045597	
Water Level Meter:	Solinst 102		
Pump:	Peri Pump Pine	005623	
Bailer:	—		

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/18/19

Well ID: TW12

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1002		0.5	2.1	8.69	345.7	1421.19	65.9	6.56	
1007		0.75	2.0	7.98	347.6	1400.24	10.0	4.74	
1012		1.25	1.9	7.68	346.8	1002.69	-47.6	4.15	
1017	8.53	2.0	1.8	7.59	346.3	1009.18	-52.2	4.06	1019 SAMPLE TIME

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW12	Sample ID: 19PS-TW12-10/8	Sample Time: 1019
Date: 10/18/19	Dup. Sample ID:	Dup. Sample Time:
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Sampl

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW13
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/16/19	**Samplers:**	BETH DAVIS
Time Start:	1200		BECKY HENDRICKS
Time Finish:	1220	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25 ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	8.26 ft		
Water Column:	16.74 ft	TD-DTW=Water Column	
Liter/Foot:	0.06 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	1.00 L	Water Column x L/ft	
Three Well Volumes:	3.00 L	Liters in Well x 3	
Sample Depth:	24 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Pump Type:	PERI	**Serial No.:**	PINE 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	4	GEL ICE	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW13

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/16/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/16/19
Source Area:		Field Personnel:	

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	8.26'	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3 3'8" SCREEN
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI

Field Testing Equipment

Water Quality Meter:	*Model*	YSI PRODSS	*Serial No.*	PINE	045597
Turbidity Meter:	*Model*		*Serial No.*		045597
Water Level Meter:	SOLINST 102				
Pump:	PINE 005623				
Bailer:	—				

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/16/2019

Well ID: 19S-TW13-1016

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1205	8.26	1.0	3.1	8.51	254.2	1202.39	-74.8	7.03	
1208		1.5	3.4	8.27	235.3	920.70	-83.2	5.14	
1212		2.0	3.4	8.15	251.4	896.90	-95.7	4.13	
1215		2.5	3.4	8.04	250.6	743.0	-99.1	4.01	1222 SAMPLE TIME
									1228 DUP TIME

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW13	Sample ID: 19PS-TW13-1016	Sample Time: 1222
Date: 10/16/19	Dup. Sample ID: 19PS-TW98-1016	Dup. Sample Time: 1228
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW14
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/16/19	**Samplers:**	BETH DAVIS
Time Start:	1305		BECKY HENDRICKS
Time Finish:	1400	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	9.34	ft		
Water Column:	15.66	ft	TD-DTW=Water Column	
Liter/Foot:	0.06	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	0.94	L	Water Column x L/ft	
Three Well Volumes:	2.82	L	Liters in Well x 3	
Sample Depth:	24	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Pump Type:	PERI	**Serial No.:**	PINE 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	GEL ICE	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW14

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/16/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/16/19
Source Area:		Field Personnel:	BETH DAVIS, BECKY HENDRICKS

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	9.34	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) d_b= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI

Field Testing Equipment

Water Quality Meter:	Model YSI PRODSS	Serial No.	PINE 045597
Turbidity Meter:	Model YSI PRODSS	Serial No.	PINE 045597
Water Level Meter:	SOLINST 102		
Pump:	PINE 005623		
Bailer:	—		

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/16/19

Well ID: TW14

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1305		0.5	9.5	8.27	321.9	2066.51	-119.2	1.96	
1309		0.8	9.3	7.89	319.4	1887.64	-183.7	0.58	
1312		1	8.8	7.84	318.8	1840.86	-192.3	0.51	
1350	9.34*		8.9	7.86	319.6	1255.46	-112.3	2.35	
									Sample time: 1355

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW14	Sample ID: 19PS-TW14-1016	Sample Time: 1355
Date: 10/16/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Samp. BD

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW15
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/16/19	**Samplers:**	Beth Davis
Time Start:	1430		Becky Hendricks
Time Finish:	1459	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	8.47	ft		
Water Column:	16.53	ft	TD-DTW=Water Column	
Liter/Foot:	0.99	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	16.39	L	Water Column x L/ft	
Three Well Volumes:	49.18	L	Liters in Well x 3	
Sample Depth:	24.0	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro DSS	**Serial No.:**	Pine 045597
Water Level Meter:	Solinst 102	**Serial No.:**	Sundance
Turbidity Meter:	YSI Pro DSS	**Serial No.:**	Pine 045597
Pump Type:	Pine Peri	**Serial No.:**	Pine 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	ICE GEL	537 MOD	Poly	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW15

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/16/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/16/19
Source Area:		Field Personnel:	Beth Davis, Becky Hendricks, George Garner

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	8.47	Total Depth (TD) (ft btoc):	25.0
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method ~~—~~ Purge Method Peri Pump

Field Testing Equipment

Water Quality Meter:	*Model*	YSI Pro DSS	*Serial No.*	Pine 045597
Turbidity Meter:	*Model*	YSI Pro DSS	*Serial No.*	Pine 045597
Water Level Meter:	Solinst			
Pump:	Pine Peri		Pine 003623	
Bailer:	~~—~~			

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/16/19

Well ID: TW15

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1437		0.50	4.7	6.13	363.7	852.14	-98.9	5.41	
1442		0.75	4.8	7.87	362.0	832.10	-150.2	4.47	
1447	8.47	1.00	4.7	7.76	359.0	671.45	-148.0	4.58	SAMPLE TIME 1451

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW15	Sample ID: 19PS-TW15-1016	Sample Time: 1451
Date: 10/16/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW17
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/16/19	**Samplers:**	Beth Davis
Time Start:	1643		Becky Hendricks
Time Finish:	1710	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25.0	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	15.16	ft		
Water Column:	9.84	ft	TD-DTW=Water Column	
Liter/Foot:	0.59	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	5.81	L	Water Column x L/ft	
Three Well Volumes:	17.43	L	Liters in Well x 3	
Sample Depth:	24.0	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro DSS	**Serial No.:**	PINE 045597
Water Level Meter:	Solinst 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI Pro DSS	**Serial No.:**	PINE 045597
Pump Type:	PINE PERI	**Serial No.:**	PINE 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	GEL ICE	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW17

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/16/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/16/19
Source Area:		Field Personnel:	BETH DAVIS, BECKY HENDRICKS, GEORGE GARNER

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625
Depth to Water (DTW) (ft btoc):	15.16	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI

Field Testing Equipment

Water Quality Meter:	Model	YSI PRODSS	Serial No.	PINE	045597
Turbidity Meter:	Model	YSI PRODSS	Serial No.		045597
Water Level Meter:	SOLINST 102				
Pump:	PINE 005623				
Bailer:	—				

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/16/2019

Well ID: TW17

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1655		0.5	3.0	8.62	342.9	1498.08	6.2	7.31	
1658		0.75	3.1	7.94	350.4	1303.45	-50.3	5.99	
1703		1.0	3.1	7.73	343.0	1090.50	-66.1	6.01	
1706	15.16	1.25	3.0	7.63	356.8	851.19	-64.1	6.12	
									1714 - sample time

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW17	Sample ID: 19PS-TW17-1016	Sample Time: 1714
Date: 10/16/2019	Dup. Sample ID: ———	Dup. Sample Time: ———
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW18
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/16/19	**Samplers:**	BETH DAVIS
Time Start:	1737		BECKY HENDRICKS
Time Finish:	1815	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	9.15	ft		
Water Column:	15.85	ft	TD-DTW=Water Column	
Liter/Foot:	0.06	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	0.95	L	Water Column x L/ft	
Three Well Volumes:	2.85	L	Liters in Well x 3	
Sample Depth:	24	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Pump Type:	PERI	**Serial No.:**	PINE 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	GEL ICE	1637 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW18

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/16/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/16/19
Source Area:		Field Personnel:	Beth Davis, Becky Hendricks, George Garner

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 6.625"
Depth to Water (DTW) (ft btoc):	9.15	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI

Field Testing Equipment

Water Quality Meter:	Model YSI PRODSS	Serial No.	PINE	045597
Turbidity Meter:	Model YSI PRODSS	Serial No.		045597
Water Level Meter:	SOLINST 107			
Pump:	PINE 005623			
Bailer:	—			

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal

Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/16/18

Well ID: TW18

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1800	9.15	0.5	5.1	8.36	331.0	1824.24	11.2	6.65	
1805		1	5.5	7.87	333.0	1372.64	-36.0	2.53	
1810		1.5	5.6	7.67	330.7	859.45	-59.7	~~15.26~~	2.31
1813		2.0	5.6	7.60	329.5	811.65	-64.5	2.31	
									18B SAMPLE

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW18	Sample ID: 19PS-TW18-1016	Sample Time: 1815
Date: 10/16/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Samp: BD

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW16
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/17/19	**Samplers:**	Beth Davis
Time Start:	1435		Becky Hendricks
Time Finish:	1454	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	10.15	ft		
Water Column:	14.85	ft	TD-DTW=Water Column	
Liter/Foot:	0.89	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	13.23	L	Water Column x L/ft	
Three Well Volumes:	39.69	L	Liters in Well x 3	
Sample Depth:	24	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	ysi Pro DSS	**Serial No.:**	Pine 045597
Water Level Meter:	Solinst 102	**Serial No.:**	Sundance
Turbidity Meter:	YSI Pro DSS	**Serial No.:**	Pine 045597
Pump Type:	Peri pump	**Serial No.:**	Pine 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	ICE UEL	6337 MOD	poly	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW16

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/17/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/17/19
Source Area:		Field Personnel:	Beth Davis, Becky Hendricks, George Garner

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	10.15	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21 - 24.3	Saturated Screen Interval (ft):	21 - 24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) d_b= borehole diameter (inches) WC_w= water column in well (feet) **SSI**=saturated screen interval (feet) V_T=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method ~~_____~~ Purge Method Peri Pump

Field Testing Equipment

Water Quality Meter:	*Model*	Pro DSS	*Serial No.*	045597
Turbidity Meter:	*Model*	Pro DSS	*Serial No.*	045597
Water Level Meter:	Solinst 102			
Pump:	Peri pump		Pine 005623	
Bailer:				

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal

Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/17/19

Well ID: TW16

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1440		1.0	5.15	9.51	315.4	800.37	35.5	6.24	
1444		1.5	5.4	8.19	312.8	643.34	-60.7	3.16	
1448		2.0	5.3	7.98	311.7	562.13	-91.3	2.77	
1452		2.5	5.2	7.85	312.4	548.94	-96.6	2.90	
									Sampling time 1451

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW16	Sample ID: 19PS-TW16-1017	Sample Time: [redacted] 1451
Date: 10/17/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW19
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/17/19	**Samplers:**	Beth Davis
Time Start:	1538		Becky Hendricks
Time Finish:	1609	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25 ft	**Screened Interval (ft.):**	21 - 24.3
DTW (ft. bTOC):	15.58 ft		
Water Column:	9.42 ft	TD-DTW=Water Column	
Liter/Foot:	0.57 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	5.32 L	Water Column x L/ft	
Three Well Volumes:	15.97 L	Liters in Well x 3	
Sample Depth:	24' ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro DSS	**Serial No.:**	Pine 045597
Water Level Meter:	Solinst 102	**Serial No.:**	Sundance
Turbidity Meter:	YSI Pro DSS	**Serial No.:**	Pine 045597
Pump Type:	Peri pump	**Serial No.:**	Pine 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☒ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	4	Ice Gel	1633 MOD	poly	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW19

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/17/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/17/19
Source Area:		Field Personnel:	Beth Davis Becky Hendricks George Garner

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	15.58	Total Depth (TD) (ft btoc):	25'
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method ✓ Purge Method _____

Field Testing Equipment

Water Quality Meter:	*Model*	YSI Pro DSS	*Serial No.*	Pine 045597
Turbidity Meter:	*Model*	YSI Pro DSS	*Serial No.*	Pine 045597
Water Level Meter:	Solinst 102			
Pump:	Pine (Peri pump)	005623		
Bailer:	—			

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/17/19

Well ID: TW19

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1553		0.25	4.3	8.21	317.4	1403.10	4.3	7.71	
1556		0.5	4.2	7.87	311.8	684.29	-42.3	3.42	
1559		1.0	4.1	7.69	310.8	539.55	-60.2	3.13	
1602	15.58	1.5	4.0	7.60	309.5	285.20	-65.1	2.59	1607 SAMPLE TIME

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW19	Sample ID: 19PS-TW19-1017	Sample Time: [redacted] 1607
Date: 10/17/19	Dup. Sample ID: ~~~	Dup. Sample Time: ~~~
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW20
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/18/19	**Samplers:**	BETH DAVIS
Time Start:	13:51		BECKY HENDRICKS
Time Finish:	1430	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	16' ft	**Screened Interval (ft.):**	12.5' - 16'
DTW (ft. bTOC):	2.76' ft	REFUSAL (PERMAFROST)	
Water Column:	3.24' ft	TD-DTW=Water Column	
Liter/Foot:	0.06 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	0.19 L	Water Column x L/ft	
Three Well Volumes:	2.38 L	Liters in Well x 3	
Sample Depth:	24 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRO DSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRO DSS	**Serial No.:**	PINE 045597
Pump Type:	PERI PUMP	**Serial No.:**	~~PINE FF PERI-101398~~ PINE 005623

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	4	ICE	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW20

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/18/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/18/19
Source Area:		Field Personnel:	BETH DAVIS

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	2.76	Total Depth (TD) (ft btoc):	16'
Screen Interval (ft):	12.5-16'	Saturated Screen Interval (ft):	12.5-16
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) d_b= borehole diameter (inches) WC_w= water column in well (feet) **SSI**=saturated screen interval (feet) V_T=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI

Field Testing Equipment

Water Quality Meter:	*Model*	YSI PRO DSS	*Serial No.*	PINE 045597	
Turbidity Meter:	*Model*	YSI PRO DSS	*Serial No.*	045597	
Water Level Meter:	SOLINST 102				
Pump:	PINE PERI 005623				
Bailer:	—				

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/18/19

Well ID: TW20

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1410	[illegible]	0.5	1.2	7.83	1110	1028.20	2.6	6.65	
1414		1.0	1.1	7.08	1111	698.56	-33.3	6.96	
1417 [illegible]		1.5	1.0	6.86	1110	482.60	-44.9	6.84	
1420	2.76	2.0	0.9	6.75	1114	477.0	-50.8	6.78	1425 SAMPLE TIME
									1428 DUP TIME

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW20	Sample ID: APS-TW20-1018	Sample Time: 1425
Date: 10/18/19	Dup. Sample ID: APS-TW99-1018	Dup. Sample Time: 1428
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Sampler: BJ

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW21
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/18/19	**Samplers:**	BETH DAVIS
Time Start:	1457		BECKY HENDRIX
Time Finish:	1700	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	20	ft	**Screened Interval (ft.):**	16-20'
DTW (ft. bTOC):	3.79'	ft		
Water Column:	16.21	ft	TD-DTW=Water Column	
Liter/Foot:	0.97	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	15.77	L	Water Column x L/ft	
Three Well Volumes:	47.30	L	Liters in Well x 3	
Sample Depth:	19.0	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	PRODSS	**Serial No.:**	Pine 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	Sundance
Turbidity Meter:	YSI PRODSS	**Serial No.:**	Pine 045597
Pump Type:	PERI Pump	**Serial No.:**	TII Peri-101398

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
NO SAMPLE COLLECTED					

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW21

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	
Source Area:		Field Personnel:	

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 3/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	3.79'	Total Depth (TD) (ft btoc):	20' (25' then pulled 5')
Screen Interval (ft):	42"	Saturated Screen Interval (ft):	—
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) d_b= borehole diameter (inches) WC_w= water column in well (feet) **SSI**=saturated screen interval (feet) V_T=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method —

Field Testing Equipment

Water Quality Meter:	*Model* —	*Serial No.*
Turbidity Meter:	*Model* —	*Serial No.*
Water Level Meter:	SOLINST	
Pump:	—	
Bailer:	—	

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

USED 2 DIFFERENT PERI PUMPS
NO WATER RETURN

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/18/19

Well ID: TW21

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1601	3.79								NO WATER RETURN
									WL = MOISTURE IN
									CASING

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW2	Sample ID: 19PS-TW21-1018	Sample Time: NONE
Date: 10/18/19	Dup. Sample ID: ———	Dup. Sample Time: ———
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☐ No ☒

Initial of Sampl (BJ)

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW01
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/19/19	**Samplers:**	BETH DAVIS
Time Start:	0840		BECKY HENDRICKS
Time Finish:	0940	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25'	ft	**Screened Interval (ft.):**	21-24.3'
DTW (ft. bTOC):	7.16'	ft		
Water Column:	17.84	ft	TD-DTW=Water Column	
Liter/Foot:	1.07	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	19.10	L	Water Column x L/ft	
Three Well Volumes:	57.3	L	Liters in Well x 3	
Sample Depth:	24.0	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Pump Type:	PERI PUMP	**Serial No.:**	~~PINE~~ TTI Peri-101398

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	ICE	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW01

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/19/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/19/19
Source Area:		Field Personnel:	BETH DAVIS BECKY HENDRICKS GEORGE GARNER

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	7.16	Total Depth (TD) (ft btoc):	25'
Screen Interval (ft):	3'8"	Saturated Screen Interval (ft):	21' - 24.3"
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = d_w{}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = (d_b{}^2 - d_w{}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method N/A Purge Method PERI PUMP

Field Testing Equipment

Water Quality Meter:	*Model*	YSI PRO DSS	*Serial No.*
Turbidity Meter:	*Model*	YSI PRO DSS	*Serial No.*
Water Level Meter:	SOLINST		
Pump:	PERI PUMP	101398	
Bailer:	—		

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/19/19

Well ID: TW01

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
0923		0.5	4.0	8.26	559	1753.90	106.8	4.57	
0927		0.75	3.1	7.66	554	1347.99	-6.7	15.6	
0931		1.0	3.0	7.48	547	905.99	-62.7	14.2	
0935	7.16	1.5	3.0	7.46	545	799.50	-70.5	14.1	0936 SAMPLE

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 19PS-TW01-1019	Sample ID: TW01	Sample Time: 0936
Date: 10/19/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Sampler: EK

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW22
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/19/19	**Samplers:**	BETH DAVIS
Time Start:	0948		BECKY HENDRICKS
Time Finish:	1020	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25'	ft	**Screened Interval (ft.):**	21-24.3'
DTW (ft. bTOC):	8.69	ft		
Water Column:	16.31	ft	TD-DTW=Water Column	
Liter/Foot:	0.06	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	0.98	L	Water Column x L/ft	
Three Well Volumes:	2.34	L	Liters in Well x 3	
Sample Depth:	24	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRO DSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRO DSS	**Serial No.:**	PINE 045597
Pump Type:	PERI	**Serial No.:**	TIT PERI-101398

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	GEL ICE	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW22

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/19/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/19/19
Source Area:		Field Personnel:	BETH DAVIS BECKY HENDRICKS GEORGE GARNER

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	8.69	Total Depth (TD) (ft btoc):	25'
Screen Interval (ft):	21 - 24.3'	Saturated Screen Interval (ft):	21-24.3'
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI

Field Testing Equipment

Water Quality Meter:	*Model*	YSI PRO DSS	*Serial No.*	045597	
Turbidity Meter:	*Model*	YSI PRO DSS	*Serial No.*	045597	
Water Level Meter:	SOLINST 102				
Pump:	PERI TIT PERI-101398				
Bailer:	—				

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal

Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/19/19

Well ID: TW22

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1007		1.0	3.9	7.83	374.0	1325.0	-33.7	4.33	
1010		1.5	4.0	7.77	371.7	1025.04	-105.6	1.59	
1013		2.0	4.0	7.78	370.2	973.44	-112.1	1.27	
1016	8.69	2.5	4.0	7.79	356.5	858.38	-125.5	3.21	1018 SAMPLE TIME

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW22	Sample ID: 19PS-TW22-1019	Sample Time: 1018
Date: 10/19/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☑ No ☐

Initial of Sampler: BD

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	19PS-TW23-1019
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/19/2019	**Samplers:**	Beth Davis, Becky Hendricks
Time Start:	1037		
Time Finish:	1111	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25 ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	9.09 ft		
Water Column:	15.91 ft	TD-DTW=Water Column	
Liter/Foot:	0.06 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	0.95 L	Water Column x L/ft	
Three Well Volumes:	2.86 L	Liters in Well x 3	
Sample Depth:	24 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Pump Type:	PERI PUMP	**Serial No.:**	TTI PERI - 101398

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☒ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	6	GEL ICE	1037 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW23

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/19/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/19/19
Source Area:		Field Personnel:	BETH DAVIS BECKY HENDRICKS GEORGE GARNER

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	9.69	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21 - 24.3	Saturated Screen Interval (ft):	21 - 24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) d_b= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI

Field Testing Equipment

Water Quality Meter:	*Model*	YSI PRODSS	*Serial No.*	045597
Turbidity Meter:	*Model*	YSI PRODSS	*Serial No.*	045597
Water Level Meter:	SOLINST 102			
Pump:	TIT PERI PUMP			PERI-101398
Bailer:				

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date:

Well ID: TW23

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1050	9.69	0.25	3.8	8.05	330.5	2451.0	-27.8	7.90	
1055		0.50	3.9	7.96	341.8	2073.13	80.2	7.28	
1100		~~0.75~~	3.9	7.92	335.7	1765.20	-84.7	7.40	
1104		1.0	3.9	7.85	334.4	1406.17	-88.9	7.45	1107 SAMPLE TIME
									1108 DUP

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW23	Sample ID: 19PS-TW23-1019	Sample Time: 1106
Date: 10/19/19	Dup. Sample ID: 19PS-TW99-1019	Dup. Sample Time: 1108
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Sampler: [signature]

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW24
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/19/19	**Samplers:**	BETH DAVIS
Time Start:	1147		BECKY HENDRICKS
Time Finish:	1250	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25.0	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	15.26	ft		
Water Column:	9.74	ft	TD-DTW=Water Column	
Liter/Foot:	0.58	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	5.65	L	Water Column x L/ft	
Three Well Volumes:	16.95	L	Liters in Well x 3	
Sample Depth:	24.0	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	PRO DSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	PRO DSS	**Serial No.:**	PINE 045597
Pump Type:	PERI PUMP	**Serial No.:**	TTT Peri - 101398

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	ICE	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW24

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/19/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/19/19
Source Area:		Field Personnel:	Beau Davis, Becky Hendricks, George Garner

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.): 2" 4" Other 5/8"		Borehole Dia (in.): 4.25" 6.25" Other 1.625"	
Depth to Water (DTW) (ft btoc):	15.26'	Total Depth (TD) (ft btoc):	25'
Screen Interval (ft):	21-24.3'	Saturated Screen Interval (ft):	21'-24.3'
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method —— Purge Method Peri Pump

Field Testing Equipment

Water Quality Meter:	Model	Pro DSS	Serial No.	645597
Turbidity Meter:	Model	Pro DSS	Serial No.	645597
Water Level Meter:	301 inst 102			
Pump:	Peri Pump 101398			
Bailer:	——			

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal

Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/19/19

Well ID: TW24

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1155	15.26								
~~1238~~		~~0.25~~							
1238		0.5	7.4	8.42	326.1	912.47	-139.0	3.16	
1242		1.0	7.5	8.37	324.9	617.23	-137.1	3.33	
1246		1.5	7.6	8.30	323.8	685.57	-132.1	3.51	
									Sample time 1247

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW24	Sample ID: 19PS-TW24-1019	Sample Time: 1247
Date: 10/19/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Sampler: [illegible]

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW25
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/19/19	**Samplers:**	BETH DAVIS
Time Start:	1313		BECKY HENDRICKS
Time Finish:	1331	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25.00	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	5.41	ft		
Water Column:	19.59	ft	TD-DTW=Water Column	
Liter/Foot:	0.06	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	1.18	L	Water Column x L/ft	
Three Well Volumes:	3.53	L	Liters In Well x 3	
Sample Depth:	24	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRO DSS	**Serial No.:**	PINE 045597
Pump Type:	PERI PUMP	**Serial No.:**	TTT PERI-101398

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	ICE GEL	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW25

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/19/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/19/19
Source Area:		Field Personnel:	BETH DAUS BECKY HENDRICKS GEORGE GARNER

☑ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	5.41	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) d_b= borehole diameter (inches) WC_w= water column in well (feet) **SSI**=saturated screen interval (feet) V_T=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method —— Purge Method PERI PUMP

Field Testing Equipment

Water Quality Meter:	*Model*	YSI PRO DSS	*Serial No.*	045597
Turbidity Meter:	*Model*	YSI PRO DSS	*Serial No.*	045597
Water Level Meter:	SOLINST 102			
Pump:	TTI PERI PUMP.		PERI-101398	
Bailer:				

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: TW25

Date:

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1317	~~5.41~~	.50	5.6	8.52	294.3	1067.01	-49.9	3.52	
1320		.75	5.6	8.21	269.0	1017.0	-110.7	2.07	
1323		1.0	5.5	8.14	292.1	859.0	-124.7	1.79	
1326		~~1.25~~	5.5	8.07	290.0	787.64	-126.8	1.77	
		↑							sample time 1327
		1.5							

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW25	Sample ID: 19PS-TW25-1019	Sample Time: 1327
Date: 10/19/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Sampler: RJ

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW26
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/19/19	**Samplers:**	BETH DAVIS
Time Start:	1400		BECKY HENDRICKS
Time Finish:	1425	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	9.75	ft		
Water Column:	15.25	ft	TD-DTW=Water Column	
Liter/Foot:	0.06	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	0.92	L	Water Column x L/ft	
Three Well Volumes:	2.75	L	Liters in Well x 3	
Sample Depth:	24	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Pump Type:	PERI PUMP	**Serial No.:**	III PERI-101398

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	ICE Gel	537 Mod	Poly	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW26

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/19/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/19/19
Source Area:		Field Personnel:	BETH DAVIS BECKY HENDRICKS GEORGE GARNER

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	9.75'	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = d_w^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = (d_b^2 - d_w^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI PUMP

Field Testing Equipment

Water Quality Meter:	Model PRO DSS	Serial No.	045597
Turbidity Meter:	Model PRO DSS	Serial No.	045597
Water Level Meter:	SOLINST 102		
Pump:	PERI PUMP ~~[illegible]~~		101398
Bailer:	—		

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/19/19

Well ID: TW26

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1403	9.75	0.5	3.5	8.02	339.7	1506.13	-68.2	~~[illegible]~~ ← 2.28	
1406		1.0	3.4	7.99	338.1	1140.68	-100.7	1.66	
1409		1.~~75~~5	3.4	7.96	337.6	975.25	-113.2	1.49	
1412		2.0	3.4	7.94	337.0	893.0	-116.9	1.42	
									sample time 1413

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW26	Sample ID: 19PS-TW26-1019	Sample Time: 1413
Date: 10/19/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Sampler: [signature]

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW27
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/19/19	**Samplers:**	BETH DAVIS
Time Start:	1525		BECKY HENDRICKS
Time Finish:	1600	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25'	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	5.88	ft		
Water Column:	19.12	ft	TD-DTW=Water Column	
Liter/Foot:	0.06	L/ft	See ***Well Volume Calculation*** table	
Liters In Well:	1.15	L	Water Column x L/ft	
Three Well Volumes:	3.44	L	Liters in Well x 3	
Sample Depth:	24	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 107	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Pump Type:	PERI	**Serial No.:**	TTT PERI - 101398

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☑

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	GEL ICE	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW27

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/19/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/19/19
Source Area:		Field Personnel:	BETH DAVIS GEORGE GARNER BECKY HENDRICKS

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	~~[illegible]~~ 5.88	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI

Field Testing Equipment

Water Quality Meter:	*Model*	YSI PRO DSS	*Serial No.*	045597
Turbidity Meter:	*Model*	YSI PRO DSS	*Serial No.*	045597
Water Level Meter:	SOLINST 102			
Pump:	PERI TTI PERI-101398			
Bailer:	—			

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/19/19

Well ID: TW27

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1449	5.88	0.5	2.2	8.33	360.4	2636.93	46.2	7.85	
1552		0.75	1.9	8.26	325.0	1515.0	-28.9	5.02	
1555		1.0	1.9	8.07	329.0	840.75	-64.8	4.23	
1558		1.5	1.8	8.00	341.2	665.27	-69.1	4.05	1559 SAMPLE TIME

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW27	Sample ID: 19PS-TW27-1019	Sample Time: 1559
Date: 10/19/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☑ No ☐

Initial of Sampler: [signature]

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW28
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/19/19	**Samplers:**	BETH DAVIS
Time Start:	1617		BECKY HENDRICKS
Time Finish:	1645	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	7.35'	ft		
Water Column:	17.65	ft	TD-DTW=Water Column	
Liter/Foot:	0.06	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	1.06	L	Water Column x L/ft	
Three Well Volumes:	3.18	L	Liters in Well x 3	
Sample Depth:	24	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRO DSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRO DSS	**Serial No.:**	PINE 045597
Pump Type:	PERI	**Serial No.:**	TTI PERI-101398

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	GEL ICE	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/19/19

Well ID: TW28

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1628	7.35	0.5	10.0	8.00	277.8	1371.68	-53.8	4.32	
1632		1.0	10.7	8.07	275.6	1020.66	-113.9	3.65	
1636		1.25	10.9	8.00	272.6	980.47	-114.9	3.75	
1640			11.0	7.96	271.6	884.73	-112.7	3.66	1641 SAMPLE TIME

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW28	Sample ID: 19PS-TW28-10/19	Sample Time: 1041
Date: 10/19/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Sampler: BD

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW28

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/19/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/19/19
Source Area:		Field Personnel:	BETH DAVIS BECKY HENDRICKS GEORGE GARNER

☒ Original Well Development ☒ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	7.35	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI

Field Testing Equipment

Water Quality Meter:	Model YSI PRODSS	Serial No. 045597		
Turbidity Meter:	Model YSI PRODSS	Serial No. 045597		
Water Level Meter:	SOLINST 102			
Pump:	TT PERI - 101398			
Bailer:	—			

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal

Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW29
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/19/19	**Samplers:**	BETH DAVIS
Time Start:	1745		BECKY HENDRICKS
Time Finish:	1800	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25 ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	6.53 ft		
Water Column:	18.47 ft	TD-DTW=Water Column	
Liter/Foot:	0.06 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	1.11 L	Water Column x L/ft	
Three Well Volumes:	3.32 L	Liters In Well x 3	
Sample Depth:	24 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRO DSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRO DSS	**Serial No.:**	PINE 045597
Pump Type:	PERI	**Serial No.:**	TTT PERI - 101398

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	GEL ICE	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/19/19

Well ID: TW29

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1750	6.53	0.25	0.9	8.14	318.5	1024.0	-32.8	5.86	
1752		0.5	0.7	7.98	317.4	737.34	-68.7	2.20	
1756	1.5→	[illegible]	0.6	7.96	316.6	610.0	-100.5	2.24	
1759		2.0	0.6	7.93	315.6	406.07	-109.3	1.46	1800 SAMPLE TIME

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW29	Sample ID: 19PS-TW29-1019	Sample Time: 1800
Date: 10/19/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Samp. RD

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW29

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/19/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/19/19
Source Area:		Field Personnel:	BETH DAVIS BECKY HENDRICKS GEORGE GARNER

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	6.53	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21.-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI

Field Testing Equipment

Water Quality Meter:	*Model*	YSI PRO DSS	*Serial No.*	045597
Turbidity Meter:	*Model*	YSI PRO DSS	*Serial No.*	045597
Water Level Meter:	SOLINST 102			
Pump:	~~FTT~~ PERI - 101398			
Bailer:	—			

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW30
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/19/19	**Samplers:**	BETH DAVIS
Time Start:	1706		BECKY HENDRICKS
Time Finish:	1735	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	6.68	ft		
Water Column:	18.32	ft	TD-DTW=Water Column	
Liter/Foot:	0.06	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	1.10	L	Water Column x L/ft	
Three Well Volumes:	3.30	L	Liters in Well x 3	
Sample Depth:	24	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRO DSS	**Serial No.:**	PINE 04559J
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRO DSS	**Serial No.:**	PINE 04559J
Pump Type:	PERI	**Serial No.:**	TTI PERI-101398

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☑

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	GEL ICE	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/19/19

Well ID: TW30

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1725	6.68	0.25	6.4	8.5	266.0	1227.60	-12.9	24.4 %	DO % NOT MG/L
1728		0.60	6.3	8.08	261.3	949.18	-70.0	1.14	mg/L
1731		1.00	6.3	7.94	259.6	776.49	-83.7	0.87	mg/L
1734		1.50	6.2	7.87	259.9	855.52	-91.0	0.74 J	1735 SAMPLE TIME

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW30	Sample ID: 19PS-TW30-1019	Sample Time: 1735
Date: 10/19/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Sampler: RB

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW30

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/19/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/19/19
Source Area:		Field Personnel:	BETH DAVIS BECKY HENDRICKS GEORGE GARNER

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	6.68	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI

Field Testing Equipment

Water Quality Meter:	Model	YSI PRODSS	Serial No.	PINE 045597	
Turbidity Meter:	Model	YSI PRODSS	Serial No.	045597	
Water Level Meter:	SOLINST 102				
Pump:	~~HH~~ PERI - 101398				
Bailer:	—				

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal

Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW31
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/20/19	**Samplers:**	BETH DAVIS
Time Start:	1251		BECKY HENDRICKS
Time Finish:	1338	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	10.72	ft		
Water Column:	14.28	ft	TD-DTW=Water Column	
Liter/Foot:	0.06	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	0.86	L	Water Column x L/ft	
Three Well Volumes:	2.57	L	Liters in Well x 3	
Sample Depth:	24	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Pump Type:	PERI	**Serial No.:**	TIT PERI-101398

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	GEL ICE	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/20/19

Well ID: TW31

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1313	10.72	1.0	14.5	7.24	338.8	1014.77	12.1	3.84	
1316		1.5	15.6	7.04	331.7	1013.21	-75.3	2.37	
1319		2.0	15.8	6.95	334.6	879.37	-91.2	2.11	
1322		2.5	15.8	6.92	332.3	797.06	-92.7	2.18	1323 SAMPLE TIME

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW31	Sample ID: 19PS-TW31-1020	Sample Time: 1323
Date: 10/20/19	Dup. Sample ID: ———	Dup. Sample Time: ———
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW31

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/20/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/20/19
Source Area:		Field Personnel:	BETH DAVIS BECKY HENDRICKS GEORGE GARNER

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	10.72	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI

Field Testing Equipment

Water Quality Meter:	Model	YSI PRO DSS	Serial No.	PINE 045597
Turbidity Meter:	Model	YSI PRO DSS	Serial No.	PINE 045597
Water Level Meter:	SOLINST 102			
Pump:	TTT PERI-101398			
Bailer:	—			

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW32
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/20/19	**Samplers:**	BETH DAUS
Time Start:	1151		BECKY HENDRICKS
Time Finish:	1225	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	7.48	ft		
Water Column:	17.52	ft	TD-DTW=Water Column	
Liter/Foot:	0.06	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	1.05	L	Water Column x L/ft	
Three Well Volumes:	3.15	L	Liters in Well x 3	
Sample Depth:	24	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Pump Type:	PERI	**Serial No.:**	PERI-101398

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☑

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	GEL ICE	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/20/19

Well ID: TW32

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1206	7.48	0.4	3.3	7.20	277.4	1742.30	14.2	7.91	
1211		1.0	3.2	7.11	270.9	1251.14	-16.9	7.62	
1216		1.25	3.2	7.07	278.4	884.21	-43.4	7.51	
1220		1.5	3.2	7.06	274.0	669.63	-48.4	7.51	1221 SAMPLE TIME

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW32	Sample ID: 19PS-TW32-1020	Sample Time: 1221
Date: 10/20/19	Dup. Sample ID: ———	Dup. Sample Time: ———
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☑ No ☐

Initial of Samp. BD

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW32

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/20/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/20/19
Source Area:		Field Personnel:	BETH DANS BECKY HENDRICKS GEORGE GARNER

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	1.48	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) d_b= borehole diameter (inches) WC_w= water column in well (feet) **SSI**=saturated screen interval (feet) V_T=Total Well Volume (gal)
Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$
Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI

Field Testing Equipment

Water Quality Meter:	*Model* YSI PRODSS	*Serial No.*	PINE 045597
Turbidity Meter:	*Model* YSI PRODSS	*Serial No.*	045597
Water Level Meter:	SOLINST 102		
Pump:	HT PERI-101398		
Bailer:	—		

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:
- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW33
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/20/19	**Samplers:**	BETH DAVIS
Time Start:	1033		BECKY HENDRICKS
Time Finish:		**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25 ft	**Screened Interval (ft.):**	21-243
DTW (ft. bTOC):	7.30 ft		
Water Column:	17.70 ft	TD-DTW=Water Column	
Liter/Foot:	0.06 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	1.06 L	Water Column x L/ft	
Three Well Volumes:	3.18 L	Liters in Well x 3	
Sample Depth:	24 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Pump Type:	PERI	**Serial No.:**	TTT PERI-101398

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☒ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	6	GEL ICE	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/20/19

Well ID: TW33

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1059	7.30	0.25	3.2	8.23	300.4	2407.84	10.8	8.04	LOTS OF SUSPENDED
1105		0.50	3.3	7.10	291.0	1842.11	-57.6	8.09	FINES
1110		0.75	3.3	7.07	286.5	1030.41	-65.9	8.58	
1115		1.00	3.3	7.05	296.8	590.68	-65.8	8.52	1116 SAMPLE
									1118 DUP

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW33	Sample ID: 19PS-TW33-1020	Sample Time: 1116
Date: 10/20/19	Dup. Sample ID: 19PS-TW99-1020	Dup. Sample Time: 1118
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Sampl (BD)

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW33

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/20/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/20/19
Source Area:		Field Personnel:	BETH DAVIS BECKY HENDRICKS GEORGE GARNER

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	7.30	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI

Field Testing Equipment

Water Quality Meter:	*Model*	YSI PRO DSS	*Serial No.*	PINE 045597	
Turbidity Meter:	*Model*	YSI PRO DSS	*Serial No.*	045597	
Water Level Meter:	SOLINST 102				
Pump:	TT PERI - 101398				
Bailer:	—				

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal

Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	~~19~~ TW34
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/20/19	**Samplers:**	BETH DAVIS
Time Start:	1005		BECKY HENDRICKS
Time Finish:	1025	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	6.28	ft		
Water Column:	18.72	ft	TD-DTW=Water Column	
Liter/Foot:	0.06	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	1.12	L	Water Column x L/ft	
Three Well Volumes:	3.37	L	Liters in Well x 3	
Sample Depth:	24	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRODSS	**Serial No.:**	PINE 045597
Pump Type:	PERI	**Serial No.:**	TTT PERI-101398

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	GEL ICE	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW34

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/20/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/20/19
Source Area:		Field Personnel:	BETH DAVIS, BECKY HENDRICKS, GEORGE GARNER

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	6.28	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21.0-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI

Field Testing Equipment

Water Quality Meter:	Model	YSI PRODSS	Serial No.	PINE 045597
Turbidity Meter:	Model	YSI PRODSS	Serial No.	PINE 045597
Water Level Meter:	SOLINST 102			
Pump:	PERI TII & PERI-101398			
Bailer:	—			

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal

Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 10/20/19

Well ID: TW34

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1008	10.28	0.5	4.0	7.37	304.7	1242.06	25.8	3.57	
1012		1.0	3.9	7.11	302.6	1250.49	-44.7	1.50	
1016		1.5	3.9	7.07	302.0	1175.58	-67.4	1.15	1018 SAMPLE TIME

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW34	Sample ID: 19PS-TW34-1020	Sample Time: 1018
Date: 10/20/19	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW35
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/20/19	**Samplers:**	BETH DAVIS
Time Start:			BECKY HENDRICKS
Time Finish:		**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	25	ft	**Screened Interval (ft.):**	21-24.3
DTW (ft. bTOC):	8.78	ft		
Water Column:	16.22	ft	TD-DTW=Water Column	
Liter/Foot:	0.06	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	0.97	L	Water Column x L/ft	
Three Well Volumes:	2.92	L	Liters in Well x 3	
Sample Depth:	24	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
(5/8")	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRO DSS	**Serial No.:**	PINE 045597
Water Level Meter:	SOLINST 102	**Serial No.:**	SUNDANCE
Turbidity Meter:	YSI PRO DSS	**Serial No.:**	PINE 045597
Pump Type:	PERI	**Serial No.:**	TTT PERI-101398

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	GEL ICE	537 MOD	POLY	

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW35

Project Information

Client:	USACE	Contract No.:	W911KB17D0018
Project:	Expanded PFAS SI	Date Started:	10/20/19
Site:	Eielson AFB and Moose Creek, AK	Date Completed:	10/20/19
Source Area:		Field Personnel:	BETH DAVIS, BECKY HENDRICKS, GEORGE GARNER

☒ Original Well Development ☐ Redevelopment

Well Details

Well Dia (in.):	2" 4" Other 5/8"	Borehole Dia (in.):	4.25" 6.25" Other 1.625"
Depth to Water (DTW) (ft btoc):	8.78	Total Depth (TD) (ft btoc):	25
Screen Interval (ft):	21-24.3	Saturated Screen Interval (ft):	21-24.3
Water Column in Well (ft):	$WC_w = TD - DTW$		
Volume in Well (gal):	$V_w = {d_w}^2 \times 0.04079 \times WC_w$		
Volume in Filter Pack (gal):	$V_{FP} = ({d_b}^2 - {d_w}^2) \times 0.01224 \times SSI$		
Total Well Volume (gal):	$V_w + V_{FP} = V_T$		

d_w=well diameter (inches) **d_b**= borehole diameter (inches) **WC_w**= water column in well (feet) **SSI**=saturated screen interval (feet) **V_T**=Total Well Volume (gal)

Total well volume 2" (gal): $V_T = [WC_w \times 0.1632] + [SSI \times 0.1721]$

Total well volume 4" (gal): $V_T = [WC_w \times 0.6528] + [SSI \times 0.2822]$

Surge Method — Purge Method PERI

Field Testing Equipment

Water Quality Meter:	Model YSI PRO DSS	Serial No.	PINE	045597
Turbidity Meter:	Model YSI PRO DSS	Serial No.		045597
Water Level Meter:	SOLINST 102			
Pump:	TIT PERI - 101398			
Bailer:				

Work Plan Criteria

Min purge volume (3 well volumes) _____ total gal
Max purge volume (10 well volumes) _____ total gal

Development complete:

- Turbidity < 10 NTUs or maximum 10 well volumes purged

SUNDANCE-EA II, LLC

Well Development Record

Well ID: TW35

Purging Data

Date: 10/20/19

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
0920		0.5	9.8	6.68	287.6	1572.0	129.7	6.58	
0924		1.0	10.6	6.71	283.9	1305.14	72.2	5.09	
0928		1.5	10.8	6.84	281.1	1026.92	10.1	4.90	
0932	8.75	2.0	10.9	6.90	274.5	991.06	-40.7	5.42	0934 SAMPLE TIME

Additional Comments:

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW35	Sample ID: 19PS-TW35-1020	Sample Time: 0934
Date: 10/20/19	Dup. Sample ID: ——	Dup. Sample Time: ——
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									

Sampled? : Yes ☒ No ☐

Initial of Sampler: BJ

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	DSAP-85
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	4/16/2020	**Samplers:**	Benjamin Leach, Nicole Stoeckle
Time Start:	1205		
Time Finish:	1340	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	21.15	ft	**Screened Interval (ft.):**	13.9 - 18.9 bgs
DTW (ft. bTOC):	15.29	ft		
Water Column:	5.86	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	3.55	L	Water Column x L/ft	
Three Well Volumes:	10.64	L	Liters in Well x 3	
Sample Depth:	17.79	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	(0.605)
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI MPS 556	**Serial No.:**	15H102751
Water Level Meter:	WLM	**Serial No.:**	16.0506116
Turbidity Meter:	Micro TPW HF Scientific	**Serial No.:**	20110430 9
Pump Type:	GeoPump	**Serial No.:**	J0400 26168

Purge Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☐ No ☑

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFCs/PFCa	2	none	537	250mL HDPE	

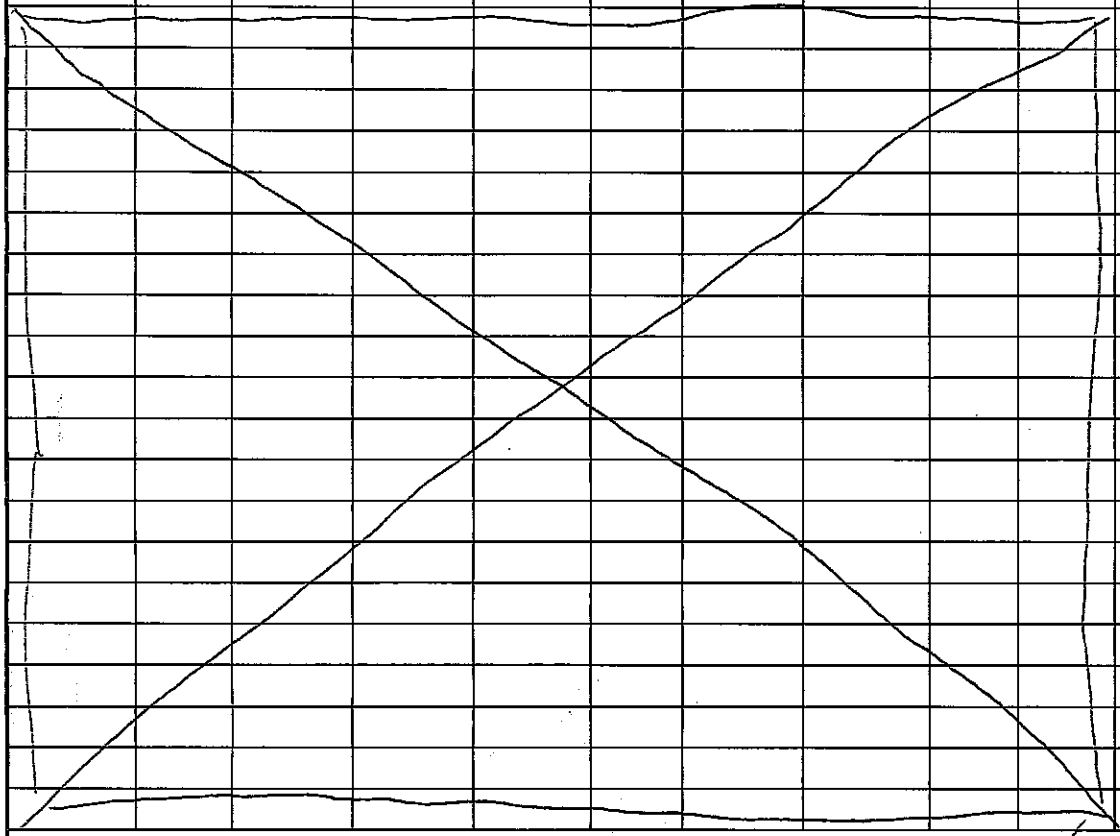
Low-Flow Groundwater Sample & Stabilization Form

Well ID:	DSAP-85	Sample ID:	20-DSAP-85-0416	Sample Time:	1311
Date:	4/16/2020	Dup. Sample ID:		Dup. Sample Time:	

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1236	START PURGING									
1241	2L	3.22	324	7.60	6.16	186.1	58.68	15.30	0.4	very turbid upon intial purge
1246	4L	3.06	309	6.45	6.42	182.3	40.22	15.31	0.4	
1251	6L	3.03	306	5.91	6.56	180.7	32.29	15.34	0.4	
1256	8L	3.04	305	5.20	6.65	179.4	16.17	15.34	0.4	
1301	10L	3.03	306	4.76	6.69	179.0	8.80	15.34	0.4	
1306	12L	2.91	307	4.48	6.71	178.2	6.56	15.34	0.4	
1311	14L	2.90	307	4.28	6.73	176.5	5.05	15.34	0.4	sample



Sampled? : Yes ☑ No ☐

Initial of Sampler: BRL, NS

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	DSAP - 14
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	4/16/2020	**Samplers:**	Benjamin Leach, Nicole Stoecklein
Time Start:	0909		
Time Finish:	1140 ~~1145~~ ~~10 1145~~	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	21.79	ft	21.79	**Screened Interval (ft.):**	~~10.79 21.79~~ 15.10 – 20.10 (79)
DTW (ft. bTOC):	13.28	ft	13.28		
Water Column:	8.51	ft	8.51	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft		See ***Well Volume Calculation*** table	
Liters in Well:	5.14 (855)	L		Water Column x L/ft	
Three Well Volumes:	15.45	L		Liters in Well x 3	
Sample Depth:	~~19.29~~ 17.60	ft		Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI MPS 556	**Serial No.:**	15h102751
Water Level Meter:	WLM	**Serial No.:**	16.050416
Turbidity Meter:	MICROTPW HF Scientific field portable	**Serial No.:**	20110409
Pump Type:	Geopump	**Serial No.:**	JQ4002668

Purge Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☑ No ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFOS/PFOA	8	none	537	250mL HDPE	1 dupl

Low-Flow Groundwater Sample & Stabilization Form

Well ID: DSAP-14	Sample ID: 20-DSAP-14-0416	Sample Time: 1052
Date: 4/16/2020	Dup. Sample ID: 20PS-MW99-0416	Dup. Sample Time: 1200
Notes: Field Blank 20-FBAM-0416 1005		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
0957	START PURGING								0.3L/min	
1002	1.5L	2.30	469	15.43	5.95	203.1	63.96	13.32	0.3L/min	Slightly Turbid
1007	3.0	2.43	461	12.40	6.32	169.7	64.17	13.33	0.3	
1012	4.25	2.28	457	8.71	6.48	146.2	49.42	13.33	0.25	
1017	5.50	2.31	457	7.43	6.55	128.0	35.05	13.33	0.25	
1022	6.75	2.35	456	7.06	6.59	116.5	31.25	13.33	0.25	
1027	8.00	2.30	456	7.21	6.64	106.2	22.92	13.33	0.25	
1032	9.25	2.37	455	7.59	6.67	98.3	21.27	13.33	0.25	
1037	10.25	2.32	455	7.70	6.71	91.8	12.96	13.33	0.25	
1042	11.50	2.33	454	6.42	6.74	86.3	9.85	13.33	0.25	
1047	12.75	2.30	454	6.14	6.75	83.5 81.6	6.24 3.27	13.33	0.25	
1052	14.00	2.30	454	4.90	6.77			13.33	0.25	Sampled

Sampled? : Yes ☑ No ☐

Initial of Sampler: BLE/NS

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW47
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	26 MAY 2020	**Samplers:**	JUDSON PARSON
Time Start:	12:02		KAYLA COPELAND
Time Finish:	1310	**Checked By:**	G. Garner

Well & Purge Information

TD (ft. bTOC):	18.75 ft	**Screened Interval (ft.):**	3.66 ft
DTW (ft. bTOC):	9.3 ft		
Water Column:	9.45 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	5.7 L	Water Column x L/ft	
Three Well Volumes:	17.1 L	Liters in Well x 3	
Sample Depth:	15 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	046714
Water Level Meter:	SOLINST	**Serial No.:**	294991
Turbidity Meter:	HACH 2100Q	**Serial No.:**	041636
Pump Type:	MASTERFLEX PERI	**Serial No.:**	033471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	None	low flow	250 mL	

AG

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: TW47

Date:

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1256	~~18.75~~	4.5	2.4	6.80	355.0	17.0	-46.3	0.28	
1259	9.3 HH	4.75	2.7	6.80	354.4	13.6	-47.7	0.30	
1302		5.0	2.5	6.82	353.8	11.5	-48.8	0.28	
1305		5.25	2.6	6.82	355.0	11.7	-49.6	0.27	
1308		5.5	2.6	6.83	354.5	~~13.0~~ 11.3	-50.4	0.26	
1310									SAMPLED
									20PS-TW47-0526

Additional Comments: ALL VALUES STABILIZED

HH

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW02C
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	5/21/2020	**Samplers:**	N. Stoeckelein
Time Start:	1501		H. Peterson
Time Finish:	1715	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	163.87 ft	**Screened Interval (ft.):**	151-161' bTOC
DTW (ft. bTOC):	4.76 ft		
Water Column:	159.11 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	96.26 L	Water Column x L/ft	
Three Well Volumes:	288.78 L	Liters In Well x 3	
Sample Depth:	156.00' ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI MPS 556	**Serial No.:**	15H102751
Water Level Meter:	WLM	**Serial No.:**	WLM-07, 052107
Turbidity Meter:	Micro TPW	**Serial No.:**	20160 5525
Pump Type:	Peristaltic Pump GeoPump	**Serial No.:**	J0400 26668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☒ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS PFOA/PFOS	8	None	EPA 537	250mL HDPE	1 dup

159.11 ft (0.605 L/ft) =

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW02C	Sample ID: 20PS-MW02C-0521	Sample Time: 1641
Date: 5/21/2020	Dup. Sample ID: 20PS-MW99-0521	Dup. Sample Time: 1600
Notes: Field blank collected: 20PS-FBPM-0521 @ 1025		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C ✓	Spec. Cond. (µS/cm) *± 3% ✓	DO (mg/L) *± 10%	pH *± 0.1 ✓	ORP (mV) *± 10 mV ✓	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1501	START PURGING									
1506	2	5.81	337	101.13	6.78	-162.8	36.09	4.73	0.4	cloudy
1511	3.5	5.18	321	35.30	7.17	-194.8	686.8	4.74	0.3	murky - cleared out some silt
1516	5	4.96	304	23.76	7.08	-215.8	154.0	4.73	0.3	
1521	6.25	5.04	305	15.00	7.19	-246.0	90.58	4.74	0.25	
1526	7.50	4.78	303	16.33	7.36	-270.0	76.61	4.74	0.25	
1531	8.75	4.60	301	14.01	7.43	-291.1	73.86	4.74	0.25	
1536	10.00	4.67	299	9.53	7.48	-303.6	70.14	4.74	0.25	
1541	11.25	4.50	297	8.52	7.48	-313.5	53.31	4.74	0.25	
1546	12.50	4.30	295	9.20	7.50	-321.1	44.00	4.74	0.25	
1551	13.75	4.33	293	11.74	7.48	-326.6	34.83	4.74	0.25	
1556	15.00	4.32	294	19.65	7.51	-333.6	25.08	4.74	0.25	
1601	16.25	4.52	293	17.23	7.50	-339.7	21.61	4.74	0.25	
1606	17.50	4.38	293	3.51	7.50	-350.3	17.30	4.73	0.25	
1611	18.75	4.38	292	2.94	7.48	-351.1	15.90	4.73	0.25	
1616	20.00	4.23	292	2.61	7.51	-353.2	14.65	4.74	0.25	
1621	21.25	4.22	292	2.56	7.49	-356.1	15.44	4.74	0.25	
1626	22.50	4.22	292	2.53	7.50	-357.9	14.73	4.74	0.25	
1631	23.75	4.32	292	2.29	7.50	-359.2	12.51	4.74	0.25	
1636	25.00	4.34	293	2.14	7.50	-361.4	12.06	4.74	0.25	
1641	26.25	4.31	292	2.13	7.50	-365.9	11.52	4.73	0.25	Collect sample.

Sampled?: Yes ☑ No ☐

Initial of Sampler: HP

212.85

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW02D
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	05/24/2020	**Samplers:**	N. Stocklein
Time Start:	1145		H. Peterson
Time Finish:	1445	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	212.85	ft	**Screened Interval (ft.):**	199.8-209.8 (10')
DTW (ft. bTOC):	4.55	ft		
Water Column:	208.30	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	126.02	L	Water Column x L/ft	
Three Well Volumes:	378.06	L	Liters in Well x 3	
Sample Depth:	206.80	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI MPS 556	**Serial No.:**	15H102751
Water Level Meter:	WLM	**Serial No.:**	WLM-07.052107
Turbidity Meter:	Micro TPW	**Serial No.:**	2016005525
Pump Type:	Peristaltic Pump 'bao Pump'	**Serial No.:**	J04002668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFOS/PFOA	4	None.	EPA 537	250mL HDPE	1 dup

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW02D	Sample ID: 20PS-MW02D-0524	Sample Time: 1410
Date: 05/24/2020	Dup. Sample ID: 20PS-MW99-0524	Dup. Sample Time: 1400
Notes:	PM FB collected.	

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C ✓	Spec. Cond. (µS/cm) *± 3% ✓	DO (mg/L) *± 10% ✓	pH *± 0.1 ✓	ORP (mV) *± 10 mV ✓	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1155	START PURGING									
1200	1.5	4.89	337	43.04	6.20	177.0	17.19	4.59	0.3	
1205	3.0	4.43	295	15.10	6.81	85.0	165.4	4.59	0.3	cloudy
1210	4.5	4.48	268	11.12	6.99	-38.7	350.3	4.59	0.3	murky
1215	6.0	4.26	266	10.44	7.03	-72.3	368.8	4.59	0.3	
1220	7.5	4.27	263	8.82	7.07	-107.2	322.9	4.60	0.3	
1225	9.0	4.19	262	8.33	7.15	-107.0	293.8	4.59	0.3	
1230	10.5	4.11	262	7.89	7.23	-87.0	250.5	4.59	0.3	
1235	12.0	4.04	263	8.17	7.29	-98.1	232.3	4.59	0.3	
1240	13.5	4.14	261	7.34	7.34	-38.3	188.6	4.59	0.3	
1245	15.0	4.16	260	7.17	7.36	-18.8	177.3	4.60	0.3	
1250	16.5	4.16	260	7.34	7.37	-49.0	166.7	4.60	0.3	
~~1255~~	18.0	4.32	260	7.34	7.39	-74.5	139.0	4.59	0.3	
1300	19.5	4.09	261	4.49	7.40	-94.4	127.2	4.60	0.3	
1305	21.0	4.21	261	5.18	7.40	-99.8	115.6	4.59	0.3	
1310	22.5	4.41	264	4.17	7.38	-83.8	110.7	4.59	0.3	
1315	24.0	4.35	262	3.69	7.34	-85.1	100.9	4.59	0.3	
1320	~~25.5~~ 25.1 HP	4.44	261	2.66	7.46	~~-79.4~~	83.62	4.60	0.3	cloudy
1325	~~25.27~~ 25.2 HP	4.42	261	3.79	~~7.47~~ 7.47	-13.5	72.60	4.60	0.3	7.47 pH
1330	~~30~~ 28.5 HP	4.21	263	5.14	7.48	-1.2	71.55	4.60	0.3	
1335	30.0	4.38	261	4.96	7.48	-11.4	68.44	4.60	0.3	
1340	31.5	4.40	261	2.48	7.48	-21.2	62.41	4.60	0.3	
1345	33.0	4.52	260	3.28	7.48	-56.0	66.84	4.60	0.3	
1350	34.5	4.32	263	5.24	7.49	-81.0	49.36	4.60	0.3	
1355	36.0	4.41	262	4.45	7.48	-76.7	48.90	4.60	0.3	
1400	37.5	4.55	262	4.20	7.49	-79.2	53.98	4.60	0.3	
1405	39.0	4.46	261	4.05	7.50	-82.0	48.83	4.60	0.3	
1410	40.5	4.46	261	4.05	7.50	-80.8	47.47	4.60	0.3	collect sample.

Sampled? : Yes ☑ No ☐

Initial of Sampler: HP

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW 45
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	31 MAY 2020	**Samplers:**	J. PARSON
Time Start:	1235		G. GARNER
Time Finish:		**Checked By:**	G. Garner

Well & Purge Information

TD (ft. bTOC):	7.33	ft	**Screened Interval (ft.):**	16" → 1.33
DTW (ft. bTOC):	4.0	ft		
Water Column:	3.3	ft	TD-DTW=Water Column	
Liter/Foot:	0.087	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	0.28	L	Water Column x L/ft	
Three Well Volumes:	0.86	L	Liters in Well x 3	
Sample Depth:	7.0	ft	Depth of Pump Intake	

0.22 GAL

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Professional	**Serial No.:**	046714
Water Level Meter:	Solinst	**Serial No.:**	294991
Turbidity Meter:	Hach 2100 Q	**Serial No.:**	041636
Pump Type:	Masterflex Peri	**Serial No.:**	033471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

MM

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 31 MAY 2020

Well ID: TW 45

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1246		0.05	22.3	6.79	721	MAX	-50.5	3.32	
									Unable to sample

Additional Comments: EXTREMELY SLOW RECHARGE, PUMP AT MINIMUM RATE, VALUES LIKELY NOT REPRESENTATIVE OF GROUNDWATER DUE TO SUCH LOW FLOW THROUGH YSI.

MZ

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW 51
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	27 MAY 2020	**Samplers:**	J. PARSON
Time Start:	1300		K. COPELAND
Time Finish:	1347	**Checked By:**	G. Garner

Well & Purge Information

TD (ft. bTOC):	12.8	ft	**Screened Interval (ft.):**	9-12.8
DTW (ft. bTOC):	2.80	ft		
Water Column:	10	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	6.05	L	Water Column x L/ft	
Three Well Volumes:	18.15	L	Liters in Well x 3	
Sample Depth:	11.0	ft	Depth of Pump Intake	

4.7 gal

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	046 714
Water Level Meter:	SOLINST	**Serial No.:**	294991
Turbidity Meter:	HACH 2100Q	**Serial No.:**	041 636
Pump Type:	MASTERFLEX PERI	**Serial No.:**	033 471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	None	Low flow	250 mL	

GG

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date:

Well ID: TW51

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
13:37	~~12.8~~ HH	4.7	3.6	6.99	460.9	57.2	-46.7	0.08	
13:40	2.8	4.9	3.6	7.02	461.2	24.4	-47.5	0.09	
13:43		5.1	3.6	7.01	461.0	23.2	-47.7	0.06	
13:46		5.3	3.5	7.03	461.3	19.5	-47.7	0.07	
13 47									SAMPLED
									20PS-TW51-0527

Additional Comments:

STABILIZED 5/6 PARAMETERS; SAMPLED

HH

SUNDANCE-EA II, LLC

0822 START PURGING

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW 50
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	27 MAY 2020	**Samplers:**	J. PARSON
Time Start:	0810		K. COPELAND
Time Finish:	0850	**Checked By:**	G. Garner

Well & Purge Information

TD (ft. bTOC):	15.0 ft	**Screened Interval (ft.):**	~~3.8~~ 3,66
DTW (ft. bTOC):	~~12.8~~ 10.0 ft		
Water Column:	5.0 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	3.025 L	Water Column x L/ft	
Three Well Volumes:	9.075 L	Liters in Well x 3	
Sample Depth:	13.0 ft	Depth of Pump Intake	

2.8

2.34
991

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	046 714
Water Level Meter:	SOLINST	**Serial No.:**	294 991
Turbidity Meter:	HACH 2100Q	**Serial No.:**	041 636
Pump Type:	MASTERFLEX PERI	**Serial No.:**	033 471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	4 (2 reg, 2 DUP)	None	Low Flow	250 mL	

LL

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date:

Well ID: TW 50

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
0837	15.0 MM	2.5	1.3	7.06	477.7	~~195~~	128.9	7.53	
0840	10.0	2.75	1.3	6.97	477.1	84.8	130.4	6.83	
0843		3.0	1.3	6.91	477.0	86.0	131.5	6.80	
0846		3.25	1.3	6.89	477.4	32.9	131.6	7.01	
0849		3.5	1.3	6.87	477.1	23.8	131.9	7.04	
0850									SAMPLED + DUP
									20S-TW50-0527
									20S-TW99-0527

Additional Comments: FIELD DUP TAKEN, STABILIZED EXCEPT FOR TURBIDITY

MM

SUNDANCE-EA II, LLC

0922 START PURGING

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW 53
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	~~0910~~ 27 MAY 2021	**Samplers:**	J. PARSON
Time Start:	0910		K. COPELAND
Time Finish:	0953	**Checked By:**	G. Garner

Well & Purge Information

TD (ft. bTOC):	7.5	ft	**Screened Interval (ft.):**	3.66
DTW (ft. bTOC):	2.0	ft		
Water Column:	5.5	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	3.3275	L	Water Column x L/ft	
Three Well Volumes:	9.98	L	Liters in Well x 3	
Sample Depth:	5.5	ft	Depth of Pump Intake	

5.5

2.6 gal

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	046 714
Water Level Meter:	SOLINST	**Serial No.:**	294 991
Turbidity Meter:	HACH 2100Q	**Serial No.:**	041 636
Pump Type:	MASTERFLEX PERI	**Serial No.:**	033 471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	None	Low flow	250 mL	

NA

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date:

Well ID: TW 53

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
0938	2.0	2.6	2.4	6.50	706.7	137	-73.2	0.55	
0941		2.85	2.3	6.48	705.5	75.8	-75.6	0.44	
0944		3.1	2.4	6.47	704.3	57.5	-77.3	0.37	
0947		3.35	2.3	6.50	704.8	35.0	-79.0	0.29	
0950		3.6	2.3	6.52	704.3	25.4	-79.9	0.27	
0953									SAMPLED
									20PS-TW53-0527

Additional Comments: STABILIZED 4/6, SAMPLED

AB

SUNDANCE-EA II, LLC

1033 START PUMPING

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW 57
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	27 MAY 2020	**Samplers:**	J. PARSON
Time Start:	1020		K. COPELAND
Time Finish:	1055	**Checked By:**	G. Garner

Well & Purge Information

TD (ft. bTOC):	8.0 ft	**Screened Interval (ft.):**	3.66
DTW (ft. bTOC):	4.0 ft		
Water Column:	4.0 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	2.42 L	Water Column x L/ft	
Three Well Volumes:	7.26 L	Liters in Well x 3	
Sample Depth:	6.0 ft	Depth of Pump Intake	

4.5

1.87 gal

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	046 714
Water Level Meter:	SOLINST	**Serial No.:**	294 991
Turbidity Meter:	HACH 2100Q	**Serial No.:**	041 636
Pump Type:	MASTERFLEX PERI	**Serial No.:**	033 471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	None	Low Flow	250 mL	

JA

11:00 pack & end
11:05 next well

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date:

Well ID: TW 57

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
10:45	~~9.0~~	2.0	2.6	6.75	500.8	252	51.3	6.70	
10:48		2.25	2.6	6.57	500.1	129	52.6	6.75	
10:51		2.5	2.5	6.61	501.5	63.9	54.4	6.93	
1055									SAMPLED
									20PS-TW57-0527

Additional Comments:

STABILIZED 4/6 PARAMETERS, SAMPLED

AH

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW56
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	MAY 27, 2020	**Samplers:**	KAYLA COPELAND
Time Start:	1200		JUDSON PARSON
Time Finish:	1236	**Checked By:**	G. Garner

Well & Purge Information

0.5 ft

TD (ft. bTOC):	12.2 ~~4.0~~ ft	**Screened Interval (ft.):**	~~2.0~~ 3.66
DTW (ft. bTOC):	9.2 ~~6.0~~ ft		
Water Column:	3.0 ~~3.0~~ ft	TD-DTW=Water Column	
Liter/Foot:	0.605 ~~.605~~ L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	1.815 L	Water Column x L/ft	
Three Well Volumes:	5.445 L	Liters in Well x 3	
Sample Depth:	~~12~~ 11.0 ft	Depth of Pump Intake	

1.4 gal

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	046 714
Water Level Meter:	SOLINST	**Serial No.:**	294 991
Turbidity Meter:	HACH 2100Q	**Serial No.:**	041 636
Pump Type:	MASTERPLEX PERI	**Serial No.:**	033 471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	None	low flow	250 mL	

DS

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date:

Well ID: TW56

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
12:22	~~12.2~~	1.5	4.5	7.22	663.6	826	-83.9	0.73	
12:26	9.2	1.75	3.1	7.27	646.9	687	-89.7	0.69	
12:29		2.0	3.3	7.27	617.6	672	-93.7	0.73	
12:32		2.3	3.2	7.32	598.6	752	-96.8	0.72	
1236									SAMPLED
									20PS-TW56-0527

Additional Comments:
ORIGINAL WELL DEPTH WAS TOO SHALLOW. HAD TO PUSH FURTHER DOWN BEFORE BEING ABLE TO PURGE
FLOW RATE @ 0.25 L/min. STABILIZE 5/6 PARAMETERS; SAMPLED

MH

SUNDANCE-EA II, LLC

1334 START PUMPING

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW 48
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	26 MAY 2020	**Samplers:**	JUDSON PARSON
Time Start:	1330		KAYLA COPELAND
Time Finish:	1420	**Checked By:**	G. Garner

Well & Purge Information

3.7	**TD (ft. bTOC):**	19	ft	**Screened Interval (ft.):** 3.66
11.6	**DTW (ft. bTOC):**	7.9	ft	
	Water Column:	11.1	ft	TD-DTW=Water Column
	Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table
	Liters in Well:	6.71	L	Water Column x L/ft
5.2 gal	**Three Well Volumes:**	20.14	L	Liters in Well x 3
	Sample Depth:	17	ft	Depth of Pump Intake

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	046 714
Water Level Meter:	SOLINST	**Serial No.:**	294991
Turbidity Meter:	HACH 2100Q	**Serial No.:**	041 636
Pump Type:	MASTERFLEX PERI	**Serial No.:**	033471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	None	Low Flow	250 mL	

GA

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date:

Well ID: TW 48

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1408	7.9	5.2	3.9	6.86	381.5	25.0	-100.5	1.24	
1411		5.5	3.7	6.89	382.3	22.8	-101.9	0.58	
1414		5.75	3.7	6.89	381.4	14.0	-106.2	0.17	
1417		6.0	3.7	6.99	382.7	13.5	-107.6	0.13	
1426									SAMPLED
									20PS-TW48-0526

Additional Comments: ALL VALUES EXCEPT FOR TURBIDITY AND DISSOLVED OXYGEN HAD STABILIZED, SO WE MADE THE DECISION TO SAMPLE.

AA

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW 49
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	26 MAY 2020	**Samplers:**	JUDSON PARSON
Time Start:	1608		KAYLA COPELAND
Time Finish:	1650	**Checked By:**	G. Garner

Well & Purge Information

17.7
13.1
2.7
2.14
991

TD (ft. bTOC):	15 ft	**Screened Interval (ft.):**	3.66
DTW (ft. bTOC):	10.4 ft		
Water Column:	4.6 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	2.79 L	Water Column x L/ft	
Three Well Volumes:	8.31 L	Liters in Well x 3	
Sample Depth:	13.5 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	046714
Water Level Meter:	SOLINST	**Serial No.:**	294991
Turbidity Meter:	HACH 2100Q	**Serial No.:**	041636
Pump Type:	MASTERFLEX PERI	**Serial No.:**	033471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	None	low flow	250 mL	

KY

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: TW 49

Date: 26 MAY 2020

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1628	~~15.0~~ HB	2.0	2.3	6.62	691.0	685	-15.7	0.33	
1631	10.4	2.25	2.3	6.62	689.5	597	-15.7	0.33	
1634		2.5	2.5	6.65	687.8	392	-14.6	0.31	
1637		2.75	2.4	6.69	688.0	289	-14.1	0.27	
1640		3.0	2.5	6.66	686.4	187	-12.7	0.29	
1643									SAMPLED
									20PS-TW49-0526

Additional Comments: HIGH TURBIDITY, BUT OTHER VALUES HAD STABILIZED, SO WE SAMPLED.

MM

SUNDANCE-EA II, LLC

1458 Purge Begins

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW 58
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	26 MAY 2020	**Samplers:**	JUDSON PARSON
Time Start:	1455		KAYLA COPELAND
Time Finish:	1535	**Checked By:**	G. Garner

Well & Purge Information

TD (ft. bTOC):	12 ft	**Screened Interval (ft.):**	3.66
DTW (ft. bTOC):	5.7 ft		
Water Column:	6.3 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	3.811 L	Water Column x L/ft	
Three Well Volumes:	11.43 L	Liters in Well x 3	
Sample Depth:	10.5 ft	Depth of Pump Intake	

2.95 gal

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	046714
Water Level Meter:	SOLINST	**Serial No.:**	294991
Turbidity Meter:	HACH 2100Q	**Serial No.:**	041636
Pump Type:	MASTERFLEX PERI	**Serial No.:**	033471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	None	low flow	250 mL	

MH

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date:

Well ID: TW 58

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1525	~~12.44~~	3	1.4	6.71	355.8	5.82	-23.3	0.27	
1528	5.7	3.25	1.4	6.63	355.5	3.82	-24.5	0.23	
1531		3.5	1.3	6.67	355.2	3.05	-30.2	0.36	
1535									SAMPLED
									20PS-TW58-0526

Additional Comments: LOW (<10) TURBIDITY, SO WE GOT OUR SAMPLE.

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW46
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	26 May 2020	**Samplers:**	JUDSON PARSON
Time Start:	1049		KAYLA COPELAND
Time Finish:	1125	**Checked By:**	G. Garner

Well & Purge Information

TD (ft. bTOC):	25'	ft	**Screened Interval (ft.):**	3.66
DTW (ft. bTOC):	15.8	ft		
Water Column:	9.2	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	5.56	L	Water Column x L/ft	
Three Well Volumes:	16.7	L	Liters in Well x 3	
Sample Depth:	23'	ft	Depth of Pump Intake	

4.3 gal

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	046714
Water Level Meter:	SOLINST	**Serial No.:**	294991
Turbidity Meter:	HACH 2100Q	**Serial No.:**	041636
Pump Type:	MASTERFLEX PERI	**Serial No.:**	033471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☒ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	8	None	low flow	250 mL	

KL

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date:

Well ID: TW46

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
11:01	15.8	2	3.4	6.68	227.8	404	-38.4	0.19	
11:06		3	3.2	6.68	226.6	218	-37	0.19	
11:11		3.5	3.3	6.69	225.3	161	-40.3	0.18	
11:16		4	3.1	6.65	224.6	91.6	-36.9	0.30	
11:21		4.5	3.1	6.69	224.5	67.9		0.29	
1125									SAMPLES TAKEN
									MS, MSD, DUP, AND SAMPLE
									20PS-TW46-0526
									20PS-TW99-0526

Additional Comments: ALL VALUES STABILIZED WITH THE EXCEPTION OF TURBIDITY. INITIAL SILTINESS HAD CLEARED UP.

MA

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW60
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	28 MAY 2020	**Samplers:**	J. PARSON
Time Start:	1206		G. GARNER
Time Finish:	1250	**Checked By:**	G. Garner

Well & Purge Information

TD (ft. bTOC):	12.7	ft	**Screened Interval (ft.):**	3.66
DTW (ft. bTOC):	5.1	ft		
Water Column:	7.6	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.598	L	Water Column x L/ft	
Three Well Volumes:	13.794	L	Liters in Well x 3	
Sample Depth:	11.0	ft	Depth of Pump Intake	

3.6
991

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	046 714
Water Level Meter:	SOLINST	**Serial No.:**	294 991
Turbidity Meter:	HACH 2100Q	**Serial No.:**	041 636
Pump Type:	MASTERFLEX PERI	**Serial No.:**	033 471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	None	Low flow	250 mL	

GG

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date:

Well ID: TW 60

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1243	~~12.7~~ MM	3.6	4.2	7.19	~~37.5~~ ~~317.5~~	27.6	-122.5	0.11	
1246	5.1	3.9	4.1	7.19	317.3	13.7	-124.1	0.08	
1249		4.2	4.1	7.21	317.9	13.6	-125.0	0.10	
1250									Sample time 1250
									20PS-TW60-0528

3.6 GAL PURGE

Additional Comments:

PARAMETERS STABILIZED

MM

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW 52
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	28 MAY 2020	**Samplers:**	J. PARSON
Time Start:	1319		G. GARNER
Time Finish:	1400	**Checked By:**	G. Garner

Well & Purge Information

TD (ft. bTOC):	12.8	ft	**Screened Interval (ft.):**	3.66
DTW (ft. bTOC):	5.3	ft		
Water Column:	7.5	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.54	L	Water Column x L/ft	
Three Well Volumes:	13.6	L	Liters in Well x 3	
Sample Depth:	11.0	ft	Depth of Pump Intake	

3.5 GAL

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	046 714
Water Level Meter:	SOLINST	**Serial No.:**	294 991
Turbidity Meter:	HACH 2100Q	**Serial No.:**	041 636
Pump Type:	MASTERFLEX PERI	**Serial No.:**	033 471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	None	Low flow	250mL	

AH

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date:

Well ID: TW52

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
13:50	~~12.8~~ N/A	3.5	2.4	7.38	308.4	51.4	-76.4	0.07	
13:53	5.3	3.75	2.5	7.27	307.3	48.4	-76.5	0.06	
13:56		4.0	2.4	7.32	307.4	43.6	-76.8	0.08	
13:58		4.1	2.3	7.37	307.1	35.6	-77.0	0.07	
14:00									SAMPLE TIME
									20PS-TW52-0528

3.5 GAL PURGE

Additional Comments:

5/6 PARAMETERS STABILIZED

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW41
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	28 MAY 2020	**Samplers:**	KAYLA COPELAND
Time Start:	1640		JUDSON PARSON
Time Finish:	1726	**Checked By:**	G. Garner

Well & Purge Information

TD (ft. bTOC):	~~17.8~~ 17.7	ft	**Screened Interval (ft.):**	3.66
DTW (ft. bTOC):	~~11.8~~ 14.1	ft		
Water Column:	3.6	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	2.178	L	Water Column x L/ft	
Three Well Volumes:	6.534	L	Liters in Well x 3	
Sample Depth:	16	ft	Depth of Pump Intake	

1.7 GAL

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	046 714
Water Level Meter:	SOLINST	**Serial No.:**	294 991
Turbidity Meter:	HACH 2100Q	**Serial No.:**	041 636
Pump Type:	MASTERFLEX PERI	**Serial No.:**	033 471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	None	Low Flow	250mL	

KL

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Well ID: TW 41

Date:

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1711	~~17.7~~ MP	1.3	6.2	7.33	1073	177	-97.7	6.82	
1713	14.1	1.35	5.9	7.38	~~1036~~	119	-92.6	6.35	
1715		1.4	5.7	7.35	1072	178	-94.1	7.42	
1717		1.5	5.6	7.37	1071	230	-92.4	7.26	
1720									SAMPLED
									20PS-TW41-0528

1.7 GAL PURGE

Additional Comments: SLOW RECHARGE, SLOWED PUMP TO 0.25 L/min INCONSISTENT PUMP RATE, 4/6 STABILIZED, SAMPLED, INCLEMENT WEATHER IMMINENT

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW 59
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	28 MAY 2020	**Samplers:**	J. PARSON
Time Start:	0950		G. GARNER
Time Finish:	1046	**Checked By:**	G. Garner

Well & Purge Information

TD (ft. bTOC):	12.9	ft	**Screened Interval (ft.):**	3.66
DTW (ft. bTOC):	5.4	ft		
Water Column:	~~8.5~~ 7.5	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.54	L	Water Column x L/ft	
Three Well Volumes:	13.6	L	Liters in Well x 3	
Sample Depth:	11	ft	Depth of Pump Intake	

3.5 gal

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	046 714
Water Level Meter:	SOLINST	**Serial No.:**	294 991
Turbidity Meter:	HACH 2100Q	**Serial No.:**	041 636
Pump Type:	MASTERFLEX PERI	**Serial No.:**	033 471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	None	Low Flow	Nalgene	250mL

YL

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date:

Well ID: TW 59

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1034	5.4	3.5	3.2	7.28	233.8	83.1	60.4	14.82	
1037		3.7	3.0	7.28	263.7	67.2	64.5	16.11	
1040		3.9	3.1	7.27	270.4	51.2	62.9	15.04	
1043		4.2	3.1	7.29	260.7	53.2	62.0	14.89	
1046		4.							Sample Time 1046
									20PS-TW59-0529

3.5 GAL PURGE

Additional Comments: 4/6 STABILIZED, SAMPLED @ 1046

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW 55
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	28 MAY 2020	**Samplers:**	J. PARSON
Time Start:	0822		G. GARNER
Time Finish:	0915	**Checked By:**	G. Garner

Well & Purge Information

TD (ft. bTOC):	~~9.0~~ ~~9.1~~ 12.7 ft	**Screened Interval (ft.):**	3.66
DTW (ft. bTOC):	5.1 ft		
Water Column:	7.6 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.598 L	Water Column x L/ft	
Three Well Volumes:	13.8 L	Liters in Well x 3	
Sample Depth:	10.0 ft	Depth of Pump Intake	

3.6 gal

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	046 714
Water Level Meter:	SOLINST	**Serial No.:**	294 991
Turbidity Meter:	HACH 2100Q	**Serial No.:**	041 636
Pump Type:	MASTERFLEX PER1	**Serial No.:**	033 471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☒ No ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	8	None	low flow	250 mL	

YY

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 28 MAY 2020

Well ID: TW 55

PURGE 3.6 GAL

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
0900	5.1	3.6	5.2	7.54	262.3	88.6	-99.9	0.16	
0903		3.8	5.1	7.52	261.9	83.7	-99.3	0.11	
0906		4.0	5.2	7.51	262.8	59.5	-98.3	0.10	
0909									Sample Time 0909
0915									DUP @ 0915
									20PS-TW55-0528
									20PS-TW99-0528
									& MS/MSD

Additional Comments: ALL STABILIZED, EXCEPT TURBIDITY WHICH WAS CONSTANTLY IMPROVING.

GA

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW 37
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	29 MAY 2020	**Samplers:**	J. PARSON
Time Start:	0750		K. COPELAND
Time Finish:	0844	**Checked By:**	G. Garner

Well & Purge Information

TD (ft. bTOC):	17.7	ft	**Screened Interval (ft.):**	3.66
DTW (ft. bTOC):	8.3	ft		
Water Column:	9.4	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	5.687	L	Water Column x L/ft	
Three Well Volumes:	17.1	L	Liters in Well x 3	
Sample Depth:	16.0	ft	Depth of Pump Intake	

4.4 GAL PURGE

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	16A714
Water Level Meter:	SOLINST	**Serial No.:**	294 911
Turbidity Meter:	HACH 2100Q	**Serial No.:**	041 636
Pump Type:	MASTERFLEX PER1	**Serial No.:**	033 471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	4 (2 reg, 2 Dup)	None	Low Flow	250 mL	

GL

SUNDANCE-EA II, LLC

0805 START PURGING

Well Development Record

Purging Data

Date: 29 MAY 2020

Well ID: TW 37

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
0834	8.3	4.4	2.5	5.77	575.3	57.9	-9.6	1.67	
0837		4.6	2.6	5.80	574.4	27.2	-13.7	1.09	
0840		4.8	2.5	5.82	572.6	19.5	-16.3	1.00	
0844									SAMPLED
									20PS-TW37-0529
									20PS-TW99-0529

4.4 GAL PURGE

Additional Comments: NEGATIVE ORP = 0, SO 5% STABILIZED, SAMPLED SLIGHTLY ABNORMAL (LOW) pH

AA

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW 38
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	29 MAY 2020	**Samplers:**	J. PARSON
Time Start:	0900		K. COPELAND
Time Finish:	0938	**Checked By:**	G. Garner

Well & Purge Information

TD (ft. bTOC):	17.7 ft	**Screened Interval (ft.):**	3.66
DTW (ft. bTOC):	12.0 ft		
Water Column:	5.7 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	3.4485 L	Water Column x L/ft	
Three Well Volumes:	10.35 L	Liters in Well x 3	
Sample Depth:	16.0 ft	Depth of Pump Intake	

2.7 GAL

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	046 714
Water Level Meter:	SOLINST	**Serial No.:**	294 991
Turbidity Meter:	HACH 2100 Q	**Serial No.:**	04 636
Pump Type:	MASTERFLEX PERI	**Serial No.:**	033 471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	None	low flow	250 mL	

Checked: GG

SUNDANCE-EA II, LLC

Well Development Record

0912 STARTED PURGING

Purging Data

Date: 29 MAY 2020

Well ID: TW 38

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
0932	12.0	2.7	3.4	6.30	462.3	33.1	6.3	0.30	
~~0935~~ 0934		2.9	3.3	6.50	462.0	24.7	6.6	0.30	
~~0938~~ 0936		3.1	3.3	6.60	462.1	24.5	6.3	0.29	
0938									SAMPLED
									20PS-TW38-0529

2.7 GAL PURGE

Additional Comments: 5/6 STABILIZED, SAMPLED @ 0938.

JH

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW 39
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	29 MAY 2020	**Samplers:**	J. PARSON
Time Start:	1323		G. GARNER
Time Finish:	1405	**Checked By:**	G. Garner

Well & Purge Information

TD (ft. bTOC):	17.0	ft	**Screened Interval (ft.):**	3.66
DTW (ft. bTOC):	8.2	ft		
Water Column:	9.4	ft	TD-DTW=Water Column	
Liter/Foot:	~~5.687~~ 0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	5.687	L	Water Column x L/ft	
Three Well Volumes:	17	L	Liters in Well x 3	
Sample Depth:	15.6	ft	Depth of Pump Intake	

4.4 GAL

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	046 714
Water Level Meter:	SOLINST	**Serial No.:**	294 991
Turbidity Meter:	HACH 2100Q	**Serial No.:**	041 636
Pump Type:	MASTERFLEX PERI	**Serial No.:**	033 471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	None	low flow	250 mL	

Checked - GG

SUNDANCE-EA II, LLC

Well Development Record

Purging Data PURGE 4.4 1323 → PURGING

Date: 29 MAY 2020

Well ID: TW 39

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
1354	~~17.6~~ HH	4.4	3.1	6.29	305.9	91.4	-16.7	0.10	
1357	8.2	4.6	3.1	6.28	306.0	95.2	-17.8	0.07	
1400		4.8	3.0	6.26	305.4	73.0	-18.7	0.07	
1403									SAMPLED
									20PS-TW39-0529

Additional Comments: STABILIZED AND SAMPLED.

HH

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW 40
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	29 MAY 2020	**Samplers:**	J. PARSON
Time Start:	1122		K. COPELAND
Time Finish:	1200	**Checked By:**	G. Garner

Well & Purge Information

TD (ft. bTOC):	~~7.4~~ 12.5	ft	**Screened Interval (ft.):**	3.66
DTW (ft. bTOC):	~~5.6~~ 4.2	ft		
Water Column:	~~1.8~~ 8.3	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	~~1.089~~ 5.02	L	Water Column x L/ft	
Three Well Volumes:	~~3.267~~ 15.06	L	Liters in Well x 3	
Sample Depth:	~~6.5~~ 11.0	ft	Depth of Pump Intake	

3.9 GAL ~~0.85 GAL~~

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PROFESSIONAL	**Serial No.:**	046 714
Water Level Meter:	SOLINST	**Serial No.:**	294 991
Turbidity Meter:	HACH 2100Q	**Serial No.:**	041 636
Pump Type:	MASTERFLEX PERI	**Serial No.:**	033 471

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	None	low flow	250 mL	

AA

SUNDANCE-EA II, LLC

Well Development Record

Purging Data

Date: 29 MAY 2020

Well ID: TW 40

Time (24 hrs)	Water Level (ft BTOC)	Volume Remove (gal)	Temp. (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
11:47	4.2	4.0	1.2	6.44	602.6	174	13.3	0.05	
11:49		4.15	1.2	6.46	602.3	131	12.4	0.08	
11:51		4.3	1.3	6.47	601.9	95.6	12.2	0.07	
11:53		4.45	1.3	6.46	601.0	70.4	11.8	0.07	
11:55									SAMPLE TIME
									20PS-TW40-0529

3.9 GAL PURGE

Additional Comments: LIKELY HIT PERMAFROST
STABILIZED 5/6 PARAMETERS

GG

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW01C
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	05/31/2020	**Samplers:**	H. Peterson, N. Stoeklen, S. Newman
Time Start:	1555		
Time Finish:	1635	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	163.00 ft	**Screened Interval (ft.):**	150.3-160.3 (10')
DTW (ft. bTOC):	3.03 ft		
Water Column:	159.97 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	96.78 L	Water Column x L/ft	
Three Well Volumes:	290.34 L	Liters in Well x 3	
Sample Depth:	155.3 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	15H102751
Water Level Meter:	WLM	**Serial No.:**	07.052107
Turbidity Meter:	Micro TPW #20000	**Serial No.:**	20160555 25
Pump Type:	GeoPump	**Serial No.:**	J0400266B

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFOS/PFOA	2	None.	EPA 537	250mL HDPE	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW01C	Sample ID: 20PS-MW01C-0531	Sample Time: 1635
Date: 05/31/2020	Dup. Sample ID: ~~20PS-MP~~ N/A	Dup. Sample Time: N/A

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1555	START PURGING									
1600	2.0	5.69	336	8.51	6.29	37.3	34.64	3.03	0.4	
1605	4.0	5.18	301	2.87	6.67	-10.1	24.32	3.06	0.4	
1610	6.0	5.09	296	2.02	6.87	-35.2	20.79	3.06	0.4	
1615	8.0	5.16	291	1.84	6.87	-47.5	19.19	3.06	0.4	
1620	10.0	4.90	290	2.28	6.90	-51.9	15.09	3.06	0.4	
1625	12.0	4.95	287	1.52	6.90	-52.3	14.47	3.06	0.4	
1630	14.0	4.94	287	1.43	6.93	-54.0	14.14	3.06	0.4	
1635	16.0	4.94	287	1.41	6.93	-47.4	14.46	3.06	0.4	

Sampled? : Yes ☒ No ☐

31 May 2020

Initial of Sampler: HP/SN/NS

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW01D
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	05/31/2020	**Samplers:**	H. Peterson, N. Streetzel, S. Newman
Time Start:	0835		
Time Finish:	1105	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	212.03 ft	**Screened Interval (ft.):**	10 199 - 209' bgs
DTW (ft. bTOC):	3.33 ft		
Water Column:	208.70 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	126.26 L	Water Column x L/ft	
Three Well Volumes:	378.79 L	Liters in Well x 3	
Sample Depth:	204 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	15H102751
Water Level Meter:	WLM	**Serial No.:**	07.052107
Turbidity Meter:	Micro TPW #20000	**Serial No.:**	20160552S
Pump Type:	Geopump	**Serial No.:**	J04002668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☒ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFOS/PFOA	8	None.	537 EPA	250mL HDPE	1 dup

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW01D	Sample ID: 20PS-MW01D-0531	Sample Time: 1050
Date: 05/31/2020	Dup. Sample ID: 20PS-MW99-0531	Dup. Sample Time: 1200
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C ✓	Spec. Cond. (µS/cm) *± 3% ✓	DO (mg/L) *± 10% ✓	pH *± 0.1 ✓	ORP (mV) *± 10 mV ✓	Turbidity (NTU) *± 10% ✓	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
0835	START PURGING									
0840	2.5	5.27	370	12.03	5.97	213.7	38.43	3.33	0.5	
0845	5.0	4.56	324	8.83	6.63	55.0	361.9	3.33	0.5	
0850	7.5	4.41	302	4.72	6.57	-98.2	802.9	3.33	0.5	very murky.
0855	10.0	4.51	298	4.12	6.75	-103.2	512.0	3.33	0.5	
0900	12.5	4.48	296	3.58	6.84	-129.5	430.3	3.33	0.5	
0905	15.0	4.46	294	3.10	6.88	-146.5	378.0	3.33	0.5	
0910	17.5	4.67	295	2.89	6.90	-145.2	229.3	3.33	0.3	clearing, still cloudy
0915	19.0	4.88	295	2.75	6.89	-159.6	134.2	3.33	0.3	
0920	20.5	4.96	297	3.20	6.91	-134.2	100.8	3.33	0.3	
0925	22.0	5.08	295	2.58	6.92	-120.9	68.3	3.33	0.3	
0930	23.5	5.41	298	1.61	6.92	-125.9	56.09	3.33	0.3	
0935	25.0	5.49	297	3.15	6.93	-124.1	44.22	3.33	0.3	
0940	26.5	5.20	301	3.95	6.94	-138.0	36.65	3.33	0.3	
0945	28.0	5.19	298	3.00	6.94	-131.8	35.24	3.33	0.3	
0950	29.5	5.29	299	2.94	6.94	-130.5	28.39	3.33	0.3	
0955	31.0	5.22	294	2.78	6.94	-138.2	27.63	3.33	0.3	
1000	32.5	5.21	294	2.85	6.94	-140.9	24.59	3.33	0.3	
1005	34.0	5.21	295	2.76	6.95	-138.3	22.43	3.33	0.3	Looks clear
1010	35.5	5.36	293	2.70	6.96	-138.5	19.23	3.33	0.3	
1015	37.0	5.22	292	2.07	6.96	-149.8	20.59	3.33	0.3	
1020	38.5	5.22	295	2.20	6.96	-142.5	17.68	3.33	0.3	
1025	40.0	5.23	297	2.89	6.93	-136.0	18.00	3.33	0.3	
1030	41.5	5.22	294	2.83	6.95	-141.8	15.98	3.33	0.3	
1035	43.0	5.27	294	2.66	6.98	-138.7	15.58	3.33	0.3	
1040	44.5	5.17	294	2.60	6.98	-144.0	13.52	3.33	0.3	
1045	46.0	5.34	293	2.64	6.99	-144.1	13.45	3.33	0.3	
1050	47.5	5.36	291	2.56	6.99	-145.2	13.18	3.33	0.3	

Sampled? : Yes ☒ No ☐

Initial of Sampler: HP/SN

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	USAP-2
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	6/8/2020	**Samplers:**	Benjamin Leach & Nicole Streckfuss Streckfuss
Time Start:	1023		
Time Finish:	1133	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	22.12 ft	**Screened Interval (ft.):**	Bgs → 14.5 - 19.5 Ft (18.41 - 23.41 bTOC)
DTW (ft. bTOC):	8.31 ft		
Water Column:	13.81 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	8.35 L	Water Column x L/ft	
Three Well Volumes:	25.06 L	Liters In Well x 3	
Sample Depth:	20.91 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	19G101486
Water Level Meter:	WLM-100	**Serial No.:**	16.050616
Turbidity Meter:	MicroTPW	**Serial No.:**	201705512
Pump Type:	Geopump	**Serial No.:**	J04002668

Purge Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☑ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	8	None	EPA 537	250mL HDPE	1 dupl.

Low-Flow Groundwater Sample & Stabilization Form

Well ID: USAP-2	Sample ID: 20-USAP-2-0608	Sample Time: 1115
Date: 6/8/2020	Dup. Sample ID: 20-MW99-0608	Dup. Sample Time: 1200
Notes: ~~20-USAP~~ 20-MW99-0608 dup		

✓Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C ✓	Spec. Cond. (µS/cm) *± 3% ✓	DO (mg/L) *± 10% ✓	pH *± 0.1 ✓	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1055	START PURGING									
1058	0.4	4.25	1656	8.71	7.06	-41.5	6.06	8.36	0.4	
1101	0.8	4.28	1635	7.14	7.07	-41.6	6.01	8.36	0.4	
1104	1.2	3.93	1640	7.32	7.09	-50.4	8.04	8.36	0.4	
1107	1.6	3.67	1642	6.58	7.10	-51.5	7.24	8.32	0.4	
1110	2.0	3.47	1640	6.67	7.10	-53.6	5.66	8.31	0.4	
1113	2.4	3.51	1641	6.36	7.12	-55.2	4.96	8.31	0.4	Sample

BRL

Sampled? : Yes ☑ No ☐

Initial of Sampler: BRL

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW 36
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	6/27/2020	**Samplers:**	GG
Time Start:	1003		JP
Time Finish:	1045	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	17.5 ft	**Screened Interval (ft.):**	7.66 ft
DTW (ft. bTOC):	6.1 ft		
Water Column:	11.4 ft	TD-DTW=Water Column	
Liter/Foot:	0.06 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	0.684 L	Water Column x L/ft	
Three Well Volumes:	2.052 L	Liters in Well x 3	
Sample Depth:	15.0 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
— 5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI	**Serial No.:**	0848
Water Level Meter:	Solinst	**Serial No.:**	294991
Turbidity Meter:	Micro TPW	**Serial No.:**	20160603
Pump Type:	Peristaltic	**Serial No.:**	84672

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at 0.0 on pump Seconds Refill ____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at 0.0 Seconds Refill ____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☒ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	8	None	Low Flow	250 mL Nalgene	Duplicate

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW 36	Sample ID: 20PS-TW 36 - 0627	Sample Time: 1040
Date: 06/27/2020	Dup. Sample ID: 20PS - TW99 - 0627	Dup. Sample Time: 0800
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1003	START PURGING									
1026	8 L	6.26	195	0.18	7.19	0	925.5	6.1	~~0.4~~ 0.4	
1029	~~9.2 10.4 L~~	5.47	190	~~0.11 0.09~~	7.02	0	484.0	6.1	~~0.8~~ 0.4	
1032	10.4	4.91	185	0.12	7.08	0	319.5	6.1	0.4	
1035	11.6	5.00	185	0.10	7.11	0	222.4	6.1	0.4	
1038	12.8	5.02	185	0.10	7.10	0	131.6	6.1	0.4	
										Sample @ 1040 Duplicate and MS/MSD

Sampled? : Yes ☒ No ☐

Initial of Sampler: GG / JP

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	TW4Z
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	27 JUNE, 2020	**Samplers:**	JUDSON PARSON
Time Start:	1153		GEORGE GARNER
Time Finish:	1225	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	~~19~~ 17.5	ft	**Screened Interval (ft.):**	3.66 ft
DTW (ft. bTOC):	9.05	ft		
Water Column:	8.45	ft	TD-DTW=Water Column	
Liter/Foot:	0.06	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	0.507	L	Water Column x L/ft	
Three Well Volumes:	1.521	L	Liters in Well x 3	
Sample Depth:	15.5	ft	Depth of Pump Intake	

0.4 GAL

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI	**Serial No.:**	08487
Water Level Meter:	Solinst	**Serial No.:**	294991
Turbidity Meter:	MicroTPW	**Serial No.:**	20160603
Pump Type:	Alexis Peristaltic	**Serial No.:**	84672

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2	None	Low Flow	250 mL Nalgene	—

Low-Flow Groundwater Sample & Stabilization Form

Well ID: TW4 2	Sample ID: 20PS-TW42-0627	Sample Time: 1222
Date: 27 JUNE, 2020	Dup. Sample ID: NA	Dup. Sample Time: NA
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1153	START PURGING									
1210	6.8	6.48	284	0.26	8.34	0	7245	9.05	0.4	
1213	8.0	6.65	284	0.44	8.26	0	428.4	9.05	0.4	
1216	9.2	6.74	284	0.71	8.24	0	228.1	9.05	0.4	
1219	10.4	6.70	282	0.74	8.24	0	167.4	9.05	0.4	
1221	11.6	6.59	281	0.75	8.25	0	99.47	9.05	0.4	
										1222 Sample Time

Sampled? : Yes ☒ No ☐

Initial of Sampler: GG / JP

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20S-MW024-0911
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9/11/2020	**Samplers:**	Dave Cochran
Time Start:	1134		Noah Robison
Time Finish:	1226	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	56.03 ft	**Screened Interval (ft.):**	Unknown
DTW (ft. bTOC):	4.89 ft		
Water Column:	51.14 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	30.94 L	Water Column x L/ft	
Three Well Volumes:	92.82 L	Liters in Well x 3	
Sample Depth:	≈ 51 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	MicroTPW	**Serial No.:**	20200837 7
Pump Type:	Geopump peristaltic	**Serial No.:**	J04002 0608

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☒ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
	10	None	537	250 ml plastic	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW02A-0911	Sample ID: 20PS-MW02A-0911	Sample Time: 1213
Date: 9/11/2020	Dup. Sample ID: 20PS-MW99-0911	Dup. Sample Time: 1216
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1140	–	5.7	268.5	4.53	6.90	222.9	13.02	4.89	0.30	
1145	1.5	4.6	262.0	3.22	7.00	222.3	0.65	4.89	0.30	
1150	3.0	4.5	262.1	2.57	7.07	220.5	11.72	4.89	0.30	
1155	4.5	4.4	261.9	2.49	7.12	219.2	8.47	4.89	0.30	
1200	6.0	4.4	260.8	2.41	7.16	217.8	10.16	4.89	0.30	
1205	7.5	4.4	260.7	2.42	7.17	216.8	10.29	4.89	0.30	
1210	9.0	4.4	261.0	2.40	7.18	214.7	10.33	4.89	0.30	

Sampled? : Yes ☒ No ☐

Initial of Sampler: DC

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	DASP-85-0911
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9/11/2020	**Samplers:**	Dave Cookston
Time Start:	1609		Noah Robinson
Time Finish:	1657	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	21.06 ft	**Screened Interval (ft.):**	Unk
DTW (ft. bTOC):	13.25 ft		
Water Column:	7.81 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.73 L	Water Column x L/ft	
Three Well Volumes:	14.19 L	Liters In Well x 3	
Sample Depth:	≈16.5 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PRO Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	MicroTPW	**Serial No.:**	20200837 7
Pump Type:	Geopump Peristalic	**Serial No.:**	J040026668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : *Yes* ☐ *No* ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
	2	None	537	250ml plastic	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: DSAP-85	Sample ID: 20PS-DSAP-85-0911	Sample Time: 1655
Date: 9/11/2020	Dup. Sample ID: —	Dup. Sample Time: —

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1613	—	6.50	264	2.30	4.27	202.3	24.25	13.25	0.30	
1618	1.5	5.84	231	0.72	3.88	195.0	10.43	13.25	0.30	
1623	3.0	5.65	219	0.66	4.04	146.0	6.93	13.25	0.30	
1628	4.5	5.60	215	0.88	5.20	117.6	3.71	13.25	0.30	
1633	6.0	5.57	211	0.94	5.61	98.8	4.91	13.25	0.30	
1638	7.5	5.56	211	0.95	5.64	96.5	2.96	13.25	0.30	
1643	9.0	5.53	209	0.98	5.78	93.3	1.56	13.25	0.30	
1648	10.5	5.54	209	1.01	5.77	92.3	5.42	13.25	0.30	
1653	12.0	5.53	209	1.02	5.77	91.2	6.83	13.25	0.30	

Sampled? : Yes ☒ No ☐

Initial of Sampler: DC

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW02B
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9/11/2020	**Samplers:**	Dave Cookston
Time Start:	1300 1232		Noah Robinson
Time Finish:	1320	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	113.88	ft	**Screened Interval (ft.):**	UNK
DTW (ft. bTOC):	4.90	ft		
Water Column:	108.98	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	65.93	L	Water Column x L/ft	
Three Well Volumes:	197.79	L	Liters in Well x 3	
Sample Depth:	≈ 108.5	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI PO Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	MicroTPW	**Serial No.:**	20200837
Pump Type:	Geopump Peristalic	**Serial No.:**	J04002606

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
	2	None	537	250ml plastic	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW02B-0911	Sample ID: 20PS-MW02B-0911	Sample Time: 1317
Date: 9/11/2020	Dup. Sample ID: ———	Dup. Sample Time: ———
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1234	-	6.6	237.7	4.02	7.34	205.9	10.95	4.90	0.30	
1239	1.5	4.9	227.7	2.77	7.20	226.7	7.12	4.90	0.30	
1244	3.0	4.9	226.6	2.18	7.23	192.1	22.94	4.90	0.30	
1249	4.5	4.8	225.9	1.81	7.26	185.2	41.03	4.90	0.30	
1254	6.0	4.7	224.9	1.48	7.27	178.2	28.41	4.90	0.30	
1259	7.5	4.6	224.4	1.35	7.27	173.7	28.43	4.90	0.30	
1304	9.0	4.6	222.4	1.09	7.27	168.4	17.00	4.90	0.30	
1309	10.5	4.6	222.3	1.04	7.29	165.0	17.74	4.90	0.30	
1314	12.0	4.6	222.9	1.02	7.30	161.6	18.32	4.90	0.30	

Sampled? : Yes ☒ No ☐

Initial of Sampler: DC

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	Well ID.:	USAP-1
Contract No.:	W911KB-17-D-0018	Project No.:	6321403
Date:	9-12-2020	Samplers:	Noah R.
Time Start:	0904		Travis H.
Time Finish:	1008	Checked By:	

Well & Purge Information

TD (ft. bTOC):	29.78 ft	Screened Interval (ft.):	Unk
DTW (ft. bTOC):	18.09 ft		
Water Column:	11.69 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	7.07 L	Water Column x L/ft	
Three Well Volumes:	21.22 L	Liters in Well x 3	
Sample Depth:	≈24.5 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	Serial No.:	0581
Water Level Meter:	Solonist	Serial No.:	24219
Turbidity Meter:	Micro TPW	Serial No.:	20200837 7
Pump Type:	peri - Geo Pump	Serial No.:	J0400 2 6068

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
Standard sample plus DUP.	4	None	peri pump	PFAS FREE 250 mL plastic	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: USAP-1
Sample ID: 20PS-USAP-1-0912
Sample Time: 1002
Date: 9-12-2020
Dup. Sample ID: 20PS-MW98-0912
Dup. Sample Time: 1413 (actual 1002)
Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
0904	—	4.3	312.8	4.07	6.63	186.6	39.48	18.09	0.3	DTW from TOC
0909	1.5	3.7	307.8	2.10	6.62	187.9	23.31	18.09	0.3	
0914	3.0	3.5	306.8	0.95	6.79	181.8	21.84	18.10	0.3	
0919	4.5	3.5	307.0	0.76	6.85	179.1	16.91	18.10	0.3	
0924	6.0	3.4	306.7	0.61	6.89	176.2	16.57	18.10	0.3	
0929	7.5	3.3	305.5	0.49	6.93	173.7	15.26	18.10	0.3	
0934	9.0	3.2	304.7	0.41	6.94	171.6	15.13	18.10	0.3	
0939	10.5	3.3	305.3	0.39	6.96	168.9	13.25	18.10	0.3	
0944	12.0	3.2	305.1	0.39	6.98	165.5	15.93	18.10	0.3	
0949	13.5	3.2	305.2	0.46	7.00	163.1	14.36	18.10	0.3	
0954	15.0	3.3	306.0	0.47	7.01	160.8	13.89	18.10	0.3	
0959	16.5	3.4	307.0	0.51	7.04	158.9	13.04	18.10	0.3	Stabilization Complete

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	DSAP-8D
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-12-2020	**Samplers:**	Noah R.
Time Start:	1343		Travis H.
Time Finish:	1454	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	606.39 ft	**Screened Interval (ft.):**	N/A Unk
DTW (ft. bTOC):	13.25 ft		
Water Column:	53.14 ft	TD-DTW=Water Column	
Liter/Foot:	0.6025 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	32.15 L	Water Column x L/ft	
Three Well Volumes:	96.45 L	Liters in Well x 3	
Sample Depth:	≈ 601ft ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	MicroTPW	**Serial No.:**	20200837 7
Pump Type:	peri. (geo pump)	**Serial No.:**	5040026668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : *Yes* ☐ *No* ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
	2	none	peri pump	PFAS FREE 250mL plastic	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: DSAP-8D | Sample ID: 20PS-DSAP-8D-0912 | Sample Time: 1451

Date: 9-12-2020 | Dup. Sample ID: — | Dup. Sample Time: —

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									DTW = 13.25 ft. from TOC
1343	—	7.9	3160.1	3.30	7.32	160.9	74.29	13.25	0.3	
1348	1.5	5.7	323.8	1.46	7.11	169.7	155.4	13.29	0.3	
1353	3.0	5.4	334.4	0.87	7.00	170.4	63.81	13.29	0.3	
1358	4.5	5.5	335.4	0.78	6.98	170.0	159.4	13.29	0.3	
1403	6.0	5.5	335.7	0.89	6.95	170.0	112.9	13.29	0.3	
1408	7.5	5.7	338.0	0.87	6.93	169.4	34.82	13.29		
1413	9.0	5.3	335.6	0.82	6.92	169.0	38.87	13.29		
1418	10.5	5.3	335.2	0.74	6.92	167.7	54.64	13.29		
1423	12.0	5.3	335.5	0.66	6.93	166.6	18.81	13.29		
1428	13.5	5.0	332.2	0.61	6.92	166.1	16.13	13.29		
1433	15.0	4.9	331.3	0.59	6.94	165.5	18.66	13.29		
1438	16.5	5.1	333.0	0.59	6.93	164.6	19.09	13.29		
1443	18.0	5.1	334.9	0.58	6.93	163.4	19.61	13.29		
1448	19.5	5.1	334.8	0.60	6.95	162.5	18.49	13.29		Stabilization complete.

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	MW01B.
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-13-2020	**Samplers:**	Noah R.
Time Start:	1211		Travis M.
Time Finish:	1313	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	113.44	ft	**Screened Interval (ft.):**	Unk
DTW (ft. bTOC):	3.82	ft		
Water Column:	109.62	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	66.32	L	Water Column x L/ft	
Three Well Volumes:	198.96	L	Liters in Well x 3	
Sample Depth:	≈108	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	MicroTPW	**Serial No.:**	202008377
Pump Type:	Peri Geo Pump	**Serial No.:**	J04002-6668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW01B	Sample ID: 20PS-MW01B-0913	Sample Time: 1311
Date: 9-13-2020	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1211	—	9.4	227.9	13.95	6.96	177.3	27.02	3.82	0.3	
1216	1.5	5.6	205.5	2.43	6.88	171.1	16.76	3.82	0.3	
1221	3.0	5.3	198.0	1.20	6.91	167.0	14.91	3.82	0.3	
1226	4.5	5.3	197.0	1.00	6.91	164.6	17.44	3.82	0.3	
1231	6.0	5.6	198.5	0.93	6.90	162.2	37.26	3.82	0.3	
1236	7.5	5.5	197.8	0.89	6.90	161.1	26.24	3.82	0.3	
1241	9.0	5.5	197.7	0.81	6.91	159.2	16.56	3.82	0.3	
1246	10.5	5.4	196.6	0.71	6.90	157.7	10.94	3.82	0.3	
1251	12.0	5.5	197.1	0.68	6.91	156.9	10.86	3.82	0.3	
1256	13.5	5.4	196.5	0.66	6.91	155.6	9.39	3.82	0.3	
1301	15.0	5.3	196.7	0.65	6.90	154.4	8.09	3.82	0.3	
1306	16.5	5.4	197.0	0.63	6.93	153.1	4.63	3.82	0.3	Stabilization Complete

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	~~20PS-MW11e~~ 20PS-MW24 (NB 9/22/2020)
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-13-2020	**Samplers:**	Noah R.
Time Start:	1433		Travis H.
Time Finish:	1603	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	17.05 ft	**Screened Interval (ft.):**	≈ 7 ft. – 17 ft.
DTW (ft. bTOC):	0.29 ft		
Water Column:	16.76 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	10.14 L	Water Column x L/ft	
Three Well Volumes:	30.4 L	Liters in Well x 3	
Sample Depth:	≈ 12 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solonist	**Serial No.:**	24219
Turbidity Meter:	MicroTPW	**Serial No.:**	202008377
Pump Type:	peri pump.	**Serial No.:**	J04002668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

20PS-MW29 (ND 9/24/2020) 20PS-MW29-0913 (NR 9/22/2020)

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~20PS-MW16~~	Sample ID: ~~20PS-MW16-0913~~	Sample Time: 1601
Date: 9-13-2020	Dup. Sample ID: ———	Dup. Sample Time: ———
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1433	—	7.4	303.7	3.42	6.67	144.6	78.11	0.29	0.3	0.29' DTW from TOC
1438	1.5	6.9	300.9	1.75	6.75	120.3	73.47	0.29	0.3	
1443	3.0	6.5	297.9	1.10	6.86	76.6	62.90	0.29		
1448	4.5	6.4	297.3	0.86	6.91	37.6	43.75	0.29		
1453	6.0	6.6	298.2	0.70	6.98	7.7	44.61	0.29		
1458	7.5	6.3	296.1	0.62	7.00	-20.2	40.94	0.29		
1503	9.0	6.5	298.1	0.54	7.05	-49.9	38.85	0.29		
1508	10.5	6.3	296.3	0.50	7.05	-77.4	35.59	0.29		
1513	12.0	6.3	295.8	0.49	7.02	-100.6	32.58	0.29		
1518	13.5	6.1	294.5	0.46	7.04	-120.1	25.17	0.29		
1523	15.0	6.3	295.6	0.44	7.06	-144.0	22.84	0.29		
1528	16.5	6.2	294.3	0.44	7.06	-160.0	23.33	0.29		
1533	18.0	6.3	295.2	0.44	7.07	-171.4	19.29	0.29		
1538	19.5	6.3	294.7	0.44	7.05	-174.8	17.10	0.29		
1543	21.0	6.2	293.8	0.46	7.07	-177.3	17.23	0.29		
1548	22.5	6.3	294.6	0.42	7.06	-178.1	16.68	0.29		
1553	24.0	6.2	293.9	0.44	7.08	-180.2	16.14	0.29		
1558	25.5	6.2	294.4	0.45	7.09	-181.6	15.44	0.29		Stabilization complete.

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	MW01A
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9/13/2020	**Samplers:**	Noah Robinson
Time Start:	0928		Travis Herman
Time Finish:	1107	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	102.05	ft	**Screened Interval (ft.):**	Unk
DTW (ft. bTOC):	4.17	ft		
Water Column:	57.88	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	35.02	L	Water Column x L/ft	
Three Well Volumes:	105.05	L	Liters in Well x 3	
Sample Depth:	≈57	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	MicroTPW	**Serial No.:**	202008377
Pump Type:	Geo Pump	**Serial No.:**	J04002668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☒ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW01A	Sample ID: 20PS-MW01A-0913	Sample Time: 1056
Date: 9/13/2020	Dup. Sample ID: 20PS-MW96-0913	Dup. Sample Time: listed as "1116"
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
0928	-	2.3	116.3	11.34	6.87	181.7	14.04	4.17	0.30	
0933	1.5	4.9	268.1	3.65	6.65	179.9	18.94	4.17	0.30	
0938	3.0	4.5	260.0	2.54	6.79	177.5	21.52	4.17	0.30	
0943	4.5	4.6	260.4	2.13	6.88	175.6	22.60	4.17	0.30	
0948	6.0	4.4	259.0	1.70	6.92	175.5	13.74	4.17	0.30	
0953	7.5	4.4	258.3	1.31	6.93	175.3	16.72	4.17	0.30	
0958	9.0	4.3	258.3	1.19	6.94	174.9	10.68	4.17	0.30	
1003	10.5	4.3	258.1	1.06	6.96	173.8	14.87	4.17	0.30	
1008	12.0	4.3	257.7	1.05	6.97	172.7	21.27	4.17	0.30	
1013	13.5	4.4	257.8	0.93	7.01	170.5	30.80	4.17	0.30	
1018	15.0	4.5	259.2	0.88	7.04	168.2	26.52	4.17	0.30	
1023	16.5	4.5	259.2	0.85	7.05	167.5	29.47	4.17	0.30	
1028	18.0	4.5	259.7	1.27	7.07	166.4	28.85	4.17	0.30	
1033	19.5	4.5	259.0	0.90	7.06	165.6	28.62	4.16	0.30	
1038	21.0	4.5	259.4	0.89	7.07	164.9	26.19	4.16	0.30	
1043	22.5	4.5	259.5	0.88	7.07	164.2	23.28	4.16	0.30	
1048	24.0	4.5	259.4	0.68	7.07	163.8	22.84	4.16	0.30	
1053	25.5	4.5	259.4	0.63	7.06	163.4	22.47	4.16	0.30	

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	~~20PS-MW13~~ 20PS-MW26 (MB 9/22/2020
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-14-2020	**Samplers:**	Noah R.
Time Start:	1659		Travis H.
Time Finish:	1818	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	22.03	ft	**Screened Interval (ft.):**	10-20
DTW (ft. bTOC):	11.12	ft		
Water Column:	10.91	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	6.60	L	Water Column x L/ft	
Three Well Volumes:	19.80	L	Liters in Well x 3	
Sample Depth:	≈17	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solonist	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	20200837 7
Pump Type:	(Peri) Geo Pump	**Serial No.:**	J04002 6068

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

2OPS-MW26 (NR) 9/22/2020 2OPS-MW26-0914 (NR) 9/22/2020

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~2OPS-MW13~~	Sample ID: ~~2OPS-MW13-0914~~	Sample Time: 1810
Date: 9-14-2020	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
		4.1 TH		START PURGING						
1659	—	~~13.0~~	377.6	2.00	7.08	111.6	153.7	11.12	0.3	Temp = 4.1°C @ 1659
1704	1.5	3.7	378.3	1.45	7.02	98.2	144.2	11.12	0.3	
1709	3.0	3.6	377.6	1.06	7.00	63.3	157.3	11.12		
1714	4.5	3.7	378.1	0.89	7.00	31.8	116.6	11.12		
1719	6.0	3.6	377.4	0.84	6.99	-0.6	71.38	11.12		
1724	7.5	3.5	377.0	0.84	6.98	-13.5	55.27	11.12		
1729	9.0	3.7	379.2	0.82	6.99	-25.5	35.15	11.12		
1734	10.5	3.6	377.0	0.78	6.99	-44.3	29.19	11.12		
1739	12.0	3.5	376.3	0.87	7.00	-60.1	21.80	11.12		
1744	13.5	3.6	377.2	0.78	7.01	-73.0	19.69	11.12		
1749	15.0	3.5	376.7	0.72	7.01	-83.9	16.97	11.12		
1754	16.5	3.4	376.2	0.81	7.00	-92.8	14.21	11.12		
1759	18.0	3.5	376.2	0.88	7.02	-98.1	12.62	11.12		
1804	19.5	3.5	375.9	0.86	7.02	-101.7	9.41	11.12		
1809	21.0	3.4	374.9	0.82	7.02	-104.4	9.62	11.12		
1814	22.5	3.4	375.4	0.79	7.03	-106.8	9.09	11.12		

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	~~20PS-MW14~~ 20PS-MW27 (NR) 9/22/2020
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-14-2020	**Samplers:**	Noah R.
Time Start:	1419		Travis H.
Time Finish:	1538	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	23.66	ft	**Screened Interval (ft.):**	3-23
DTW (ft. bTOC):	6.20	ft		
Water Column:	17.46	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters In Well:	10.56	L	Water Column x L/ft	
Three Well Volumes:		L	Liters in Well x 3	
Sample Depth:		ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solonist	**Serial No.:**	24219
Turbidity Meter:	MicroTPW	**Serial No.:**	202008377
Pump Type:	peri	**Serial No.:**	J04002606 8

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

20PS-MW27 20PS-MW27-0914 (NR) 9/22/2020

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~20PS-MW14~~	Sample ID: ~~20PS-MW14-0914~~	Sample Time: 1536
Date: 9-14-2020	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1419	—	8.5	360.0	5.94	7.27	104.0	20.01	6.20	0.3	
1424	1.5	6.6	354.4	1.75	7.15	26.9	18.61	6.20	0.3	
1429	3.0	6.4	355.0	0.86	7.19	-60.7	20.85	6.20	0.3	
1434	4.5	6.3	354.6	0.62	7.23	-136.0	26.85	6.20		
1439	6.0	6.3	354.0	0.51	7.25	-201.6	68.71	6.20		
1444	7.5	6.2	352.3	0.48	7.26	-249.1	90.82	6.20		
1449	9.0	6.2	347.2	0.47	7.27	-289.7	89.76	6.20		
1454	10.5	6.2	345.1	0.46	7.28	-314.7	72.11	6.20		
1459	12.0	6.2	343.0	0.50	7.32	-334.1	59.25	6.20		
1504	13.5	6.2	339.3	0.50	7.32	-337.4	40.99	6.20		
1509	15.0	6.2	337.0	0.50	7.30	-341.8	36.73	6.20		
1514	16.5	6.2	333.7	0.48	7.33	-343.1	23.90	6.20		
1519	18.0	6.2	331.0	0.48	7.34	-344.8	19.81	6.20		
1524	19.5	6.2	329.2	0.51	7.32	-346.1	8.29	6.20		
1529	21.0	6.2	328.0	0.49	7.33	-348.2	5.91	6.20		
1534	22.5	6.2	329.8	0.48	7.32	-350.8	4.58	6.20		Stabilization Complete

Sampled? : Yes ☒ No ☐

Initial of Sampler: _____

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	~~20PS-MW17~~ 20PS-MW30 @ 9/22/2020
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-14-2020	**Samplers:**	Noah R.
Time Start:	1037		Travis H.
Time Finish:	1145	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	23.95 ft	**Screened Interval (ft.):**	~~≈13.5'-23.5'~~ 10-20
DTW (ft. bTOC):	3.91 ft		
Water Column:	20.04 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	12.12 L	Water Column x L/ft	
Three Well Volumes:	36.37 L	Liters in Well x 3	
Sample Depth:	≈19 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solonist	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	202008377
Pump Type:	peristaltic (geo pump)	**Serial No.:**	J04002 6668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

20PS-MW30 (NR) 9/22/2020 20PS-MW30-0914 (NR) 9/22/2020

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~20PS-MW17~~	Sample ID: ~~20PS-MW17-0914~~	Sample Time: 1140
Date: 9-14-2020	Dup. Sample ID: 20PS-MW96-0914	Dup. Sample Time: listed as "1304"
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1037	—	4.0	260.8	4.45	6.61	181.4	143.4	3.91	0.3	
1042	1.5	3.7	258.0	2.22	6.75	174.4	165.7	3.91	0.3	
1047	3.0	3.6	257.9	1.49	6.89	167.1	122.5	3.91	0.3	
1052	4.5	3.6	258.4	1.22	6.99	158.2	51.90	3.91	0.3	
1057	6.0	3.6	258.3	1.06	7.09	147.1	32.93	3.92	0.3	Spec. Cond = 258.3
1102	7.5	3.6	258.2	0.97	7.11	140.6	26.82	3.92	0.3	
1107	9.0	3.6	258.0	0.82	7.15	132.3	16.59	3.91	0.3	
1112	10.5	3.6	258.1	0.76	7.18	124.9	14.41	3.91	0.3	
1117	12.0	3.6	257.4	0.76	7.21	117.1	14.25	3.91	0.3	
1122	13.5	3.5	257.3	0.68	7.25	107.3	12.59	3.91		
1127	15.0	3.6	257.2	0.65	7.27	104.4	6.28	3.91		
1132	16.5	3.6	257.3	0.63	7.30	101.6	5.87	3.91		
1137	18.0	3.6	257.4	0.61	7.32	99.4	5.12	3.91		Stabilization complete.

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	~~20PS-MW15~~ 20PS-MW28 (NR) 9/22/2020
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-14-2020	**Samplers:**	Noah R.
Time Start:	1228		Travis H.
Time Finish:	1334	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	23.62 ft	**Screened Interval (ft.):**	~~≈13.5-23.5 ft.~~ (NR) 13-23
DTW (ft. bTOC):	12.00 ft		
Water Column:	11.62 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	7.03 L	Water Column x L/ft	
Three Well Volumes:	21.1 L	Liters in Well x 3	
Sample Depth:	≈ 18.5 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	20200837 7
Pump Type:	Peri (geo pump)	**Serial No.:**	J040026068

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

MW-28 (NR) 9/22/2020 20PS - MW28 - 0914 (NR) 9/22/2020

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~MW15~~	Sample ID: ~~20PS-MW15-0914~~	Sample Time: 1331
Date: 9-14-2020	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1228	—	8.4	269.5	8.96	7.18	129.8	52.59	12.00	0.3	DTW = 12.00 ft. from TOC
1233	1.5	7.0	257.9	1.90	7.10	114.6	71.43	12.00	0.3	
1238	3.0	6.9	257.6	1.21	7.14	98.4	87.65	12.00	0.3	
1243	4.5	7.0	258.1	0.93	7.14	81.3	47.53	12.01	|	
1248	6.0	7.0	258.4	0.77	7.17	68.4	41.89	12.01	|	
1253	7.5	7.0	258.4	0.69	7.17	52.7	38.29	12.01	|	
1258	9.0	6.9	258.8	0.62	7.19	33.6	33.49	12.01	|	
1303	10.5	6.9	258.6	0.60	7.19	24.9	24.42	12.01	|	
1308	12.0	7.0	260.1	0.56	7.21	10.1	21.83	12.01	↓	
1313	13.5	7.0	260.4	0.55	7.22	-1.3	14.06	12.01	↓	
1318	15.0	7.0	260.9	0.55	7.22	-12.4	8.68	12.01		
1323	16.5	7.0	260.2	0.51	7.21	-14.8	8.64	12.01		
1328	18.0	7.0	260.8	0.50	7.23	-18.1	6.42	12.01		Stabilization Complete

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW25
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-17-2020	**Samplers:**	Noah R.
Time Start:	1548		Travis H.
Time Finish:	1620	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	160.71	ft	**Screened Interval (ft.):**	~~160.5-160.5~~ WR 4-14
DTW (ft. bTOC):	11.79	ft		
Water Column:	4.92	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	2.97	L	Water Column x L/ft	
Three Well Volumes:	8.93	L	Liters in Well x 3	
Sample Depth:	≈13	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	MicroTPW	**Serial No.:**	20200837 7
Pump Type:	Geo Pump (peri)	**Serial No.:**	J04002 1668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW25	Sample ID: 20PS-MW25-0917	Sample Time: 1630
Date: 9-17-2020	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1548	—	6.1	219.7	4.44	7.22	87.3	50.62	11.79	0.3	
1553	1.5	5.5	226.7	2.19	7.02	42.6	53.78	11.80	0.3	
1558	3.0	5.1	226.4	1.49	6.97	-24.1	35.41	11.80	0.3	
1603	4.5	5.0	220.9	1.32	6.95	-74.5	22.96	11.80	0.3	
1608	6.0	5.1	222.1	1.36	6.91	-98.9	17.15	11.80	0.3	
1613	7.5	5.1	218.2	1.31	6.76	-104.8	15.16	11.80	0.3	
1618	9.0	5.0	216.2	1.17	6.88	-105.5	6.80	11.80	0.3	
1623	10.5	5.0	214.6	1.19	6.86	-108.0	5.98	11.80	0.3	
1628	12.0	4.9	210.9	1.21	6.84	-102.5	3.19	11.80	0.3	Stabilization Complete

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW22
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-17-2020	**Samplers:**	Noah R.
Time Start:	~~1155~~ 1155		Travis H.
Time Finish:	1248	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	23.89	ft	**Screened Interval (ft.):**	~~15.5-23.5~~ WB 10-20
DTW (ft. bTOC):	7.71	ft		
Water Column:	16.18	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters In Well:	9.79	L	Water Column x L/ft	
Three Well Volumes:	29.37	L	Liters in Well x 3	
Sample Depth:	≈19	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	MicroTPW	**Serial No.:**	20200837 7
Pump Type:	Geo Pump	**Serial No.:**	J040026668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW22	Sample ID: 20PS-MW22-0917	Sample Time: 1246
Date: 9-17-2020	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1155	—	9.7	442.5	4.43	6.99	150.5	33.12	7.71	0.3	
1200	1.5	8.5	432.4	1.34	6.86	70.5	22.94	7.80	0.3	
1205	3.0	8.1	466.0	0.81	6.79	10.0	10.69	7.80	0.3	
1210	4.5	7.7	470.8	0.66	6.80	-61.2	8.26	7.80	0.3	
1215	6.0	7.7	476.2	0.45	6.79	-111.4	5.87	7.80	|	
1220	7.5	7.7	480.9	0.45	6.78	-157.1	4.55	7.80	|	
1225	9.0	7.7	484.1	0.52	6.80	-199.0	0.95	7.80	|	
1230	10.5	7.8	491.7	0.83	6.77	-219.2	0.03	7.80	|	
1235	12.0	7.7	494.3	0.80	6.74	-221.7	0.39	7.80	|	
1240	13.5	7.8	495.4	0.78	6.72	-223.4	0.02	7.80	|	
1245	15.0	7.8	497.2	0.74	6.74	-224.9	0.14	7.80	|	
									↓	

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW24
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-17-2020	**Samplers:**	Noah R.
Time Start:	1439		Travis H.
Time Finish:	1523	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	17.27 ft	**Screened Interval (ft.):**	≈ ~~7 - 17~~ (WR) 4.5 - 14.5
DTW (ft. bTOC):	12.63 ft		
Water Column:	4.64 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	2.81 L	Water Column x L/ft	
Three Well Volumes:	8.42 L	Liters in Well x 3	
Sample Depth:	≈ 14.5 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	202008377
Pump Type:	Geo Pump (peri)	**Serial No.:**	J0400260608

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW24	Sample ID: 20PS-MW24-0917	Sample Time: 1520
Date: 9-17-2020	Dup. Sample ID: —	Dup. Sample Time: —

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1439	—	6.1	296.0	15.62	7.15	89.9	125.6	12.66	0.3	
1444	1.5	5.9	293.3	4.72	7.17	46.8	133.2	12.68	0.3	
1449	3.0	5.6	291.4	2.93	7.11	-5.8	74.04	12.68	0.3	
1454	4.5	5.4	290.2	2.96	7.13	-30.9	34.61	12.68	0.3	
1459	6.0	5.4	290.4	2.67	7.14	-46.3	25.73	12.68	0.3	
1504	7.5	5.5	291.3	3.16	7.14	-45.2	17.83	12.68	0.3	
1509	9.0	5.4	288.0	3.17	7.14	-45.5	9.94	12.68	0.3	
1514	10.5	5.3	287.9	3.13	7.14	-44.2	6.67	12.68	0.3	
1519	12.0	5.3	288.5	3.19	7.15	-43.3	6.05	12.68	0.3	

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW23 (20PS-MW33 @RB 9/22/20)
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-17-2020	**Samplers:**	Noah R.
Time Start:	1321		Travis H.
Time Finish:	1411	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	19.12 ft	**Screened Interval (ft.):**	9.5-19.5
DTW (ft. bTOC):	13.91 ft		
Water Column:	5.21 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	3.15 L	Water Column x L/ft	
Three Well Volumes:	9.45 L	Liters in Well x 3	
Sample Depth:	≈ 14 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	MicroTPW	**Serial No.:**	20200837 7
Pump Type:	Geo Pump (peri)	**Serial No.:**	J040026668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

20PS-MW33 (NR) 9/22/2020 20PS-MW33-0917 (NR) 9/22/2020

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~20PS-MW23~~	Sample ID: ~~20PS-MW23-0917~~	Sample Time: 1408
Date: 9-17-2020	Dup. Sample ID: ———	Dup. Sample Time: ———
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1321	—	7.1	587	3.29	6.75	124.0	64.61	13.91	0.3	
1326	1.5	6.2	591	1.88	6.59	72.5	78.40	14.14	0.3	
1331	3.0	6.2	607	1.13	6.65	-52.8	51.91	14.14	0.3	
1336	4.5	6.3	6006	1.01	6.67	-114.4	40.70	14.14	0.3	
1341	6.0	6.3	602	0.85	6.69	-159.6	27.24	14.11	0.3	
1346	7.5	6.5	596	0.83	6.65	-186.4	21.69	14.11	0.3	
1351	9.0	6.8	602	0.77	6.67	-188.8	13.35	14.11	0.3	
1356	10.5	6.3	591	0.68	6.65	-198.7	8.41	14.12	0.3	
1401	12.0	6.4	592	0.70	6.66	-198.5	5.98	14.11	0.3	
1406	13.5	6.4	596	0.71	6.62	-194.8	2.84	14.11	0.3	Stabilization complete.

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	~~20PS-MW20~~ 20PS-MW32 (NR) 9/22/2020
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-17-2020	**Samplers:**	Noah R.
Time Start:	1032		Travis H.
Time Finish:	1106	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	23.40	ft	**Screened Interval (ft.):**	~~13'-23'~~ (NR) 10-20
DTW (ft. bTOC):	5.88	ft		
Water Column:	17.52	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	10.60	L	Water Column x L/ft	
Three Well Volumes:	31.8	L	Liters in Well x 3	
Sample Depth:	≈18	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	~~Solon~~ Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	20200837
Pump Type:	Peristaltic (geo pump)	**Serial No.:**	J0400260b8

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

20PS-MW32 ~~20PS-MW32~~ (N2) 9/22/2020 ~~20PS-MW20~~ 20PS-MW32-0917 (NR) 9/22/2020

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~20PS-MW20~~	Sample ID: ~~20PS-MW20~~-0917	Sample Time: 1105
Date: 9-17-2020	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1032	—	6.4	262.5	3.12	7.04	168.4	13.51	5.88	0.3	
1037	1.5	5.0	253.9	0.91	6.96	167.3	2.31	5.87	0.3	
1042	3.0	4.9	253.1	0.48	6.97	164.8	4.20	5.87	0.3	
1047	4.5	4.8	252.9	0.44	6.98	161.5	3.70	5.87	0.3	
1052	6.0	4.8	252.8	0.39	7.00	157.1	4.41	5.87	0.3	
1057	7.5	4.8	253.2	0.37	7.03	156.8	3.73	5.87	0.3	
1102	10.0	4.9	253.2	0.36	7.04	155.6	1.94	5.87	0.3	Stabalization complete.

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	~~20PS-MW18~~ 20PS-MW31 (NR) 9/22/20
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-17-2020	**Samplers:**	Travis H.
Time Start:	0911		Noah R
Time Finish:	1007	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	21.96 ft	**Screened Interval (ft.):**	~~11.5-21.5~~ (NR) 10-20
DTW (ft. bTOC):	11.69 ft		
Water Column:	10.27 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 (L/ft)	See ***Well Volume Calculation*** table	
Liters in Well:	6.21 L	Water Column x L/ft	
Three Well Volumes:	18.64 L	Liters in Well x 3	
Sample Depth:	≈ 17 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	20200837 7
Pump Type:	Pers. geo pump	**Serial No.:**	J0400261618

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☒ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

20PS-MW31 (NR) 9/22/2020 20PS_MW31-0917 (NR) 9/22/2020

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~20PS-MW18~~	Sample ID: ~~20PS-MW18-0917~~	Sample Time: 0959
Date: 9-17-2020	Dup. Sample ID: 20PS-MW94-0917	Dup. Sample Time: 1014
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
0911	—	6.1	293.4	5.08	6.28	185.7	102.4	11.69	0.3	
0916	1.5	5.0	286.7	1.73	6.46	182.4	78.96	11.68	0.3	
0921	3.0	4.8	284.7	1.33	6.58	180.0	65.84	11.68	0.3	
0926	4.5	4.9	285.0	1.00	6.64	177.6	51.40	11.69	0.3	
0931	6.0	4.9	285.0	0.89	6.73	175.6	29.54	11.69	0.3	
0936	7.5	4.8	284.3	0.85	6.78	174.1	22.88	11.69	0.3	
0941	9.0	4.9	284.7	0.86	6.79	173.1	15.78	11.68	0.3	
0946	10.5	4.8	284.4	0.87	6.82	171.1	9.89	11.69	0.3	
0951	12.0	4.8	283.8	0.84	6.87	169.8	7.61	11.69	0.3	
0956	13.5	4.8	283.0	0.81	6.89	168.1	3.06	11.69	0.3	Stabilization Complete.

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	~~20PS-HCMW04-D~~ M 9-22-2020
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403 20PS-HCMW04-75
Date:	9-18-2020	**Samplers:**	Noah R.
Time Start:	1257		Travis H.
Time Finish:	1341	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	75.48 ft	**Screened Interval (ft.):**	Unk
DTW (ft. bTOC):	9.98 ft		
Water Column:	65.5 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	39.63 L	Water Column x L/ft	
Three Well Volumes:	118.9 L	Liters in Well x 3	
Sample Depth:	≈ 70.5 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	MicroTPW	**Serial No.:**	20200837
Pump Type:	Geo Pump (peri)	**Serial No.:**	J0400266 68

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : *Yes* ☐ *No* ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

HCMW04-75 20PS-HCMW04-75-0918

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~HCMW04-D-TM~~	Sample ID: ~~20PS-HCMW04-D-0918-TM~~ 9-22-2020	Sample Time: 1339
Date: 9-18-2020	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1257	—	6.38	228	7.49	7.37	-275.7	9.31	9.98	0.3	
1302	1.5	4.63	208	0.92	4.54	-92.4	3.03	9.98	0.3	
1307	3.0	4.55	199	0.59	4.52	-80.5	1.00	9.98	0.3	
1312	4.5	4.49	195	0.56	5.27	-75.0	0.66	9.98	0.3	
1317	6.0	4.45	194	0.60	5.36	-49.5	0.04	9.98	0.3	
1322	7.5	4.61	193	0.57	6.09	8.6	0.00	9.98	0.3	
1327	9.0	4.64	193	0.59	6.14	10.2	0.00	9.98	0.3	
1332	10.5	4.58	192	0.58	6.21	13.6	0.00	9.98	0.3	
1337	12.0	4.54	192	0.57	6.33	19.2	0.00	9.98	0.3	

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	~~20PS-HCMW04-S~~ M 9-22-2020
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403 20PS-HCMW04-15
Date:	9-18-2020	**Samplers:**	Noah R.
Time Start:	1257		Travis M.
Time Finish:	1328	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	16.84 ft	**Screened Interval (ft.):**	UNK
DTW (ft. bTOC):	9.98 ft		
Water Column:	6.86 ft	TD-DTW=Water Column	
Liter/Foot:	0.6005 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.15 L	Water Column x L/ft	
Three Well Volumes:	12.45 L	Liters in Well x 3	
Sample Depth:	≈ 12 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	20200877
Pump Type:	Geo Pump (peri)	**Serial No.:**	J040026068

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

HCMW04-15

~~20PS-HCMW04-S~~ TH 9-22

20PS-HCMW04-15-0918 TH 9-22-2020

~~20PS-HCMW04-S~~ TH 9-22-2020

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~HCMW04-S~~ TH 9-22	Sample ID: ~~20PS-HCMW04-S~~	Sample Time: 1325
Date: 9-16-2020	Dup. Sample ID: 20PS-MW93-0918	Dup. Sample Time: 1514

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1257	—	6.4	421.4	7.76	7.05	246.7	8.95	9.98	0.3	
1302	1.5	5.3	406.7	1.92	6.91	245.6	1.03	10.10	0.3	
1307	3.0	5.3	410.9	1.79	6.89	244.7	0.72	10.10	0.3	
1312	4.5	5.3	410.0	1.63	6.88	244.2	0.70	10.10	0.3	
1317	6.0	5.2	409.3	1.58	6.87	243.6	0.51	10.10	0.3	
1322	7.5	5.3	408.7	1.47	6.85	243.0	0.56	10.10	0.3	Stabilization complete

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

9-22-2020 TH

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	~~DWC1A / DWC1A/HCMW01-S~~ 20PS-HCMW01-15
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-18-2020	**Samplers:**	Noah R
Time Start:	1040		Travis R.
Time Finish:	1120	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	16.88 ft	**Screened Interval (ft.):**	Unk
DTW (ft. bTOC):	10.04 ft		
Water Column:	6.84 ft	TD-DTW=Water Column	
Liter/Foot:	0.6005 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.14 L	Water Column x L/ft	
Three Well Volumes:	12.41 L	Liters in Well x 3	
Sample Depth:	≈ 13.5 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	20200837 7
Pump Type:	Geo Pump	**Serial No.:**	J04002 6068

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

20PS-HCMW01-15 S = TM Shallow 20PS-HCMW01-15-0918

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~DWC1A/HCMW01-S~~	Sample ID: ~~20PS-HCMW01-S-0918~~ TM 9-22-2020	Sample Time: 1118
Date: 9-18-2020 TM	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1041	—	4.8	688	8.02	6.60	242.7	56.56	10.04	0.3	
1046	1.5	3.5	509	5.29	6.72	230.8	42.34	10.04	0.3	
1051	3.0	3.5	499.9	4.80	6.79	230.5	32.78	10.04	0.3	
1056	4.5	3.5	486.9	4.28	6.82	230.7	19.50	10.04	0.3	
1101	6.0	3.4	466.4	3.74	6.85	231.1	12.46	10.04	0.3	
1106	7.5	3.4	457.9	3.36	6.88	231.4	8.37	10.04	0.3	
1111 TM	~~8.09.0~~	3.4	453.7	3.31	6.90	231.7	4.93	10.04	1	
1116	10.5	3.4	450.3	3.28	6.91	232.2	3.12	10.04	1	Stabilization Complete
									↓	

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	~~DWCIB/HCMW01D~~ 20PS-HCMW01-75
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-18-2020	**Samplers:**	N. Robinson
Time Start:	1040		T. Herman
Time Finish:	1135	**Checked By:**	

TH 9-22-2020

Well & Purge Information

TD (ft. bTOC):	75.95 ft	**Screened Interval (ft.):**	UNK
DTW (ft. bTOC):	10.18 ft		
Water Column:	65.77 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	39.8 L	Water Column x L/ft	
Three Well Volumes:	119.4 L	Liters In Well x 3	
Sample Depth:	≈ 71 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	20200837 7
Pump Type:	Geo Pump (peri)	**Serial No.:**	J04002 10068

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : *Yes* ☐ *No* ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

20PS-HCMW01-75

~~D = Deep~~ TM

20PS-HCMW01-75-0918

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~DWCIBJ HCMW01D~~ TM	Sample ID: ~~20PS-HCMW01-D-0918~~ TM 9-22-20	Sample Time: 1133
Date: 9-18-2020	Dup. Sample ID:	Dup. Sample Time:

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1041	—	4.56	235	5.06	10.90	255.3	22.110	10:18	0.3	
1046	1.5	3.53	202	1.67	6.65	410.4	22.81	10.10	0.3	
1051	3.0	3.50	214	0.73	5.37	404.8	22.52	10.10	0.3	
1056	4.5	3.47	228	0.97	5.47	360.0	14.65	10.10	0.3	
1101	6.0	3.39	232	0.75	5.20	299.4	10.00	10.10	0.3	
1106	7.5	3.35	233	0.38	5.18	208.0	8.85	10:10	0.3	
1111	9.0	3.33	233	0.41	5.41	154.6	8.12	10.10		
1116	10.5	3.37	233	0.57	5.71	115.1	7.94	10.10		
1121	12.0	3.40	233	0.58	6.11	72.6	7.33	10.10		
1126	13.5	3.42	233	0.60	6.17	68.4	3.38	10.10		
1131	15.0	3.44	233	0.59	6.21	~~44.9~~ 104.9 TM	3.47	10.10		

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	~~20PS-HCMW02-D~~ (deep)
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-18-2020	**Samplers:**	Noah R. 20PS-HCMW02-75
Time Start:	1456		Travis M.
Time Finish:	1550	**Checked By:**	

TM 9-22-2020

Well & Purge Information

TD (ft. bTOC):	75.52 ft	**Screened Interval (ft.):**	Unk
DTW (ft. bTOC):	9.70 ft		
Water Column:	65.82 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	39.82 L	Water Column x L/ft	
Three Well Volumes:	119.5 L	Liters In Well x 3	
Sample Depth:	≈ 70.5 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	20200837
Pump Type:	Geo Pump	**Serial No.:**	J0400216068

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

20PS-HCMW02-75 20PS-HCMW02-75-0918

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~20PS-HCMW02-D~~	Sample ID: ~~20PS-HCMW02-D-0918-TM~~ 9-22-2020	Sample Time: 1547
Date: 9-18-2020 TM	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1459	—	6.16	246	3.95	6.44	-89.7	6.91	9.70	0.3	
1504	1.5	5.29	237	0.71	4.45	-56.3	6.68	9.73	0.3	
1509	3.0	5.34	236	0.58	4.93	-118.6	11.94	9.73	0.3	
1514	4.5	5.17	235	0.70	5.49	-133.0	17.96	9.73	0.3	
1519	6.0	5.09	235	0.57	5.89	-128.0	22.58	9.73	0.3	
1524	7.5	4.97	236	0.53	6.06	-92.0	19.63	9.73	0.3	
1529	9.0	4.94	236	0.64	6.21	-94.1	12.51	9.73	0.3	
1534	10.5	4.94	236	0.52	6.42	-85.4	7.71	9.73	0.3	
1539	12.0	4.88	236	0.50	6.46	-82.1	4.47	9.73	0.3	
1544	13.5	4.86	235	0.52	6.64	-86.4	2.72	9.73	0.3	Purge stabilization complete
TM ~~1549~~	~~15.0~~								~~0.3~~	—

Sampled? : Yes ☒ No ☐

Initial of Sampler: KJR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

9-22-2020

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	~~20PS-HCMW02-S~~ TM (Shallow)
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-18-2020	**Samplers:**	Noah R. 20PS-HCMW02-15
Time Start:	1450		Travis M.
Time Finish:	1533	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	18.60 ft	**Screened Interval (ft.):**	UNK
DTW (ft. bTOC):	9.26 ft		
Water Column:	9.34 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	5.65 L	Water Column x L/ft	
Three Well Volumes:	16.95 L	Liters in Well x 3	
Sample Depth:	≈ 13.5 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	20200837 7
Pump Type:	Geo Pump	**Serial No.:**	J040026668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

20PS-HCMW02-15 20PS-HCMW02-15-0918

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~20PS-HCMW02-S~~	Sample ID: ~~20PS-HCMW02-S-0918~~ TM 9-22-2020	Sample Time: 1531
Date: 9-18-2020 TM	Dup. Sample ID: ———	Dup. Sample Time: ———
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1459	~~1.5~~	6.3	264.2	5.24	7.09	245.1	39.15	9.26	0.3	
1504	~~3.0~~ 1.5	5.8	261.8	3.09	7.00	246.4	19.87	9.30	0.3	
1509	~~4.5~~ 3.0	5.7	263.0	2.50	7.02	244.3	15.49	9.30	0.3	
1514	~~6.0~~ 4.5	5.6	265.5	1.99	7.04	242.0	9.06	9.30	0.3	
1519	~~7.5~~ 6.0	5.5	266.2	1.51	7.03	240.2	3.74	9.30	0.3	
1524	~~9.0~~ 7.5	5.5	267.6	1.47	7.04	239.2	2.97	9.30	0.3	
1529	9.0	5.4	268.3	1.41	7.02	238.7	0.65	9.30	0.3	Stabilization Complete.

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	~~HCMW05-S~~ TM 9-22-2020
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403 HCMW05-15
Date:	9-19-2020	**Samplers:**	Noah R.
Time Start:	0937		Travis H.
Time Finish:	1035	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	13.98 ft	**Screened Interval (ft.):**	Unk
DTW (ft. bTOC):	4.52 ft		
Water Column:	9.46 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	5.7 L	Water Column x L/ft	
Three Well Volumes:	17.2 L	Liters in Well x 3	
Sample Depth:	≈ 9 ft. ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	202008377
Pump Type:	Geo Pump (peri)	**Serial No.:**	J0400206 68

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☒ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

HCMW05-15 20PS-HCMW05-15-0919

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~HCMW05-5~~ TM	Sample ID: ~~20PS-HCMW05-5-0919~~ TM 9-22-2020	Sample Time: 1029
Date: 9-19-2020	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
0937	—	7.4	299.1	2.61	6.70	142.4	3.91	4.52	0.3	
0942	1.5	7.3	300.7	1.54	6.49	149.1	3.66	4.24	0.3	
0947	3.0	7.1	305.8	1.37	6.50	141.2	3.24	4.24	↓	
0952	4.5	7.0	306.2	1.13	6.53	129.5	4.17	4.24	↓	
0957	6.0	6.9	303.1	0.92	6.57	118.8	2.01	4.24	↓	
1002	7.5	6.7	301.2	0.81	6.57	108.2	1.89	4.24	↓	
1007	9.0	6.6	298.6	0.79	6.60	102.4	1.67	4.24	↓	
1012	10.5	6.5	296.5	0.73	6.62	92.3	1.86	4.24	↓	
1017	12.0	6.5	296.4	0.73	6.63	90.8	1.63	4.24	↓	
1022	13.5	6.5	295.0	0.69	6.65	89.4	1.38	4.24	↓	
1027	15.0	6.5	293.8	0.67	6.68	87.7	1.72	4.24		Stabilization Complete

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	~~HCMW05-D~~ M 9-22-2020
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403 HCMW05-75
Date:	9-19-2020	**Samplers:**	Noah R.
Time Start:	0937		Travis H.
Time Finish:	1054	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	74.96 ft	**Screened Interval (ft.):**	Unk
DTW (ft. bTOC):	4.10 ft		
Water Column:	70.86 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	42.9 L	Water Column x L/ft	
Three Well Volumes:	128.6 L	Liters in Well x 3	
Sample Depth:	≈70 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	(0.605)
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	04F10639AD
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	20200837 7
Pump Type:	Geo Pump (peri)	**Serial No.:**	J04002 0668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

HCMW05-75 20PS-HCMW05-75-0919

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~HCMW05-D~~ TM	Sample ID: ~~20PS-HCMW05-D-0919~~ TM 9-22-2020	Sample Time: 1049
Date: 9-19-2020	Dup. Sample ID: 20PS-MW92-0919	Dup. Sample Time: 0814
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
TM 0937	—	5.71	58	4.58	6.70	207.2	11.59	4.10	0.3	
942 ~~0937~~	1.5	4.92	83	2.09	2.70	376.7	13.40	4.10	0.3	
947 ~~0942~~	3.0	4.36	128	0.92	0.50	371.2	9.07	4.10	0.3	
952 ~~0947~~	4.5	4.22	142	0.77	0.96	319.0	6.44	4.10	0.3	
957 ~~0952~~	6.0	4.06	150	0.94	1.80	267.7	4.87	4.10		
1002	7.5	4.03	159	0.68	3.04	180.6	2.76	4.10		
1007	9.0	4.00	162	0.60	3.75	134.3	3.62	4.10		
1012	10.5	3.86	165	0.69	4.65	80.7	1.71	4.10		
1017	12.0	3.84	165	0.66	4.97	56.6	2.10	4.10		
1022	13.5	3.90	164	0.67	5.35	32.0	1.58	4.10	↓	
1027	15.0	4.03	168	0.88	5.89	2.1	1.78	4.10		
1032	16.5	4.08	169	0.81	6.12	-15.0	1.47	4.10		
1037	18.0	4.13	170	0.93	6.29	-28.2	1.86	4.10		
1042	19.5	4.12	172	0.89	6.31	-28.0	1.70	4.10		
1047	21.0	4.14	172	0.90	6.34	-29.4	1.06	4.10		Stabilization complete

Sampled? : Yes ☒ No ☐

Initial of Sampler: NK

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	~~20PS-HCMW03-S~~ TM (shallow) 9-22-2020
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-19-2020	**Samplers:**	Noah R. 20PS-HCMW03-15
Time Start:	TM ~~HH~~ 1207		Travis H.
Time Finish:	1313	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	13.20 ft	**Screened Interval (ft.):**	Unknown
DTW (ft. bTOC):	4.19 ft		
Water Column:	9.01 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	5.5 L	Water Column x L/ft	
Three Well Volumes:	16.5 L	Liters in Well x 3	
Sample Depth:	≈ 8 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	04F10639AD
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	MicroTPW	**Serial No.:**	202008377
Pump Type:	Geo Pump.	**Serial No.:**	J0400216168

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

20PS-HCMW03-15(Shallow) 20PS-HCMW03-15-0919

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~20PS-HCMW03-15~~	Sample ID: ~~20PS-HCMW03-S-0919~~ TM 9-22-2020	Sample Time: 1311
Date: 9-19-2020 TM	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1207	—	9.46	395	2.10	6.71	68.1	204.5	4.20	0.3	
1212	1.5	9.37	393	1.23	6.68	54.4	223.2	4.20	0.3	
1217	3.0	9.13	397	0.67	6.64	32.1	180.6	4.20	0.3	
1222	4.5	9.14	399	0.66	6.60	23.7	99.50	4.20		
1227	6.0	9.17	401	0.56	6.61	15.8	69.23	4.20		
1232	7.5	9.20	400	0.57	6.64	2.5	45.99	4.20		
1237	9.0	9.19	399	0.73	6.65	-2.5	31.85	4.20		
1242	10.5	9.26	395	0.53	6.67	-8.8	20.60	4.20		
1247	12.0	9.26	393	0.55	6.68	-11.4	14.08	4.20		
1252	13.5	9.35	391	0.58	6.68	-13.2	11.27	4.20	↓	
1257	15.0	9.27	388	0.56	6.69	-15.2	10.01	4.20	0.3	
TM ~~12~~ 1302	16.5	9.40	385	0.58	6.69	-17.2	7.62	4.20	0.3	
1307	18.0	9.51	388	0.56	6.69	-13.1	5.60	4.20	0.3	Stabilization complete

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

TM 9-22-2020

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	~~20PS-HCMW03-D~~ 20PS-HCMW03-75 (deep)
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-19-2020	**Samplers:**	Noah R.
Time Start:	TM ~~1111~~ 1207		Travis M.
Time Finish:	1303	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	72.08 ft	**Screened Interval (ft.):**	Unk
DTW (ft. bTOC):	4.06 ft		
Water Column:	68.02 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	41.1 L	Water Column x L/ft	
Three Well Volumes:	123.5 L	Liters in Well x 3	
Sample Depth:	≈67 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	MicroTPW	**Serial No.:**	20200837
Pump Type:	Geo Pump	**Serial No.:**	J04002 6668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

20PS-HCMW03-75 (deep) 20PS-HCMW03-75-0919

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~20PS-HCMW03-D~~ TM	Sample ID: ~~20PS-HCMW03-D-0919~~ TM 9-22-2020	Sample Time: 1301
Date: 9-19-2020	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1207	—	7.6	332.4	2.71	6.88	126.5	33.93	4.06	0.3	
1212	1.5	7.0	320.4	1.31	7.00	125.2	32.02	4.06	0.3	
1217	3.0	6.8	291.5	0.93	7.12	119.6	16.36	4.06	0.3	
1222	4.5	6.8	260.1	0.74	7.14	114.5	17.11	4.06	↓	
1227	6.0	6.7	247.8	0.64	7.15	111.5	7.58	4.06	↓	
1232	7.5	6.7	241.6	0.55	7.16	108.4	6.88	4.06	↓	
1237	9.0	6.6	239.4	0.50	7.16	106.6	5.31	4.06	↓	
1242	10.5	6.7	241.9	0.48	7.17	104.9	4.39	4.06	↓	
1247	12.0	6.7	239.4	0.47	7.19	102.6	3.34	4.06	↓	
1252	13.5	6.7	234.7	0.45	7.20	100.9	3.27	4.06	↓	
1257	15.0	6.6	233.1	0.43	7.19	99.6	5.87	4.06		Stabilization complete

Sampled? : Yes ☑ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	MW-07
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9/21/20	**Samplers:**	NR, TH, GK
Time Start:	1012		
Time Finish:	1108	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	17.44 ft	**Screened Interval (ft.):**	3-13
DTW (ft. bTOC):	10.29 ft		
Water Column:	7.15 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.33 L	Water Column x L/ft	
Three Well Volumes:	12.98 L	Liters In Well x 3	
Sample Depth:	13 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	20200837 7
Pump Type:	Geo Pump.	**Serial No.:**	5040026068

Purge Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☒ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW07 | Sample ID: 20PS-MW07-0921 | Sample Time: 1058

Date: 9-21-2020 | Dup. Sample ID: 20PS-MW90-0921 | Dup. Sample Time: 0713

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (uS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
~~1002~~			~~297.3~~	~~4.24~~	START PURGING					No odor !!
~~1004~~			~~294.7~~	~~5.07~~						
1014	0.6	4.3	~~294.7~~	~~5.16~~	6.68	172.6	72.89	10.29	0.3	
1019	2.1	4.2	297.3	4.16	6.65	175.4	46.17	"		
1024	3.6	4.3	297.7	4.05	6.71	174.1	38.34	"		
1029	5.1	4.3	298.7	3.92	6.75	171.6	29.54	"		
1034	6.6	4.3	298.0	3.82	6.79	169.4	16.84	"		
1039	8.1	4.3	298.3	3.79	6.81	167.1	10.71	"		
1044	9.6	4.3	299.3	3.67	6.84	163.4	7.77	"		
1049	11.1	4.4	299.7	3.69	6.83	160.4	3.65	"		
1054	12.6	4.4	299.8	3.70	6.89	160.2	2.61	"		

Sampled? : Yes ☑ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW08
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-21-2020	**Samplers:**	Noah R.
Time Start:	1133		Travis H.
Time Finish:	1212	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	16.66 ft	**Screened Interval (ft.):**	3-13
DTW (ft. bTOC):	8.96 ft		
Water Column:	7.7 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.66 L	Water Column x L/ft	
Three Well Volumes:	13.98 L	Liters in Well x 3	
Sample Depth:	11.5 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	20200837 7
Pump Type:	Geo Pump	**Serial No.:**	J04002668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW08 | Sample ID: 20PS-MW08-0921 | Sample Time: 1210

Date: 9-21-2020 | Dup. Sample ID: — | Dup. Sample Time: —

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1133	—	7.3	439.4	3.95	6.99	160.7	79.12	8.96	0.3	
1138	1.5	7.0	437.1	1.54	6.89	148.0	47.42	8.98		
1143	3.0	7.2	435.5	1.18	6.87	131.0	25.93	8.96		
1148	4.5	7.3	426.0	1.04	6.87	115.3	18.18	8.96		
1153	6.0	7.3	422.3	1.10	6.88	103.3	10.17	8.96		
1158	7.5	7.2	419.9	1.20	6.88	91.7	8.27	8.96		
1203	9.0	7.3	418.8	1.19	6.88	88.6	5.32	8.96		
1208	10.5	7.3	416.9	1.16	6.88	83.3	3.52	8.96		Purge stabilization complete

Sampled?: Yes ☒ No ☐

Initial of Sampler: NR.

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW09
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-21-2020	**Samplers:**	Noah R.
Time Start:	1227		Travis H.
Time Finish:	1344	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	19.57	ft	**Screened Interval (ft.):**	6.5 - 16.5
DTW (ft. bTOC):	12.34	ft		
Water Column:	7.23	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.37	L	Water Column x L/ft	
Three Well Volumes:	13.12	L	Liters in Well x 3	
Sample Depth:	≈15	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	MicroTPW	**Serial No.:**	20200837
Pump Type:	Geo Pump (peri)	**Serial No.:**	J040026668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW09	Sample ID: 20PS-MW09-0921	Sample Time: 1342
Date: 9-21-2020	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1243	—	6.6	374.5	4.56	6.89	134.4	54.37	12.34	0.3	
1248	1.5	4.9	349.9	1.03	6.76	131.8	77.30	12.42		
1253	3.0	4.9	357.9	0.69	6.85	121.3	66.79	12.42		
1258	4.5	5.0	364.8	0.61	6.85	116.0	46.11	12.42		
1303	6.0	4.8	367.2	0.61	6.88	109.9	28.63	12.42		
1308	7.5	5.0	367.8	0.60	6.92	104.6	20.59	12.42		
1313	9.0	5.0	363.8	0.56	6.94	98.9	15.43	12.42		
1318	10.5	4.8	342.5	0.51	6.98	94.8	12.14	12.42	↓	
1323	12.0	5.1	363.9	0.50	6.96	92.8	10.74	12.41		
1328	13.5	5.0	362.6	0.49	6.97	91.4	8.47	12.41		
1333	15.0	5.0	362.4	0.49	6.98	90.1	5.71	12.41		
1338	16.5	5.0	361.8	0.49	6.99	90.2	4.33	12.41	↓	Purge Stabilization complete Sample time: 1342

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	MW10
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-21-2020	**Samplers:**	N. Robinson
Time Start:	1420		G. Kornewshe
Time Finish:	1505	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	16.27 ft	**Screened Interval (ft.):**	3-13
DTW (ft. bTOC):	9.16 ft		
Water Column:	7.11 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.30 L	Water Column x L/ft	
Three Well Volumes:	12.90 L	Liters in Well x 3	
Sample Depth:	≈ 12 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	MicroTPW	**Serial No.:**	20200837 7
Pump Type:	Geo Pump (peri)	**Serial No.:**	J040026668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID:	20PS-MW10	Sample ID:	20PS-MW10-0921
Date:	9-21-2020	Dup. Sample ID:	—
Notes:			

Sample Time:	1503
Dup. Sample Time:	—

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
~~1416~~	START PURGING									
1420	—	7.2	485.6	4.83	7.07	118.8	96.81	9.110	0.3	
1425	1.5	6.6	483.8	2.95	6.98	103.8	70.22	9.26		
1430	3.0	6.7	495.0	2.82	7.10	88.4	61.94	9.26		
1435	4.5	6.6	491.6	2.74	7.15	76.2	34.39	9.26		
1440	6.0	6.6	490.0	2.49	7.16	68.2	16.79	9.26		
1445	7.5	6.7	489.8	2.70	7.16	62.2	10.74	9.26		
1450	9.0	6.8	487.3	2.71	7.17	57.8	6.98	9.26		
1455	10.5	6.7	488.5	2.78	7.15	54.1	5.94	9.26 9.26		
1500	12.0	6.8	487.2	2.79	7.15	52.3	4.37			

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20B-MW19
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-23-2020	**Samplers:**	Noah R.
Time Start:	1323		Travis H.
Time Finish:	1410	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	16.55	ft	**Screened Interval (ft.):**	3-13
DTW (ft. bTOC):	9.38	ft		
Water Column:	7.17	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.34	L	Water Column x L/ft	
Three Well Volumes:	13.01	L	Liters in Well x 3	
Sample Depth:	≈12	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	20200837 7
Pump Type:	Geo Pump (peri)	**Serial No.:**	J040026068

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : *Yes* ☐ *No* ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW19 | Sample ID: 20PS-MW19-0923 | Sample Time: 1408

Date: 9-23-2020 | Dup. Sample ID: — | Dup. Sample Time: —

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1327	—	6.4	836	3.67	6.89	144.0	136.1	9.38	0.3	
1332	1.5	4.5	703	1.15	6.71	142.3	55.92	9.36		
1337	3.0	4.4	572	0.90	6.74	139.0	26.00	9.36		
1342	4.5	4.3	504	0.85	6.76	137.0	18.53	9.37		
1347	6.0	4.2	483.3	0.76	6.78	135.6	16.53	9.37		
1352	7.5	4.1	451.6	0.74	6.79	134.8	10.84	9.37		
1357	9.0	4.1	413.0	0.73	6.79	132.6	7.72	9.37		
1402	10.5	4.1	414.4	0.72	6.81	132.5	8.66	9.37		
1407	12.0	4.1	412.2	0.72	6.81	132.1	7.24	9.37		Stabilization complete.

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW14
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-23-2020	**Samplers:**	Noah R.
Time Start:	1451		Travis H.
Time Finish:	1545	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	16.31 ft	**Screened Interval (ft.):**	3-13
DTW (ft. bTOC):	6.69 ft		
Water Column:	9.62 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	5.82 L	Water Column x L/ft	
Three Well Volumes:	17.46 L	Liters In Well x 3	
Sample Depth:	~~11~~ ≈13 ≈11 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	MicroTPW	**Serial No.:**	202008377
Pump Type:	Geo Pump (peri)	**Serial No.:**	J04002668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : *Yes* ☐ *No* ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW14 | Sample ID: 20PS-MW14-0923 | Sample Time: 1545

Date: 9-23-2020 | Dup. Sample ID: — | Dup. Sample Time: —

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1454	—	7.8	459.3	1.26	6.90	134.3	98.63	6.69	0.3	
1459	1.5	7.7	459.4	0.61	6.85	125.0	94.70	6.72		
1504	3.0	7.9	468.9	0.43	6.90	108.3	46.54	6.72		
1509	4.5	8.0	483.2	0.46	6.92	93.1	28.23	6.72		
1514	6.0	8.0	489.4	0.57	6.93	81.7	24.98	6.72		
1519	7.5	8.0	496.5	0.52	6.94	71.5	16.01	6.72		
1524	9.0	7.9	485.7	0.53	6.94	62.4	25.21	6.72		
1529	10.5	7.9	494.6	0.49	6.94	56.1	16.54	6.72		
1534	12.0	7.9	490.7	0.47	6.92	51.1	9.77	6.72		
1539	13.5	7.8	486.4	0.49	6.93	49.8	9.82	6.72		
1544	15.0	7.9	490.3	0.49	6.93	47.1	6.54	6.72		Stabilization complete

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW11
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-23-2020	**Samplers:**	Noah R.
Time Start:	0952		Travis H.
Time Finish:	1045	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	14.67	ft	**Screened Interval (ft.):**	1.5 - 11.5
DTW (ft. bTOC):	7.05	ft		
Water Column:	7.62	ft	TD-DTW=Water Column	
Liter/Foot:	0.6005	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.61	L	Water Column x L/ft	
Three Well Volumes:	13.83	L	Liters in Well x 3	
Sample Depth:	≈10.5	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	20200837 7
Pump Type:	Geo Pump	**Serial No.:**	J0400216 68

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW11 | Sample ID: 20PS-MW11-0923 | Sample Time: 1045

Date: 9-23-2020 | Dup. Sample ID: — | Dup. Sample Time: —

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1008	—	7.4	365.3	2.80	6.91	111.1	490.8	7.05	0.3	
1013	1.5	7.4	367.5	1.25	6.85	111.0	484.1	7.07	0.3	
1018	3.0	8.0	369.3	1.23	6.84	110.8	219.3	7.07		
1023	4.5	8.0	371.3	1.17	6.84	111.9	78.53	7.07		
1028	6.0	8.1	373.1	0.86	6.83	114.0	20.13	7.07		
1033	7.5	8.1	373.7	0.87	6.83	116.4	9.68	7.07		
1038	9.0	8.1	373.5	0.86	6.83	117.9	8.19	7.07		
1043	10.5	8.1	373.8	0.84	6.84	118.5	9.28	7.07	↓	Stabilization complete

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW12
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-23-2020	**Samplers:**	Noah R.
Time Start:	0900		Travis H.
Time Finish:	0948	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	16.19 ft	**Screened Interval (ft.):**	3-13
DTW (ft. bTOC):	8.61 ft		
Water Column:	7.58 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.59 L	Water Column x L/ft	
Three Well Volumes:	13.76 L	Liters In Well x 3	
Sample Depth:	≈ 12 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	MicroTPW	**Serial No.:**	20200837 7
Pump Type:	Geo Pump (Peri)	**Serial No.:**	J040026068

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : *Yes* ☐ *No* ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW12
Sample ID: 20PS-MW12-0923
Sample Time: 0944
Date: 9-23-2020
Dup. Sample ID: 20PS-MW99-0923
Dup. Sample Time: 0800
Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
0907	—	7.10	314.5	8.59	7.02	146.5	72.16	8.61	0.3	
0912	1.5	6.7	300.3	1.61	6.62	131.1	50.39	8.62		
0917	3.0	6.7	293.5	0.90	6.64	123.7	25.14	8.62		
0922	4.5	6.7	286.2	0.69	6.74	114.9	15.58	8.61		
0927	6.0	6.8	288.6	0.65	6.79	112.4	14.41	8.61		
0932	7.5	6.7	286.5	0.58	6.87	104.8	9.50	8.61		
0937	9.0	6.7	284.4	0.56	6.91	100.0	6.48	8.62		
0942	10.5	6.7	281.0	0.55	6.98	98.1	4.89	8.62		

Sampled? : Yes [X] No [ ]

Initial of Sampler: NC

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW20
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-23-2020	**Samplers:**	Noah R.
Time Start:	1227		Travis H.
Time Finish:	1303	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	16.90 ft	**Screened Interval (ft.):**	3-13
DTW (ft. bTOC):	9.55 ft		
Water Column:	7.35 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.45 L	Water Column x L/ft	
Three Well Volumes:	13.34 L	Liters in Well x 3	
Sample Depth:	≈ 12.5 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	202008377
Pump Type:	Geo Pump (peri)	**Serial No.:**	J04002668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW20 | Sample ID: 20PS-MW20-0923 | Sample Time: 1302

Date: 9-23-2020 | Dup. Sample ID: — | Dup. Sample Time: —

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1231	—	7.7	415.5	6.19	7.09	121.8	40.73	9.55	0.3	
1236	1.5	5.5	399.8	0.95	7.02	122.7	40.80	9.75	0.3	
1241	3.0	5.6	400.3	0.81	7.07	120.6	54.46	9.80		
1246	4.5	5.6	398.4	0.70	7.09	120.5	18.15	9.80		
1251	6.0	5.6	399.4	0.80	7.10	120.8	6.93	9.80		
1256	7.5	5.6	399.6	0.84	7.10	121.1	4.51	9.80		
1301	9.0	5.6	397.0	0.87	7.10	121.5	2.02	9.80		Stabilization complete.

Sampled? : Yes ☑ No ☐

Initial of Sampler: NR.

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	Well ID.:	20PS-MW18
Contract No.:	W911KB-17-D-0018	Project No.:	6321403
Date:	9-23-2020	Samplers:	Noah R.
Time Start:	1126		Travis H.
Time Finish:	1210	Checked By:	

Well & Purge Information

TD (ft. bTOC):	17.01 ft	Screened Interval (ft.):	4-14
DTW (ft. bTOC):	10.22 ft		
Water Column:	6.79 ft	TD-DTW=Water Column	
Liter/Foot:	0.1005 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.11 L	Water Column x L/ft	
Three Well Volumes:	12.32 L	Liters in Well x 3	
Sample Depth:	≈13 ft	Depth of Pump Intake	

Well Volume Calculation

Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	Serial No.:	0581
Water Level Meter:	Solinst	Serial No.:	24219
Turbidity Meter:	Micro TPW	Serial No.:	20200837 7
Pump Type:	Geo Pump (peri)	Serial No.:	J04002 6618

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW18 | Sample ID: 20PS-MW18-0923 | Sample Time: 1208

Date: 9-23-2020 | Dup. Sample ID: — | Dup. Sample Time: —

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1126	—	6.1	278.8	4.33	7.05	137.3	29.75	10.22	0.3	
1131	1.5	4.6	268.0	1.23	6.85	134.9	54.78	10.26		
1136	3.0	4.7	276.9	0.74	6.87	127.8	26.84	10.26		
1141	4.5	4.6	282.5	0.63	6.90	123.0	22.31	10.26		
1146	6.0	4.6	283.9	0.53	6.92	119.2	12.50	10.26		
1151	7.5	4.6	286.3	0.57	6.92	116.8	10.13	10.26		
1156	9.0	4.6	286.7	1.20	6.92	114.2	6.78	10.26		
1201	10.5	4.6	288.9	1.17	6.93	112.6	5.19	10.26		
1206	12.0	4.6	289.6	1.16	6.93	110.5	3.18	10.26		Stabilization complete.

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	Well ID.:	20DS-MW03
Contract No.:	W911KB-17-D-0018	Project No.:	6321403
Date:	9-24-2020	Samplers:	Noah R.
Time Start:	1430		Travis H.
Time Finish:	1535	Checked By:	

Well & Purge Information

TD (ft. bTOC):	16.11 ft	Screened Interval (ft.):	3-13
DTW (ft. bTOC):	4.41 ft		
Water Column:	11.7 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	7.08 L	Water Column x L/ft	
Three Well Volumes:	21.24 L	Liters in Well x 3	
Sample Depth:	~~13~~ 11 ft TM	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	Serial No.:	0581
Water Level Meter:	Solinst	Serial No.:	24219
Turbidity Meter:	MicroTPW	Serial No.:	202008377
Pump Type:	Geo Pump (peri)	Serial No.:	J04002-16168

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW03 | Sample ID: 20PS-MW03-0924 | Sample Time: 1533

Date: 9-24-2020 | Dup. Sample ID: — | Dup. Sample Time: —

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1441	—	5.8	195.2	4.51	7.19	149.2	107.60	4.41	0.3	
1446	1.5	5.4	193.3	1.72	7.13	142.7	111.5	4.41		
1451	3.0	5.6	192.4	1.04	7.17	130.2	83.31	4.41		
1456	4.5	5.5	188.4	0.84	7.20	120.8	56.98	4.41		
1501	6.0	5.5	186.8	0.63	7.21	113.2	41.41	4.41		
1506	7.5	5.5	185.8	0.55	7.22	109.5	33.71	4.41		
1511	9.0	5.5	184.7	0.47	7.22	104.8	28.50	4.41		
1516	10.5	5.5	183.9	0.47	7.24	101.2	22.33	4.41		
1521	12.0	5.5	182.6	0.46	7.25	97.6	17.45	4.41		
1526	13.5	5.5	183.1	0.46	7.26	94.4	17.57	4.41		
1531	15.0	5.5	181.7	0.46	7.26	91.9	17.18	4.41		Stabilization Complete
~~1536~~	~~16.5~~	TH 9-24-20								

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	Well ID.:	20PS-MW23
Contract No.:	W911KB-17-D-0018	Project No.:	6321403
Date:	9-24-2020	Samplers:	Noah R.
Time Start:	1607		Travis H.
Time Finish:	1711	Checked By:	

Well & Purge Information

TD (ft. bTOC):	12.73 ft	Screened Interval (ft.):	3-13
DTW (ft. bTOC):	3.61 ft		
Water Column:	9.12 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	5.52 L	Water Column x L/ft	
Three Well Volumes:	16.55 L	Liters in Well x 3	
Sample Depth:	~~9~~ ≈8 ft 9-25 TH	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	Serial No.:	0581
Water Level Meter:	Solinst	Serial No.:	24219
Turbidity Meter:	Micro TPW	Serial No.:	20200837 7
Pump Type:	Geo Pump	Serial No.:	J04002 6068

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW23
Date: 9-24-2020
Sample ID: 20PS-MW23-0924
Dup. Sample ID: —
Sample Time: 1709
Dup. Sample Time: —
Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1622	—	14.3	302.0	1.74	7.17	112.3	587.9	3.61	0.3	
1627	1.5	14.4	300.9	1.59	7.19	104.7	382.2	3.62		
1632	3.0	14.4	302.9	1.02	7.12	94.3	86.35	3.62		
1637	4.5	14.3	298.8	0.84	7.11	92.1	38.30	3.62		
1642	6.0	14.3	295.8	0.67	7.10	91.4	19.41	3.62		
1647	7.5	14.3	294.7	0.57	7.10	90.8	12.10	3.62		
1652	9.0	14.4	294.2	0.51	7.10	89.9	10.00	3.62		
1657	10.5	14.3	294.4	0.49	7.10	89.0	9.21	3.62		
1702	12.0	14.4	294.0	0.47	7.10	87.3	5.89	3.62		
1707	13.5	14.4	292.9	0.46	7.11	86.3	3.03	3.62		Stabilization complete

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW-2
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-24-2020	**Samplers:**	Noah R.
Time Start:	1220		Travis H.
Time Finish:	1301	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	10.24 ft	**Screened Interval (ft.):**	Unk
DTW (ft. bTOC):	4.59 ft		
Water Column:	5.65 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	3.42 L	Water Column x L/ft	
Three Well Volumes:	10.25 L	Liters in Well x 3	
Sample Depth:	~~≈7~~ ≈7 ft (TM 9-25)	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	9-25 TM ~~20200837~~ #0581
Water Level Meter:	Solinst	**Serial No.:**	#24219
Turbidity Meter:	MicroTPW	**Serial No.:**	#20200837
Pump Type:	Geo Pump	**Serial No.:**	J0400266 68

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : *Yes* ☐ *No* ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW-2 | Sample ID: 20PS-MW-2-0924 | Sample Time: 1259

Date: 9-24-2020 | Dup. Sample ID: — | Dup. Sample Time: —

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1222	—	7.8	265.0	12.50	6.93	151.5	13.70	4.59	0.3	
1227	1.5	7.9	266.4	2.40	6.93	140.6	3.11	4.60		
1232	3.0	7.9	264.7	1.16	6.93	131.7	1.28	4.60		
1237	4.5	8.0	265.4	0.84	6.95	125.9	0.74	4.60		
1242	6.0	7.9	265.3	0.75	6.97	121.7	0.54	4.60		
1247	7.5	7.9	265.6	0.68	6.98	117.8	1.19	4.60		
1252	9.0	7.9	265.2	0.66	7.00	114.4	0.07	4.60		
1257	10.5	8.0	265.6	0.66	7.01	111.3	0.09	4.60	↓	Stabilization complete

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	Well ID.:	20PS-MW01
Contract No.:	W911KB-17-D-0018	Project No.:	6321403
Date:	9-24-2020	Samplers:	Noah R
Time Start:	1055		Travis H.
Time Finish:	1152	Checked By:	

Well & Purge Information

TD (ft. bTOC):	16.58 ft	Screened Interval (ft.):	3-13
DTW (ft. bTOC):	8.72 ft		
Water Column:	7.86 ft	TD-DTW=Water Column	
Liter/Foot:	0.1605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.75 L	Water Column x L/ft	
Three Well Volumes:	14.27 L	Liters in Well x 3	
Sample Depth:	≈12 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	Serial No.:	0581
Water Level Meter:	Solinst	Serial No.:	24219
Turbidity Meter:	Micro TPW	Serial No.:	20200837 7
Pump Type:	Geo Pump (peri)	Serial No.:	J0400260 68

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☒ No ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW01 | Sample ID: 20PS-MW01-0924 | Sample Time: 1143

Date: 9-24-2020 | Dup. Sample ID: 20PS-MW88-0924 | Dup. Sample Time: 0840

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1101	—	4.7	318.0	6.51	7.56	181.7	122.1	8.72	0.3	
1106	1.5	4.2	296.8	2.63	7.01	177.1	60.93	8.71		
1111	3.0	4.2	279.7	1.89	6.87	169.1	45.06	8.71		
1116	4.5	4.2	274.5	1.58	6.90	157.5	22.46	8.71		
1121	6.0	4.2	266.4	1.39	6.95	148.8	16.73	8.71		
1126	7.5	4.1	259.7	1.19	6.96	142.6	10.30	8.71		
1131	9.0	4.1	257.5	1.06	6.96	139.1	7.81	8.71		
1136	10.5	4.1	250.2	1.04	6.97	137.8	7.48	8.71		
1141	12.0	4.0	249.8	1.01	6.98	131.8	4.08	8.71		Stabilization complete.

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW13
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-25-2020	**Samplers:**	Noah R.
Time Start:	1823		Travis H.
Time Finish:	1918	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	18.06 ft	**Screened Interval (ft.):**	5-15
DTW (ft. bTOC):	11.25 ft		
Water Column:	6.81 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.12 L	Water Column x L/ft	
Three Well Volumes:	12.36 L	Liters in Well x 3	
Sample Depth:	≈ 14 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	20200837 7
Pump Type:	Geo Pump (peri)	**Serial No.:**	J04002 6618

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : *Yes* ☐ *No* ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW13
Sample ID: 20PS-MW13-0925
Sample Time: 1916
Date: 9-25-2020
Dup. Sample ID: —
Dup. Sample Time: —
Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1830	—	3.8	367.0	3.53	7.07	106.4	178.6	11.25	0.3	
1835	1.5	3.6	364.3	2.15	7.06	103.3	625.6	11.53		
1840	3.0	3.5	374.3	1.50	7.05	88.6	93.15	11.53		
1845	4.5	3.4	376.0	1.13	7.14	67.4	62.81	11.53		
1850	6.0	3.3	367.8	0.87	7.23	38.2	46.65	11.53		
1855	7.5	3.4	365.2	0.84	7.25	11.6	33.48	11.53		
1900	9.0	3.3	353.3	0.75	7.27	-19.5	31.20	11.53	↓	
1905	10.5	3.3	348.2	0.71	7.29	-42.0	22.72	11.53		
1910	12.0	3.3	345.6	0.74	7.28	-44.1	21.90	11.53		
1915	13.5	3.3	342.7	0.75	7.28	-47.4	21.21	11.53		Stabilization complete

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW15
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-25-2020	**Samplers:**	Noah R.
Time Start:	1623		Travis M.
Time Finish:	1810	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	18.41	ft	**Screened Interval (ft.):**	5-15
DTW (ft. bTOC):	12.666	ft		
Water Column:	5.75	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	3.48	L	Water Column x L/ft	
Three Well Volumes:	10.44	L	Liters in Well x 3	
Sample Depth:	≈ 14	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	202008377
Pump Type:	Geo Pump	**Serial No.:**	3040026068

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

TM 9-25

Well ID: 20PS-MW15	Sample ID: ~~20PS-MW15~~ 20PS-MW15-0925	Sample Time: 1808
Date: 9-25-2020	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1632	—	7.8	231.4	7.47	7.44	145.2	365.1	12.66	0.3	
1637	1.5	7.4	246.4	1.96	7.20	137.8	324.4	12.66		
1642	3.0	7.4	259.6	1.49	7.07	129.0	528.7	12.80		
1647	4.5	7.3	259.2	1.37	7.03	121.3	392.6	12.80		
1652	6.0	7.3	256.9	1.32	7.00	106.9	353.0	12.80		
1657	7.5	7.3	253.9	1.16	6.98	94.1	271.6	12.80		
1702	9.0	7.3	259.4	1.07	6.94	84.6	182.2	12.80		
1707	10.5	7.4	261.7	1.03	6.92	77.2	133.8	12.80	↓	
1712	12.0	7.3	253.3	0.88	6.94	64.0	253.0	12.80		
1717	13.5	7.3	255.7	0.84	6.91	56.3	256.7	12.80		
1722	15.0	7.3	254.7	0.84	6.91	49.9	199.5	12.80		
1727	16.5	7.3	261.8	0.80	6.88	47.2	153.1	12.80		
1732	18.0	7.3	262.9	0.79	6.86	43.6	112.9	12.80		
1737	19.5	7.3	264.1	0.92	6.85	41.5	86.18	12.80		
1742	21.0	7.3	262.5	0.84	6.85	37.4	64.41	12.80		
1747	22.5	7.3	263.1	0.82	6.85	36.1	55.27	12.80		
1752	24.0	7.3	260.0	0.80	6.86	30.5	43.49	12.80		
1757	25.5	7.3	263.5	0.81	6.84	29.5	25.48	12.80		
1802	27.0	7.3	261.3	0.82	6.84	28.7	25.10	12.80		
1807	28.5	7.3	259.8	0.80	6.84	25.3	25.70	12.80		Stabilization complete

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW17
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	9-25-2020	**Samplers:**	Noah R.
Time Start:	1403		Travis H.
Time Finish:	1500	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	15.67	ft	**Screened Interval (ft.):**	3-13
DTW (ft. bTOC):	3.99	ft		
Water Column:	11.68	ft	TD-DTW=Water Column	
Liter/Foot:	0.1605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	7.07	L	Water Column x L/ft	
Three Well Volumes:	21.20	L	Liters in Well x 3	
Sample Depth:	≈ 11.5	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Plus	**Serial No.:**	0581
Water Level Meter:	Solinst	**Serial No.:**	24219
Turbidity Meter:	Micro TPW	**Serial No.:**	20200837 7
Pump Type:	Geo Pump	**Serial No.:**	J040026068

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note

Low-Flow Groundwater Sample & Stabilization Form

Well ID:	20PS-MW17	Sample ID:	20PS-MW17-0925	Sample Time:	1458
Date:	9-25-2020	Dup. Sample ID:	20PS-MW87-0925	Dup. Sample Time:	1110

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1407	—	4.2	240.5	5.57	7.82	146.2	51.14	3.99	0.3	
1412	1.5	3.8	237.8	1.45	7.39	133.3	55.060	3.99	↓	
1417	3.0	3.8	236.6	0.98	7.24	119.7	27.67	3.99	↓	
1422	4.5	3.8	235.1	0.67	7.30	101.0	27.25	3.99	↓	
1427	6.0	3.8	235.4	0.57	7.31	93.6	19.99	4.00	↓	
1432	7.5	3.8	233.7	0.50	7.30	86.4	16.43	4.00	↓	
1437	9.0	3.7	233.4	0.49	7.30	79.8	12.60	4.00	↓	
1442	10.5	3.7	233.6	0.47	7.29	73.6	11.37	4.00	↓	
1447	12.0	3.7	232.7	0.45	7.31	66.9	9.66	4.00		
1452	13.5	3.7	232.6	0.44	7.34	65.1	8.69	4.00		
1457	15.0	3.7	232.7	0.46	7.33	61.7	7.35	4.00		Stabilization complete.

Sampled? : Yes ☒ No ☐

Initial of Sampler: NR.

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW02
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/29/2020	**Samplers:**	B. Leach J. Parson
Time Start:	1624		
Time Finish:	1733	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	15.86 ft	**Screened Interval (ft.):**	2.8 - 12.8' bgs
DTW (ft. bTOC):	5.65 ft		
Water Column:	10.21 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	6.18 L	Water Column x L/ft	
Three Well Volumes:	18.53 L	Liters In Well x 3	
Sample Depth:	10.76 ~~8.00~~ ft (PL) ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	15H102751
Water Level Meter:	WLM-100	**Serial No.:**	16.950616
Turbidity Meter:	MicroTPW	**Serial No.:**	291403321
Pump Type:	Geopump II peristaltic	**Serial No.:**	~~NA~~ J0400 26668

Purge Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☑

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFCs	2	none	537	250ml HDPE	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW02	Sample ID: 20PS - MW02 - 1029	Sample Time: 1732
Date: 10/29/2020	Dup. Sample ID: NA	Dup. Sample Time: NA

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C ✓	Spec. Cond. (µS/cm) *± 3% ✓	DO (mg/L) *± 10% ✓	pH *± 0.1 ✓	ORP (mV) *± 10 mV ✓	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1624	START PURGING									
1629	2.5L	2.39	124	1.56	6.52	1.6	457.1	5.74	0.500	
1634	5.0L	2.39	134	0.48	6.44	-5.1	326.0	5.71	0.500	
1639	7.5L	2.42	146	0.42	6.47	-13.4	283.8	5.72	0.500	
1644	10.0L	2.49	157	0.38	6.54	-26.2	218.4	5.74	0.500	
1649	12.5L	2.46	163	0.27	6.59	-35.6	160.4	5.73	0.500	
1654	15.0L	2.40	168	0.21	6.62	-42.8	128.6	5.71	0.500	
1659	17.5L	2.38	172	0.14	6.65	-49.6	133.3	5.72	0.500	
1704	20.0L	2.35	175	0.09	6.68	-56.0	91.21	5.75	0.500	
1709	22.5L	2.37	180	0.19	6.69	-61.3	70.46	5.75	0.500	
1714	25.0L	2.42	183	0.14	6.71	-66.7	61.63	5.74	0.500	
1719	27.5L	2.55	186	0.15	6.71	-69.7	58.48	5.74	0.500	
1724	30.0L	2.51	188	0.16	6.72	-72.1	49.08	5.74	0.500	
1729	32.5L	2.47	188	0.17	6.72	-75.1	34.32	5.74	0.500	Parameters Stabilized, Sample collected.
1732										Sample Collected.

Sampled? : Yes ☑ No ☐

Initial of Sampler: JBLL

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20ps - MW06
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/29/2020	**Samplers:**	B. Leach J. Parson
Time Start:	1345		
Time Finish:	1454	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	15.30 ft	**Screened Interval (ft.):**	5.5-15.5' bgs
DTW (ft. bTOC):	6.75 ft		
Water Column:	8.55 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	5.173 L	Water Column x L/ft	
Three Well Volumes:	15.52 L	Liters In Well x 3	
Sample Depth:	(BL) ~~10.50~~ 11.03 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	15H102751
Water Level Meter:	WLM-100	**Serial No.:**	16.050616
Turbidity Meter:	MicroTPW	**Serial No.:**	20140332I
Pump Type:	GeoPump II peristaltic	**Serial No.:**	(BL) ~~NA~~ 5048026668

Purge Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☑ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFCs	8	none	537	~~250 mL HDPE~~	
				250 mL HDPE	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MWC6	Sample ID: 20PS-MW06-1029	Sample Time: 1453
Date: 10/29/2020	Dup. Sample ID: 20PS-MW99-1029	Dup. Sample Time: 0800
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C ✓	Spec. Cond. (µS/cm) *± 3% ✓	DO (mg/L) *± 10% ✓	pH *± 0.1 ✓	ORP (mV) *± 10 mV ✓	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1345	START PURGING									
1350	2L	5.85	358	1.48	6.96	-7.4	355.9	6.80	0.400	
1355	4.5L	6.08	336	0.49	6.99	-26.9	~~336~~ 272	6.80	0.500	
1400	7.0L	6.13	331	0.47	7.00	-30.7	204.8	6.81	0.500	
1405	9.5L	6.12	328	0.40	6.99	-35.9	159.0	6.85	0.500	
1410	12.0L	6.11	332	0.40	6.98	-40.8	95.79	6.88	0.500	
1415	14.5L	6.01	328	0.26	6.99	-44.1	57.92	6.87	0.500	
1420	17.0L	6.13	336	0.26	6.98	-46.6	40.10	6.87	0.500	
1425	19.5L	6.18	337	0.21	6.97	-48.9	30.89	6.89	0.500	
1430	22.0L	6.03	335	0.14	6.97	-49.8	23.02	6.90	0.500	
1435	24.5L	6.15	334	0.11	6.97	-51.5	17.01	6.90	0.500	
1440	27.0L	6.19	336	0.13	6.97	-52.0	12.46	6.90	0.500	
1445	29.5L	6.20	337	0.13	6.96	-50.8	10.50	6.89	0.500	
1450	32.0L	6.20	340	0.16	6.96	-50.5	10.07	6.89	0.500	Parameters stabalized, Turbidity at 10.
1453										Sample 20PS-MW06-1029 Collected.

Sampled? : Yes ☑ No ☐

Initial of Sampler: BKC

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20S-MW05
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/30/2020	**Samplers:**	B. Leach J. Doran
Time Start:	0912		
Time Finish:	1019	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	16.22 ft	**Screened Interval (ft.):**	3'-13' bgs
DTW (ft. bTOC):	8.51 ft		
Water Column:	7.71 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.66 L	Water Column x L/ft	
Three Well Volumes:	14.00 L	Liters in Well x 3	
Sample Depth:	(M) ~~8 ft~~ 12.37 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	15H102751
Water Level Meter:	WLM-100	**Serial No.:**	16.050616
Turbidity Meter:	MicroTPW	**Serial No.:**	20140332 1
Pump Type:	Geopump II peristaltic	**Serial No.:**	(BL) NA 5040526068

Purge Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ~~Yes~~ (BL) (No)

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFCs	BRL-8 (4) ~~8~~ (MS)	none	537	250mL HDPE	1 dup (MS/MSD) (MS)

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW05	Sample ID: 20PS-MW05-1030	Sample Time: 1027
Date: 10/30/2020	Dup. Sample ID: 20PS-MW99-1030	Dup. Sample Time: 1200
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C ✓	Spec. Cond. (µS/cm) * ± 3% ✓	DO (mg/L) *± 10% ✓	pH *± 0.1 ✓	ORP (mV) *± 10 mV ✓	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
0912	START PURGING									
0917	2.5L	3.93	294	1.77	6.93	-30.9	162.1	8.57	0.500	
0922	5.0L	3.85	293	0.73	6.93	-43.5	112.0	8.63	0.500	
0927	7.5L	3.87	293	0.59	6.92	-47.4	80.79	8.62	0.500	
0932	10.0L	3.89	292	0.45	6.93	-52.0	55.79	8.62	0.500	
0937	12.5L	3.84	292	0.36	6.93	-56.7	47.30	8.61	0.500	
0942	15.0L	3.81	292	0.29	6.93	-60.1	40.68	8.62	0.500	
0947	17.5L	3.81	291	0.26	6.94	-61.9	26.59	8.62	0.500	
0952	20.0L	3.83	291	0.19	6.94	-63.5	23.97	8.62	0.500	
0957	22.5L	3.83	293	0.22	6.94	-64.7	18.34	8.62	0.500	
~~0957~~ 1002	25.0L	3.85	292	0.22	6.95	-67.4	13.10	8.61	0.500	Concluded purge After 5 parameters stable
1007										Sample collected

Sampled? : Yes ☑ No ☐

Initial of Sampler: BRL

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW04
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/31/20	**Samplers:**	N. Stoeckle in
Time Start:	0955		B. Leach
Time Finish:	1119	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	16.24	ft	**Screened Interval (ft.):**	3-13' bgs
DTW (ft. bTOC):	7.89	ft		
Water Column:	8.35	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	5.05	L	Water Column x L/ft	
Three Well Volumes:	15.15	L	Liters in Well x 3	
Sample Depth:	10.4 ft	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	15H102751
Water Level Meter:	WLM-100	**Serial No.:**	16.050616
Turbidity Meter:	MicroTPW	**Serial No.:**	20140332 1
Pump Type:	Geopump II peristaltic	**Serial No.:**	(BL) ~~NA~~ J04002668

Purge Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☑

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFCs	4	none	537	250mL HDPE	Parent and dupe

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW04	Sample ID: 20PS-MW04-1031	Sample Time: 1113
Date: 10/31/2020	Dup. Sample ID: 20PS-MW99-1031	Dup. Sample Time: 1130
Notes: Field Blank at 1100, AM Field blank.		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1028	START PURGING									
1033	2L	3.53	358	1.96	5.83	28.5	93.92	8.02	0.400	
1038	4L	3.48	351	0.76	6.25	11.2	86.81	8.01	0.400	
1043	6L	3.41	351	0.49	6.47	-5.2	78.76	8.02	0.400	
1048	8L	3.48	352	0.34	6.55	-14.6	83.13	8.02	0.400	
1053	10L	3.57	353	0.22	6.65	-25.7	85.98	8.02	0.400	
1058	12L	3.61	353	0.22	6.71	-35.8	81.56	8.02	0.400	
1103	14L	3.63	352	0.14	6.75	-47.4	73.53	8.01	0.400	
1108	16L	3.60	351	0.11	6.77	-57.9	63.15	8.02	0.400	
1113	18L	3.64	351	0.09	6.78	-64.1	61.58	8.01	0.400	3X well volumes achieved, Sample collected

Sampled? : Yes ☑ No ☐

Initial of Sampler: BKL

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	19PS-MW01A
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/29/19	**Samplers:**	M. Stoecklein
Time Start:	1320		H. Peterson
Time Finish:		**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	61.64	ft	**Screened Interval (ft.):**	51.31 - 61.31 bgs
DTW (ft. bTOC):	5.16	ft		
Water Column:	56.48	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	34.17	L	Water Column x L/ft	
Three Well Volumes:	102.51	L	Liters in Well x 3	
Sample Depth:	56.31	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro 556	**Serial No.:**	16m100077
Water Level Meter:	WLM-07.052017	**Serial No.:**	07.052017
Turbidity Meter:	Micro TPW	**Serial No.:**	20110617
Pump Type:	Peristaltic Pump	**Serial No.:**	J04002668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☒ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2x120mL	NA	537	HDPE	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 19PS-MW01A	Sample ID: 19PS-MW01A-1029	Sample Time: 1450
Date: 10/29/19	Dup. Sample ID: 19PS-MW99-1029	Dup. Sample Time: 1500
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1325	1.5	3.0	347.3	2.67	7.28	44.4	461.7	5.16	0.30	
1330	1.5	2.8	345.2	1.68	7.26	17.2	278.3	5.16	0.30	
1335	1.5	2.8	345.4	1.95	7.27	24.7	151.0	5.16	0.30	
1340	1.5	2.8	345.5	1.27	7.29	-2.2	94.59	5.16	0.30	
1345	1.5	2.8	345.3	1.04	7.30	-19.7	87.35	5.16	0.30	
1350	1.5	2.8	344.6	0.94	7.31	-36.4	80.78	5.15	0.30	
1355	1.5	2.8	345.2	0.89	7.31	-46.5	54.84	5.16	0.30	
1400	1.5	2.7	343.9	0.73	7.31	-56.3	44.53	5.16	0.30	
1405	1.5	2.7	344.4	0.69	7.31	-66.9	44.25	5.16	0.30	Volume removed in Liters of calculated cumulatively until
1410	15	2.7	343.8	0.58	7.31	-74.9	34.40	5.16	0.30	
1415	16.5	2.7	344.5	0.56	7.32	-84.6	32.08	5.16	0.30	
1420	18.0	2.7	344.4	0.52	7.32	-91.1	26.63	5.16	0.30	
1425	19.5	2.7	345.1	0.51	7.33	-99.0	27.09	5.16	0.30	
1430	21.0	2.7	344.2	0.52	7.32	-101.6	15.22	5.16	0.30	
1435	22.5	2.7	345.0	0.61	7.31	-111.4	13.10	5.16	0.30	
1440	24.0	2.7	345.2	0.57	7.31	-115.4	12.35	5.16	0.30	
1445	25.5	2.8	344.6	0.53	7.32	-118.6	11.14	5.16	0.30	
1450	27.0	2.8 √	344.9 √	0.51	7.32 √	-122.1	12.06	5.16	0.30	

Sampled? : Yes ☒ No ☐

Initial of Sampler: NS/HP

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	C PFAS 19PS-MW01B
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/30/19	**Samplers:**	N. Stoeckelein
Time Start:	1300		
Time Finish:	1515	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	113.42	ft	**Screened Interval (ft.):**	99.92-109.92 bgs
DTW (ft. bTOC):	4.96	ft		
Water Column:	108.46	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	65.62	L	Water Column x L/ft	
Three Well Volumes:	196.85	L	Liters in Well x 3	
Sample Depth:	104.92	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	(0.605)
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro 556	**Serial No.:**	16M00077
Water Level Meter:	Solinst	**Serial No.:**	H249 24219
Turbidity Meter:	Micro TPW	**Serial No.:**	20110107
Pump Type: Geo	Peristaltic Pump	**Serial No.:**	J0400 26068

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2x 4x120mL	NA	537	120mL HDPE	1 dup

4.03

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 19PS-MW01B	Sample ID: 19PS-MW01B-1030	Sample Time: 1450
Date: 10/30/19	Dup. Sample ID: 19PS-MW99-1030	Dup. Sample Time: 1500
Notes: Collect field blank @ 1330 19PS-FBPM-1030		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1315	START PURGING									
1320	1.5	2.9	270.3	5.56	6.33	200.3	542.6	4.94	0.30	
1325	3.0	3.-	265.6	2.42	6.53	137.8	493.3	4.95	1	
1330	4.5	3.-	264.1	1.47	6.67	87.2	490.8	4.95		
1335	6.-	3.-	262.9	1.18	6.81	42.6	403.5	4.94		
1340	7.5	2.9	262.8	0.90	6.90	4.6	330.2	4.95		
1345	9.-	2.9	262.9	0.77	6.94	-17.1	264.7	4.95		
1350	10.5	2.9	262.1	0.69	6.98	-50.-	211.0	4.94		
1355	12.-	2.9	262.4	0.69	7.-	-71.3	128.2	4.95		
1400	13.5	3.0	262.3	0.63	7.03	-93.5	110.9	4.95		
1405	15.-	3.-	262.0	0.58	7.04	-118.7	82.47	4.94		
1410	16.5	3.-	261.9	0.57	7.06	-163.2	54.36	4.94		
1415	18.-	2.9	261.9	0.53	7.08	-219.5	44.76	4.95		
1420	19.5	3.0	261.6	0.51	7.09	-230.2	42.02	~~4.98~~		4.94 DTW
1425	21.0	3.2	262.1	0.50	7.11	-288.2	46.65	4.95		
1430	22.5	3.1	262.-	0.48	7.10	-320.4	35.07	4.95		
1435	24.-	3.0	262.-	0.46	7.11	-329.5	31.03	4.94		
~~1435~~ 1440	25.5	3.-	261.3	0.43	7.13	-349.2	23.78	4.95		
1445	27.-	3.-	262.1	0.43	7.13	-359.9	29.37	4.95		
1450	28.5	3.-	261.5	0.43	7.15	-358.3	30.97	4.95		Sample

Sampled? : Yes ☑ No ☐

Initial of Sampler: NS

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW01C
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	05/31/2020	**Samplers:**	H. Peterson, N. Stoeklen, S. Newman
Time Start:	1555		
Time Finish:	1635	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	163.00 ft	**Screened Interval (ft.):**	150.3-160.3 (10')
DTW (ft. bTOC):	3.03 ft		
Water Column:	159.97 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	96.78 L	Water Column x L/ft	
Three Well Volumes:	290.34 L	Liters in Well x 3	
Sample Depth:	155.3 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	15H102751
Water Level Meter:	WLM	**Serial No.:**	07.052107
Turbidity Meter:	Micro TPW #20000	**Serial No.:**	20160555 25
Pump Type:	GeoPump	**Serial No.:**	J0400266B

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFOS/PFOA	2	None.	EPA 537	250mL HDPE	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW01C	Sample ID: 20PS-MW01C-0531	Sample Time: 1635
Date: 05/31/2020	Dup. Sample ID: ~~20PS-MP~~ N/A	Dup. Sample Time: N/A

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1555	START PURGING									
1600	2.0	5.69	336	8.51	6.29	37.3	34.64	3.03	0.4	
1605	4.0	5.18	301	2.87	6.67	-10.1	24.32	3.06	0.4	
1610	6.0	5.09	296	2.02	6.87	-35.2	20.79	3.06	0.4	
1615	8.0	5.16	291	1.84	6.87	-47.5	19.19	3.06	0.4	
1620	10.0	4.90	290	2.28	6.90	-51.9	15.09	3.06	0.4	
1625	12.0	4.95	287	1.52	6.90	-52.3	14.47	3.06	0.4	
1630	14.0	4.94	287	1.43	6.93	-54.0	14.14	3.06	0.4	
1635	16.0	4.94	287	1.41	6.93	-47.4	14.46	3.06	0.4	

Sampled? : Yes ☒ No ☐

31 May 2020

Initial of Sampler: HP/SN/NS

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW01D
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	05/31/2020	**Samplers:**	H. Peterson, N. Streetzel, S. Newman
Time Start:	0835		
Time Finish:	1105	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	212.03 ft	**Screened Interval (ft.):**	10 199 - 209' bgs
DTW (ft. bTOC):	3.33 ft		
Water Column:	208.70 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	126.26 L	Water Column x L/ft	
Three Well Volumes:	378.79 L	Liters in Well x 3	
Sample Depth:	204 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	15H102751
Water Level Meter:	WLM	**Serial No.:**	07.052107
Turbidity Meter:	Micro TPW #20000	**Serial No.:**	20160552S
Pump Type:	Geopump	**Serial No.:**	J04002668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☒ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFOS/PFOA	8	None.	537 EPA	250mL HDPE	1 dup

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW01D	Sample ID: 20PS-MW01D-0531	Sample Time: 1050
Date: 05/31/2020	Dup. Sample ID: 20PS-MW99-0531	Dup. Sample Time: 1200
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C ✓	Spec. Cond. (µS/cm) *± 3% ✓	DO (mg/L) *± 10% ✓	pH *± 0.1 ✓	ORP (mV) *± 10 mV ✓	Turbidity (NTU) *± 10% ✓	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
0835	START PURGING									
0840	2.5	5.27	370	12.03	5.97	213.7	38.43	3.33	0.5	
0845	5.0	4.56	324	8.83	6.63	55.0	361.9	3.33	0.5	
0850	7.5	4.41	302	4.72	6.57	-98.2	802.9	3.33	0.5	very murky.
0855	10.0	4.51	298	4.12	6.75	-103.2	512.0	3.33	0.5	
0900	12.5	4.48	296	3.58	6.84	-129.5	430.3	3.33	0.5	
0905	15.0	4.46	294	3.10	6.88	-146.5	378.0	3.33	0.5	
0910	17.5	4.67	295	2.89	6.90	-145.2	229.3	3.33	0.3	clearing, still cloudy
0915	19.0	4.88	295	2.75	6.89	-159.6	134.2	3.33	0.3	
0920	20.5	4.96	297	3.20	6.91	-134.2	100.8	3.33	0.3	
0925	22.0	5.08	295	2.58	6.92	-120.9	68.3	3.33	0.3	
0930	23.5	5.41	298	1.61	6.92	-125.9	56.09	3.33	0.3	
0935	25.0	5.49	297	3.15	6.93	-124.1	44.22	3.33	0.3	
0940	26.5	5.20	301	3.95	6.94	-138.0	36.65	3.33	0.3	
0945	28.0	5.19	298	3.00	6.94	-131.8	35.24	3.33	0.3	
0950	29.5	5.29	299	2.94	6.94	-130.5	28.39	3.33	0.3	
0955	31.0	5.22	294	2.78	6.94	-138.2	27.63	3.33	0.3	
1000	32.5	5.21	294	2.85	6.94	-140.9	24.59	3.33	0.3	
1005	34.0	5.21	295	2.76	6.95	-138.3	22.43	3.33	0.3	Looks clear
1010	35.5	5.36	293	2.70	6.96	-138.5	19.23	3.33	0.3	
1015	37.0	5.22	292	2.07	6.96	-149.8	20.59	3.33	0.3	
1020	38.5	5.22	295	2.20	6.96	-142.5	17.68	3.33	0.3	
1025	40.0	5.23	297	2.89	6.93	-136.0	18.00	3.33	0.3	
1030	41.5	5.22	294	2.83	6.95	-141.8	15.98	3.33	0.3	
1035	43.0	5.27	294	2.66	6.98	-138.7	15.58	3.33	0.3	
1040	44.5	5.17	294	2.60	6.98	-144.0	13.52	3.33	0.3	
1045	46.0	5.34	293	2.64	6.99	-144.1	13.45	3.33	0.3	
1050	47.5	5.36	291	2.56	6.99	-145.2	13.18	3.33	0.3	

Sampled? : Yes ☒ No ☐

Initial of Sampler: HP/SN

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	19PS-MW02A
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10-26-2019	**Samplers:**	Ryan W.
Time Start:	1345		Nicole S.
Time Finish:	1445	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	61.55	ft	**Screened Interval (ft.):**	~~49-59~~ ft bgs @ 51.39-61.39
DTW (ft. bTOC):	6.34	ft		
Water Column:	55.21	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	33.4	L	Water Column x L/ft	
Three Well Volumes:	100.2	L	Liters in Well x 3	
Sample Depth:	~~56.39~~ @	ft bgs	Depth of Pump Intake	

Well Volume Calculation

Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro 556	**Serial No.:**	16M100077
Water Level Meter:	WLM-07.052017	**Serial No.:**	07.05.2017
Turbidity Meter:	Micro TPW	**Serial No.:**	20110617
Pump Type:	Peristaltic Pump	**Serial No.:**	J04002668

Purge Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☑ No ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFOS/PFOA	2	NoNE	~~Low Flow~~ 537	120mL HDPE	NA
				RW	10.26.19

Low-Flow Groundwater Sample & Stabilization Form

Well ID:	19PS-MW02A	Sample ID:	19PS-MW02A-1026	Sample Time:	1430
Date:	10-26-19	Dup. Sample ID:	19PS-MW99-1026	Dup. Sample Time:	1445

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
	START PURGING									
1349	0.5	2.9	343.5	6.72	7.63	117.3	17.19	6.34	0.3	Clear/No odor
1355	1.8	2.2	348.2	2.66	7.53	104.9	6.412	6.34	0.3	"
1400	3.3	2.2	350.5	1.82	7.53	95.8	32.35	6.34	0.35	"
1405	5.0	2.1	356.0	1.51	7.52	87.4	12.25	6.34	0.35	"
1410	6.7	2.1	355.7	1.16	7.51	80.7	7.05	6.34	0.35	"
1415	8.4	2.1	355.1	1.05	7.49	76.0	4.67	6.34	0.35	"
1420	10.1	2.1	354.5	0.89	7.50	69.8	3.40	6.34	0.35	"
1425	11.8	2.1	354.8	0.82	7.50	65.0	2.90	6.34	0.35	"
1430	13.5	2.1	354.3	0.77	7.50	60.3	2.86	6.34	0.35	"

RW 10.26.19

Sampled?: Yes ☑ No ☐

Initial of Sampler: RW

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	19PS-MW02B
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	10/27/19	**Samplers:**	N. Stoeckelein
Time Start:	1235		
Time Finish:	1415	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	112.9	ft	**Screened Interval (ft.):**	~~100.20 - 110.20~~ 101.75 - 111.75 bgs
DTW (ft. bTOC):	6.35	ft		
Water Column:	106.55	ft	TD-DTW=Water Column	
Liter/Foot:	0.1605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	64.47	L	Water Column x L/ft	
Three Well Volumes:	193.39	L	Liters in Well x 3	
Sample Depth:	105.20	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro 556	**Serial No.:**	16M100177
Water Level Meter:	WLM	**Serial No.:**	07.052017
Turbidity Meter:	Micro TPW	**Serial No.:**	20110617
Pump Type:	Peristaltic Pump	**Serial No.:**	JD4002068

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS	2X120 mL	NA	537	HDPE	

~~Figure SOP048-1.~~

97 - change to 2nd denuder 1242.

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 19PS-MW02B	Sample ID: 19PS-MW02B-1027	Sample Time: 1400
Date: 10/27/19	Dup. Sample ID: 19PS-MW99-1027	Dup. Sample Time: 1430
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1235	START PURGING									
1240	1.5	2.7	313.5	5.03	6.62	218.2	88.10	6.31	0.30	turbidity is "dirty"/cloudy
1245	3.0	2.8	312.7	3.82	7.02	132.1	357.6	6.33		
1250	4.5	2.6	310.5	3.20	7.28	104.1	251.1	6.33		
1255	6.-	2.6	309.1	2.75	7.38	75.3	123.6	6.34		
1300	7.5	2.6	307.9	2.38	7.43	52.5	100.1	6.33		
1305	9.-	2.5	308.2	2.09	7.49	29.5	93.23	6.34		
1310	10.5	2.6	307.6	1.97	7.54	8.1	81.45	6.33		
1315	12.0	2.6	307.6	1.74	7.57	-12.2	101.85	6.33		turbidity clearing but still cloudy
1320	13.5	2.6	307.6	1.62	7.58	-30.2	61.91	6.34		
1325	15.-	2.5	306.2	1.41	7.62	-58.1	48.66	6.33		
1330	16.5	2.5	305.9	1.28	7.64	-106.1	36.83	6.34		
1335	18.-	2.6	305.-	1.20	7.65	-220.8	35.27	6.33		ORP is reading strange, may disregard due to potential probe failure.
1340	19.5	2.6	303.9	1.07	7.67	-379.-	28.20	6.34		turbidity increasing slightly, cloudy
1345	21.-	2.6	304.-	1.05	7.69	-382.0	40.25	6.33		
1350	22.5	2.6	303.2	1.04	7.63	~~-384.-~~ -379.40	32.35	6.34		-379.40 ORP
1355	24.-	2.6	303.3	0.95	7.69	-383.0	37.30	6.33		
1400	25.5	2.5	302.5	0.89	7.69	-386.2	52.84	6.34	0.30	4/6 stabilized, sampled.

Sampled? : Yes ☑ No ☐

Initial of Sampler: NB

~~Figure SOP048-1.~~

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW02C
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	5/21/2020	**Samplers:**	N. Stoeckelein
Time Start:	1501		H. Peterson
Time Finish:	1715	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	163.87 ft	**Screened Interval (ft.):**	151-161' bTOC
DTW (ft. bTOC):	4.76 ft		
Water Column:	159.11 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	96.26 L	Water Column x L/ft	
Three Well Volumes:	288.78 L	Liters In Well x 3	
Sample Depth:	156.00' ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI MPS 556	**Serial No.:**	15H102751
Water Level Meter:	WLM	**Serial No.:**	WLM-07, 052107
Turbidity Meter:	Micro TPW	**Serial No.:**	20160 5525
Pump Type:	Peristaltic Pump GeoPump	**Serial No.:**	J0400 26668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☒ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFAS PFOA/PFOS	8	None	EPA 537	250mL HDPE	1 dup

159.11 ft (0.605 L/ft) =

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW02C	Sample ID: 20PS-MW02C-0521	Sample Time: 1641
Date: 5/21/2020	Dup. Sample ID: 20PS-MW99-0521	Dup. Sample Time: 1600
Notes: Field blank collected: 20PS-FBPM-0521 @ 1025		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C ✓	Spec. Cond. (µS/cm) *± 3% ✓	DO (mg/L) *± 10%	pH *± 0.1 ✓	ORP (mV) *± 10 mV ✓	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1501	START PURGING									
1506	2	5.81	337	101.13	6.78	-162.8	36.09	4.73	0.4	cloudy
1511	3.5	5.18	321	35.30	7.17	-194.8	686.8	4.74	0.3	murky - cleared out some silt
1516	5	4.96	304	23.76	7.08	-215.8	154.0	4.73	0.3	
1521	6.25	5.04	305	15.00	7.19	-246.0	90.58	4.74	0.25	
1526	7.50	4.78	303	16.33	7.36	-270.0	76.61	4.74	0.25	
1531	8.75	4.60	301	14.01	7.43	-291.1	73.86	4.74	0.25	
1536	10.00	4.67	299	9.53	7.48	-303.6	70.14	4.74	0.25	
1541	11.25	4.50	297	8.52	7.48	-313.5	53.31	4.74	0.25	
1546	12.50	4.30	295	9.20	7.50	-321.1	44.00	4.74	0.25	
1551	13.75	4.33	293	11.74	7.48	-326.6	34.83	4.74	0.25	
1556	15.00	4.32	294	19.65	7.51	-333.6	25.08	4.74	0.25	
1601	16.25	4.52	293	17.23	7.50	-339.7	21.61	4.74	0.25	
1606	17.50	4.38	293	3.51	7.50	-350.3	17.30	4.73	0.25	
1611	18.75	4.38	292	2.94	7.48	-351.1	15.90	4.73	0.25	
1616	20.00	4.23	292	2.61	7.51	-353.2	14.65	4.74	0.25	
1621	21.25	4.22	292	2.56	7.49	-356.1	15.44	4.74	0.25	
1626	22.50	4.22	292	2.53	7.50	-357.9	14.73	4.74	0.25	
1631	23.75	4.32	292	2.29	7.50	-359.2	12.51	4.74	0.25	
1636	25.00	4.34	293	2.14	7.50	-361.4	12.06	4.74	0.25	
1641	26.25	4.31	292	2.13	7.50	-365.9	11.52	4.73	0.25	Collect sample.

Sampled?: Yes ☑ No ☐

Initial of Sampler: HP

212.85

SUNDANCE-EA II, LLC

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	USACE/EAFB & Moose Creek	**Well ID.:**	20PS-MW02D
Contract No.:	W911KB-17-D-0018	**Project No.:**	6321403
Date:	05/24/2020	**Samplers:**	N. Stocklein
Time Start:	1145		H. Peterson
Time Finish:	1445	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	212.85	ft	**Screened Interval (ft.):**	199.8-209.8 (10')
DTW (ft. bTOC):	4.55	ft		
Water Column:	208.30	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	126.02	L	Water Column x L/ft	
Three Well Volumes:	378.06	L	Liters in Well x 3	
Sample Depth:	206.80	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI MPS 556	**Serial No.:**	15H102751
Water Level Meter:	WLM	**Serial No.:**	WLM-07.052107
Turbidity Meter:	Micro TPW	**Serial No.:**	2016005525
Pump Type:	Peristaltic Pump 'bao Pump'	**Serial No.:**	J04002668

Purge Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☒ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
PFOS/PFOA	4	None.	EPA 537	250mL HDPE	1 dup

Low-Flow Groundwater Sample & Stabilization Form

Well ID: 20PS-MW02D	Sample ID: 20PS-MW02D-0524	Sample Time: 1410
Date: 05/24/2020	Dup. Sample ID: 20PS-MW99-0524	Dup. Sample Time: 1400
Notes:	PM FB collected.	

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C ✓	Spec. Cond. (µS/cm) *± 3% ✓	DO (mg/L) *± 10% ✓	pH *± 0.1 ✓	ORP (mV) *± 10 mV ✓	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1155	START PURGING									
1200	1.5	4.89	337	43.04	6.20	177.0	17.19	4.59	0.3	
1205	3.0	4.43	295	15.10	6.81	85.0	165.4	4.59	0.3	cloudy
1210	4.5	4.48	268	11.12	6.99	-38.7	350.3	4.59	0.3	murky
1215	6.0	4.26	266	10.44	7.03	-72.3	368.8	4.59	0.3	
1220	7.5	4.27	263	8.82	7.07	-107.2	322.9	4.60	0.3	
1225	9.0	4.19	262	8.33	7.15	-107.0	293.8	4.59	0.3	
1230	10.5	4.11	262	7.89	7.23	-87.0	250.5	4.59	0.3	
1235	12.0	4.04	263	8.17	7.29	-98.1	232.3	4.59	0.3	
1240	13.5	4.14	261	7.34	7.34	-38.3	188.6	4.59	0.3	
1245	15.0	4.16	260	7.17	7.36	-18.8	177.3	4.60	0.3	
1250	16.5	4.16	260	7.34	7.37	-49.0	166.7	4.60	0.3	
~~1255~~	18.0	4.32	260	7.34	7.39	-74.5	139.0	4.59	0.3	
1300	19.5	4.09	261	4.49	7.40	-94.4	127.2	4.60	0.3	
1305	21.0	4.21	261	5.18	7.40	-99.8	115.6	4.59	0.3	
1310	22.5	4.41	264	4.17	7.38	-83.8	110.7	4.59	0.3	
1315	24.0	4.35	262	3.69	7.34	-85.1	100.9	4.59	0.3	
1320	~~25.5~~ 25.1 HP	4.44	261	2.66	7.46	~~-79.4~~	83.62	4.60	0.3	cloudy
1325	~~25.27~~ 25.2 HP	4.42	261	3.79	~~7.47~~ 7.47	-13.5	72.60	4.60	0.3	7.47 pH
1330	~~30~~ 28.5 HP	4.21	263	5.14	7.48	-1.2	71.55	4.60	0.3	
1335	30.0	4.38	261	4.96	7.48	-11.4	68.44	4.60	0.3	
1340	31.5	4.40	261	2.48	7.48	-21.2	62.41	4.60	0.3	
1345	33.0	4.52	260	3.28	7.48	-56.0	66.84	4.60	0.3	
1350	34.5	4.32	263	5.24	7.49	-81.0	49.36	4.60	0.3	
1355	36.0	4.41	262	4.45	7.48	-76.7	48.90	4.60	0.3	
1400	37.5	4.55	262	4.20	7.49	-79.2	53.98	4.60	0.3	
1405	39.0	4.46	261	4.05	7.50	-82.0	48.83	4.60	0.3	
1410	40.5	4.46	261	4.05	7.50	-80.8	47.47	4.60	0.3	collect sample.

Sampled? : Yes ☑ No ☐

Initial of Sampler: HP

EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

APPENDIX G – BORING LOGS AND MONITORING WELL CONSTRUCTION DETAILS

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix G.1 – Soil Boring Logs

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SUNDANCE-EA II, LLC

Boring 19 PS-MW02A Date 10.22.18 Sheet 1 of 4

Boring Location

Project Name Eielson Air Force Base PFAS SI SU08-004 Task No. 003

Logged By: Ryan W. Weather: Clear 30's °F

Drilled By: Geotek AK Start time: 1335 End Time: 1540

Drill Type/Method: Geoprobe 8040DT Auger (HSA)

Sampling Method: Grab for composite IDW

Elevation _____ Datum _____

Obs. Well Install. ☐ Yes ☐ No

Bottom of Boring: 62 ft ATD Water Level Depth: 7ft ☐ No

Size (%) G Max.	S Range	F Att. Limits	PID or other	DEPTH bgs (ft)	Interval (ft)	SAMPLE Type	Number	Sample Recovery	Penetration Resistance	DESCRIPTION: Den., moist, color, minor, MAJOR CONSTITUENT, NON-SOIL SUBSTANCES: Odor, staining, sheen, scrap, slag, etc.	REMARKS: Drill Action, drill and sample procedures, water conditions, heave, etc.	SUMMARY LOG (Water and Date)
0%	Fg	80%	0.0				RW	0		CL 80% silt, med plastic, 20% sand fg poorly graded, 2.5Y 3/3		
75% 3"	5% Fg	20%	0.0					2		GP, 2.5Y 3/3, silt has med plastic. Gravels fine to coarse Gravels: Quartz, Quartzite, Sandstone, volcanic/igneous. well rounded gravel		
								7			encountered water table at approx 7ft.	
75%	20%	5%	0.0					10		GP, 2.5Y 3/3 Increase in sand percentage. Otherwise same as above	encountered some cobbles with Drill bit. No gravel gravels came up with Auger ★ started adding @ 10ft 5 gallons of water for every 5 ft drilled.	
55%	30% fg	15	0.0					17		GW, 2.5Y 3/3 Sand is well graded and well graded gravels		
								20				

SUNDANCE-EA II, LLC

Boring 19PS-MW02A Date 10.22.19 Sheet 2 of 4

Boring Location

Project Name Eielson Air Force Base PFAS SI SU08-004 Task No. 003

Logged By: Ryan W. Weather: clear 30.5°F

Drilled By: Geotek AK Start time: 1335 End Time: 1540

Drill Type/Method: Geoprobe 8040 DT Auger (HSA)

Sampling Method: Grab for composite FDW

Elevation _____ Datum _____

Obs. Well Install. ☐ Yes ☐ No

Bottom of Boring: 62 ft ATD Water Level Depth: 7 ft ☐ No

Size (%) G Max.	Size (%) S Range	Size (%) F Att. Limits	PID or other	DEPTH bgs (ft)	DEPTH Interval (ft)	SAMPLE Type	SAMPLE Number	Sample Recovery	Penetration Resistance	DESCRIPTION: Den., moist, color, minor, MAJOR CONSTITUENT, NON-SOIL SUBSTANCES: Odor, staining, sheen, scrap, slag, etc.	REMARKS: Drill Action, drill and sample procedures, water conditions, heave, etc.	SUMMARY LOG (Water and Date)
65	25	10	0.0					30		GW, Fg to coarse grain sands 2.5Y 3/3. One cobble pulled up in auger. No significant changes. Rounded gravel		
								30			Have added 20 gal of water so far.	
55	35	10	0.0					2		GW Rounded to sub angular gravels. Fine to coarse grained sands. 2.5Y 3/2.		

SUNDANCE-EA II, LLC

Boring 19PS-MW02A Date 10.22.19 Sheet 3 of 4

Boring Location

Project Name Eielson Air Force Base PFAS SI SU08-004 Task No. 003

Logged By: Ryan W. Weather: Clear 30°Fs

Drilled By: Geotek AK Start time: 1335 End Time: 1540

Drill Type/Method: Geoprobe 8040 DT Auger (HSA)

Sampling Method: Grab for composite IDW

Elevation _____ Datum _____

Obs. Well Install. ☐ Yes ☐ No

Bottom of Boring: 62 ft ATD Water Level Depth: 7ft ☐ No

Size (%) G Max.	S Range	F Att. Limits	PID or other	DEPTH bgs (ft)	Interval (ft)	SAMPLE Type	Number	Sample Recovery	Penetration Resistance	DESCRIPTION: Den., moist, color, minor, MAJOR CONSTITUENT, NON-SOIL SUBSTANCES: Odor, staining, sheen, scrap, slag, etc.	REMARKS: Drill Action, drill and sample procedures, water conditions, heave, etc.	SUMMARY LOG (Water and Date)
50	40	10	0.0							GW 2.5Y3/2, rounded to subangular gravels, coarse sands with silt.	@42 Driller encountered some cobbles	
55	35	10	0.0							GW 2.5 Y 3/2 Rounded to subangular gravels. well graded gravels. Predominatly coarse sands		
45	~~50~~ 50	15	0.0							GW 2.5 Y 3/2 Rounded to subangular well graded gravels Coarse sands. slight increase in fines and sand percent		

SUNDANCE-EA II, LLC

Boring 19PS-MW02A Date 10.22.19 Sheet 4 of 4

Boring Location

Project Name Eielson Air Force Base PFAS SI SU08-004 Task No. 003

Logged By: Ryan W. Weather: clear 30's °F

Drilled By: Geotek AK Start time: 1335 End Time: 1540

Drill Type/Method: Geoprobe 8040DT Auger (HSA)

Sampling Method: Grab for composite IDW

Elevation _____ Datum _____

Obs. Well Install. ☐ Yes ☐ No

Bottom of Boring: 62 ft ATD Water Level Depth: 7 ft ☐ No

Size (%) G Max.	Size (%) S Range	Size (%) F Att. Limits	PID or other	DEPTH bgs (ft)	DEPTH Interval (ft)	SAMPLE Type	SAMPLE Number	Sample Recovery	Penetration Resistance	DESCRIPTION: Den., moist, color, minor, MAJOR CONSTITUENT, NON-SOIL SUBSTANCES: Odor, staining, sheen, scrap, slag, etc.	REMARKS: Drill Action, drill and sample procedures, water conditions, heave, etc.	SUMMARY LOG (Water and Date)
55	35	10			TD			60		GW Rounded to Subangular gravels. well graded coarse to fine sands. 2.5Y 3/2	Added a total of 55 gallons of water @1350 reached TD.	

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10-23-18

Boring 19PS-MW02B Date ~~19PS-MW02~~ Sheet 1 of 3

Boring Location

Project Name Eielson Air Force Base PFAS SI SU08-004 Task No. 003

Logged By: Ryan W. Weather: Cloudy 30°F

Drilled By: Geotek AK Start time: 1530 End Time:

Drill Type/Method: Hollow stem Auger (HSA) Geoprobe 8040DT

Sampling Method: Grab for composite IDW

Elevation Datum

Obs. Well Install. ☐ Yes ☐ No

Bottom of Boring: 115 ATD Water Level Depth: 7ft ☐ No

Size (%) G Max.	Size (%) S Range	Size (%) F Att. Limits	PID or other	DEPTH bgs (ft)	DEPTH Interval (ft)	SAMPLE Type	SAMPLE Number	Sample Recovery	Penetration Resistance	DESCRIPTION: Den., moist, color, minor, MAJOR CONSTITUENT, NON-SOIL SUBSTANCES: Odor, staining, sheen, scrap, slag, etc.	REMARKS: Drill Action, drill and sample procedures, water conditions, heave, etc.	SUMMARY LOG (Water and Date)
55	35	10	00					60		GW Rounded to Subangular gravels. well graded coarse to fine sand. 2.5 Y 3/2	See Bore log for 19PS-MW02A for 1-60ft Added 5gal of water per foot after first 5 feet	
65	25	10	00					5		GW Rounded to Subangular. Some cobbles observed in cuttings. Well graded Sands. 2.5 Y 3/2		

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Boring 19BS-MW02B Date 10-23-19 Sheet 2 of 3

Boring Location

Project Name Eielson Air Force Base PFAS SI SU08-004 Task No. 003

Logged By: Ryan W Weather: Cloudy 30's °F

Drilled By: Geotek AK Start time: 1530 End Time:

Drill Type/Method: Hollow Stem Auger (HSA) Geprobe 8040DT

Sampling Method: Grab for composite IDW

Elevation Datum

Obs. Well Install. ☐ Yes ☐ No

Bottom of Boring: 115 ATD Water Level Depth: 7ft ☐ No

Size (%) G Max.	Size (%) S Range	Size (%) F Att. Limits	PID or other	DEPTH bgs (ft)	DEPTH Interval (ft)	SAMPLE Type	SAMPLE Number	Sample Recovery	Penetration Resistance	DESCRIPTION: Den., moist, color, minor, MAJOR CONSTITUENT, NON-SOIL SUBSTANCES: Odor, staining, sheen, scrap, slag, etc.	REMARKS: Drill Action, drill and sample procedures, water conditions, heave, etc.	SUMMARY LOG (Water and Date)
65	30	5								GW. Rounded to Sub angular gravels. Medium grain sand with 20% course to fine, 2.5 Y 3/2		
55	35	10								GW. Rounded to angular gravels. well graded sands. 2.5 Y 3/2		

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Boring 19PS-MW02B Date 10-23-19 Sheet 3 of 3

Boring Location

Project Name Eielson Air Force Base PFAS SI SU08-004 Task No. 003

Logged By: Ryan W. Weather:

Drilled By: Geotek AK Start time: End Time:

Drill Type/Method: Hollow stem Auger (HSA) Geoprobe 8040DT

Sampling Method: Grab for composite IDW

Elevation Datum

Obs. Well Install. ☐ Yes ☐ No

Bottom of Boring: 115 ATD Water Level Depth: 7ft ☐ No

Size (%) G Max.	Size (%) S Range	Size (%) F Alt. Limits	PID or other	DEPTH bgs (ft)	DEPTH Interval (ft)	SAMPLE Type	SAMPLE Number	Sample Recovery	Penetration Resistance	DESCRIPTION: Den., moist, color, minor, MAJOR CONSTITUENT, NON-SOIL SUBSTANCES: Odor, staining, sheen, scrap, slag, etc.	REMARKS: Drill Action, drill and sample procedures, water conditions, heave, etc.	SUMMARY LOG (Water and Date)
50	40	10								GP. Rounded to subangular. Poorly graded gravels. Fine gravels max 1inch. well graded sands. 2.5 Y 3/2		
30	45	25								SM. Fine Gravels coarse med to fine sands. Increase in silts. Rounded to subangular 2.5 Y 3/2		
25	50	25								SM Fine gravels med to fine sands. Rounded to subangular 2.5 Y 3/2	TD@ 115 Added a total of 100 gallons	

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Soil Boring Log

Boring ID: 20PS-MW02C	**Monitoring Well ID:** 20PS-MW02C (160' TD)
Project: PFAS SI	Geologist: N. Stoecklein
Location: EAFB and Moose Creek, AK	Date: 5/16/2020

Time	Depth (ft bgs)	Core Interval	Recovered/ Driven	Group Symbol	**Soil Description:** Group name, color, moisture content *Coarse grains* - angularity and shape *Fine grains* - Plasticity, dry strenght, dilatency, toughness, and consistency	% Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Fines	Blow Count	PID (ppm)	Sample Interval	Analytical Sample No. (QA./QC)
1005	120'	~~120'~~		SW	2.5Y 4/2 DK grayish brown SW well graded ~~gravelly~~ sands rounded to angular ~~gravel~~ Sand - Course w/ fines at max size 3mm		~~25%~~ 50%	~~50~~ 35%	10%	5%	NA	NA	NA	
1017	130'	~~130'~~			~~SP-SW~~ 2.5Y 5/1 Gray well graded sands w/ increasing size sub to angular 4-5mm size	@	20% ~~40%~~	65% ~~25%~~	10%	5%				
1057	140'				2.5Y 5/1 Gray well graded sand sub to angular Fine ~~fine~~ to course in size 3mm max size, decrease in size from above interval w/ increasing fines		10%	55%	30%	~~5%~~ >5% ~~10%~~				
1113	150'				2.5 Y 5/1 Gray poorly graded sands, ~~gravel~~ fine gravel sub rounded to angular 5mm max gravel size, well graded sands	60%	10%	~~30%~~ 40% ~~10%~~ 25%	5%					
	160'													

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Soil Boring Log

Boring ID: 20PS-MW02D	**Monitoring Well ID:** 20PS-MW02D
Project: PFAS SI	Geologist: N. Stoeckien, H. Peterson
Location: EAFB and Moose Creek, AK	Date: 5/19/2020, 5/20/2020

Time	Depth (ft bgs)	Core Interval	Recovered/ Driven	Group Symbol	**Soil Description:** Group name, color, moisture content *Coarse grains* - angularity and shape *Fine grains* - Plasticity, dry strenght, dilatency, toughness, and consistency	% Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Fines	Blow Count	PID (ppm)	Sample Interval	Analytical Sample No. (QA./QC)
	160			SP	2.5Y 4/1 dark gray poorly sorted med. to coarse Sand ~~of gravel~~ rounded to subangular, ~~gravel~~ Sand max 2mm in size C	2	70%	20%	10%					
	170				2.5Y 4/1 dark gray poorly sorted med to coarse sand ~~of fine gravel~~, increasing sand size/amt., rounded to subangular, ~~gravel~~ Sand max size 2 C		30%	60%	10%					
	180				↓									
	185			SP	2.5Y 4/1 dark gray. Poorly-graded Sands with subrounded gravels. poorly-sorted, low plasticity	5	35	50	10					
	190			SP	2.5Y 2.5/1 very dark gray/Black (moist) poorly-graded medium sand grains Sporadic subrounded gravels (<2")	0	10	80	10					
	200 @													

Sundance-EA II, LLC

Soil Boring Log

Boring ID: 20PS-MW02D	**Monitoring Well ID:** 20PS-MW02D
Project: PFAS SI	Geologist: N. Stoecklein, H. Peterson
Location: EAFB and Moose Creek, AK	Date: 5/20/2020 ~~5/1e~~

Time	Depth (ft bgs)	Core Interval	Recovered/ Driven	Group Symbol	**Soil Description:** Group name, color, moisture content *Coarse grains* - angularity and shape *Fine grains* - Plasticity, dry strenght, dilatency, toughness, and consistency	% Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Fines	Blow Count	PID (ppm)	Sample Interval	Analytical Sample No. (QA./QC)
	200			SP	2.5Y 4/1 dark gray. Poorly-graded medium-coarse sand grains Subrounded. Low plasticity	0	40	40	10	10				
	205			SP	2.5Y 4/1 dark gray. Poorly-graded medium-coarse sand grains subrounded	0	40	40	10	10				
	210													

EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

Appendix G.2 – Well Completion Diagrams

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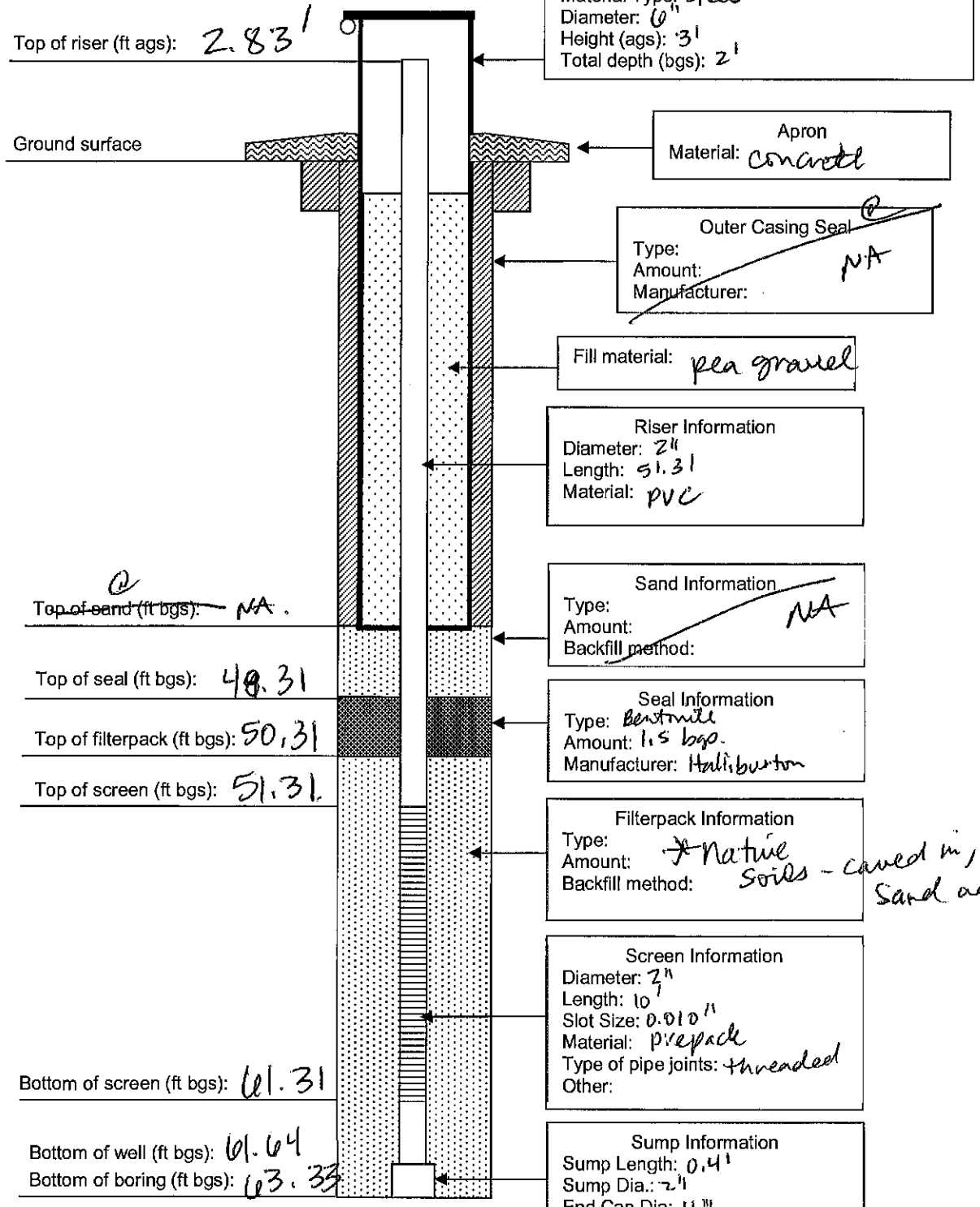
Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: 19PS - MW01A

Soil Boring ID:	19PS-MW01A	Source Area:	Well Cluster #1 / FC
Project:	**PFAS SI**	Location:	**EAFB and Moose Creek, AK**
Installation Date:	10/26/19	Drilling Method:	Hollow Stem Auger
Completion Date:	10/27/19	Field Personnel:	N. Stoecklein



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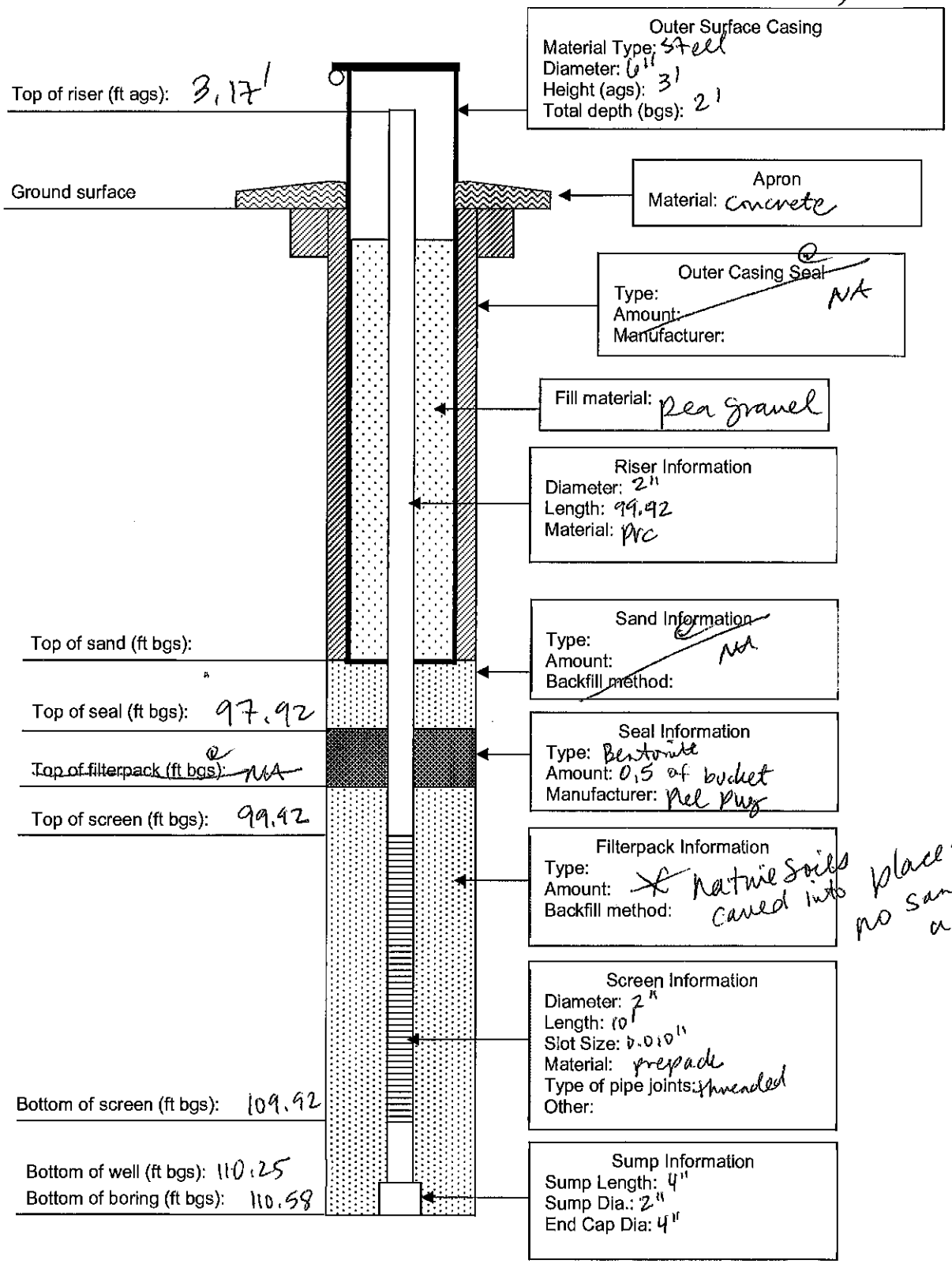
Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: 19PS-MW01B

Soil Boring ID: 19PS-MW01B	Source Area: Chena Flood Channel, WC #1
Project: **PFAS SI**	Location: **EAFB and Moose Creek, AK**
Installation Date: 10/27/19	Drilling Method: Hollow Stem Auger
Completion Date: 10/28/19	Field Personnel: N. Streeklein, H. Peterson

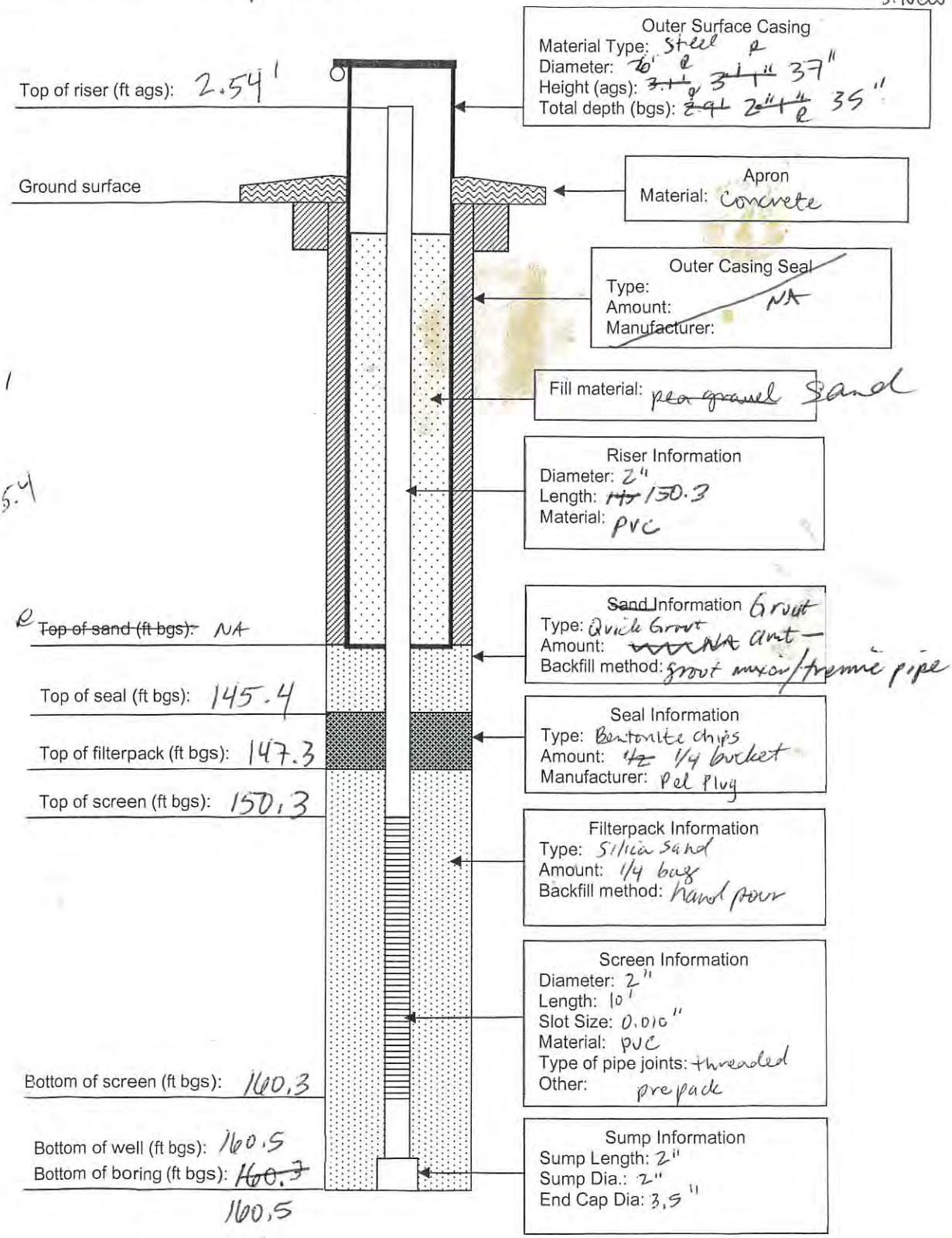


SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: 20PS-MW01C

Soil Boring ID: 20PS-MW01C	Source Area: Chena Flood Channel, well Cluster #1
Project: **PFAS SI**	Location: **EAFB and Moose Creek, AK**
Installation Date: 5/27-29/20	Drilling Method: Rotary Wash
Completion Date: 6/2/2020	Field Personnel: N Strecklein, H. Peterson, S. Newman



3.1

145.4

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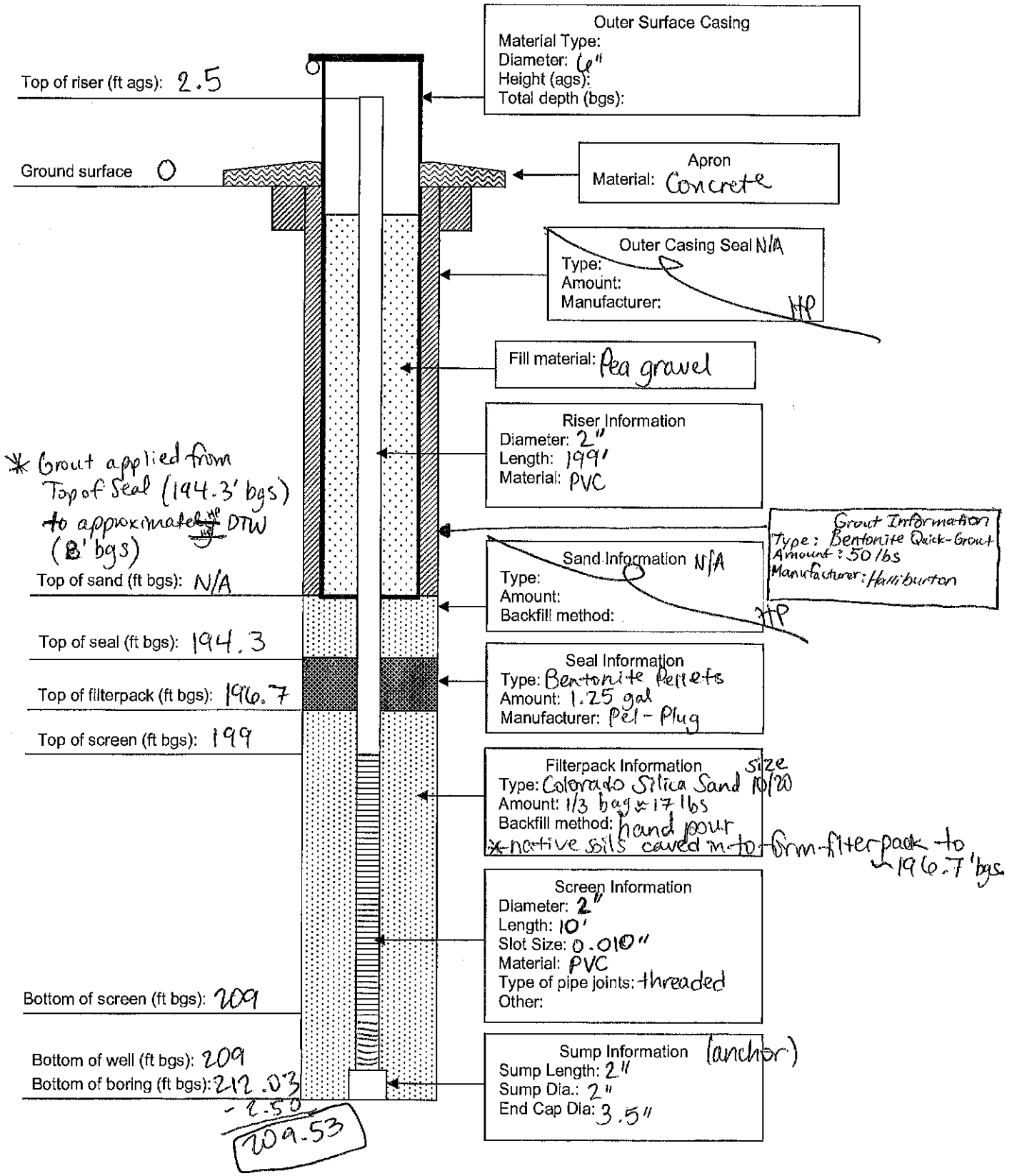
Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: 20PS_MW01D

Soil Boring ID: 20PS-MW01D	Source Area: Chena Flood Channel Well Cluster #1
Project: **PFAS SI**	Location: **EAFB and Moose Creek, AK**
Installation Date: 5/22/2020	Drilling Method: Rotary Wash
Completion Date: 5/27/2020	Field Personnel: N. Sheetlein, H. Peterson, S. Newman



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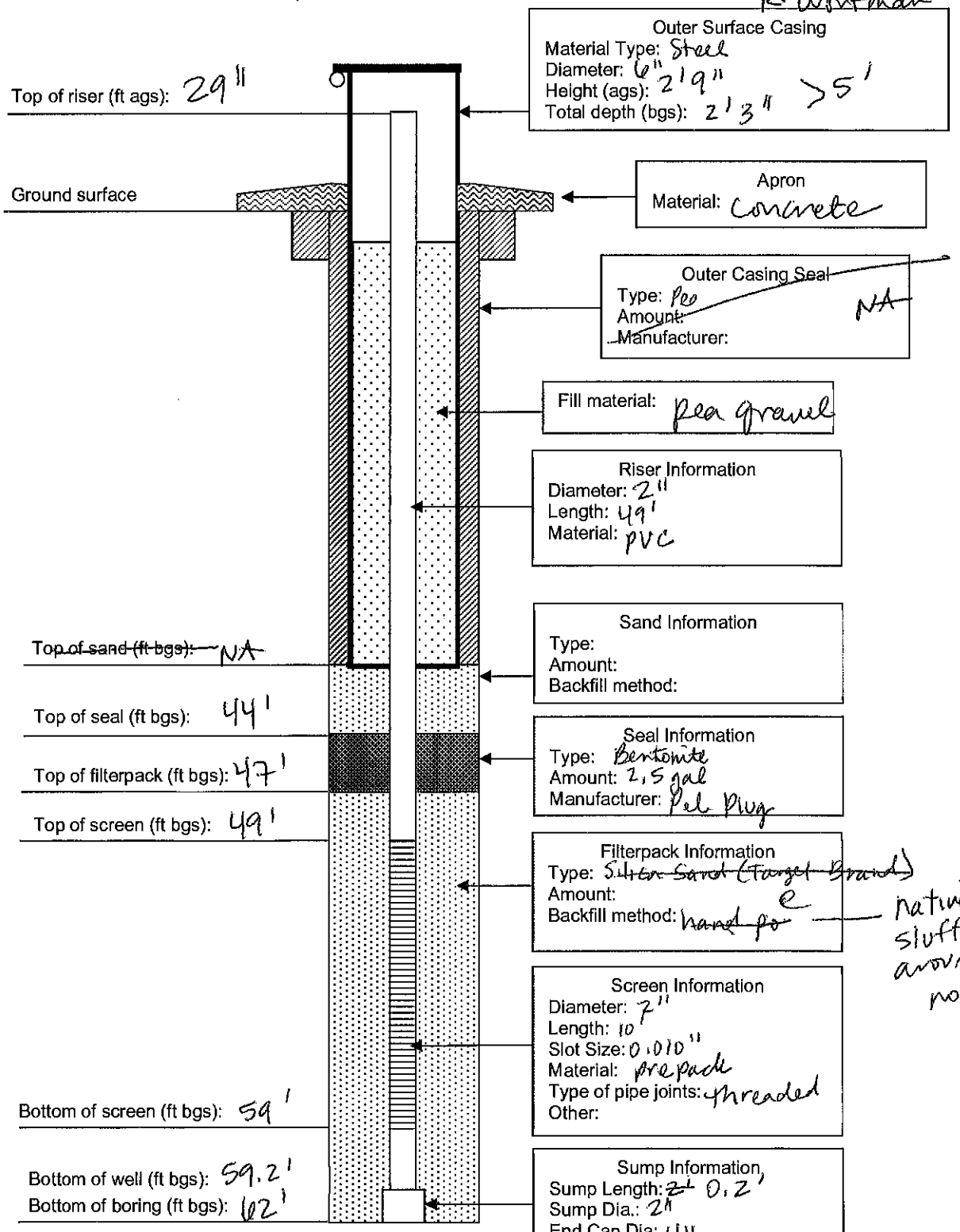
Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: 19PS-MW02A

Soil Boring ID:	19PS-MW02A	Source Area:	Chena Flood
Project:	**PFAS SI**	Location:	**EAFB and Moose Creek, AK**
Installation Date:	10/22/19	Drilling Method:	Hollow Stem Auger
Completion Date:	10/23/19	Field Personnel:	N. Stoeckelin R. Wortman



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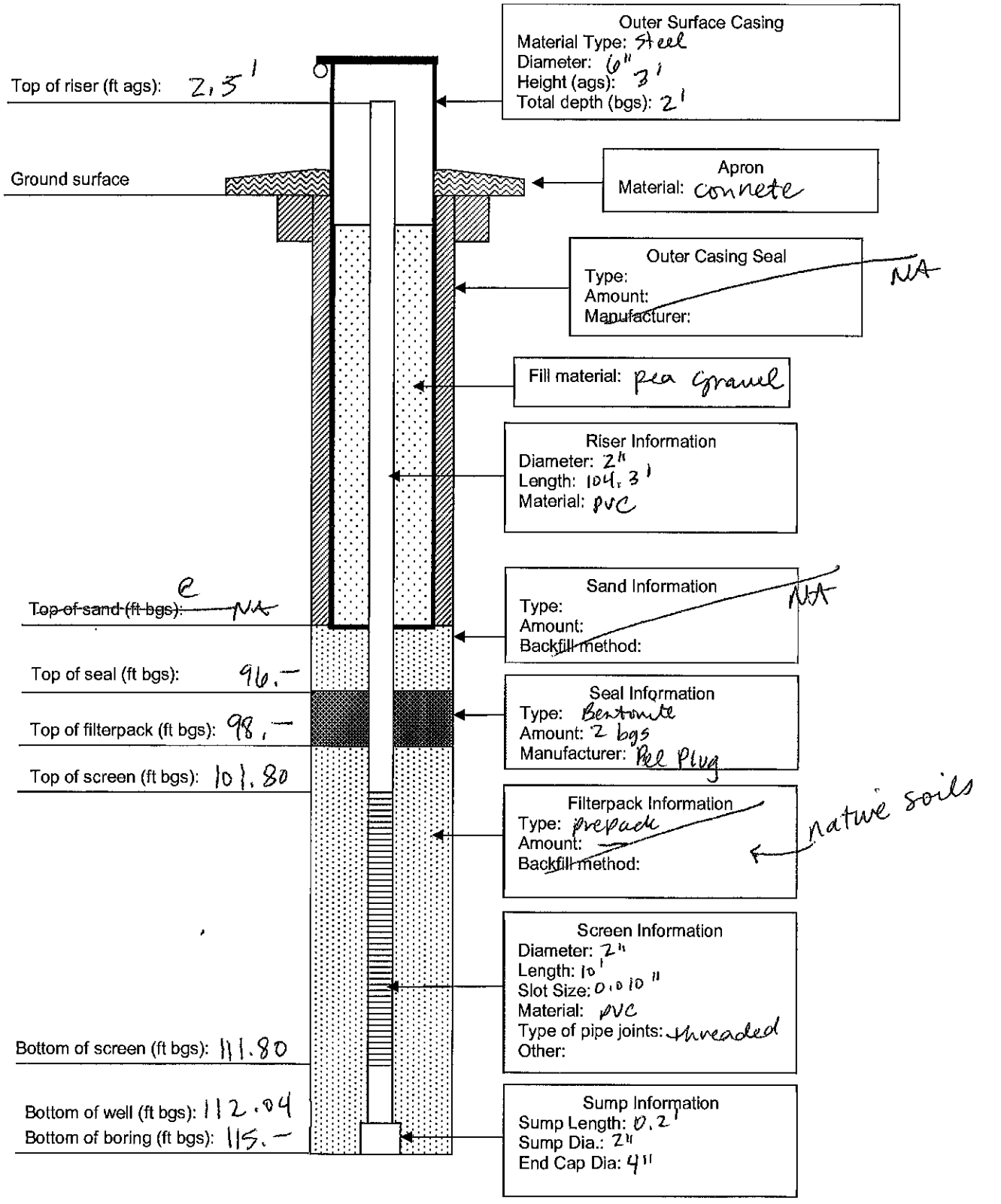
Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: 19PS-MW02B

Soil Boring ID: 19PS-MW02B	Source Area:
Project: **PFAS SI**	Location: **EAFB and Moose Creek, AK**
Installation Date: 10/23/19	Drilling Method: Hollow Stem Auger
Completion Date: 10/25/19	Field Personnel: N. Stoeckle, R. Wortman

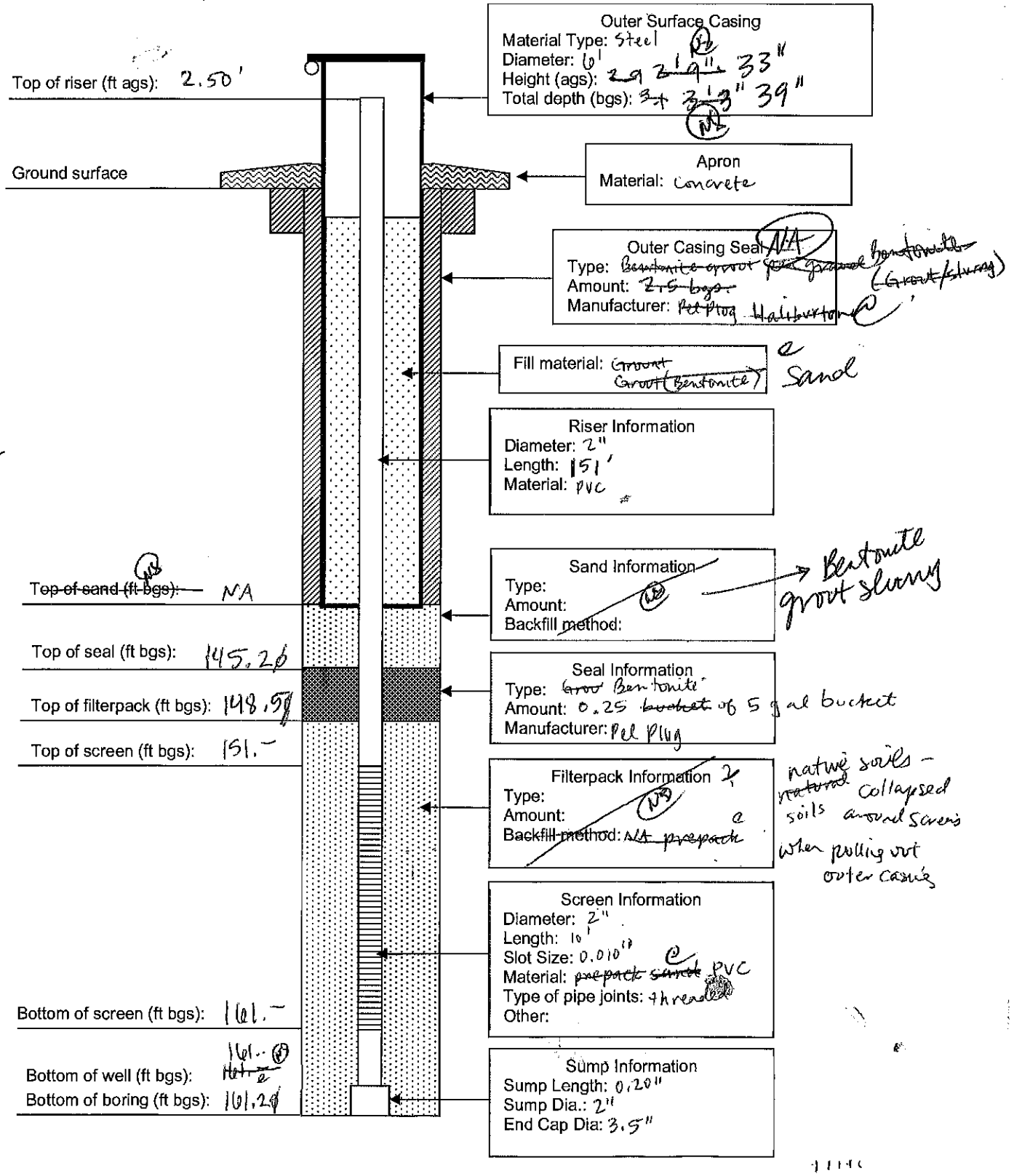


SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: 20PS-MW02C

Soil Boring ID: 20PS-MW02C	Source Area: Chena Flood Channel
Project: **PFAS SI**	Location: **EAFB and Moose Creek, AK**
Installation Date: 5/16/2020	Drilling Method: Rotary Wash
Completion Date: 6/2/2020	Field Personnel: N. Stoeckle



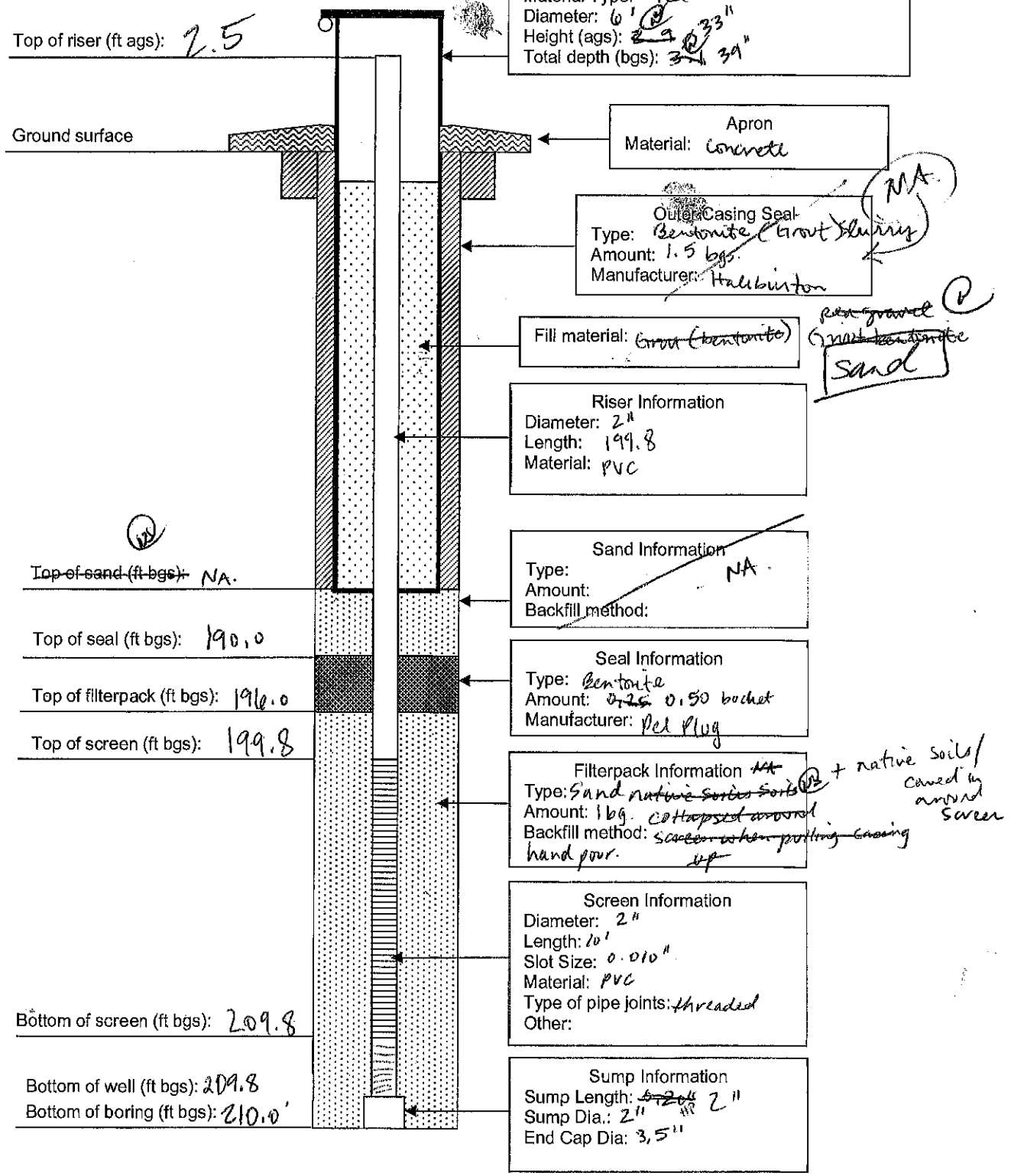
145.2

SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: 20PS-MW02D

Soil Boring ID: 20PS-MW02D	Source Area: Chena Flood Channel well Cluster #2
Project: **PFAS SI**	Location: EAFB and Moose Creek, AK
Installation Date: 5/17/2020	Drilling Method: Rotary Wash
Completion Date: ~~5/21/2020~~ @ ~~5/31/20~~ 6/2/2020	Field Personnel: N. Stoecklein; H. Peterson



196.-

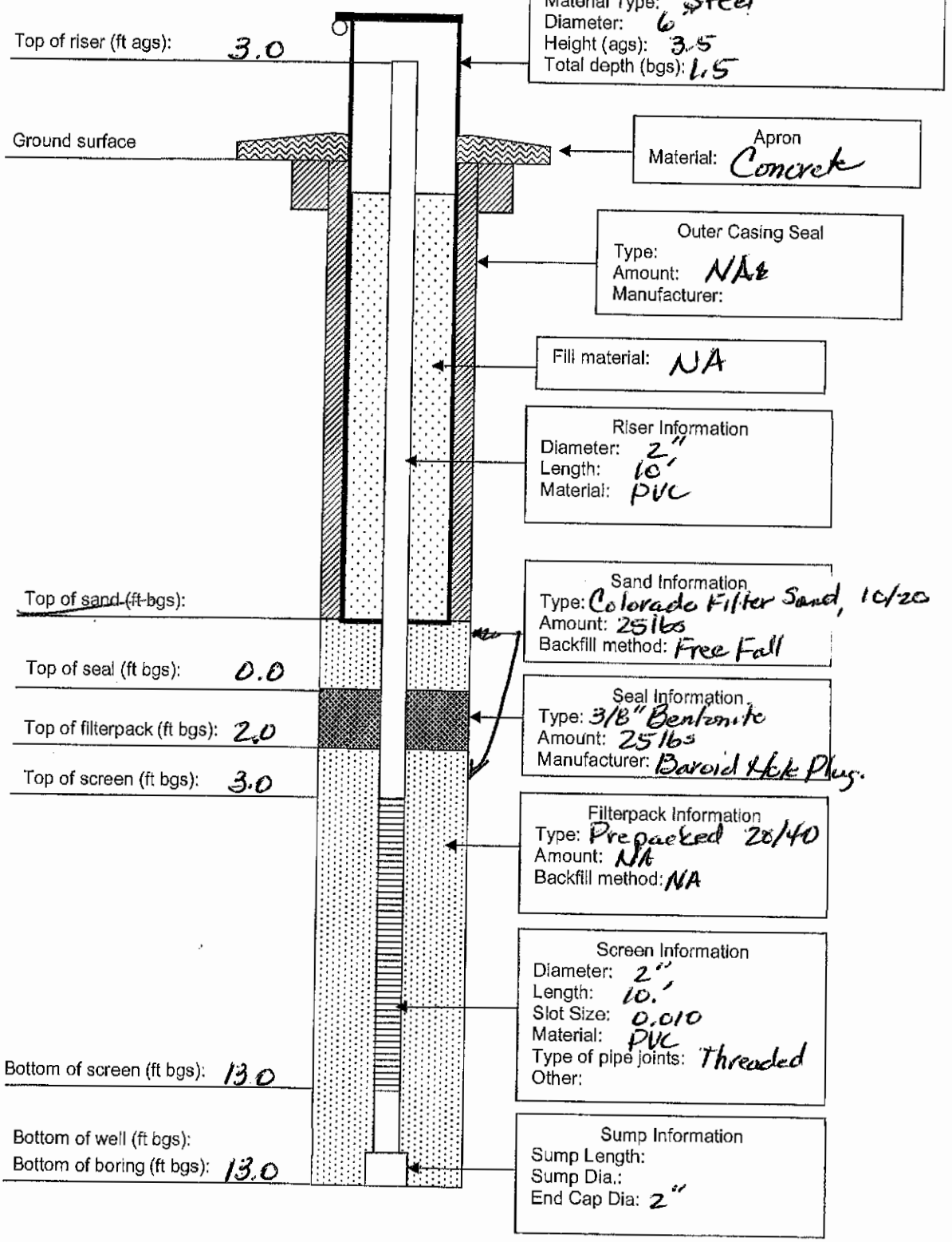
198.2

SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: MW-1 20PS-MW01

Soil Boring ID:	Source Area: EAFB
Project: PFAS SI	Location: EAFB and Moose Creek, AK
Installation Date: 9/20/2020	Drilling Method: DPT
Completion Date: 9/20/2020	Field Personnel: D. Cookston J. Parson

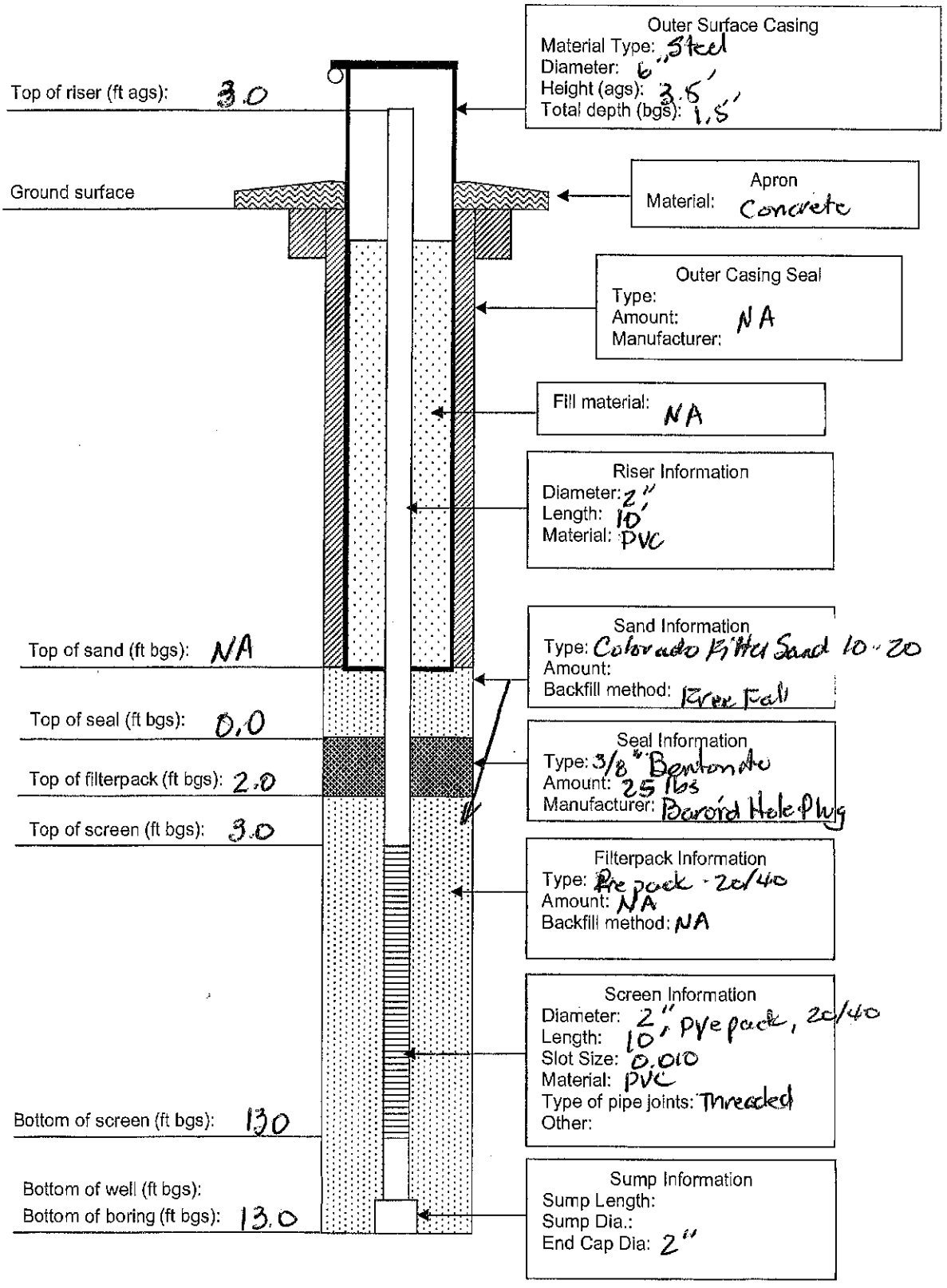


SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: MW-3 20PS-MW03

Soil Boring ID:	Source Area: EAFB
Project: **PFAS SI**	Location: **EAFB and Moose Creek, AK**
Installation Date: 9/20/2020	Drilling Method: DPT
Completion Date: 9/20/2020	Field Personnel: D. Cookston, J. Parson

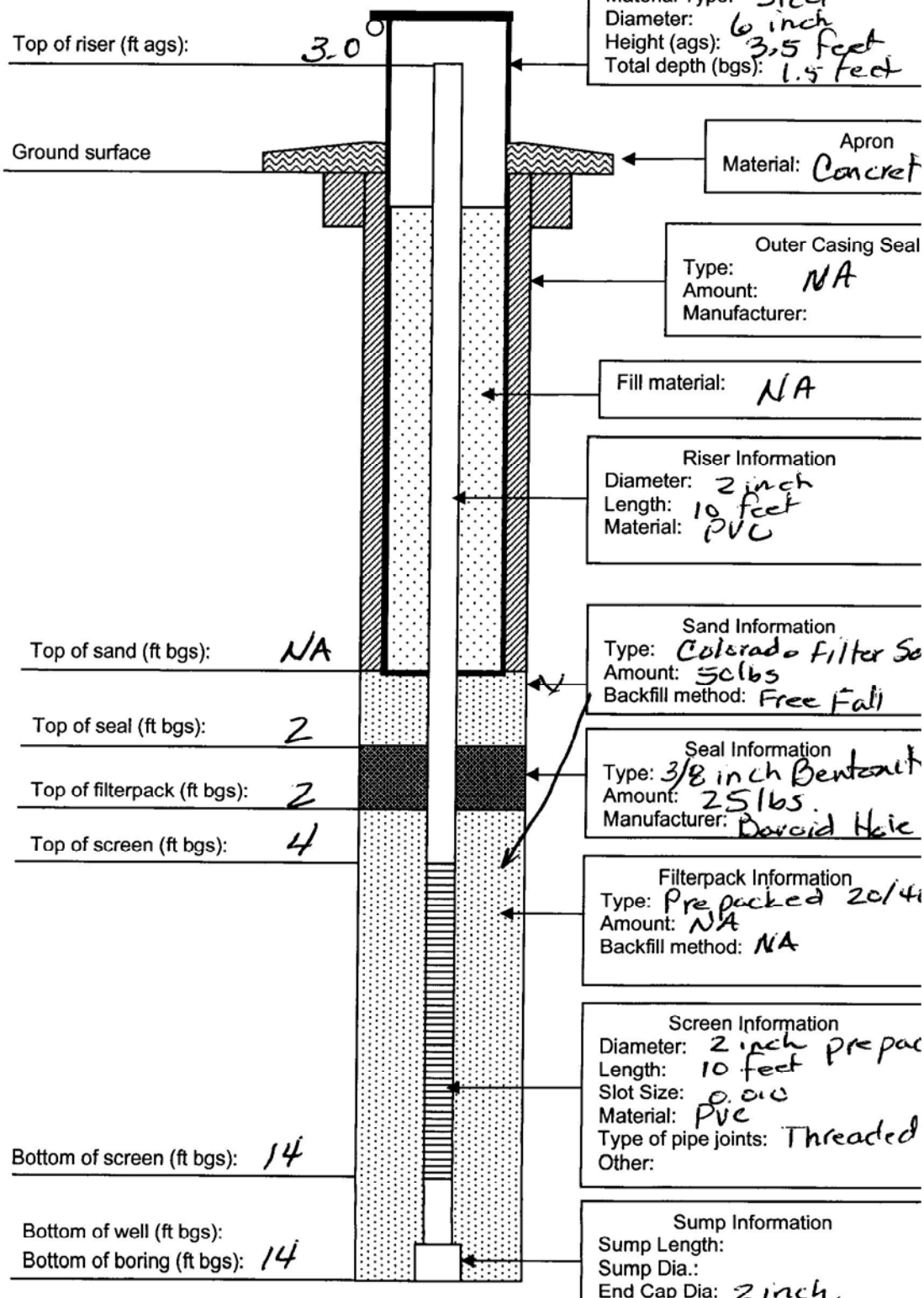


SUNDANCE-EA II, LLC

Monitoring Well Completion
Stickup M

Monitoring Well ID: MW-07 20PS-MW07

Soil Boring ID:	Source Area:
Project: PFAS SI	Location: EAFB and Moose Cre
Installation Date: 9/18/2020	Drilling Method: DPT
Completion Date: 9/18/2020	Field Personnel: D. Cookston J. Parson

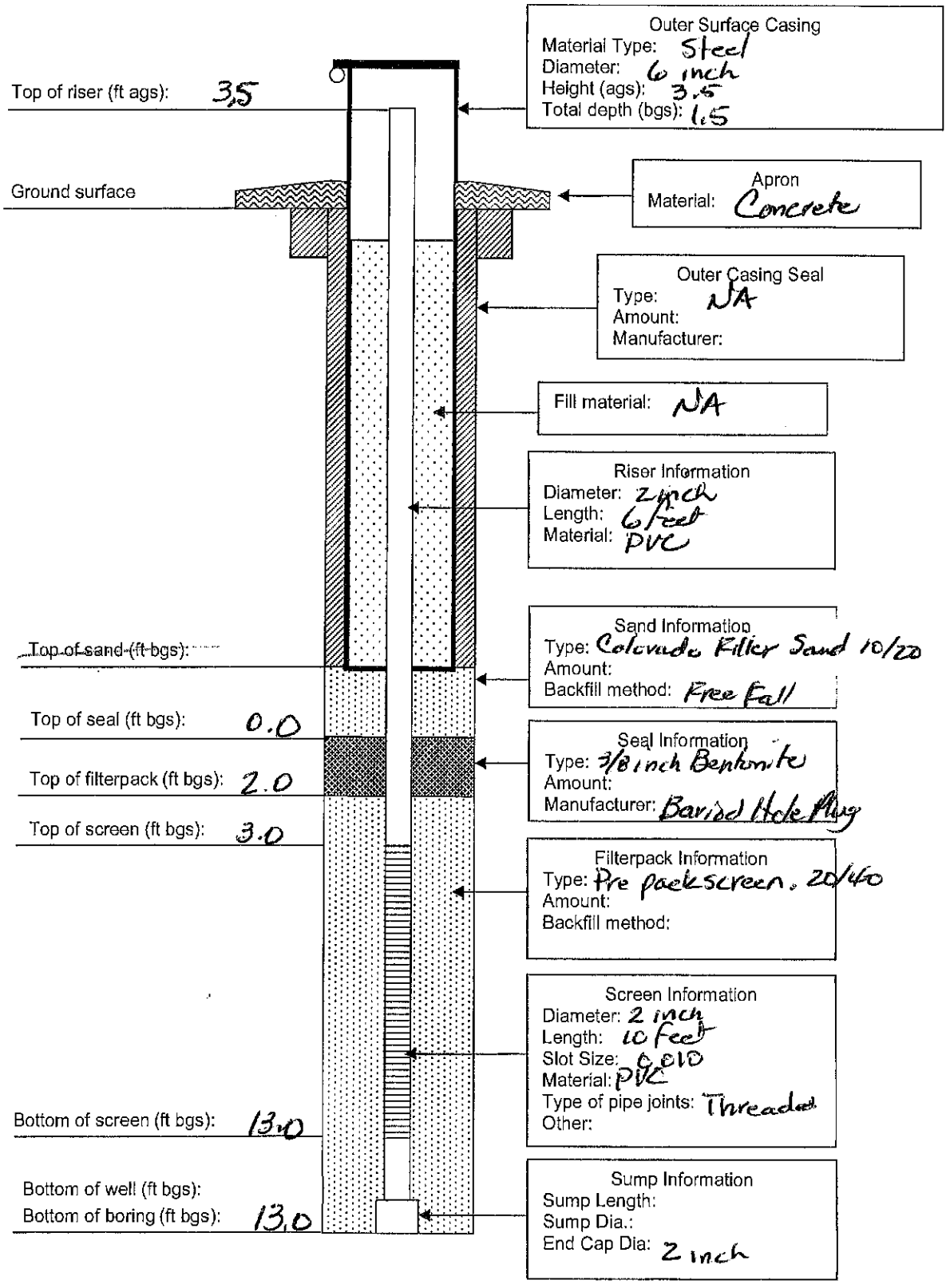


SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: MW-8 20PS-MW08

Soil Boring ID:	Source Area: EAFB
Project: PFAS SI	Location: EAFB and Moose Creek, AK
Installation Date: 9/18/2020	Drilling Method: DPT
Completion Date: 9/18/2020	Field Personnel: D. Cookstem J. Person

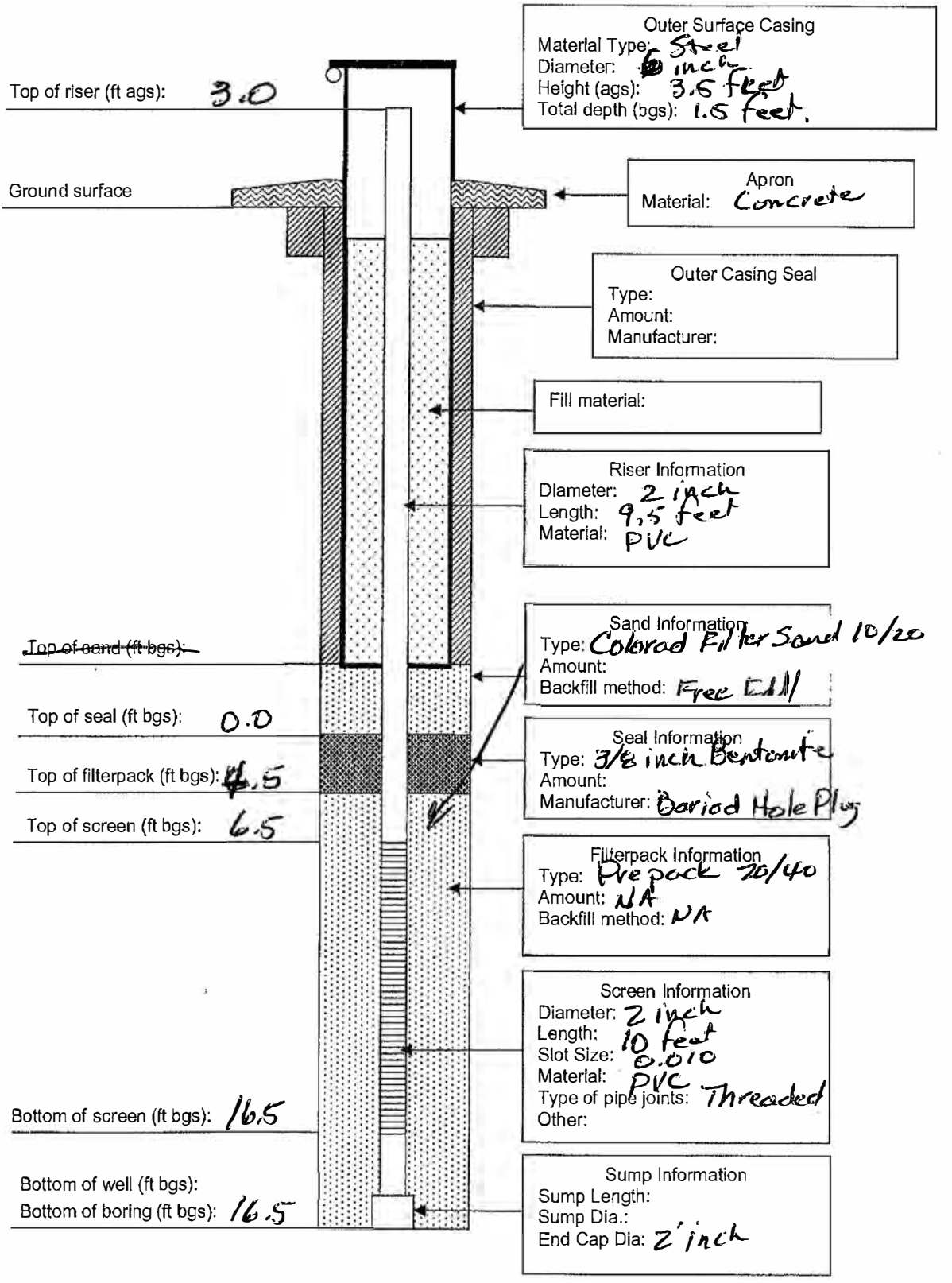


SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: MW-09 20PS-MW09

Soil Boring ID:		Source Area:	MC
Project:	PFAS SI	Location:	EAFB and Moose Creek, AK
Installation Date:	9/18/2020	Drilling Method:	DPT
Completion Date:	9/18/2020	Field Personnel:	D. Cockston, J. Parson

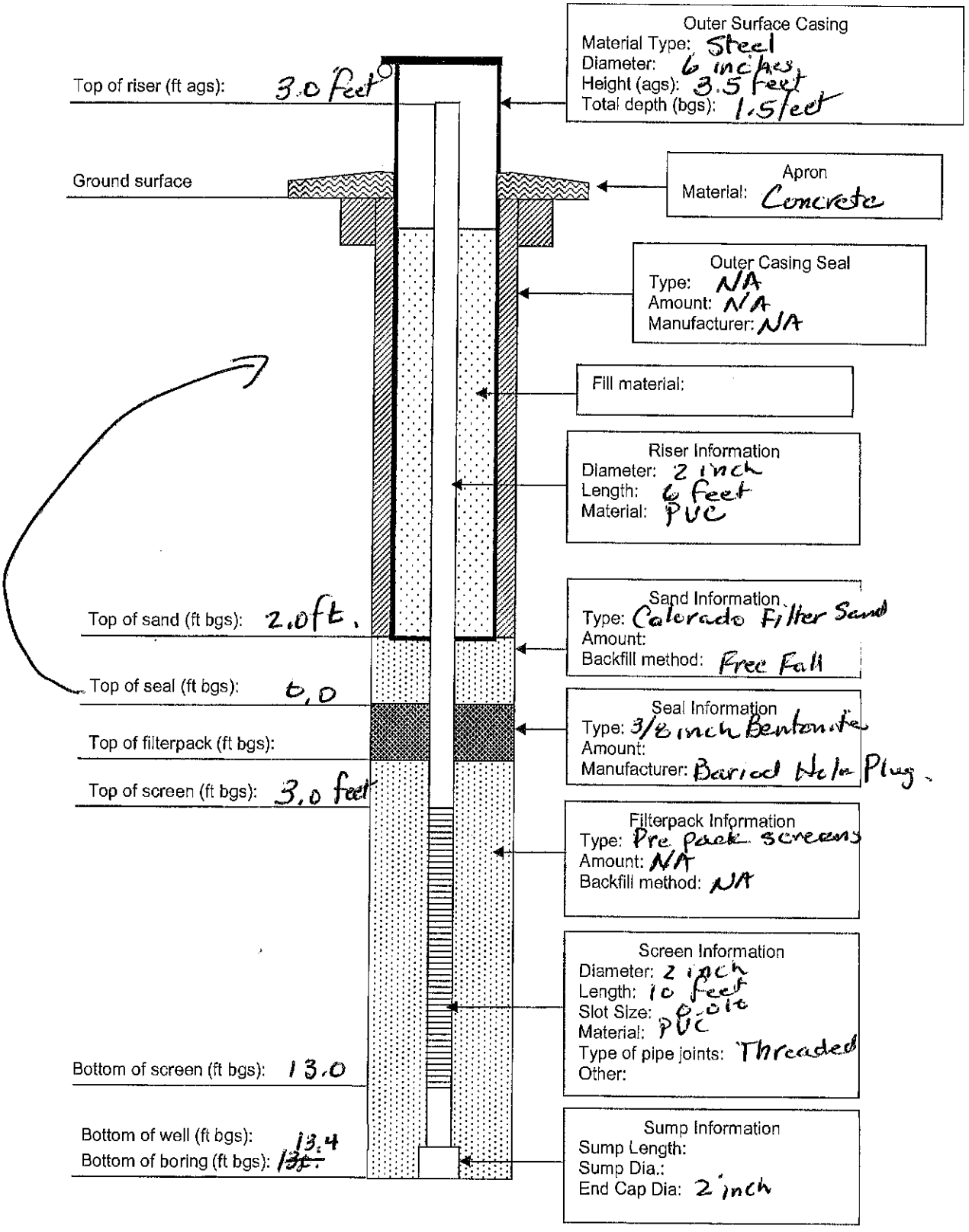


SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: MW-10 20PS-MW10

Soil Boring ID:	Source Area: MC
Project: PFAS SI	Location: EAFB and Moose Creek, AK
Installation Date: 9/18/2020	Drilling Method: DPT
Completion Date: 9/18/2020	Field Personnel: D. Carstater, J. Parson

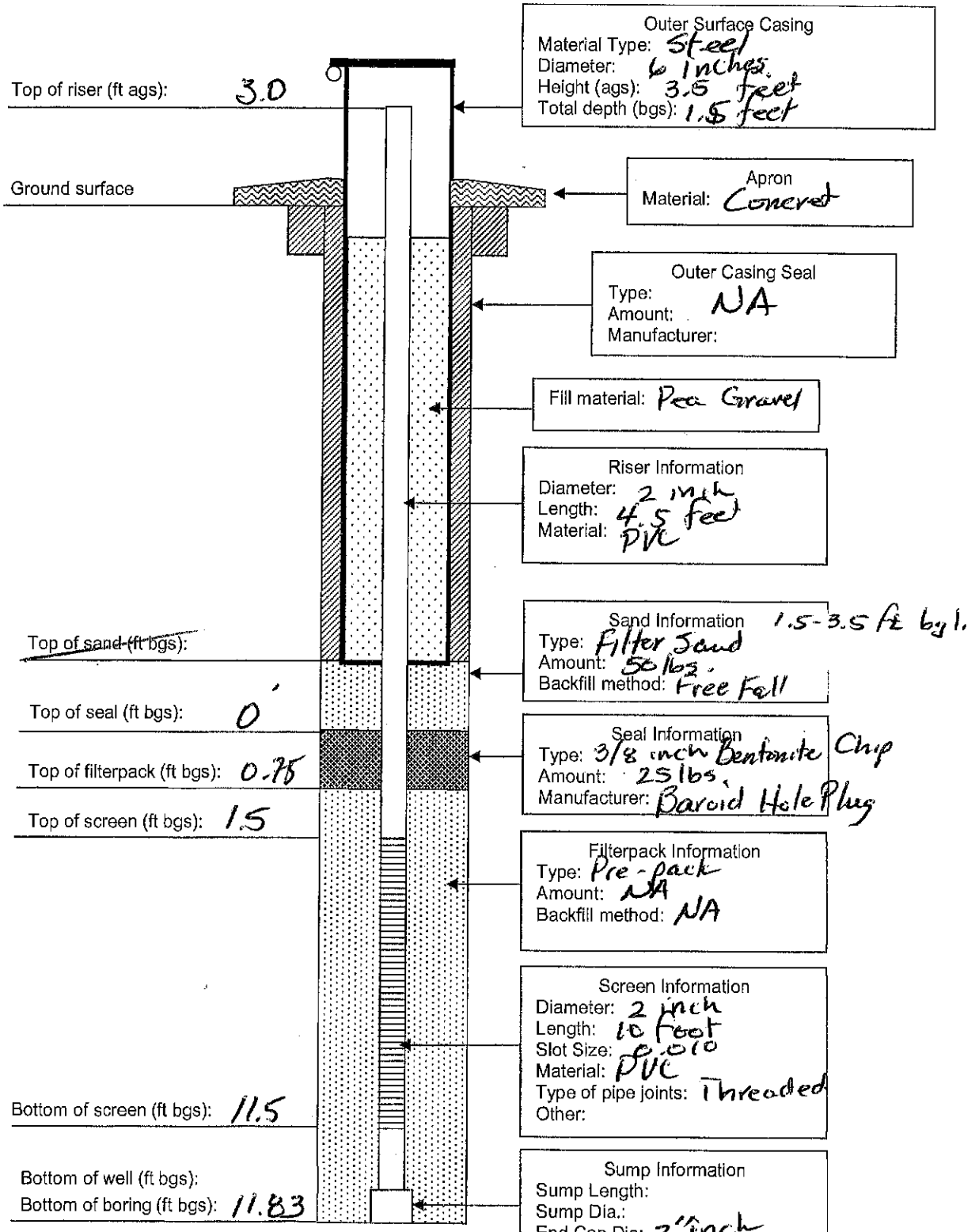


SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: 20PS - MW 11

Soil Boring ID:	Source Area:
Project: PFAS SI	Location: EAFB and Moose Creek, AK
Installation Date: 9/16/2020	Drilling Method: DPT
Completion Date: 9/16/2020	Field Personnel: D. Cookston



Outer Surface Casing
Material Type: Steel
Diameter: 6 inches
Height (ags): 3.5 feet
Total depth (bgs): 1.5 feet

Apron
Material: Concrete

Outer Casing Seal
Type:
Amount: NA
Manufacturer:

Fill material: Pea Gravel

Riser Information
Diameter: 2 inch
Length: 4.5 feet
Material: PVC

Sand Information 1.5-3.5 ft bgl.
Type: Filter Sand
Amount: 50 lbs.
Backfill method: Free Fall

Seal Information
Type: 3/8 inch Bentonite Chip
Amount: 25 lbs.
Manufacturer: Baroid Hole Plug

Filterpack Information
Type: Pre-pack
Amount: NA
Backfill method: NA

Screen Information
Diameter: 2 inch
Length: 10 foot
Slot Size: 0.010
Material: PVC
Type of pipe joints: Threaded
Other:

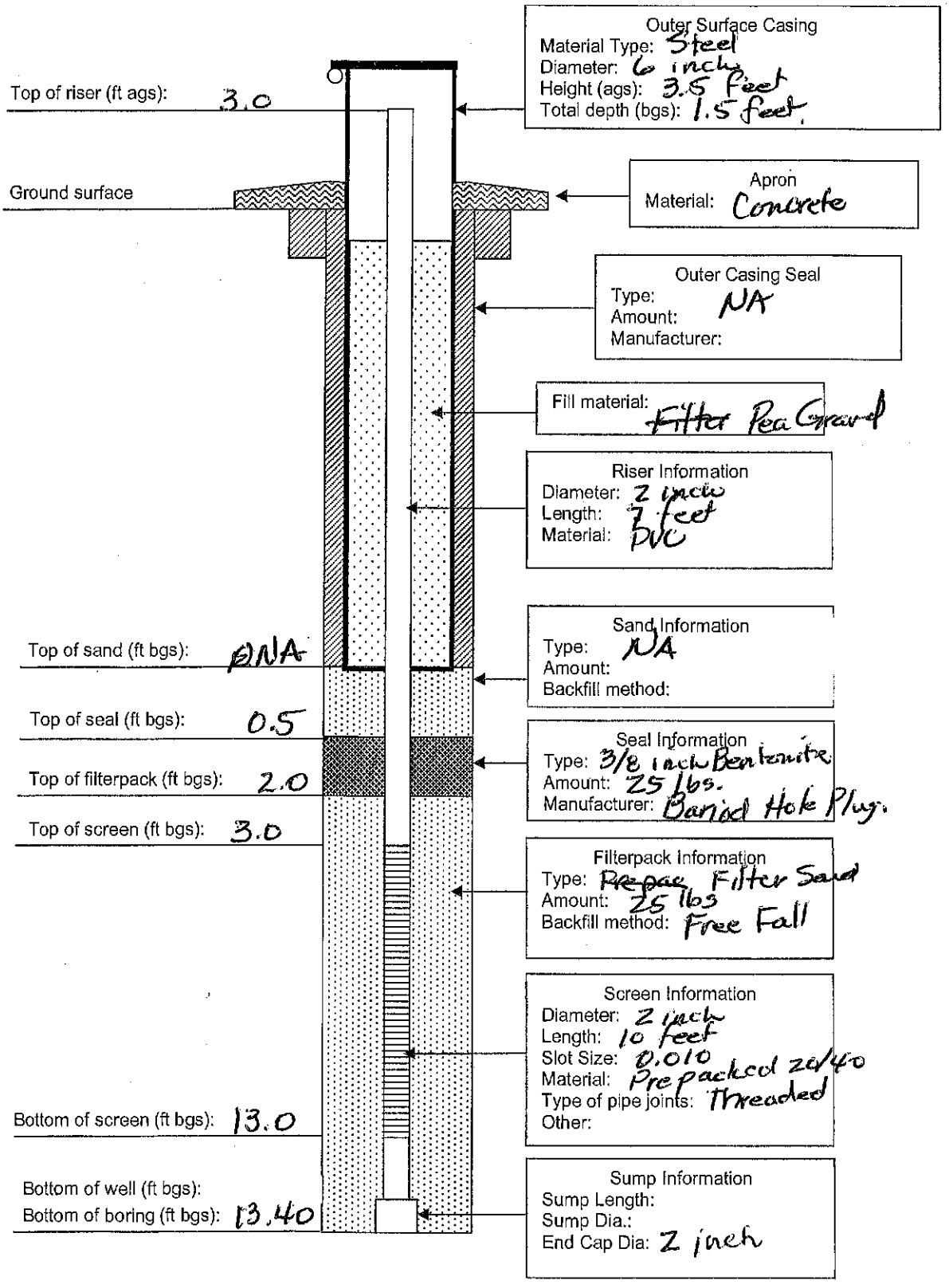
Sump Information
Sump Length:
Sump Dia.:
End Cap Dia: 2 inch

SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: DC 20PS-MW12

Soil Boring ID:	Source Area: MC
Project: PFAS SI	Location: EAFB and Moose Creek, AK
Installation Date: 9/16/2020	Drilling Method: DPT
Completion Date: 9/16/2020	Field Personnel: D. Cockston

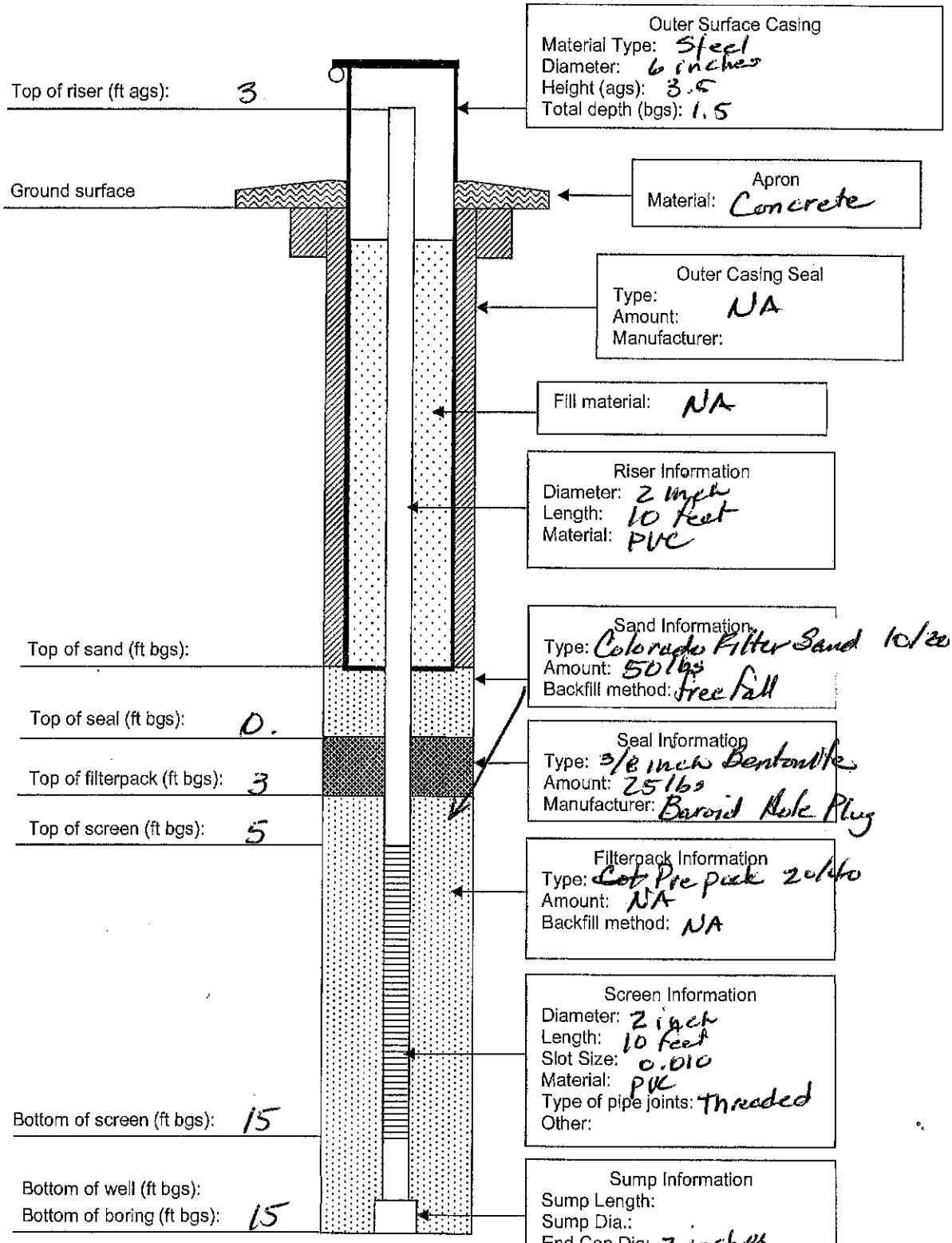


SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: MW-13 20PS-MW13

Soil Boring ID:	Source Area: CFC
Project: PFAS SI	Location: EAFB and Moose Creek, AK
Installation Date: 9/23/2020	Drilling Method: DPT
Completion Date: 9/23/2020	Field Personnel: D. Cookston J. Parson



Outer Surface Casing
Material Type: Steel
Diameter: 6 inches
Height (ags): 3.5
Total depth (bgs): 1.5

Apron
Material: Concrete

Outer Casing Seal
Type:
Amount: NA
Manufacturer:

Fill material: NA

Riser Information
Diameter: 2 inch
Length: 10 feet
Material: PVC

Sand Information
Type: Colorado Filter Sand 10/20
Amount: 50 lbs
Backfill method: free fall

Seal Information
Type: 3/8 inch Bentonite
Amount: 25 lbs
Manufacturer: Baroid Hole Plug

Filterpack Information
Type: Colt Pre pack 20/40
Amount: NA
Backfill method: NA

Screen Information
Diameter: 2 inch
Length: 10 feet
Slot Size: 0.010
Material: PVC
Type of pipe joints: Threaded
Other:

Sump Information
Sump Length:
Sump Dia.:
End Cap Dia: 2 inches

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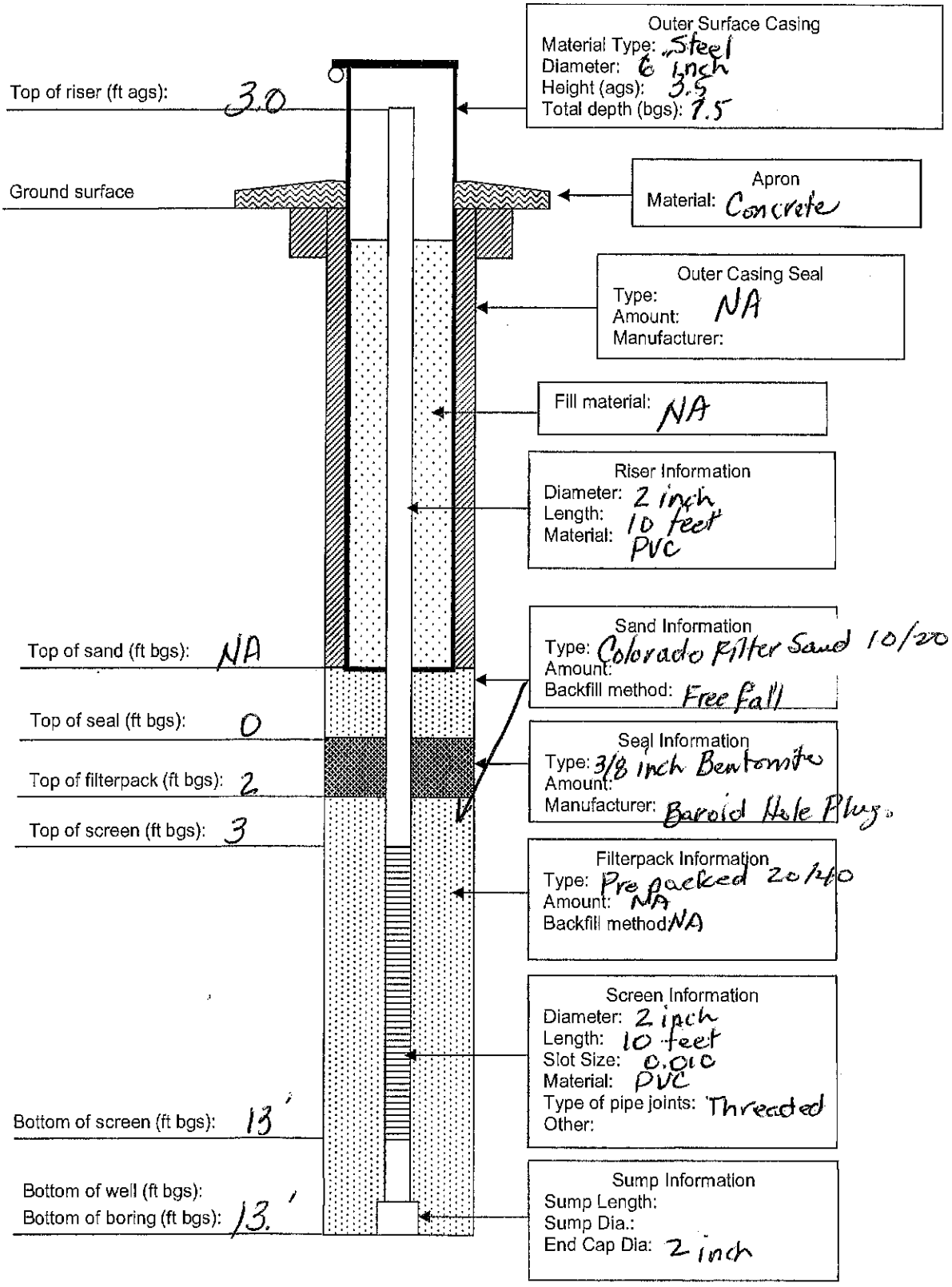
Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: New MW-1420PS-MW14

Soil Boring ID:	Source Area: CFC
Project: **PFAS SI**	Location: **EAFB and Moose Creek, AK**
Installation Date: 9/21/2020	Drilling Method: DPT
Completion Date: 9/21/2020	Field Personnel: B. Cookston J. Parson

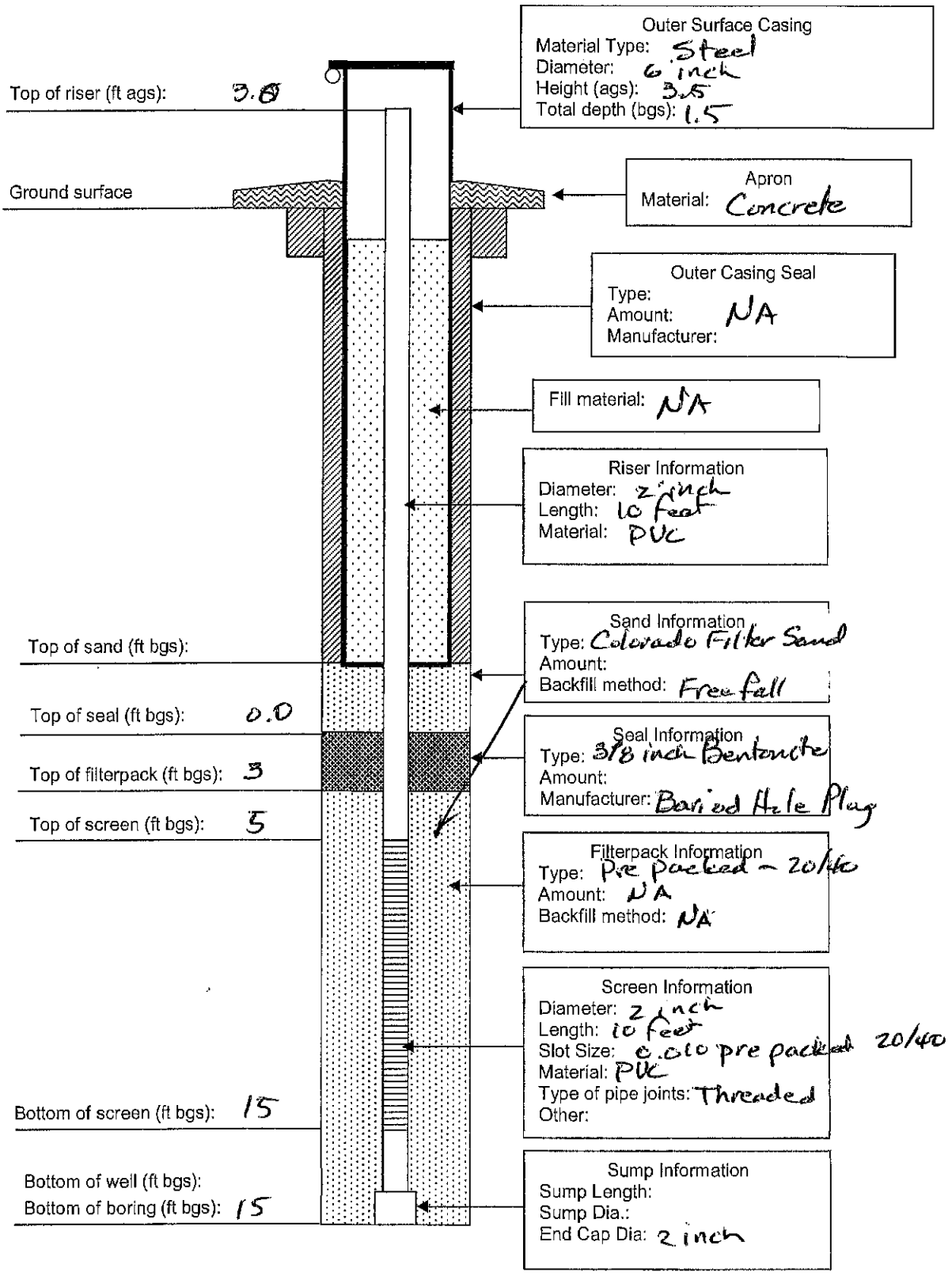


SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: MW-15 20PS-MW15

Soil Boring ID:	Source Area: CFC
Project: PFAS SI	Location: EAFB and Moose Creek, AK
Installation Date: 9/23/2020	Drilling Method: DPT
Completion Date: 9/23/2020	Field Personnel: P.Cockston d.Parson

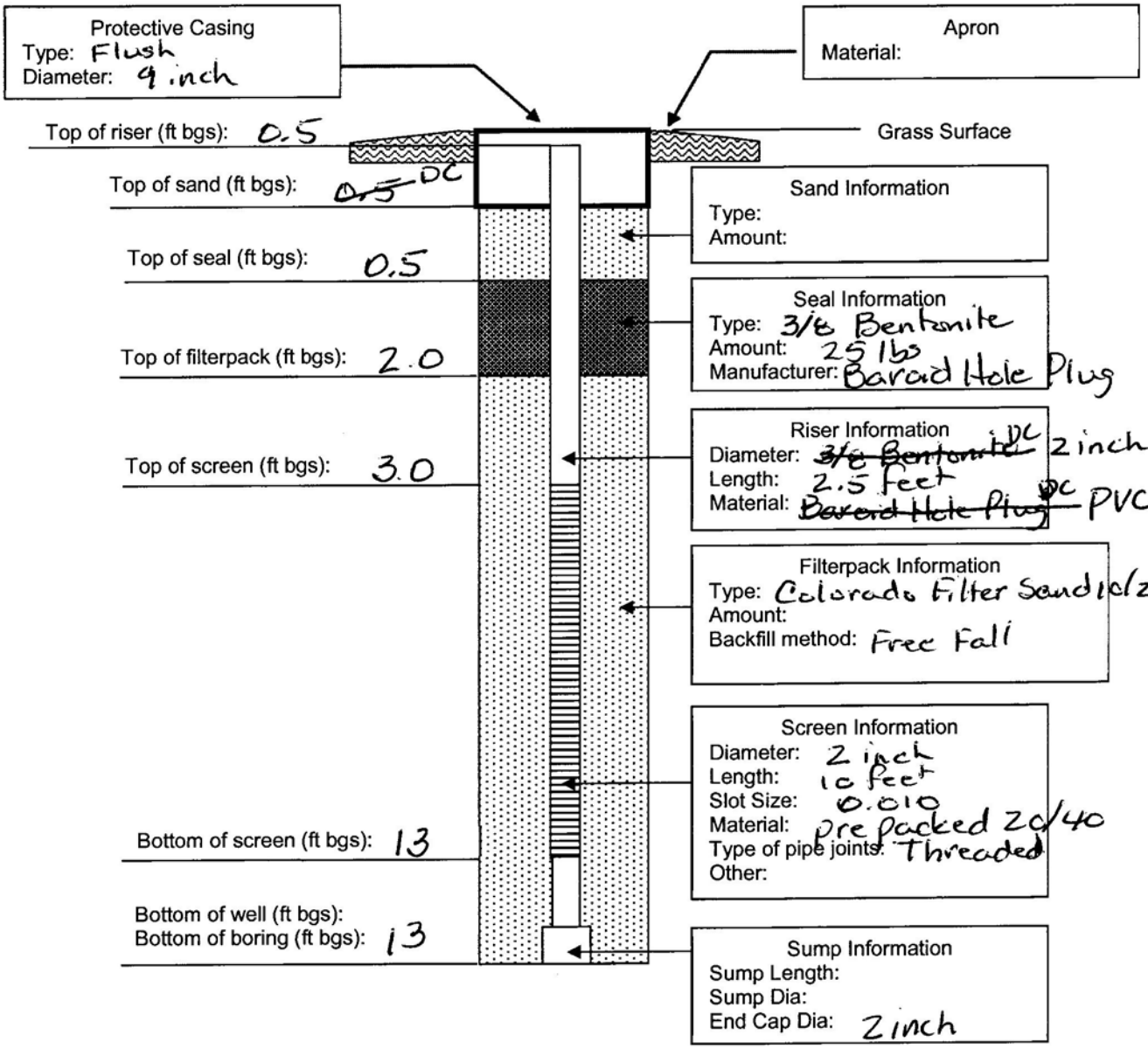


SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Flush Mount

Monitoring Well ID: New MW-16 20PS-MW16

Soil Boring ID:	Source Area: CFC
Project: **PFAS SI**	Location: **EAFB and Moose Creek, AK**
Installation Date: 9/23/2020	Drilling Method: DPT
Completion Date: 9/23/2020	Field Personnel: D. Cookston, J. Parson



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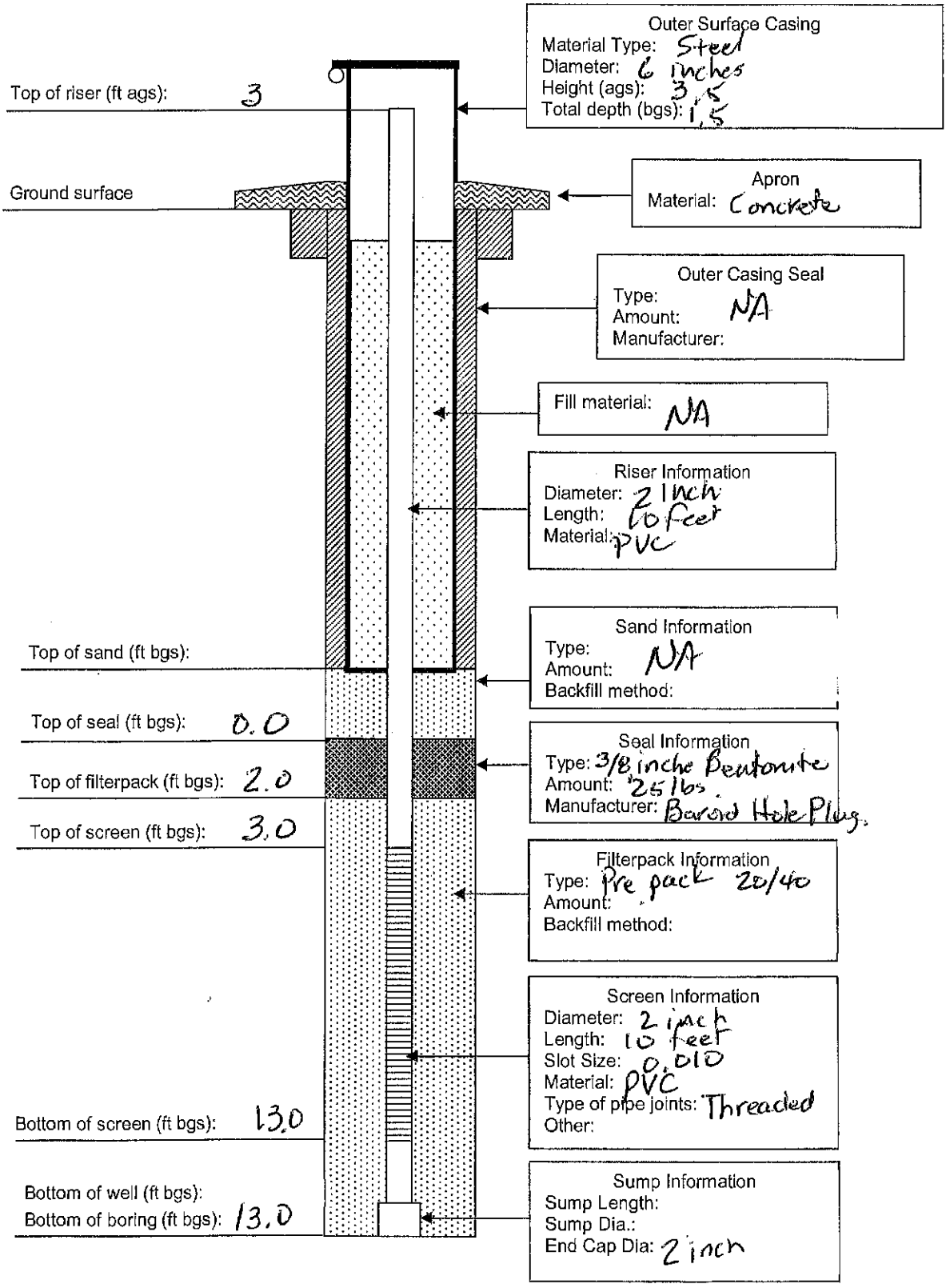
Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: MW-17 20PS-MW17

Soil Boring ID:	Source Area: OFC
Project: **PFAS SI**	Location: EAFB and Moose Creek, AK
Installation Date: 9/23/2020	Drilling Method: DPT
Completion Date: 9/23/2020	Field Personnel: D. Cookston J. Parson



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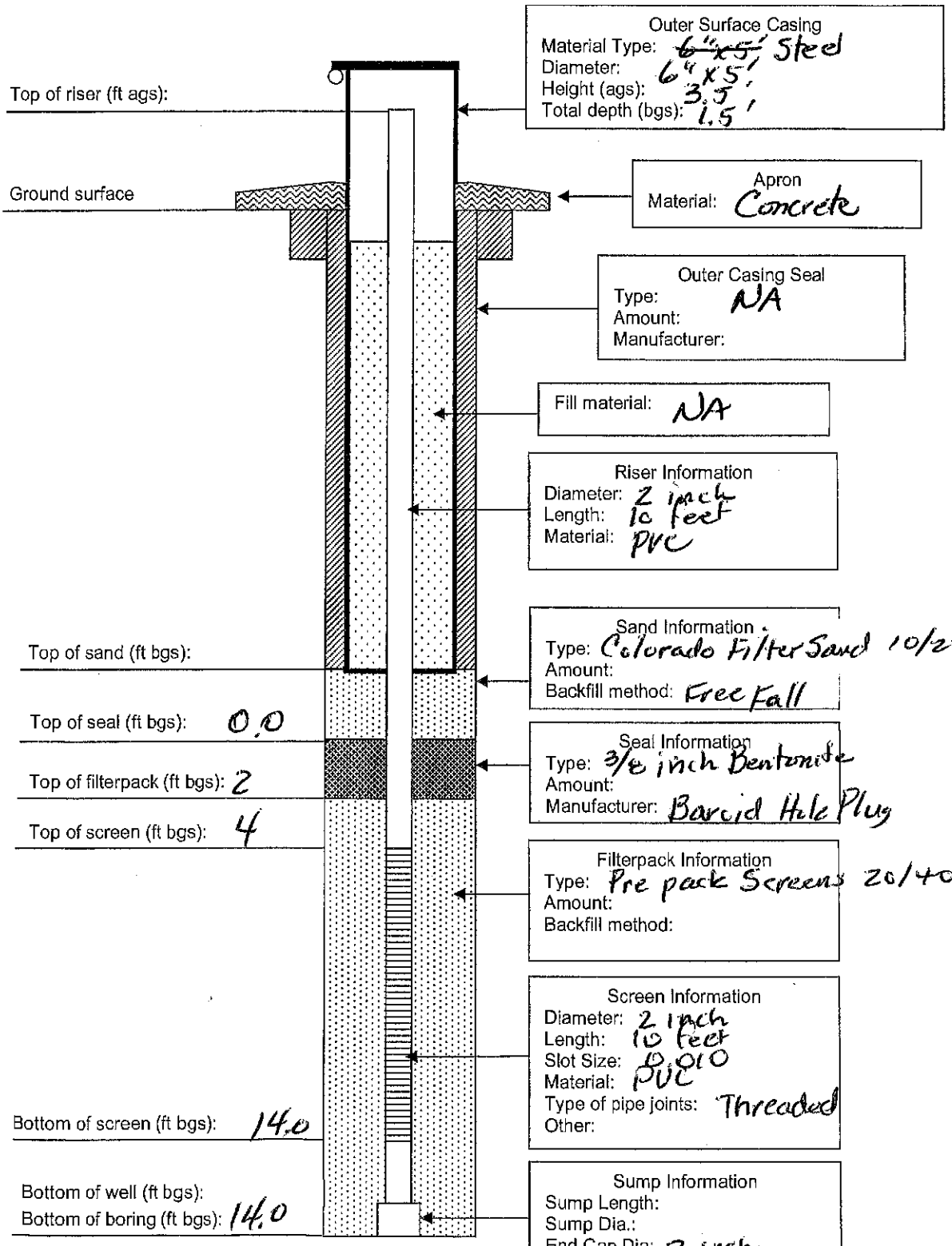
Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: ~~New MW-18~~ 20PS-MW18

Soil Boring ID:	Source Area: CFC
Project: PFAS SI	Location: EAFB and Moose Creek, AK
Installation Date: 9/19/2020	Drilling Method: DPT
Completion Date: 9/19/2020	Field Personnel: D. Cookston J. Pearson

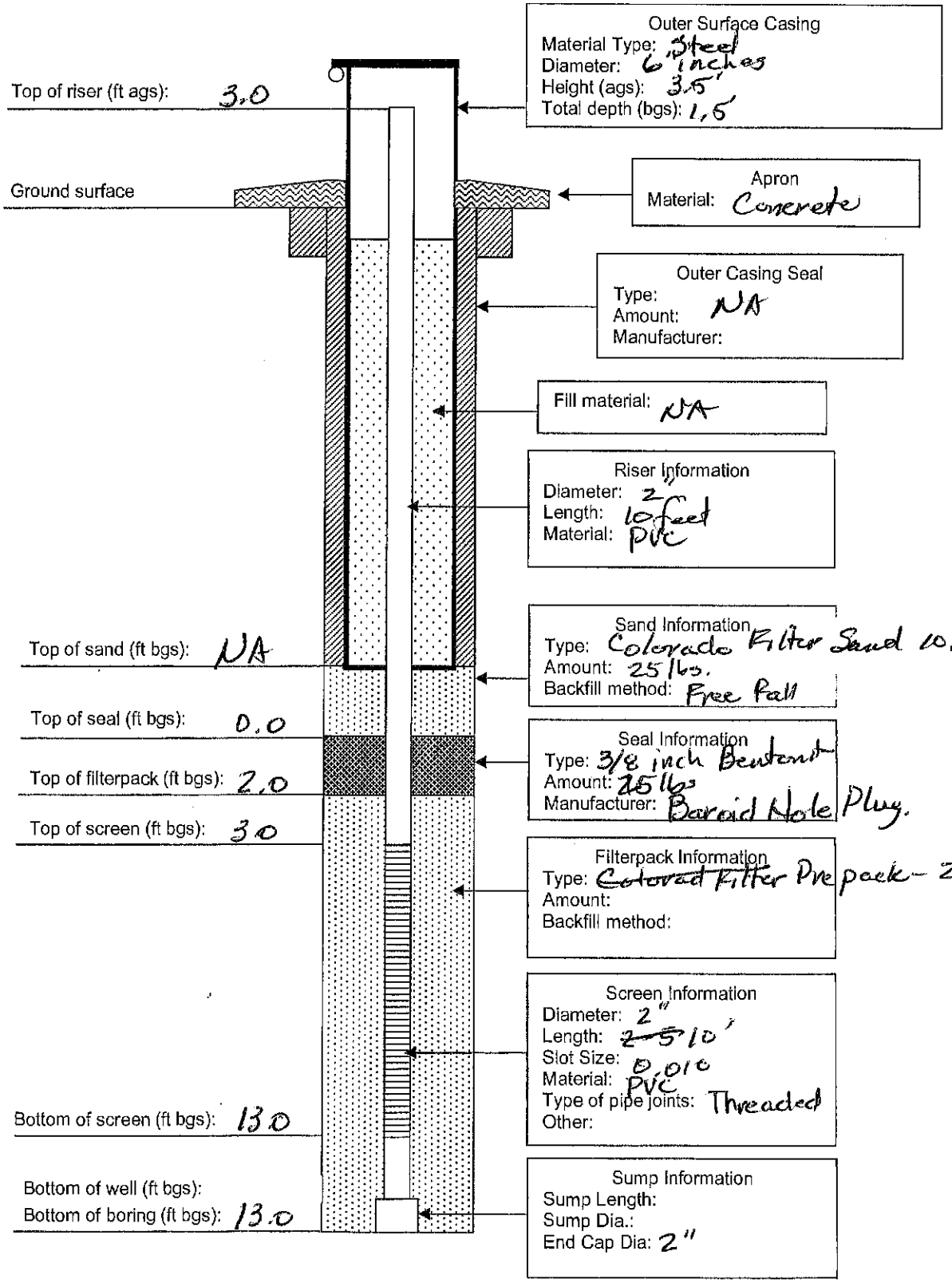


SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: MW-19 20PS-MW19

Soil Boring ID:	Source Area: CEC
Project: PFAS SI	Location: EAFB and Moose Creek, AK
Installation Date: 9/19/2020	Drilling Method: DPT
Completion Date: 9/19/2020	Field Personnel: D. Cookston J. Parson

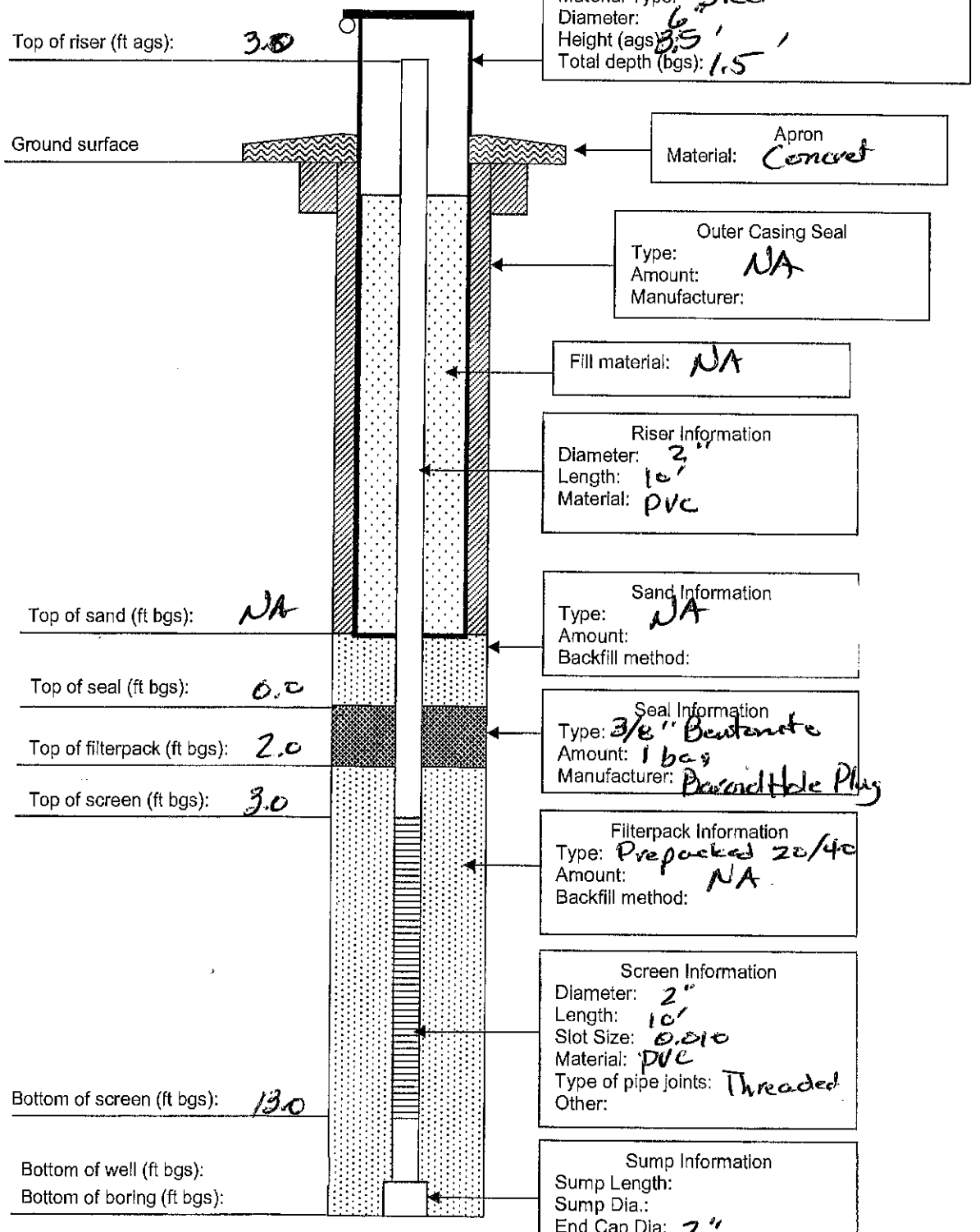


SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: New MW-20 20PS-MW20

Soil Boring ID:	Source Area: CFC
Project: PFAS SI	Location: EAFB and Moose Creek, AK
Installation Date: 9/19/2020	Drilling Method: DPT
Completion Date: 9/19/2020	Field Personnel: D. Cookston J. Parson

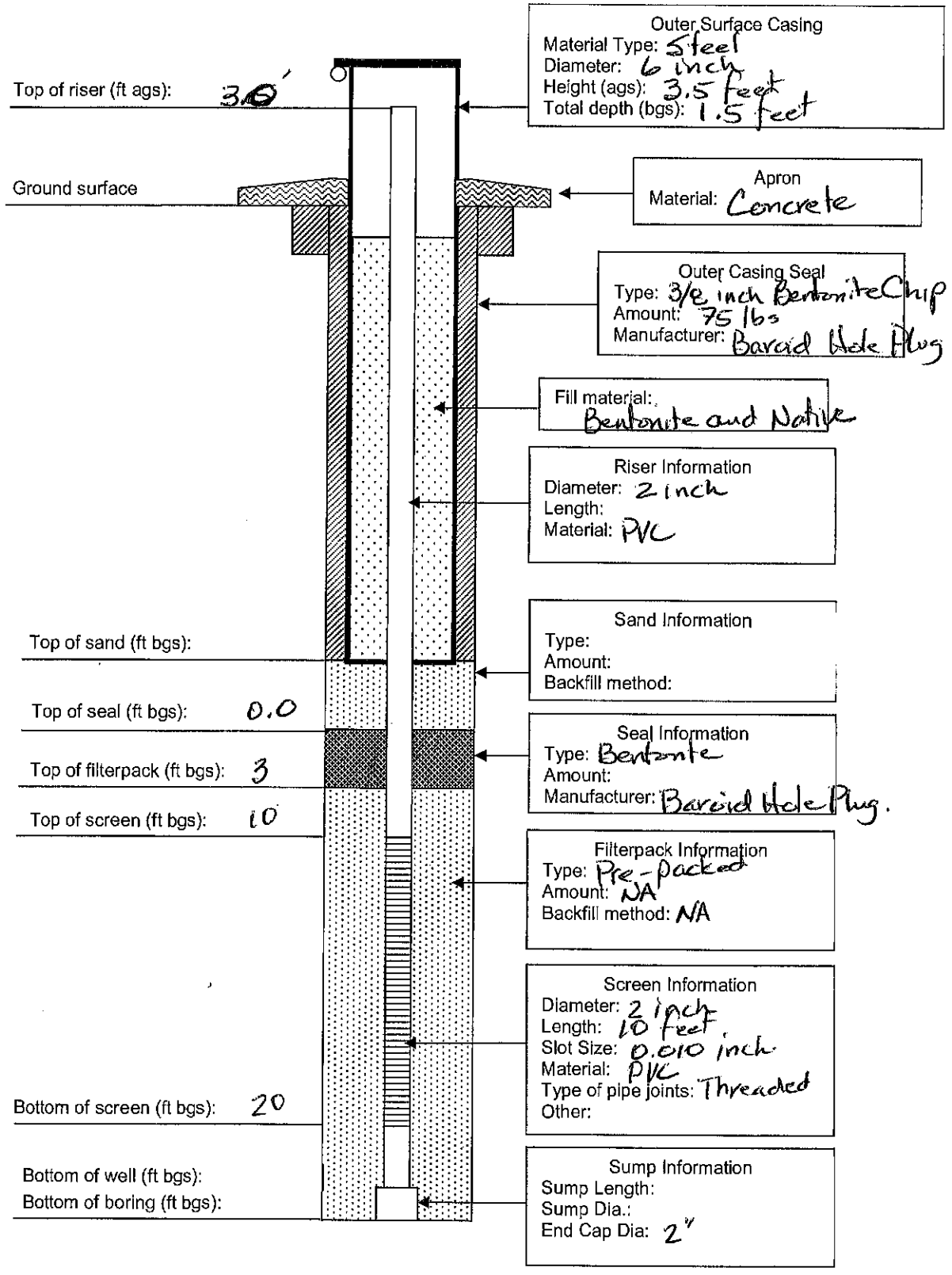


SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: ~~20~~PS-MW22

Soil Boring ID:	Source Area: CFC
Project: **PFAS SI**	Location: **EAFB and Moose Creek, AK**
Installation Date: 9/13/2020	Drilling Method: DPT
Completion Date: 9/14/2020	Field Personnel: D.Cookston

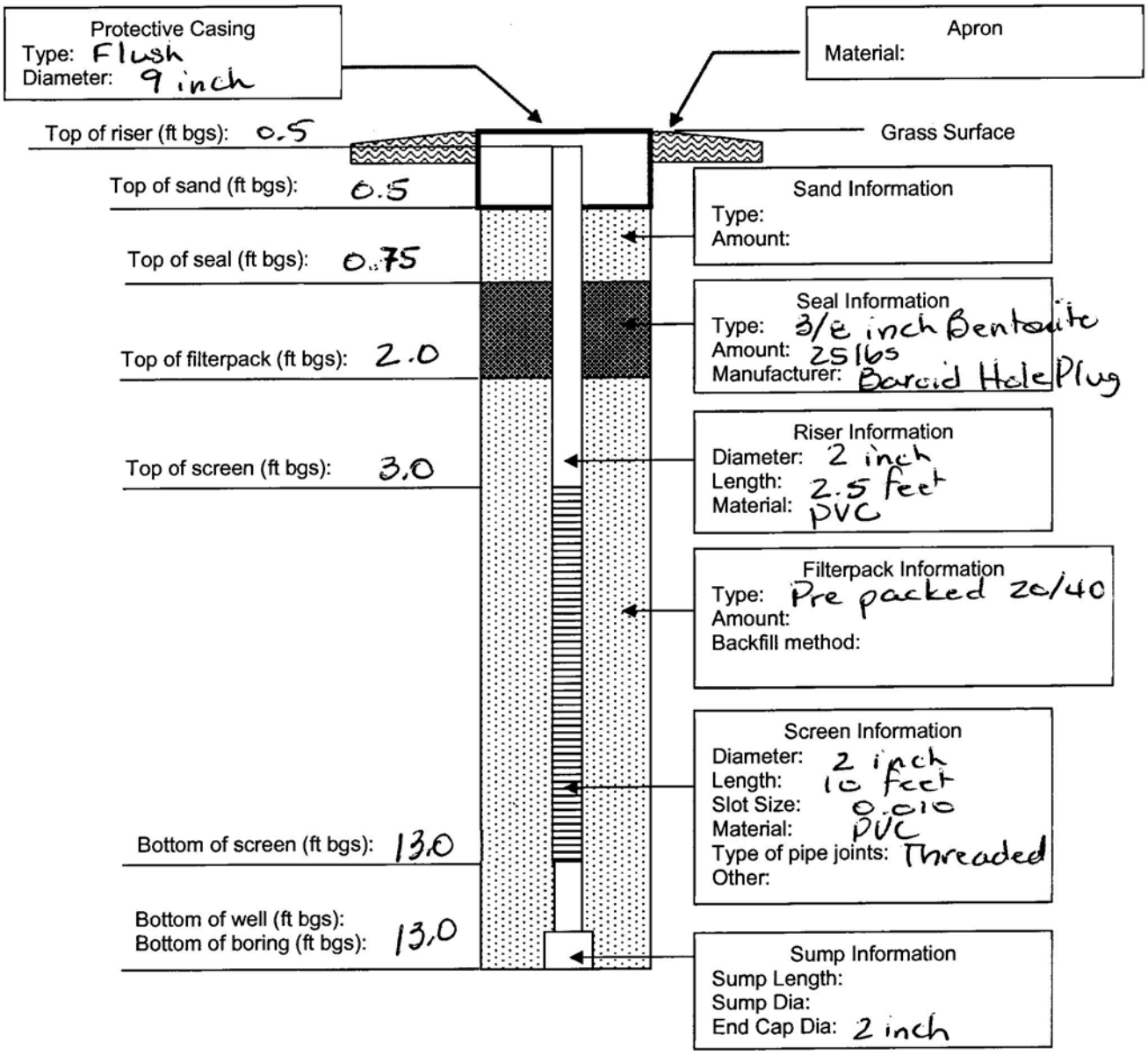


SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Flush Mount

Monitoring Well ID: New MW-2320PS-MW23

Soil Boring ID:		Source Area:	CFC
Project:	**PFAS SI**	Location:	**EAFB and Moose Creek, AK**
Installation Date:	9/19/2020	Drilling Method:	DPT
Completion Date:	9/19/2020	Field Personnel:	D. Cookston J. Parson

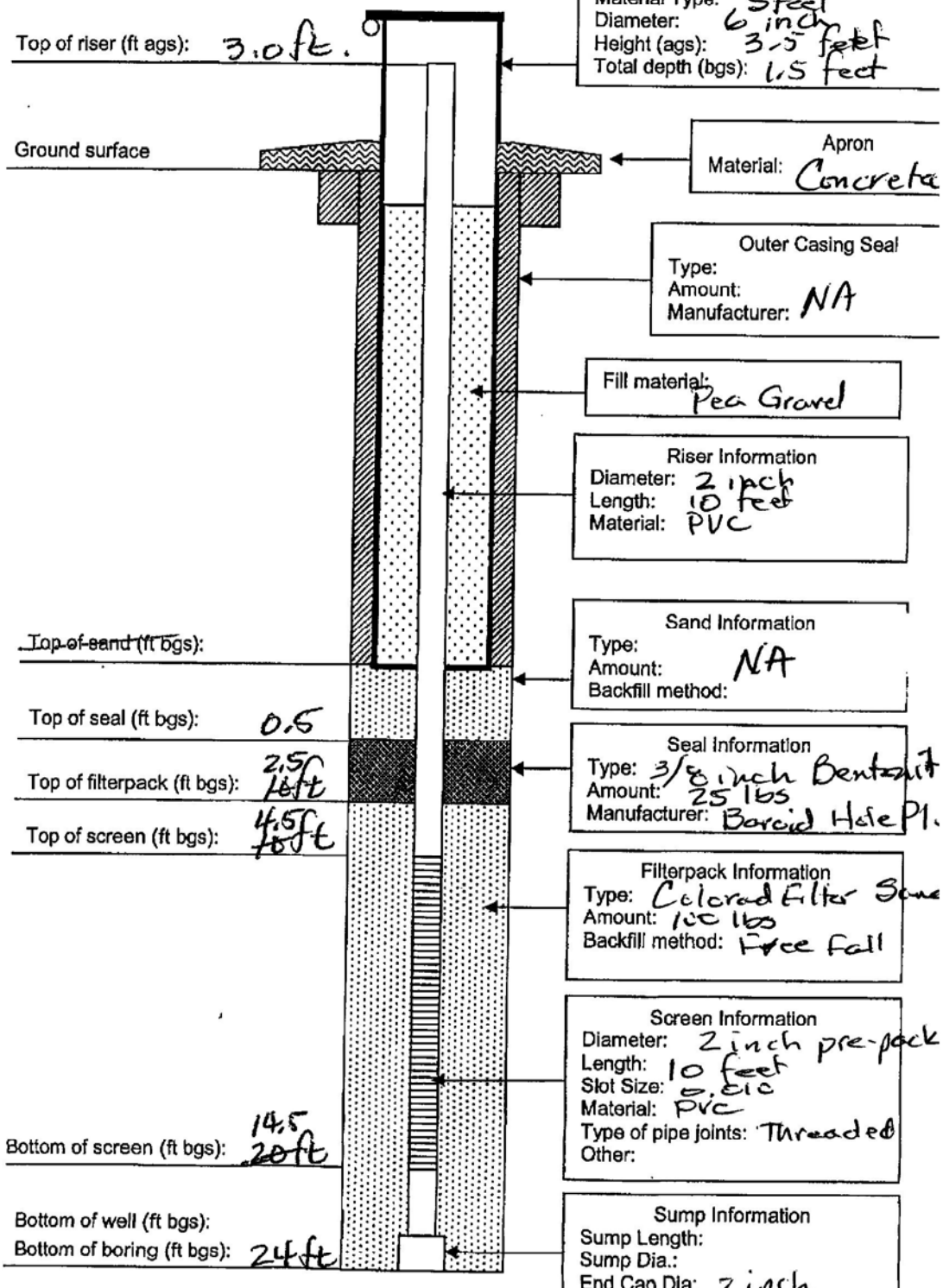


SUNDANCE-EA II, LLC

Monitoring Well Completion Di
Stickup Mon

Monitoring Well ID: RDPS-MW24

Soil Boring ID:	Source Area: CFC
Project: PFAS SI	Location: EAFB and Moose Creek,
Installation Date: 9/14/2020	Drilling Method: DPT
Completion Date: 9/14/2020	Field Personnel: D. Cookston

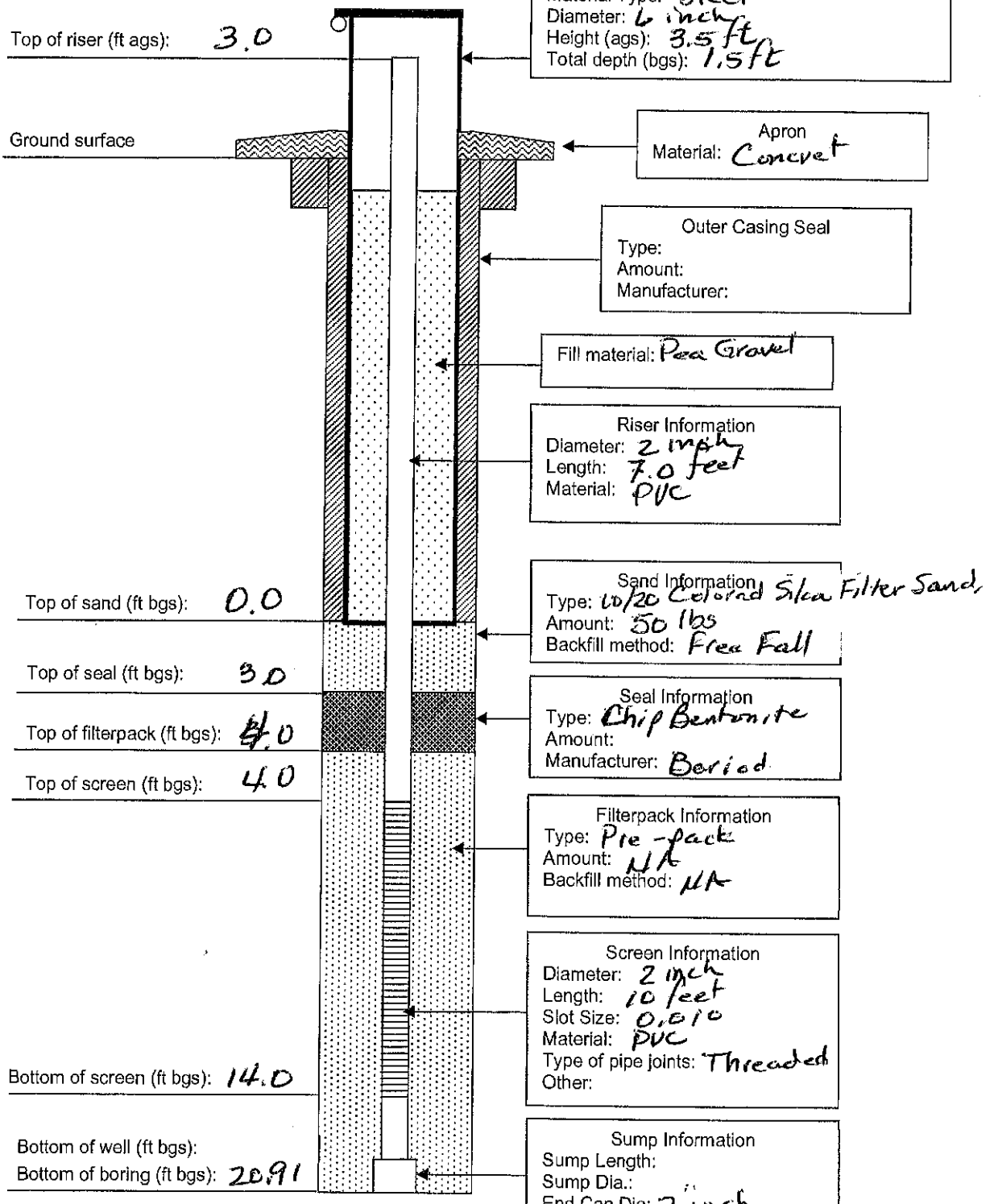


SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: 20PS-MW25

Soil Boring ID:	Source Area: CFC
Project: PFAS SI	Location: EAFB and Moose Creek, AK
Installation Date: 9/14/2020	Drilling Method: DPT
Completion Date: 9/14/2020	Field Personnel: D. Cookston

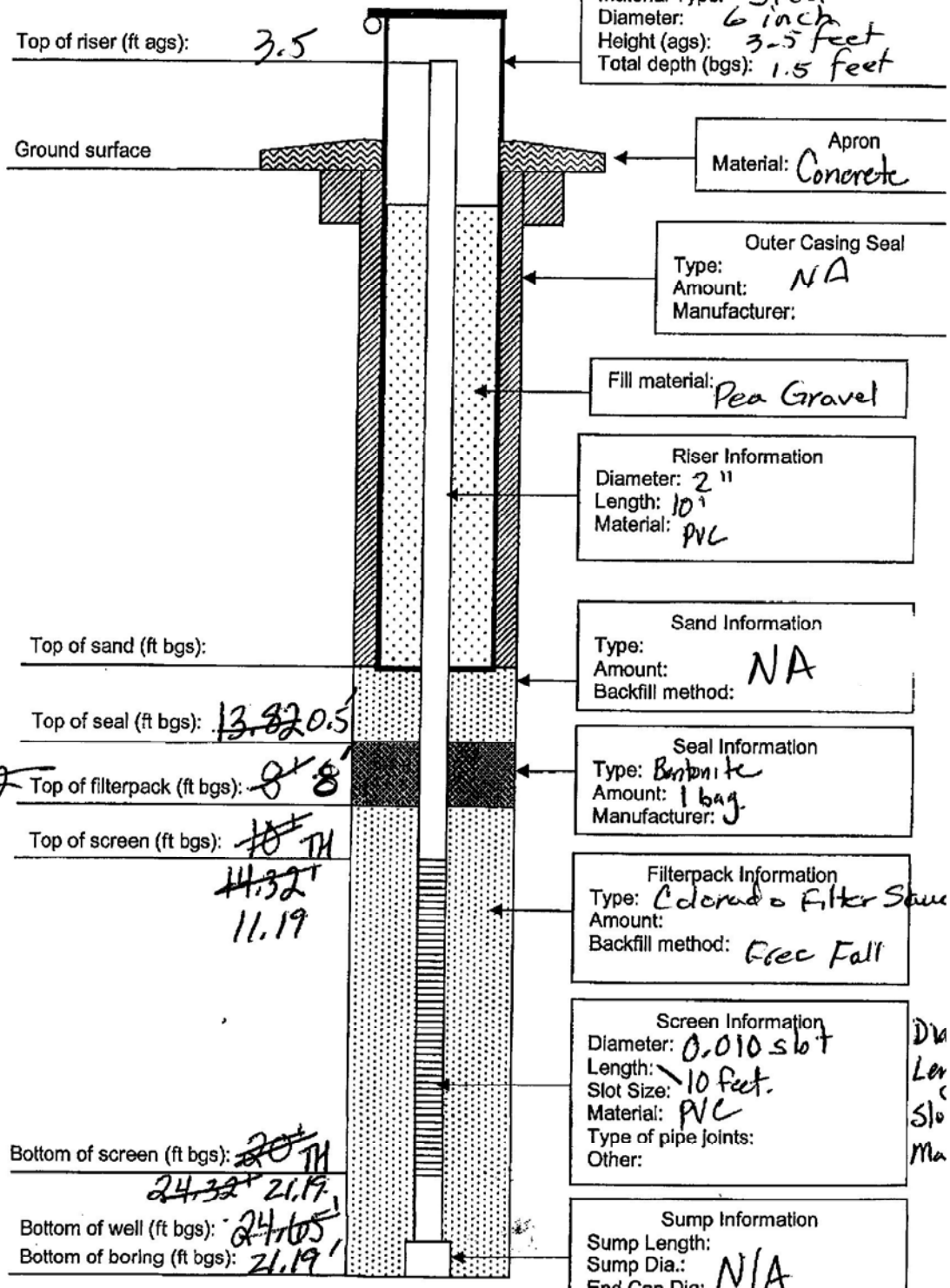


SUNDANCE-EA II, LLC

Monitoring Well Completion Di
Stickup Mon

Monitoring Well ID: ~~PS20~~ = ~~MW13~~ DC 26 20PS-MW26

Soil Boring ID:	Source Area: CFC
Project: **PFAS SI**	Location: EAFB and Moose Creek,
Installation Date: 9-11-2020	Drilling Method: Direct Push/ DP
Completion Date: 9-11-2020	Field Personnel: Travis H (EA)



Outer Surface Casing
Material Type: Steel
Diameter: 6 inch
Height (ags): 3.5 feet
Total depth (bgs): 1.5 feet

Apron
Material: Concrete

Outer Casing Seal
Type:
Amount: NA
Manufacturer:

Fill material: Pea Gravel

Riser Information
Diameter: 2"
Length: 10'
Material: PVC

Sand Information
Type:
Amount: NA
Backfill method:

Seal Information
Type: Bentonite
Amount: 1 bag
Manufacturer:

Filterpack Information
Type: Colorado Filter Sand
Amount:
Backfill method: Free Fall

Screen Information
Diameter: 0.010 slot
Length: 10 feet.
Slot Size:
Material: PVC
Type of pipe joints:
Other:

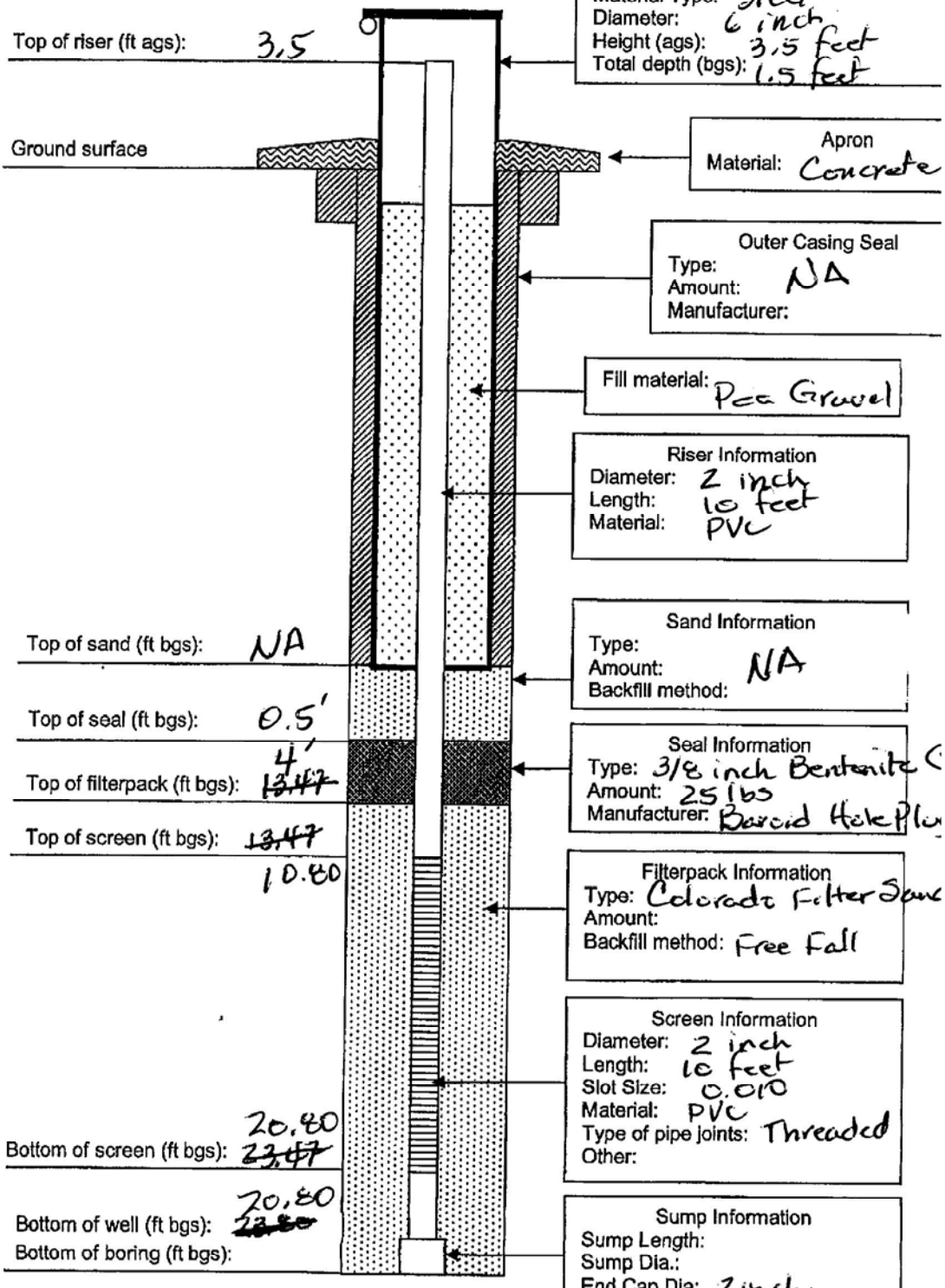
Sump Information
Sump Length:
Sump Dia.:
End Cap Dia: N/A

SUNDANCE-EA II, LLC

Monitoring Well Completion Di
Stickup Mon

Monitoring Well ID: MW-HF27 20PS-MW27

Soil Boring ID:	Source Area: CFC
Project: PFAS SI	Location: EAFB and Moose Creek, A
Installation Date: 9/10/2020	Drilling Method: DPT
Completion Date: 9/10/2020	Field Personnel: D. Cookston



Outer Surface Casing
Material Type: Steel
Diameter: 6 inch
Height (ags): 3.5 feet
Total depth (bgs): 1.5 feet

Apron
Material: Concrete

Outer Casing Seal
Type:
Amount: NA
Manufacturer:

Fill material: Pea Gravel

Riser Information
Diameter: 2 inch
Length: 10 feet
Material: PVC

Sand Information
Type:
Amount: NA
Backfill method:

Seal Information
Type: 3/8 inch Bentonite C
Amount: 25 lbs
Manufacturer: Baroid Hole Plu

Filterpack Information
Type: Colorado Filter Sand
Amount:
Backfill method: Free Fall

Screen Information
Diameter: 2 inch
Length: 10 feet
Slot Size: 0.010
Material: PVC
Type of pipe joints: Threaded
Other:

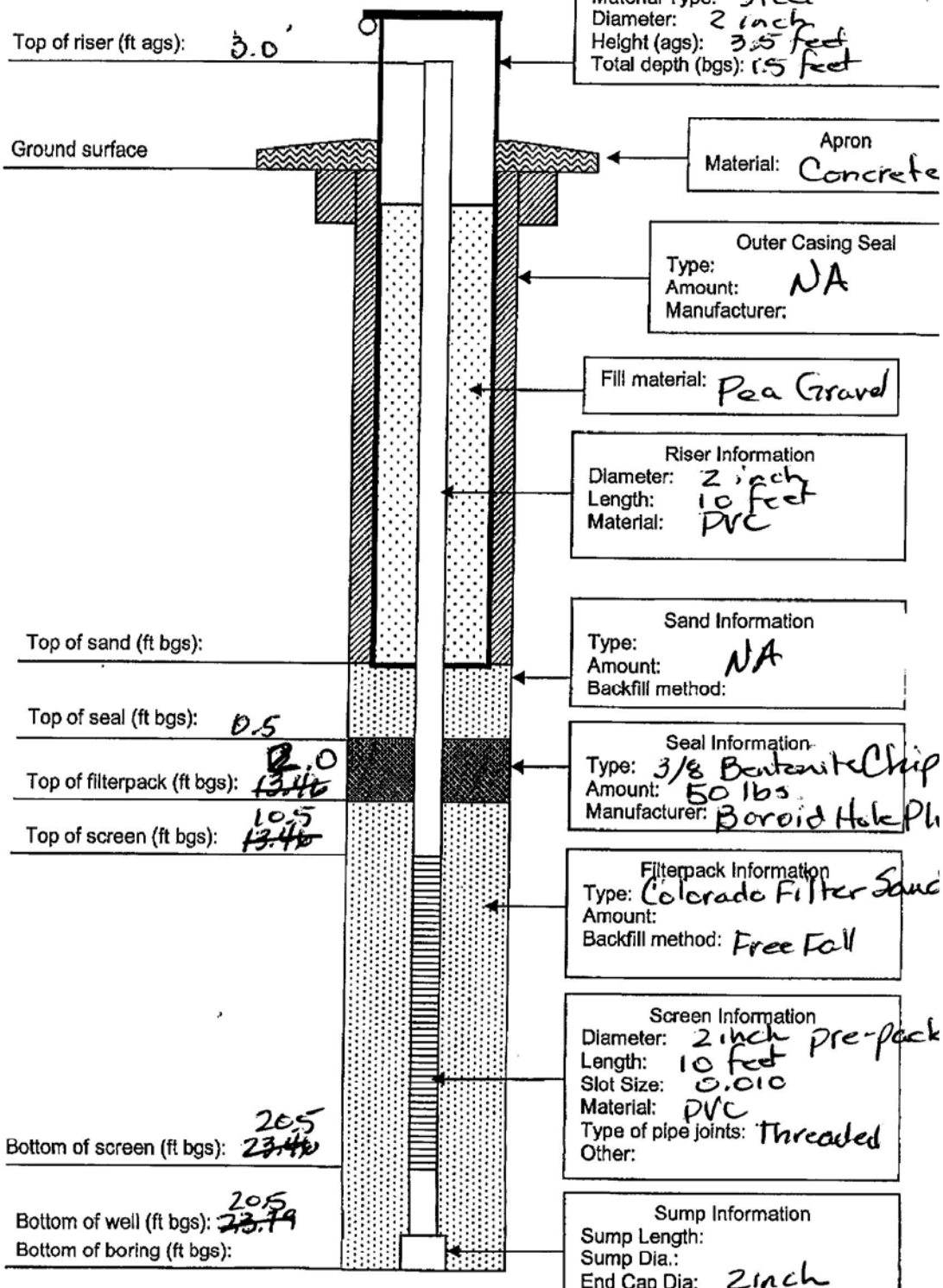
Sump Information
Sump Length:
Sump Dia.:
End Cap Dia: 2 inch

SUNDANCE-EA II, LLC

Monitoring Well Completion Di
Stickup Mon

Monitoring Well ID: MW-15 28 20PS-MW28

Soil Boring ID:	Source Area: CFC
Project: PFAS SI	Location: EAFB and Moose Creek, A
Installation Date: 9/10/2020	Drilling Method: DPT
Completion Date: 9/10/2020	Field Personnel: D. Cookston

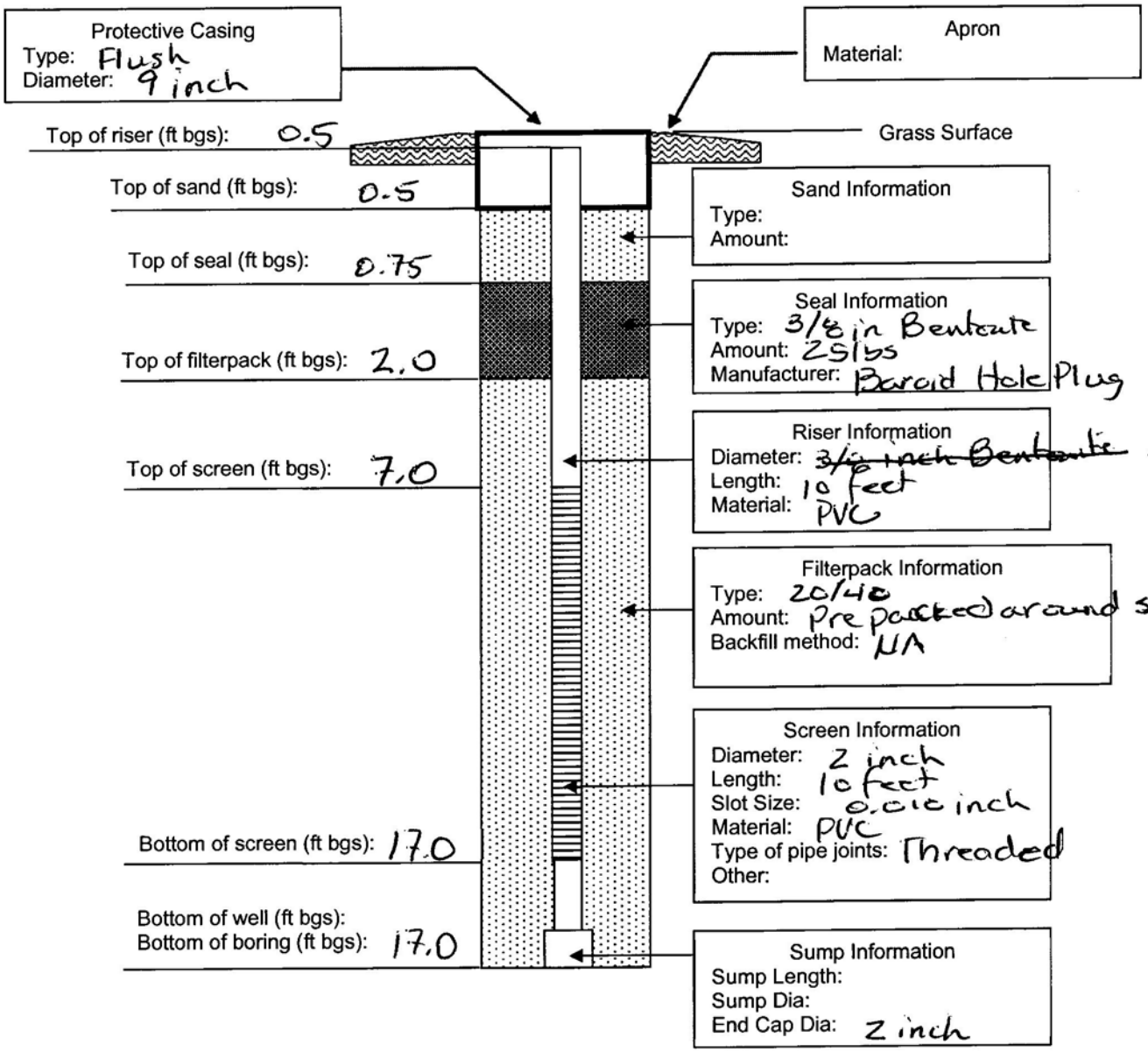


SUNDANCE-EA II, LLC 20PS-MW29

Monitoring Well Completion Diagram
Flush Mount

Monitoring Well ID: MW-29 (Old MW-16)

Soil Boring ID:	Source Area: CFC
Project: **PFAS SI**	Location: **EAFB and Moose Creek, AK**
Installation Date: 9/9/2020	Drilling Method: DPT
Completion Date: 9/9/2020	Field Personnel: D. Cockston

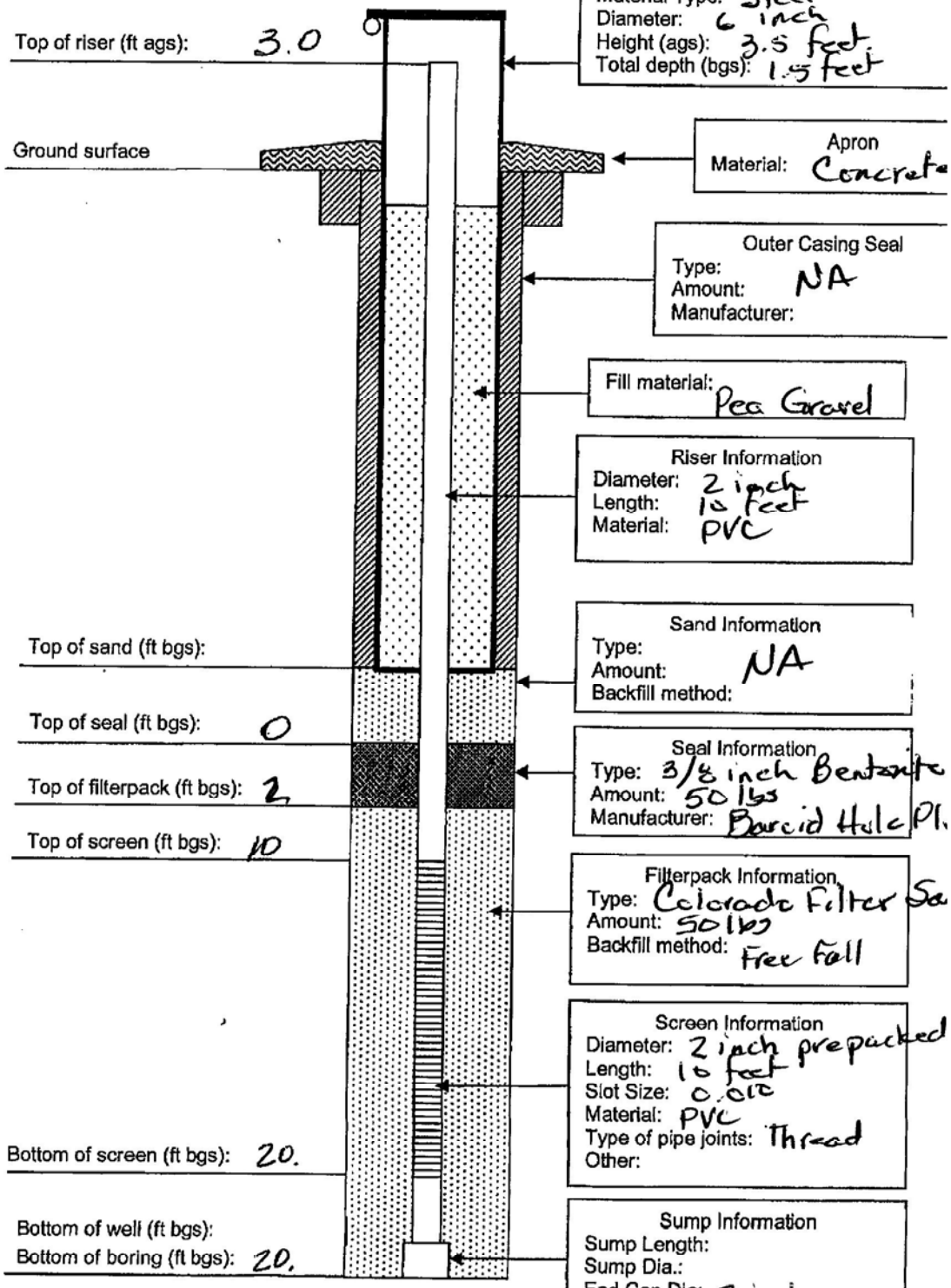


SUNDANCE-EA II, LLC

Monitoring Well Completion Di
Stickup Mon

Monitoring Well ID: MW-17 DC 30 20PS-MW30

Soil Boring ID:	Source Area: CFC
Project: PFAS SI	Location: EAFB and Moose Creek, A
Installation Date: 9/10/2020	Drilling Method: DPT
Completion Date: 9/10/2020	Field Personnel: D. Cookston



Outer Surface Casing
Material Type: Steel
Diameter: 6 inch
Height (ags): 3.5 feet
Total depth (bgs): 1.5 feet

Apron
Material: Concrete

Outer Casing Seal
Type:
Amount: NA
Manufacturer:

Fill material: Pea Gravel

Riser Information
Diameter: 2 inch
Length: 10 feet
Material: PVC

Sand Information
Type:
Amount: NA
Backfill method:

Seal Information
Type: 3/8 inch Bentonite
Amount: 50 lbs
Manufacturer: Baroid Hole Pl

Filterpack Information
Type: Colorado Filter Sa
Amount: 50 lbs
Backfill method: Free Fall

Screen Information
Diameter: 2 inch prepacked
Length: 10 feet
Slot Size: 0.010
Material: PVC
Type of pipe joints: Thread
Other:

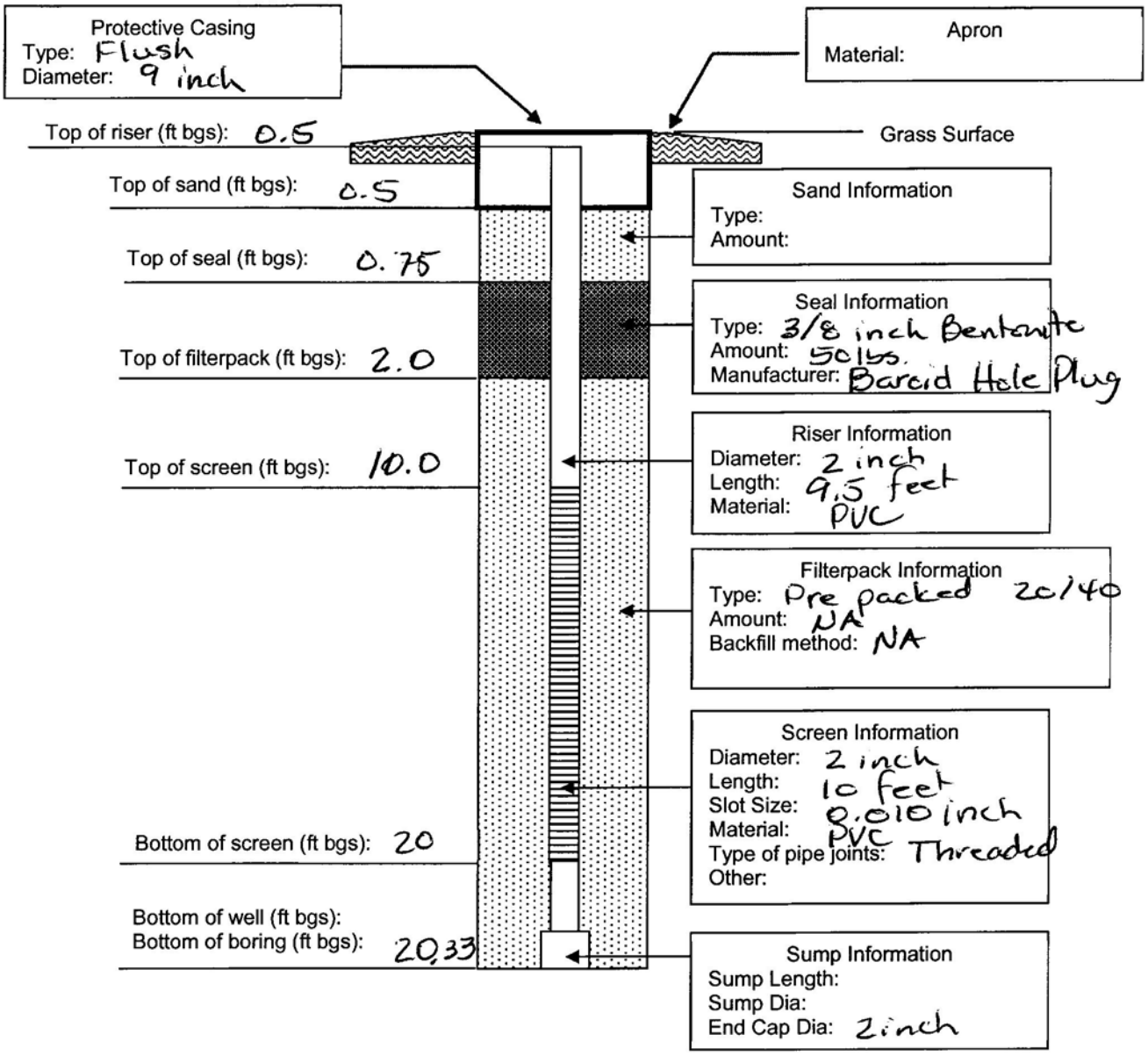
Sump Information
Sump Length:
Sump Dia.:
End Cap Dia: 2 inch

SUNDANCE-EA II, LLC 20PS-MW31

Monitoring Well Completion Diagram
Flush Mount

Monitoring Well ID: MW-31 (Old MW-18)

Soil Boring ID:	Source Area: CFC
Project: **PFAS SI**	Location: **EAFB and Moose Creek, AK**
Installation Date: 9/13/2020	Drilling Method: DPT
Completion Date: 9/13/2020	Field Personnel: D. Cookston

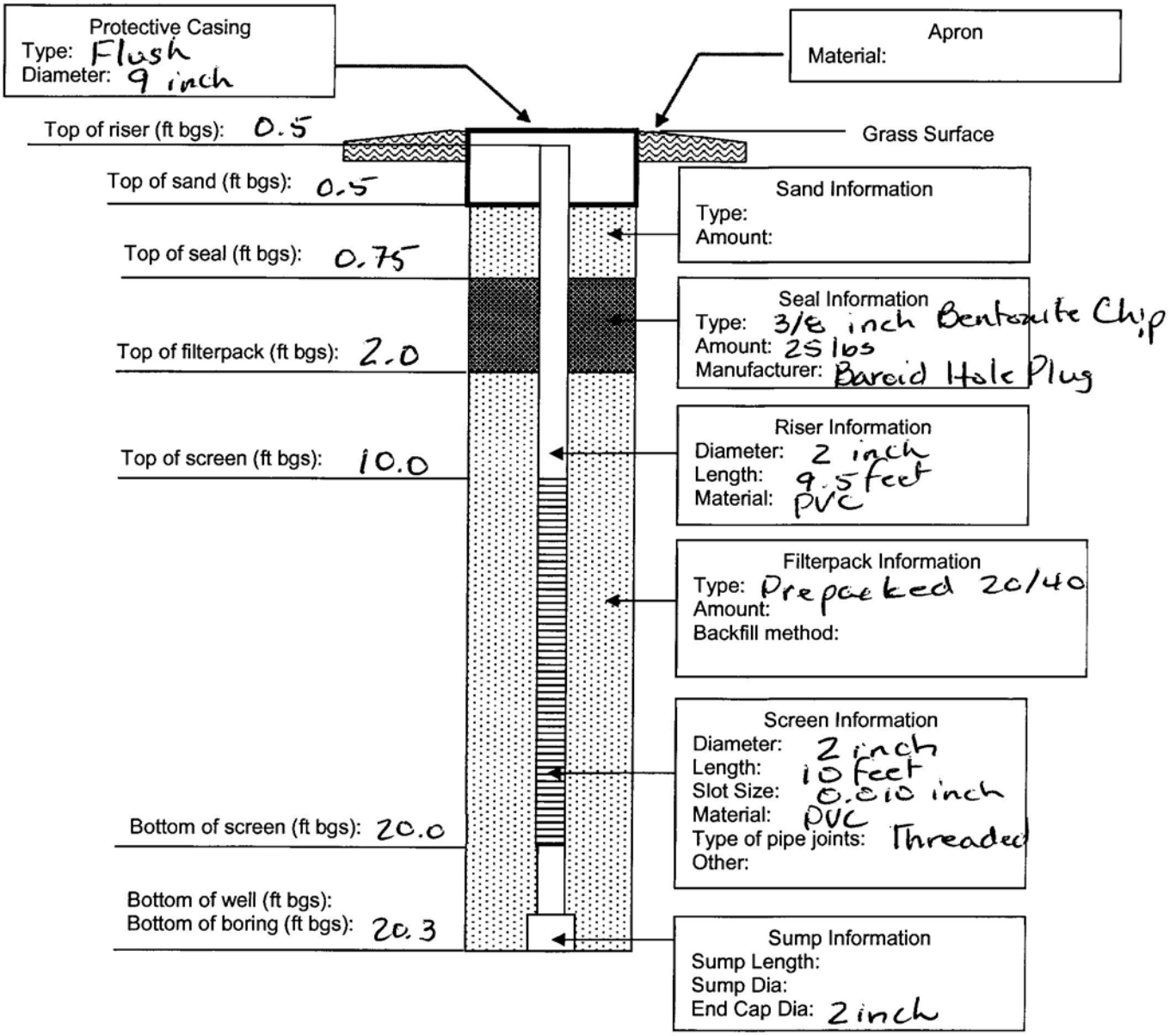


SUNDANCE-EA II, LLC 20PS-MW30

Monitoring Well Completion Diagram
Flush Mount

Monitoring Well ID: MW-32 (Old MW-20)

Soil Boring ID:	Source Area: CFC
Project: **PFAS SI**	Location: **EAFB and Moose Creek, AK**
Installation Date: 9/13/2020	Drilling Method: DPT
Completion Date: 9/13/2020	Field Personnel: D. Cookston

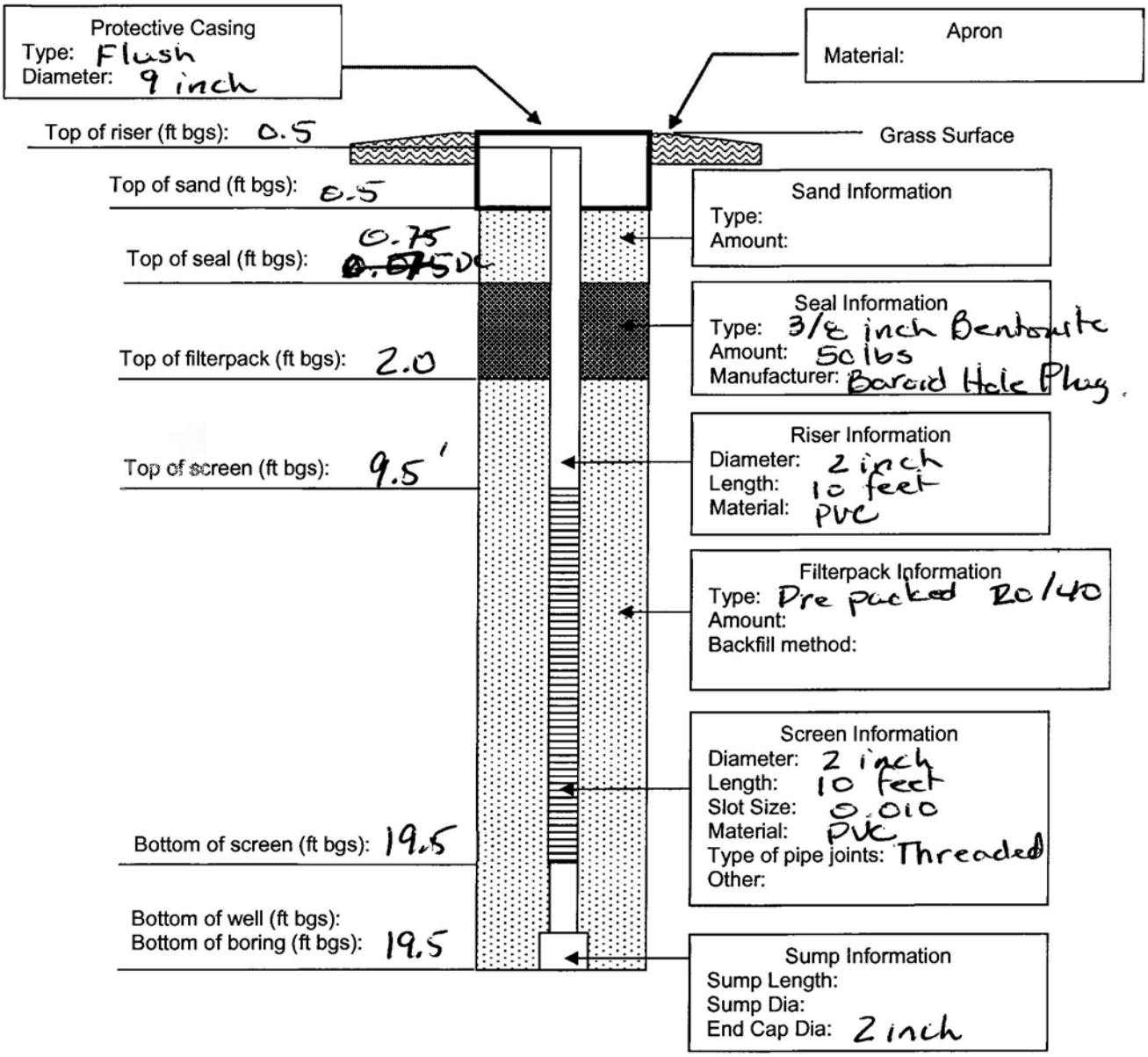


SUNDANCE-EA II, LLC 20PS-MW33

Monitoring Well Completion Diagram
Flush Mount

Monitoring Well ID: MW-33 (Old MW-23)

Soil Boring ID:		Source Area:	CFC
Project:	PFAS SI	Location:	EAFB and Moose Creek, AK
Installation Date:	9/15/2020	Drilling Method:	DPT
Completion Date:	9/15/2020	Field Personnel:	D. Cookston

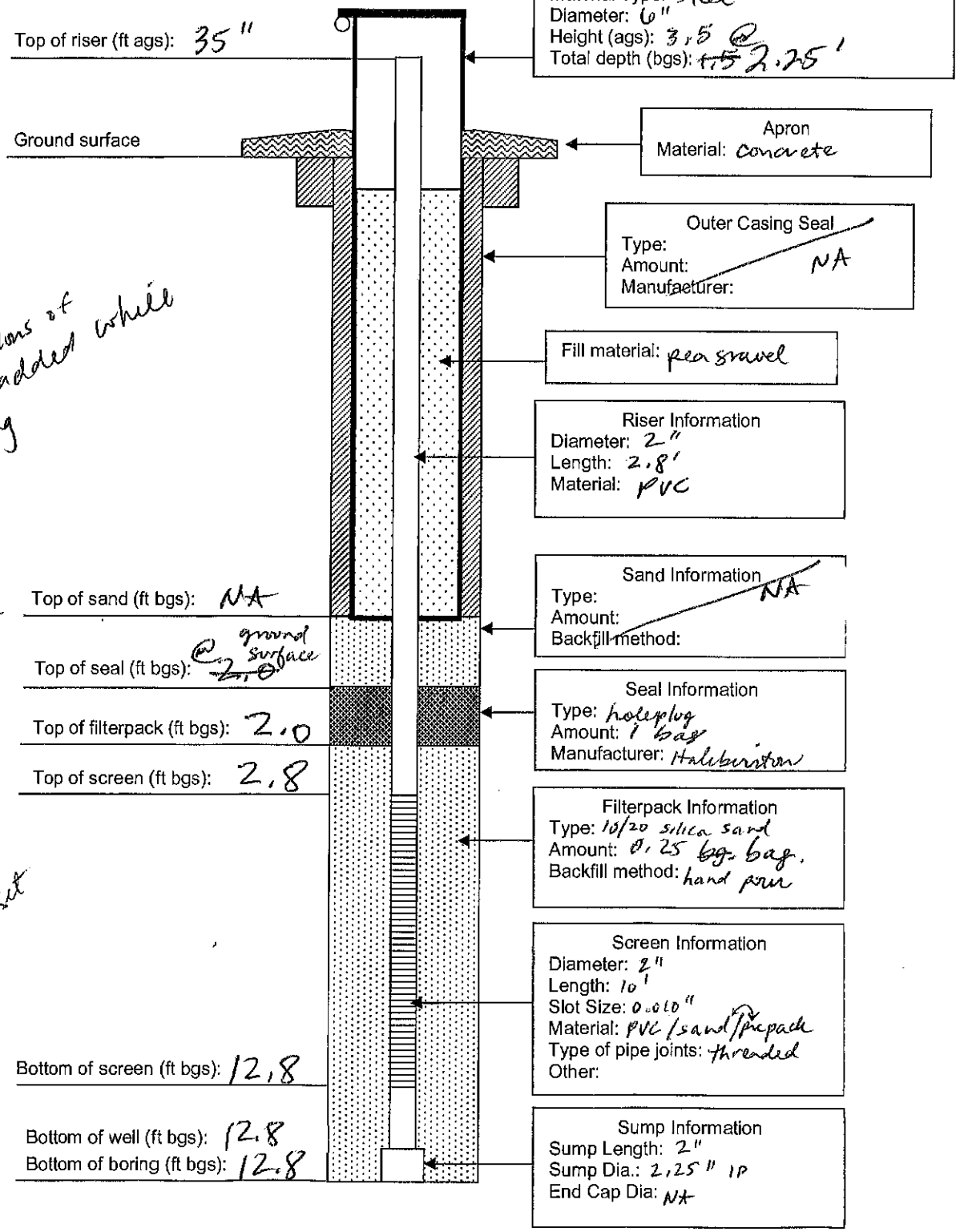


SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: 20PS-MW02

Soil Boring ID: NA	Source Area: EAFB
Project: **PFAS SI**	Location: **EAFB and Moose Creek, AK**
Installation Date: 10/27/20	Drilling Method: direct push
Completion Date: 10/28/20	Field Personnel: N. Stoecklein

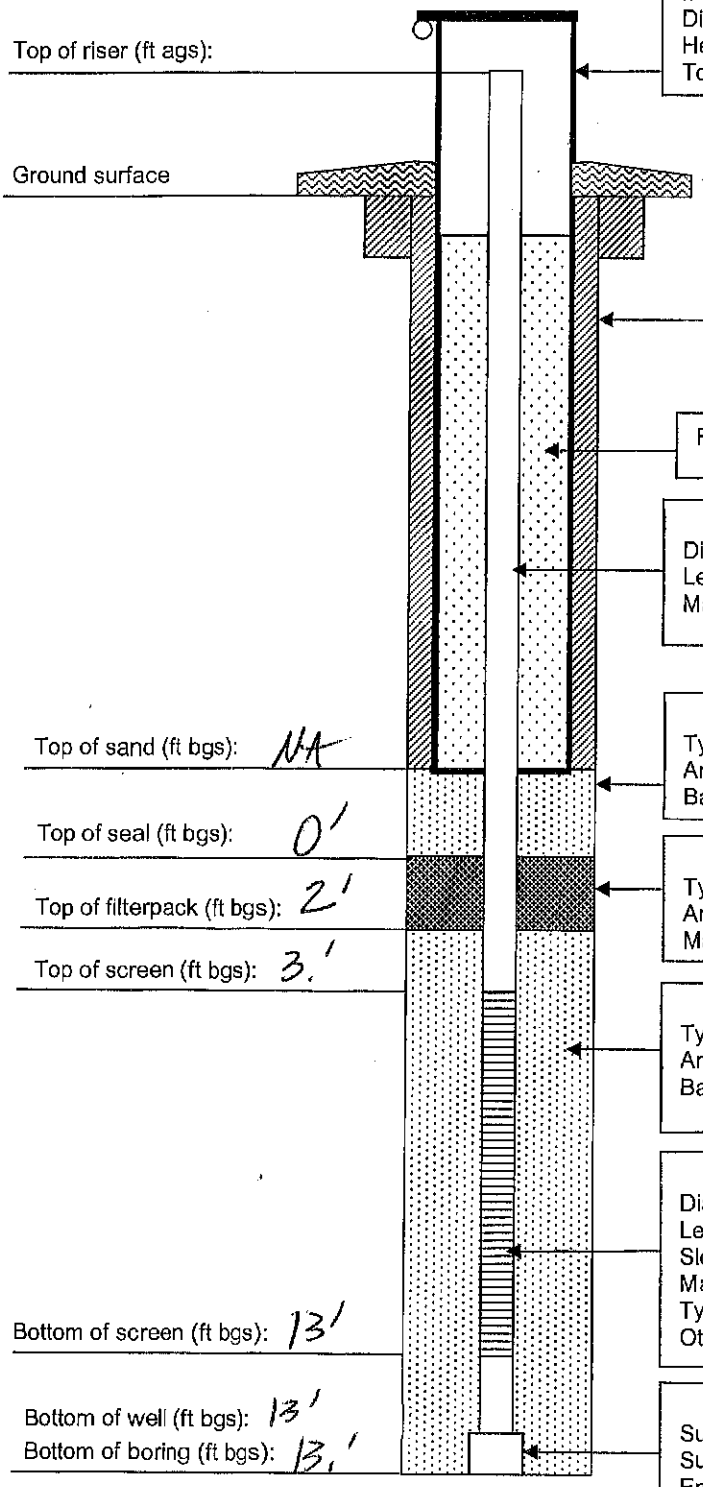


SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: 20PS-MW04

Soil Boring ID:	NA	Source Area:	EAFB
Project:	PFAS SI	Location:	EAFB and Moose Creek, AK
Installation Date:	10/29/20	Drilling Method:	direct push
Completion Date:	10/29/20	Field Personnel:	N. Stoeckl



Outer Surface Casing
Material Type: steel
Diameter: 6"
Height (ags): 42"
Total depth (bgs): 37"

Apron
Material: Concrete

Outer Casing Seal
Type: hole plug
Amount: 0.5 bg (same as seal below)
Manufacturer: Halliburton

Fill material: Sand

Riser Information
Diameter: 2"
Length: 3'
Material: PVC

Sand Information
Type:
Amount:
Backfill method: NA

Seal Information
Type: hole plug
Amount: 0.5 bag
Manufacturer: Halliburton

Filterpack Information
Type: native soils collapsed
Amount:
Backfill method: around well screen

Screen Information
Diameter: 2"
Length: 10'
Slot Size: 0.010"
Material: prepack / PVC
Type of pipe joints: threaded
Other:

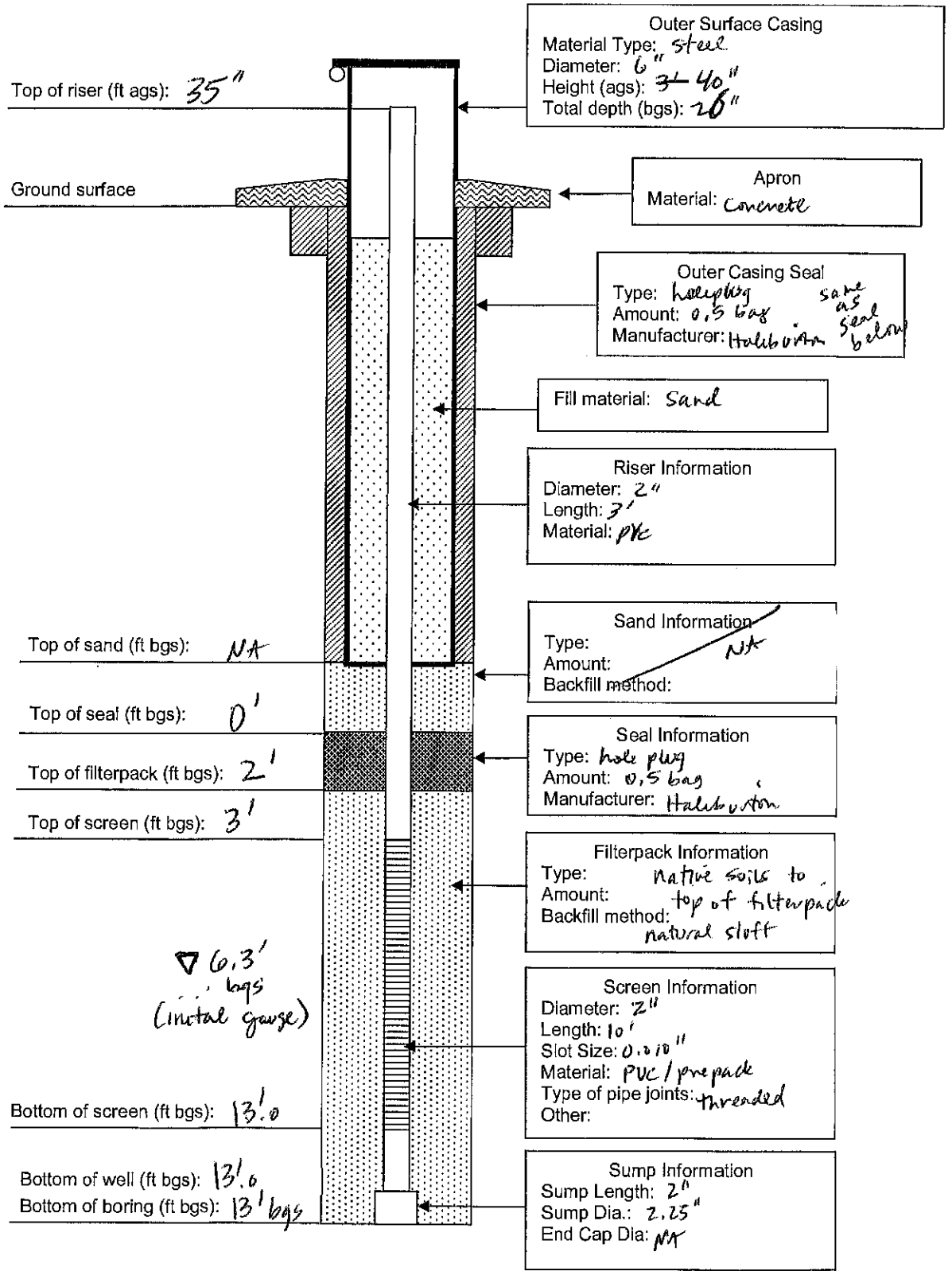
Sump Information
Sump Length: 2"
Sump Dia.: 2.25" ID
End Cap Dia: NA

SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Stickup Monument

Monitoring Well ID: 20 PS - MW05

Soil Boring ID:	NA	Source Area:	EAFB
Project:	**PFAS SI**	Location:	**EAFB and Moose Creek, AK**
Installation Date:	10/28/20	Drilling Method:	direct push
Completion Date:	10/28/20	Field Personnel:	N. Stoecklein

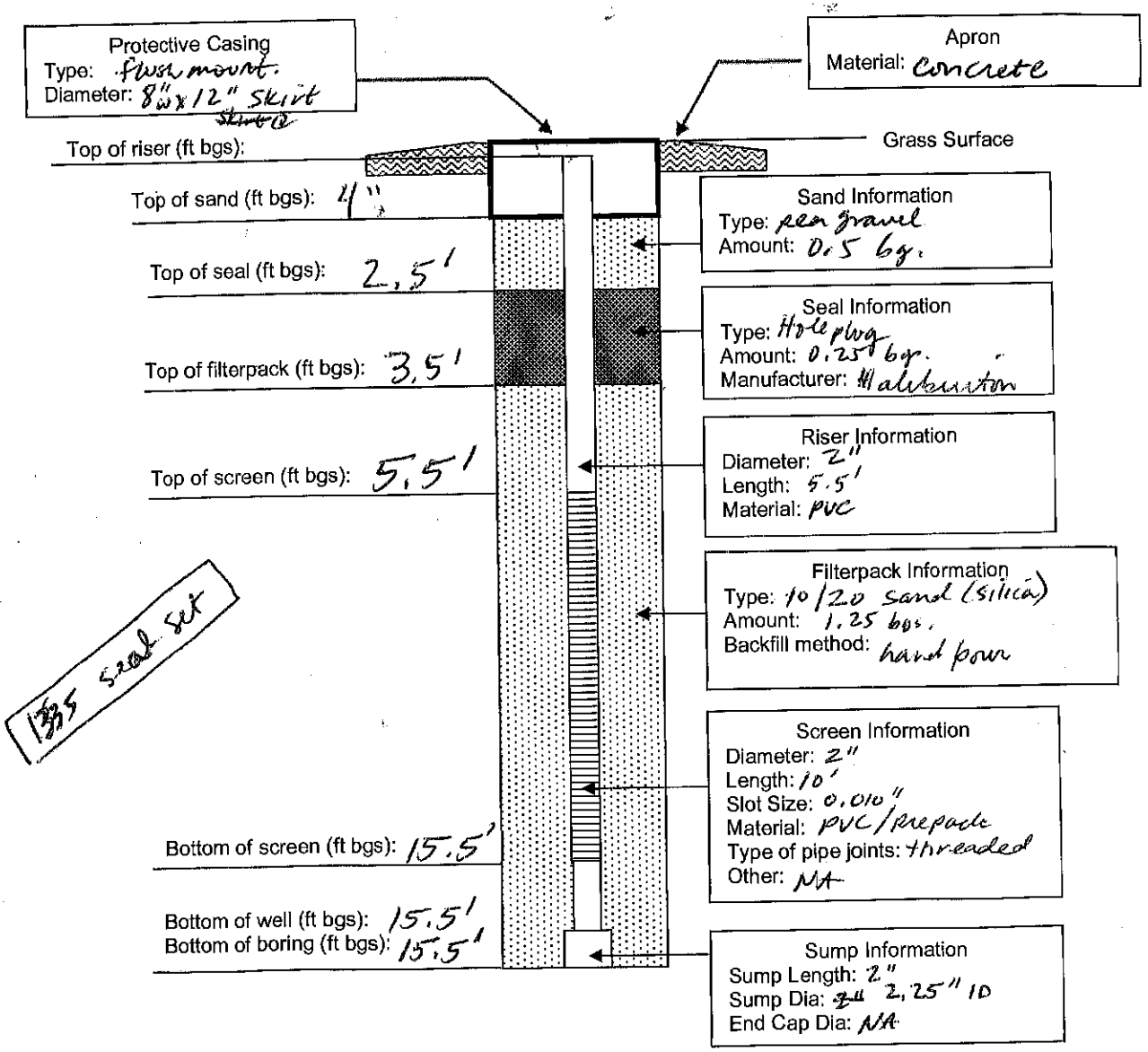


SUNDANCE-EA II, LLC

Monitoring Well Completion Diagram
Flush Mount

Monitoring Well ID: 20PS-MW01

Soil Boring ID: NA	Source Area: EAFB
Project: **PFAS SI**	Location: **EAFB and Moose Creek, AK**
Installation Date: 10/27/20	Drilling Method: direct push
Completion Date: 10/27/20	Field Personnel: Nicole Stecklein



EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

APPENDIX H –SURVEY REPORT

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APPENDIX H

SURVEY REPORT

Expanded Perfluorooctane Sulfonate (PFOS), Perfluorooctanoic Acid (PFOA), and Perfluorobutane Sulfonate (PFBS) Site Inspection (SI) Report for Eielson Air Force Base and Moose Creek, Alaska

Prepared under:

U.S. Army Corps of Engineers – Alaska District
Alaska District
PO Box 6898
JBER, Alaska 99506-0898

Contract No.: W911KB-17-D-0018
Task Order: W911KB18F0173

Prepared for:

United States Air Force
Air Force Civil Engineer Center (AFCEC) CZOP
10471 20th Street, Suite 326
PO Box 6898
JBER, Alaska 99506-2201

Prepared by:

Sundance-EA II, LLC
711 H Street, Suite 330
Anchorage, Alaska 99501

July 2022

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APPENDIX H
SURVEY REPORT

Expanded
Perfluorooctane Sulfonate (PFOS)/
Perfluorooctanoic Acid (PFOA)/
Perfluorobutane Sulfonate (PFBS)
Site Inspection (SI) Report
for
Eielson Air Force Base and Moose Creek, Alaska

Prepared for:

United States Air Force
Air Force Civil Engineer Center (AFCEC) CZOP
10471 20th Street, Suite 326
PO Box 6898
JBER, Alaska 99506-2201

Prepared by:
Sundance-EA II, LLC
711 H Street, Suite 330
Anchorage, Alaska 99501

July 2022

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TABLE OF CONTENTS

Table of Contents i
List of Tables ii
List of Attachments ii
List of Acronyms and Abbreviations iii
1 Project Description 1
2 Coordinate Systems 1
3 Field Procedures 2
3.1 Survey 2
3.1.1 Control Survey 2
3.1.2 Level Loops 2
4 Survey Accuracy 2
5 Reference 3

LIST OF TABLES

Table H-1. Survey Details in Meters

LIST OF ATTACHMENTS

Attachment H-1. Survey Reports
Attachment H-2. Survey Field Documentation
Attachment H-3. Datasheet – NGS for CORS Site “FAIR”
Attachment H-4. Datasheet – NGS Monument A611
Attachment H-5. Photograph of NGS Monument A611
Attachment H-6. Survey Base Files
Attachment H-7. Differential Correction Logs

LIST OF ACRONYMS AND ABBREVIATIONS

3-Tier Alaska	3-Tier Alaska Civil Engineering and Surveying
AFB	Air Force Base
AFCEC	U.S. Air Force Civil Engineer Center
CORS	continually operating reference station
GIS	geographical information system
GPS	global positioning system
MED	Manual for Electronic Deliverables
NAVD88	North American Vertical Datum of 1988
NGS	National Geodetic Survey
No.	Number
NSRS	National Spatial Reference System
OPUS	Online Positioning User Service
PFBS	Perfluorobutane Sulfonate
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PID	Permanent Identifier
PVC	polyvinylchloride
RTK	real time kinematic
SI	Site Inspection
Sundance-EA	Sundance-EA LLC
USACE	U.S. Army Corps of Engineers
UTM	Universal Transverse Mercator
WGS84	World Geodetic System 1984

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1 PROJECT DESCRIPTION

Sundance-EA II LLC (Sundance EA), on behalf of the U.S. Army Corps of Engineers-Alaska District (USACE-Alaska District), has prepared this Survey Report to summarize all survey activities performed during the Expanded Perfluorooctane Sulfonate (PFOS), Perfluorooctanoic Acid (PFOA), and Perfluorobutane Sulfonate (PFBS) Site Inspection (SI) for Eielson Air Force Base (AFB) and the adjacent community of Moose Creek. Work associated under this Expanded SI was performed for the U.S. Air Force Civil Engineer Center (AFCEC) under Contract Number (No.) W911KB-17-D-0018, Task Order No. W911KB18F0173, Modification 1. The goal of this Expanded SI Report was to further delineate known PFOS, PFOA, and PFBS groundwater contamination migrating off Eielson AFB to the community of Moose Creek impacting the groundwater that the community of Moose Creek uses as its domestic water source. Investigated media included groundwater, surface water, sediment, and soil.

Sampling locations, newly installed permanent monitoring wells, and features of interest were surveyed by field teams using a global positioning system (GPS) to provide spatial reference information for reporting, integration into geographical information system (GIS) data, and to document sample locations and features of interest in accordance with the 2017 Manual of Electronic Deliverables ([MED]; USACE, 2017).

Field teams collected a horizontal and vertical position with a Trimble™ Geo7X™ handheld mapping-grade GPS for each temporary groundwater wells, surface water, sediment, and soil samples collected at Eielson AFB and the adjacent community of Moose Creek. Horizontal and vertical positions of various site features were documented with a GPS and used to georeference aerial photography.

In addition, a professional survey was conducted on 15 December 2020 of all permanent monitoring wells (e.g., deep clustered and shallow monitoring wells) by an Alaska State licensed surveyor with 3-Tier Alaska Civil Engineering and Surveying from Fairbanks, Alaska (3-Tier Alaska). 3-Tier Alaska employed Topcon GPS receivers to locate all permanent monitoring wells and to verify and establish the horizontal and vertical control. A Leica DNA10 digital level was used to run all level loops and provide elevations for the permanent monitoring wells to meet the horizontal and vertical quality as specified for site inspections in the 2017 MED. The monitoring well survey summary in meters is provided in Table H-1. The professional survey reports from 3-Tier Alaska is provided in Attachment H-1. The field documentation from 3-Tier Alaska is provided in Attachment H-2.

Further information, including coordinate systems, survey field procedures, and survey accuracy are presented in the following sections.

2 COORDINATE SYSTEMS

The horizontal reference was in geographic coordinate system World Geodetic System 1984 (WGS84) Universal Transverse Mercator (UTM) Zone 6N in meters. The vertical reference was to the North American Vertical Datum of 1988 (NAVD88).

3 FIELD PROCEDURES

3.1 SURVEY

Permanent monitoring wells (e.g., deep clustered and shallow monitoring wells) were measured in accordance with the 2017 MED, Section 4, Page 7. Elevation data included the top of the polyvinylchloride (PVC) pipe inside the monitoring well casing and the ground elevation at the monitoring well. Differential leveling was used to determine the elevations of the top of the PVC pipes and the natural ground at the monitoring wells. To ensure correct elevations, "turns" were made on the top of each PVC pipe.

For temporary monitoring wells, soil borings, surface water, and sediment samples were surveyed with a Trimble GEO 7x handheld GPS. To ensure accuracy and consistency of the instrument, pre-loaded data of existing locations and use of aerial imagery were compared to ensure GPS settings were correct.

3.1.1 Control Survey

Static sessions were collected on each new control point the day it was set. The static sessions were post-processed using Topcon Magnet Tools software, which provided "closed loop" solutions and established northing, easting, and elevation for each point. (Accuracies for each control point can be found in the GPS Loop Closure Reports.zip file.) The static sessions were also sent to the Online Positioning User Service (OPUS) provided through the National Geodetic Survey (NGS) website. The OPUS solutions provided coordinates that were compared to the post-processed data and used as a check for error. Control points A6, 101, and 1000 were used as the real time kinematic (RTK) base points for the horizontal location of all wells. Positions of the control points were determined from the post-processed data.

3.1.2 Level Loops

Using the Leica DNA10 digital level, survey crews ran level loops from the established control points to each well. Well pipes were "turned" through as a part of the level loop. Level loops were calculated first for acceptable closure, then elevations were adjusted as necessary based on final processed data.

4 SURVEY ACCURACY

For permanent monitoring wells, the basis of horizontal coordinates was the NGS Datasheet for continuously operating reference stations (CORS) site "FAIR" provided in Attachment H-3. The horizontal location for each monitoring well was determined through RTK measurements made at each monitoring well. The basis of elevation is the National Geodetic Benchmark designated "A611" (Permanent Identifier [PID] TT2716) as provided in data sheet Attachment H-4, and a photograph provided in Attachment H-5. The professional survey base files are provided in Attachment H-6. The practices described in the following sections ensured horizontal accuracies within 1.0 feet and vertical accuracies within 0.01 feet and are in accordance with 2017 MED.

All survey data for temporary groundwater wells, surface water, sediment, soil boring sampling locations were post-processed for differential correction using multiple CORS to tie the data to the National Spatial Reference System (NSRS) and meet the horizontal accuracy requirement of

sub 1 meter, as specified in the 2017 MED. Differential correction logs are provided in Attachment H-7.

5 REFERENCE

USACE, 2017. *Manual for Electronic Deliverables*. Requirements for Submittal of Documents, Chemistry Data, Geospatial Data, and Other Items. Dated April 2017.

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EXPANDED PFOS/PFOA/PFBS SITE INSPECTION REPORT
EIELSON AFB AND MOOSE CREEK, ALASKA

TABLE

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Table H-1. Survey Details in Meters					
Monitoring Well	**Northing (m)**	**Easting (m)**	**Well Elev (m)**	**Ground Elev (m)**	**Date**
19PS-MW01A	7177465.413	487703.261	154.318	155.083	10/28/2020
19PS-MW01B	7177471.420	487703.958	154.290	155.204	10/28/2020
20PS-MW01C	7177474.325	487704.137	154.433	155.296	10/28/2020
20PS-MW01D	7177468.345	487703.556	154.385	155.128	10/28/2020
19PS-MW02A	7176688.653	487216.291	155.342	156.015	10/27/2020
19PS-MW02B	7176691.080	487221.339	155.369	156.174	10/27/2020
20PS-MW02C	7176691.614	487222.494	155.293	156.189	10/27/2020
20PS-MW02D	7176689.902	487219.028	155.415	156.104	10/27/2020
20PS-MW01	7176581.112	494517.138	160.106	161.029	11/10/2020
20PS-MW02	7175064.120	495610.731	161.496	162.410	11/10/2020
20PS-MW03	7174076.359	496739.466	162.791	163.559	11/10/2020
20PS-MW04	7172932.371	497661.391	164.041	165.001	11/10/2020
20PS-MW05	7168854.655	496664.214	167.991	168.893	11/2/2020
20PS-MW06	7173880.735	494001.302	162.520	162.401	11/10/2020
20PS-MW07	7174837.889	493352.164	161.453	162.373	11/10/2020
20PS-MW08	7175365.406	493100.981	160.535	161.432	11/10/2020
20PS-MW09	7176639.655	490855.088	159.283	160.133	11/10/2020
20PS-MW10	7176948.625	490203.009	158.195	158.990	11/11/2020
20PS-MW11	7177127.788	489673.368	157.152	158.088	11/10/2020
20PS-MW12	7177237.566	489308.677	157.350	158.243	11/10/2020
20PS-MW13	7177423.927	488247.719	156.543	157.408	10/27/2020
20PS-MW14	7176517.027	487621.596	155.994	156.866	10/28/2020
20PS-MW15	7176252.153	486757.777	157.673	158.612	10/27/2020
20PS-MW16	7176663.601	486764.171	154.601	154.446	10/27/2020
20PS-MW17	7176270.343	486138.819	154.823	155.704	10/27/2020
20PS-MW18	7177303.180	486381.682	155.137	155.991	10/27/2020
20PS-MW19	7177438.570	486298.504	154.634	155.512	10/27/2020
20PS-MW20	7177393.776	486490.384	155.214	156.158	10/27/2020
20PS-MW22	7178324.143	487374.239	153.211	154.138	10/28/2020
20PS-MW23	7178321.010	488036.391	153.306	153.223	10/28/2020
20PS-MW24	7178045.163	488908.570	155.884	156.789	11/10/2020
20PS-MW25	7179667.000	489329.811	153.632	154.491	11/10/2020
20PS-MW26	7177423.693	488258.605	156.552	157.454	10/27/2020
20PS-MW27	7176512.106	487623.321	155.973	156.872	10/28/2020
20PS-MW28	7176252.400	486751.795	157.658	158.521	10/27/2020
20PS-MW29	7176784.518	487078.246	154.683	154.531	10/27/2020
20PS-MW30	7176189.208	485968.943	154.723	155.720	10/27/2020
20PS-MW31	7177296.544	486380.143	155.634	155.525	11/10/2020
20PS-MW32	7177328.451	486425.726	154.025	153.955	10/27/2020
20PS-MW33	7178554.178	487997.012	156.137	155.954	10/28/2020

Notes:

The permanent monitoring wells were the only points surveyed. All other locations were located using a handheld GPS.

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EXPANDED PFOS/PFOA/PFBS SITE INSPECTION REPORT
EIELSON AFB AND MOOSE CREEK, ALASKA

ATTACHMENTS

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EXPANDED PFOS/PFOA/PFBS SITE INSPECTION REPORT
EIELSON AFB AND MOOSE CREEK, ALASKA

ATTACHMENT H-1. SURVEY REPORTS

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3-TIER
ALASKA
CIVIL ENGINEERING & SURVEYING

December 17, 2020

Colleen Rust, PMP, PG-WA
Sundance Consulting Inc.
8210 Louisiana Blvd NE, Ste. C
Albuquerque, NM 87113

REF.: *Monitor Well survey in Moose Creek and Eielson Air Force Base. The wells noted herein are located throughout the Moose Creek community, the Chena Flood Plain, and Eielson AFB on both sides of the Richardson Highway between Mileposts 343 and 339.*

Ms. Rust,

The monitor well survey was completed on December 15, 2020. Attached is the report of the survey for the wells. Included in the report are UTM Zone 6 North coordinates in meters. Elevation data includes the top of the PVC pipe inside the well casing and the ground elevation at the well. These wells were measured in accordance with the "Geospatial Information" Section 4, Page 7 of the US Army Corps of Engineers publication "Manual For Electronic Deliverables", Dated April, 2017.

The basis of horizontal coordinates is the NGS Datasheet for CORS Site "FAIR". The horizontal reference frame is WGS 84. The horizontal location for each well was determined through RTK measurements made at each monitor well.

The basis of elevation is the National Geodetic Benchmark designated "A6" (PID TT2716). Vertical datum is NAVD88 per the datasheet for this benchmark. Differential leveling was used to determine the elevations of the top of the PVC pipes and the natural ground at the wells. To ensure correct elevations, "turns" were made on the top of each PVC pipe.

For your records, a copy of the Data Sheets for "A6" and "FAIR" are attached as a part of this report.

Thank you for the opportunity to provide this survey. If you have any questions, or comments, please contact our office.

Signed,

PLS

Steve Lowry PLS

STATE OF ALASKA
12-17-2020
Steven D. Lowry
12136 S
REGISTERED PROFESSIONAL LAND SURVEYOR

Monitor Well Submission – Eielson-Moose Creek.pdf
Enc:Table 5-1 Well Construcion Details - Complete, NGS datasheet for FAIR, NGS datasheet for A6

326 Driveway Street, Suite 102, Fairbanks, AK 99701 - (O) 907-451-7411 (F) 907-451-7413

3-TIER
ALASKA
CIVIL ENGINEERING & SURVEYING

December 22, 2020

Colleen Rust, PMP, PG-WA
Sundance Consulting Inc.
8210 Louisiana Blvd NE, Ste. C
Albuquerque, NM 87113

REF.: *Survey Report for the Monitor Well survey in Moose Creek and Eielson Air Force Base. Includes a brief description of Equipment and Practices used to meet necessary standards for deliverables.*

Ms. Rust,

3-Tier Alaska employed Topcon GPS receivers to locate all monitor wells and verify and establish the horizontal and vertical control used in this survey. A Leica DNA10 digital level was used to run all level loops and provide elevations for the monitor wells. The practices described below ensured horizontal accuracies within 1.0' and vertical accuracies within 0.01'.

Control Survey:
Static sessions were collected on each new control point the day it was set. The static sessions were Post Processed using Topcon Magnet Tools software which provided "closed loop" solutions and established Northing, Easting, and Elevation for each point. (Accuracies for each control point can be found in the GPS Loop Closure Reports.zip file.) The static sessions were also sent to the Online Positioning User Service (OPUS) provided through the National Geodetic Survey (NGS) website. The OPUS solutions provided coordinates that were compared to the Post Processed data and used as a check for error.

RTK Survey:
Control Points A6, 101, and 1000 were used as the RTK base points for the horizontal location of all wells. Positions of the control points were determined from the Post Processed data.

Level Loops:
Using the Leica DNA10 digital level survey crews ran level loops from the established control points to each well. Well pipes were "turned" through as a part of the level loop. Level loops were calculated first for acceptable closure, then elevations were adjusted as necessary based on final processed data.

Regards,

Oliver J. Loftus

326 Driveway Street, Suite 102, Fairbanks, AK 99701 - (O) 907-451-7411 (F) 907-451-7413

EXPANDED PFOS/PFOA/PFBS SITE INSPECTION REPORT
EIELSON AFB AND MOOSE CREEK, ALASKA

ATTACHMENT H-2. SURVEY FIELD DOCUMENTATION

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20-1341 MONITOR WELLS, N.P.
~ SEARCH FOR MONUMENTS $
AS-BUILT MONITOR WELLS ~

DC: FC 5000-1
BASE: @1000 UAS MON STA 112+1317 (1983)
— HIPER II #00341 HI: 6 53/1.974M
ROVER:
— HIPER V #17983 1.919

PT	CODE	HR
100	UAS MON PT-1	5 93
2000	CK 100	" " "
200	MW 19	6 93
2001	CK 200	" " "
201	MW 20	6 93
2002	CK 201	" " "
202	MW 18	6 93
2003	CK 202	" " "
203	MW 32	6 93
2004	CK 203	" " "
204	MW 26	6 93
2005	CK 204	" " "

J. OLIN 10/27/20 F.B. 20-41
S. WICK 27°F SNOWY

DESC

STATIC ON: 11:08 AM STATIC OFF: 3:38PM
USA ARMY MON IN CONC ON DIKE WEST OF FLOOD PLAINS .7' BELOW GRADE

FOUND ARMY MON ON SLOPE OF DIKE .7' BELOW GRADE

FOUND MW 19 @ COMP 19 (A/G SOLID)
COULD NOT FIND MW 21

FOUND MW 20 @ COMP 20 (SOLID)
↑ ABOVE GROUND ↑

FOUND MW 18 @ COMP 18 (SOLID)
↖ ABOVE GROUND ↗

FOUND MW 32 @ COMP 32 (AT GRADE)

FOUND MW 26 @ COMP 26 (ABOVE GROUND)
RIGHT BY #13

20-1341 MONITOR WELLS N.P.

PT	CODE	HR
205	MW 13	693
2006	CK 205	" "
206	MOOSE CREEK CLUSTER 2A	" "
2007	CK 206	" "
207	" " CLUSTER 2B	" "
2008	CK 207	
208	" " CLUSTER 2C	" "
2009	CK 208	
209	" " CLUSTER 2D	" "
2010	CK 209	
210	MW 15	693
2011	CK 210	" "
211	MW 28	" "
2012	CK 211	" "
212	MW 30	693
2013	CK 212	" "

J. OLIN
S. WICK
10/27/20 F.B. 20-41 12.
28°F CLOUDY

DESC

MW # 13 ABOVE GROUND (SOLID) (BY MW 26)

MOOSE CREEK CREEK CLUSTER 2 MWS' ALL SHOT AS A-D (MW (2A)

MOOSE CREEK MW CLUSTER (2B) (ABOVE GROUND)

MOOSE CREEK CLUSTER #2 (2C) (ABOVE GROUND)

MOOSE CREEK CLUSTER #2 (2D) (ABOVE GROUND WELL)

MW 15 IS ABOVE GROUND WELL RIGHT BY MW 28

MW 28 IS ABOVE GROUND WELL RIGHT BY MW 15

MW 30 IS A/G WELL

20-1341 MONITOR WELL, N.P.

J. OLIN
S. WICK
10/27/20
F. B. 20-41 3

PT	CODE	HR
213	MW 17	693
2014	CK 213	
214	MW 16	" " "
2015	CK 214	
215	MW 29	" " "
2016	CK 215	693

DESC.

ABOVE GROUND WELL @ COMP 17

@ GRADE MW 16

@ GRADE MW 29

20-1341 MONITOR WELL N.P.
~~ SEARCH FOR MONS/MONITOR WELLS ~~

DC: FC 5000-1
BASE: @1000 HI: 6 54/1.993M
- HIPER II #C0341
STATIC ON: 9:07AM STATIC OFF:
(END OF DAY) HI: 6 54/1.993M
ROVER:
- HIPER V #17983

PT	CODE	HR
	SET CONTROL POINT REBAR W/AC 2" @ MOOSE CREEK BRIDGE IN OPEN AREA BETWEEN RAILROAD & PIPELINE	
	- HIPER GA #182 HI: 5 68/1.731M	
	STATIC ON: 12:11PM STATIC OFF: 3:59PM	
101	CP2 RBC	6 93
2017	CK 101	" "
216	MOOSE CREEK CLUSTER 1-A	
2018	CK 216	6 93
217	" " CLUSTER 1-B	" "
2019	CK 217	

J. OLIN 10/28/20 F.B. 20-11 14
S. WICK 12°F CLOUDY (MOSTLY)
SNOW .4' DEEP

DESC

341_10_28_20_1000_20_1341.tps

log1028u.tps

SET REBAR W/ CAP FOR A BETTER LOCATION
SOLID, PLUMB, $.1 BELOW GROUND

START OF MOOSE CREEK CLUSTER MONITOR WELLS
1-A

1-B

Rite in the Rain

20-1341 MONITOR WELLS, N.P. AK

PT	CODE	HR
218	MOOSE CREEK CLUSTER 1-C	6 93
2020	CK 218	" "
219	" " " CLUSTER 1-D	" " "
2021	CK 219	
220	MW ?	" " "
2022	CK 220	
221	MW 14	
2023	CK 221	" " "
222	MW 27	" " "
2024	CK 222	
223	MW 22	" " "
2025	CK 223	
224	MW 23	" "
2026	CK 224	
225	MW 33	" "
2027	CK 225	

J. OLIN 10/28/20 F.B. 20-41
S. WICK

DESC

MOOSE CREEK CLUSTER 1
(1C & 1D)

FOUND A MW NOT ON COMP LIST BY 4 YELLOW BOLLARDS BUT NOT SURE IF IT IS A WELL.

ABOVE GROUND WELL

ABOVE GROUND WELL

ABOVE GROUND WELL

@ GRADE WELL IN FLOOD PLAINS

@ GRADE WELL IN FLOOD PLAINS

Rite in the Rain

20-1341 MONITOR WELLS, N.P.

PT	CODE	HR
~~226~~	~~MW 25~~	~~6 93~~
~~2028~~	~~CK 226~~	
~~227~~	~~MW~~	
~~2029~~	~~CK 227~~	
3000	CK SHOT 100(0.05,0.06)6 93	

J. OLIN 10/28/20 F.B. 20-41 16
S. WICK

FOUND MW 25 BUT BASE DIED AS WE GOT THERE SO WE WILL STILL NEED TO SHOOT IT TOMMORROW.

~~&~~ CALLED IT ~~A~~ DAY.

Rite in the Rain

20-1341 EIELSON AFB MW SURVEY
SURVEY MW-05

DC FC 5000

STATIC BASE @ ~~CP3~~ CPMW05 HI: 5.26 / 1.603m
ON @ 8:33 AM
OFF @ 9:54 AM
- TOPCON HIPER GA II 182
~~log 1102r.tps~~ log 1102r.tps

STATIC ON MW05 HI: 2.45 / 0.745m
ON @ 9:19 AM
OFF @ 9:30 AM
- TOPCON HIPER GA II 182
log 0104a.tps

NOTE:
SEE FB: 20-42 FOR ADDNL STATIC DATA P. 1-2

*OFFICE NOTE: NO RTK FOR MW05
SEE OPUS & LOOP CLOSURES IN NOV 2 DATA FOR POSITION & ERROR

O. LOFTUS 02-NOV-202
S. WICKENKAMP CLOUDY ~ -10°F FB: 20-41

* SET #5 EBR @ BG IN FIELD S. OF AIR PLANE PKING:
  - ~ 70' SE OF WHITE POST FOR BURIED CABLE
  - EASTERLY OF TREES
  - ~ 30' FROM EDGE OF ROAD

* SET UP OVER WELL PIPE

LEVEL PEG TEST (A2 x B)

STA	+	-
A	5.028	
B		5.104
	4.979	
A		4.894

OLD: -0.8
NEW: -21.4
RET: 4.903

20-1341 EIELSON AFB MW SURVEY

LEVEL LOOP

	STA	+	−	INT	ELEV
CPMW05	CP3				553.359
	3 1.44	556.503			
MW05			2 .451		554.052
	2 .465	556.517			
CPMW05	CP3		3 .154		553.363

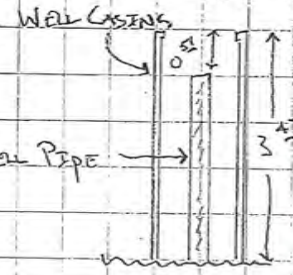
O.L. 02-NOV-2020 (12)

S.W FB! 20-41

ADJ: + 0.056 ? 553.415

NOTE: EIELSON GRND SHOT 554.108

WELL PIPE IS 0.51 BELOW RIM OF WELL CASING. WELL CASING RIM IS 3.47' ABOVE GRND



554.03
+ 0.51
554.56
- 3.47
551.09
+0.056
551.146

20-1341 MONITOR WELLS/N.P.
~SET CONTROL~

DC: FC 5 000-1
BASE: @ A6 (MON IN CONC)
-HIPER GA #184 HI: 4 75/1.448M
STATIC ON: 7:16AM STATIC OFF: 3:12PM

HIPER GA #6260 @ CP BY MOOSE CREEK
HI: 5 68/1.731M
STATIC ON: 7:54AM STATIC OFF: 11:07AM

HIPER GA #6218 @ CP2 BY DIKE
HI: 4 69/1.429M
STATIC ON: 9:03AM STATIC OFF: 12:28PM

HIPER GA #6260 @ CP3 BY MW #9
HI: 5 55/1.692M
STATIC ON: 11:27AM STATIC OFF: 11:50AM

HIPER GA #6260 @ CP4 BY MILEPOST 341
HI: 5 73/1.746M
STATIC ON: 12:12PM STATIC OFF: 3:22PM

J. OLIN 11/2/20 F.B. 20-42 1
O. LOFTUS
S. WICK
DESC:
A6

GA184_11_2_20.tps

CP BY BLUFFS & MOOSE CREEK BRIDGE
AC 2" SET BETWEEN RAILROAD & PIPELINE
6260_11_2_20_CP.tps

CP2 ON NORTH SIDE OF HIGHWAY
AC 2" SET ON SHLD OF DIKE
~~6260_11_2_20_CP3~~ 6218_11_2_20_CP2.tps

CP3 BY MW #9
AC 2" SET @ GRADE 30' FROM MW
6260_11_2_20_CP3.tps

CP4 BY MILEPOST 341

6260_11_2_20_CP4.tps

Rite in the Rain

20-1341 MONITOR WELLS/N.P.
~STATIC SESSIONS~

HIPER GA #6218 @ DYKE CP1
HI: 5 25/1.600M
STATIC ON: 12:54PM STATIC OFF: 3:39PM

HIPER II #00341 @ CP5 BY MW#10
HI: 5 15/1.570M
STATIC ON: 1:19PM STATIC OFF: 1:41PM

HIPER II #00341 @ CP6 BY MW#8
HI: 4 92/1.494M
STATIC ON: 2:07PM STATIC OFF: 2:28PM

HIPER II #00341 @ CP7 BY MW#7
HI: 5 12/1.561M
STATIC ON: 2:43PM STATIC OFF: 3:05PM

J. OLIN 11/2/20 F.B. 20-42 12
S. WICK

DESC:
ARMY MON ON DIKE
CP1 6218_11_2_20_DYKECP1.tps

CP5 BY MW#10
00341_11_2_20_CP5.tps

CP6 BY MW#8
00341_11_2_20_CP6.tps

CP7 BY MW#7
00341_11_2_20_CP6_MW7.tps

*CALLED IT/ WENT TO PICK UP ALL RECIEVERS

Rite in the Rain

20-1341 EILSON AFB MW SURVEY
SETTING CONTROL/STATIC SESSIONS

DC: FC 5000-1

STATIC BASE @ CP 101 @ BLUFFS BY MOOSE CREEK
-HIPER GA #184 HI: 5 44/100 / 1.658M
STATIC ON: 9:36AM STATIC OFF: 1:57PM

STATIC ON A-6 BY EILSON AFB/SOUTH OF HIGHWAY
-HIPER GA # 6218 HI: 4 64/100 / 1.414M
STATIC ON: 10:08AM STATIC OFF: 1:45PM

STATIC ON UAS MON @ Q65
- HIPER GA #6260 HI: 5 72/100 / 1.743M
STATIC ON: 11:30AM STATIC OFF: 12:12PM

STATIC ON MH-9 (MON IN CONC MANHOLE/4' HIGHER ABOVE THE AVENUE.)
-HIPER II #00341 HI: 4 36/100 / 1.329M
STATIC ON: 12:06PM STATIC OFF: BATTERY DIED

STATIC ON MH-7 (MON IN CONC MANHOLE @ GRADE
-HIPER GA #6260 HI: 5 16/100 / 1.573M
STATIC ON: 12:36PM STATIC OFF: 1:07PM

*UNABLE TO LOCATE F97, W64, MH-3, MH-5

J. OLIN-MARTIN NOV ~~2ND~~ 3 2020 (13)
S. WICKENKAMP -26°F SUNNY F.B. 20-41

DESC:

CP 101 BY BLUFFS
2" AC
184_11_3_20_CP_101.tps

A-6 (MON SET IN CONC)
SOUTH OF HIGHWAY ACROSS FROM EILSON
6218_11_3_20_A6.tps

Q-65
MON IN CONC MANHOLE
6260_11_3_20_CP_8.tps

MH-9
MON IN CONC MANHOLE 4' HIGHER THEN AVE
00341_11_3_20_MH9

MH-7
MON IN CONC MANHOLE WHICH IS @ GRADE
6260_11_3_20_MH7.tps

F97 BEHIND CLOSED FENCE BEHIND CONTROL TOWER

Rite in the Rain

ELESON MONITOR WELLS

STATIC GPS

RCVR: TOPCON HIPER V
- S/N 14835
~~D.C~~ DC: TOPCON FC5000-2

START: 09:45 HI: 5.19'
STOP: 12:15 1.582 METERS
SET UP @ A-6

FILE NAME: 201341_110920_14835_A6

RCVR: TOPCON HIPER V HI: 5.50'
- S/N 14813 1.676 M

START: 10:13
STOP: 15:34
SET UP @ CP101

FILE NAME - 201341_110920_14813_CP101

RCVR: TOPCON HIPER GA HI: 4.91'
- S/N 6760 1.514 M

START - 11:14
STOP - 15:34
SET UP ON CP102

N. ENGSON
S. WICK

~25°F
SNOWING

FB 20-41
11/09/20

(14

SET REBAR 5/8" NEAR CLUSTER #1
TO BE CALLED CP102

EIELSON M. W. CONT'D

N. ENSIGN
S. WICK
11-NOV-2020

LEVELING - LEICA DNA 10 S/N 333746

PNT	BS	HI	FS	ΣNT	ELEV
CP3					522.389
	5.296	527.685			
MW09			2.318		525.367
GRND				5.11	522.575
	2.143	527.510			
CP3			5.120		522.390
Σ	7.439		7.438		
	Δ = 0.001				
CP5					519.685
	2.373	522.058			
MW10			4.836		517.222
TP1	5.226	522.448			
MW10			0.846		521.602
GRND				3.46	518.388
	1.072	522.674			
CP5			2.987		519.687
Σ	8.671		8.669		
	Δ = 0.002				

GOOD

MEASURED ON E. SIDE OF PIPE - RECORDED AS INT. GROUND SHOT ON N. SIDE OF WELL. RECORDED AS 2. SAME PT AS CP3

ADJ. LOW + 0.019

SHOT ON N. SIDE OF PIPE

+ 0.019 = 521.621
+ 0.019 = 519.007

EELSON M.W. CONT'D

STA	BS	HI	FS	INT	ELEV
CP 6					527.690
	4.73	532.420	2.79		
					529.63
MW08 (GRND)				5.73	526.69
	2.56	532.19	4.495		527.695
Σ	7.29		7.285		
CP 7					

N. ENSIGN
S. WSCLE

11-NOV-2020

527.688

SHOT ON N SIDE OF PIPE

529.628

528.688

527.693

Eielson Monitor Wells

FC 5000 – 2

Hiper V 14835 Base @ CP101 (RBC 2" 12136) HI: $5\frac{45}{1.661}$M

Static Start: 9:50 a.m

Static Stop: Base Dead

Static File: 14835_111020_CP101

Store	Code	HR

T. Lail
S. Wick

FB 20 – 41
11-10-20

23° cloudy snow WT

17

Hiper Ga 184 @ A-6 (3.5" BC) HI: $5\frac{25}{1.600}$M

Static Start: 9:33 a.m

Static Stop: 2:52 p.m

Static File: 184_111020_A-6

Hiper V 14813 @ CP 103 (Rebar Set 5/8") HI: $5\frac{16}{1.573}$M

Static Start: 10:11 a.m

Static Stop: 12:40 p.m

Static File: 14813_111020_CP103

* Set 5/8" Rebar near cluster # 2 Monitor wells

Hiper V 14813 @ CP 104 (Rebar Set 5/8") HI: $5\frac{16}{1.573}$M

Static Start: 1:08 p.m

Static Stop: 1:53 p.m

Static File: 14813_111020_CP104

* Set 5/8" Rebar near Monitor Wells 15 & 28

Rite in the Rain

Eielson Monitor Wells

STA	+	HI	−	FFS	EL
Rebar CP102	1 715				509 965
		511 680			
216 (20PS-MW01C)			2 187		509 497
	2 159				
		511 656			
216 GRND				4 984	506 672
217 (19PS-MW01B)			2 455		509 201
	2 489				
		511 690			
217 GRND				5 486	506 204
218 (20PS-MW01D)			2 739		508 951
	2 720				
		511 671			
218 GRND				5 157	506 514
219 (19PSMW01A)			2 868		508 803
	2 889				
		511 642			
219 GRND				5 398	506 294
T.P1			1 013		510 679
	10 720				
		521 399			
T.P2			4 317		517 082
	4 654				
		571 736			

T.L
S.W

FB 20-41
11-10-20

(18)

DESC

Shot Notch on PVC pipe, cluster 1 Monitor Well

Shot Notch on PVC Pipe, cluster 1 Monitor Well

Shot Notch on PVC Pipe, cluster 1 Monitor Well

Shot Notch on PVC Pipe, cluster 1 Monitor Well

Rite in the Rain

Eielson Monitor Wells

STA	+	HI	−	IRS	EL
T.P 3		521.736	5.266		516.470
	4.706				
		521.176			
T.P 4			3.155		518.021
	4.274				
		522.295			
MW 13			5.862		516.433
	5.928				
		522.361			
MW13 GRND				8.767	513.594
MW 26			5.776		516.585
	5.383				
		521.968			
MW26 GRND				8.348	513.620
T.P 5			4.033		517.935
	3.483				
		521.416			
T.P 6			4.826		516.592
	5.330				
~~T.P 7~~		521.922			
T.P. 7			4.812		517.110
	3.601				
		520.711			

T.L
S.W

EB 20-41
11-10-20

(19)

Desc

Shot North Lip of PVC Pipe, on Black Mark

Shot North Lip of PVC Pipe, on Black Mark

Rite in the Rain

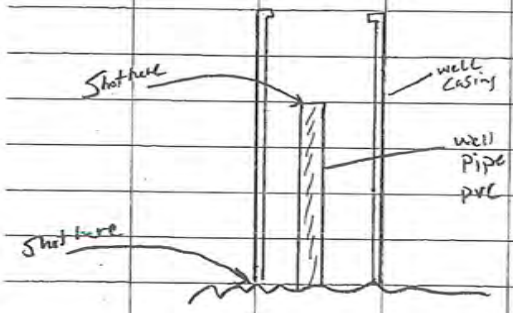
Eielson Monitor Wells

STA	+	HI	−	IFS	EL
T.P. 8		520.711	13.194		507.517
	4.203				
		511.720			
Rebar CP102			1.747		509.973

Job: Eielson

Line: Cluster 1

"Typical"



1.L
S.W

11-10-20

DESC

check & adjust

coll. err. old: -21.4"

coll. err. New: -8.2"

Difference : 13.1

Reticle : 5.422 Ft

Rite in the Rain

STA	Eielson +	Monitor wells HI	—	IFS	EL
Rebar CP 103	4 841				509 925
		514 766			
206A (20PS-MW02C)			2 354		517 412
	2 337				
		514 749			
206A GRND				5 282	509 467
					512 362
207B (19PS-MW02B)			2 387		
	2 419				
		514 781			
207B GRND				5 056	509 725
					512 127
208C (20PS-MW02D)			2 654		
	2 627				
		514 754			
208C GRND				4 878	509 876
					511 842
209D (19PS-MW02A)			2 912		
	2 962				
		514 804			
209D GRND				5 172	509 652
Rebar CP 103			4 882		-0 003
					509 922

Job: Eielson

Line: Cluster 2

T.L
S.W

ADJ: + 0.019 = 509 944

512 431
Shot notch on PVC Pipe, Cluster 2 Monitor well

509 486

Shot notch on PVC Pipe, Cluster 2 Monitor Well 512 384

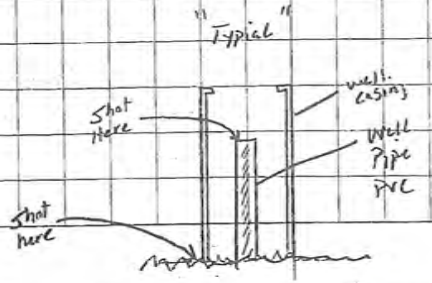
509 744

Shot notch on PVC Pipe, Cluster 2 Monitor Well 512 146

509 895

Shot notch on PVC Pipe, Cluster 2 Monitor Well 511 861

509 651



Rite in the Rain

Elelson Monitor Wells

STA	+	HI	−	IFS	EL
Rebar CP 104	5 439				517 684
		523 123			
MW 1S			2 690		520 433
	2 655				
		523 088			
MW 1S GRND				5 742	517 346
					520 427
MW 2B			2 961		
	3 005				
		523 132			
MW 2B GRND				5 832	517 300
Rebar CP 104			5 443		005
					517 689

Job: Elelson

Line: Line 1

T.L
S.W

FB 20-41
11-10-20

22

DESC

ADJ: -0.049 = 517 635

Shot North Lip P.V.C pipe, Black Mark 520 384

517 297

Shot North Lip P.V.C Pipe, Black Mark 520 078

517 251

Rite in the Rain

Eielson Monitor Wells (Line 2)

STA	+	HI	-	IFS	EL
Rebar CP 103	11 804				509 925
		521 729			
T.P. 1			4 578		517 151
	4 888				
		522 039			
T.P. 2			3 710		518 329
	4 237				
		522 566			
T.P. 3			12 066		510 500
	4 541				
		515 041			
T.P. 4			4 616		510 425
	5 186				
		515 531			
T.P 5			3 878		511 653
	4 145				
		515 798			
MW 14			1 163		~~514 635~~
	1 175				
		515 810			
MW 14 GRND				4 038	~~511 222~~
MW 27			1 157		~~514 651~~
	1 185				
		515 838			
MW 27 GRND				4 135	~~511 203~~

T. Lail
S. Wick

FB 20-41
11-11-20

25° Cloudy

(23)

DESC

ADJ: +0.019 = 509 944

Shot North Lip of P.V.C. pipe, Black Mark 514 654

511 791

Shot North Lip of P.V.C Pipe, Black Mark 514 672

511 727

Rite in the Rain

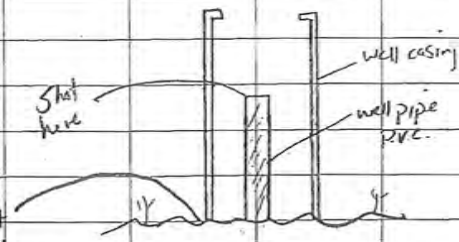
T.L
S.W

'95 CO-91
11-11-20

DESC

Eielson Monitor wells

STA	+	HI	−	IFS	EL
T.P.6		515.838	5.466		510.372
	5.093				
		515.465			
T.P 7			4.741		510.724
	5.001				
		515.725			
T.P. 8			3.328		512.397
	10.661				
		523.058			
T.P. 9			5.495		517.563
	4.357				
		521.920			
T.P. 10			4.508		517.412
	4.740				
		522.152			
Rebar CP 103			12.206		0.022
					509.946



Rite in the Rain

Eidlson Monitor Wells (Line 3)

STA	+	HI	−	IFS	EL
Rebar CP 104	5.025				517.684
		522.709			
T.P. 1			11.609		511.100
	5.473				
		516.573			
T.P. 2			5.261		511.312
	4.403				
		515.715			
Hub 1			8.176		507.539
	8.219				
		515.758			
T.P 3			4.445		511.313
	5.265				
		516.578			
T.P 4			5.454		511.124
	11.863				
		522.987			
Rebar CP 104			5.289		~~0.013~~
					517.698

T.L
S.W

TD 20-H
11-11-20

(25)

DESC

ADJ: -0.049 = 517.635

Set Hub @ grade on Powerline, Pink Flagging

ADJ DWN → ~~507.536~~ -0.049 = 507.487

Rite in the Rain

STA	Eidson +	Monitor HI	Wells –	(LINE 6) IFS	EL
Hub 1	4 800				~~507 534~~
		512 336			
T.P. 1			4 536		507 802
	4 988				
		512 780			
T.P. 2			4 980		507 806
	4 232				
		512 040			
T.P 3			4 556		507 484
	5 042				
		512 526			
MW 17 A			1 638		~~510 980~~
	1 637				
		512 525			
MW 17 (GRID)				4 526	~~507 997~~
T.P. 4			5 057		507 468
	5 137				
		512 605			
MW 30 A			1 661		510 944
	1 611				
		512 555			
MW 30 (GRID)				4 882	~~507 615~~
T.P. 5			4 448		508 107
	4 418				
		512 525			

D	E	S	C
507	487		

(ADJ: -0.049)

Shot North Side PVC pipe, Black Mark

ADJ: -0.0028 = ~~510 980~~ 510 837

507 950

Shot Northside PVC Pipe, Black Mark

ADJ: -0.0028 = ~~510 943~~ 510 893

507 624

Rite in the Rain

Gielson Monitor wells

STA	+	HI	−	IFS	EL
T.P. 6		512.525	4.932		507.593
	4.590				
		512.183			
T.P. 7			4.510		507.673
	5.508				
		513.181			
T.P. 8			5.459		507.722
	4.756				
		512.478			
Hub 1			4.914		0.028
					507.564

T.L
S.W

FB 20-41
11-12-20

(29)

D	E	S	C

Rite in the Rain

Erickson Monitor wells

Hiper Ga 184 @ A-6 (BC 3.5" in cone) HI: 5 35 / 1.630m

Static start 1:40 p.m

Static stop: 3:25

Static file: 184_111220_a-6

Hiper V 14835 @ CP 101 (RBC 2" 12136) HI: 5 39 / 1.642 M

Static start: 1:57 p.m

Static stop: 3:31

Static file: 14835_111220_CP101

T.L
S.W

FB 20-41
11-12-20

30

Hiper V 14813 @ Set Rear CP 105 HI: 5 16 / 1.572M

Static start: 2:20 p.m

Static stop 2:52 p.m

Static file: 14813_111220_CP 105

Chelson Monitor Wells

FC 5000 - 2

Hiper Ga 184 @ A-6 HI: 5 65/100 / 1.722 M

Static Start: 8:52 a.m

Static Stop: 3:19 p.m

Static File: 184_111620_A-6

Hiper V 14835 @ cp 101 HI: 5 45/100 / 1.661 M

Static Start: 9:10 a.m

Static Stop: 3:29

Static File: 14835_111620_cp101

Hiper V 14813 @ cp 106 (Set Rebar) HI: 5 16/100 / 1.572 M

Static Start: 9:32 a.m

Static Stop:

Static File: 14813_111620_cp106

Hiper V 14813 @ cp 107 (Set Rebar) HI: 5 16/100

Static Start 2:29 p.m

Static Stop: 3:01 p.m

Static File: 14813_111620_cp107

5. Wick

11-16-20

clear (C)

Rite in the Rain

Elelson Monitor Wells (Line 7)

Sta	+	HI	−	IFS	EL
Rebar CP 106	4.207				510.320
		514.527			
T.P 1	~~4.497~~		4.417		510.110
	5.469				
		515.579			
T.P 2			3.721		511.858
	3.679				
		514.937			
MW 19			4.696		~~510.241~~
	4.672				
		514.913			
MW19 (2nd)				7.549	~~507.364~~
T.P 3			3.056		511.857
	4.263				
		516.120			
T.P. 4			6.116		510.004
	4.435				
		514.439			
CP 106			4.115		~~0.005~~
					510.324

T.L
S.W

FB 20-45
11-16-20

3

D e s c

~~Adj. -0.062 = 510.328~~

Adj! -0.031 = 510.289

510.210

Shot P.I.C. Pipe, North, Black Mark

507.333

Rite in the Rain

Elelson Monitor wells

STA	+	HI	−	IFS	EL
CP 106	5 973				510 320
		516 293			
T.P 1			8 083		508 210
	5 115				
		513 325			
MW 20			0 967		512 358
	0 957				
		513 295			
MW 20 (GRND)				4 000	509 295
T.P. 2			6 462		506 835
	5 215				
		512 048			
MW 32			6 921		505 127
	9 694				
		514 821			
MW 32 (GRND)				9 465	505 356
MW 18			3 012		511 809
	2 973				
		514 782			
MW 18 Grnd				5 773	509 009
MW 31			4 506		510 276
	4 482				
		514 758			
MW 31 (GRND)				4 113	510 645

T.L
S.W

FB 20-45
11-16-20

(5)

Desc	
ADJ: −0.031 =	510 289
Shot pvc pipe, North, Blackmark	512 327
	509 264
Shot pvc pipe, North, Blackmark	505 096
	505 325
Shot pvc pipe North, Blackmark	511 778
	508 978
Shot pvc pipe, North, Blackmark	510 245
	510 614

Rite in the Rain

Elelson Monitor Wells

Sta	+	HI	—	EFS	EL
T.P.3		514.758	8.481		506.277
	5.872				
		512.149			
T.P.4			0.660		511.489
	4.358				
		515.849			
CP 106			5.538		-0.012
					510.309

J.L
S.W

FB 20-45
11-16-20

(6)

Desc

Rite in the Rain

Gielson Monitor Wells

FC 5006-2

HiperGa 184 @ A-6 HI: 5^{31} / 1.618 M

STATIC START: 8:58 a.m

STATIC STOP: 12:35 p.m

STATIC FILE: 184_111820_A-6

HiperV 14835 Base @ cp 101 HI: 5^{63} / 1.716 M

STATIC START: 9:22 a.m

STATIC STOP: 9:58

STATIC FILE: 14835_111820_cp101

STORE	CODE	HR
226	MW 24	6^{16}

S. Wick

TD 10-45

11-18-20

-20°

clear

(9)

HiperV 14813 @ cp 108 (Set Rebar) HI:

STATIC START:

STATIC STOP:

STATIC FILE: 14813_111820_cp107

"NO SD card in Rover 14813"

"D.d NOT do Static", but set Rebar near MW 24, also Shot horizontal with GPS.

check & Adjust

coll. err old: -15.9

coll. err. new: -14.5

Difference: 1.4

Reticle: 4.996 ft

Rite in the Rain

Erelson Moeller Wells Line 11

STA	+	HI	−	FFS	EC
<1> 105	4 884				507 629
		512 585			
MW 16 B			5 854		506 731
	5 770				
		512 501			
MW 16 Grnd				5 260	507 241
CP 105			4 882		− 0 010
					507 619

Digital Level Not Functioning @ 22°.
Stopped Level.

T.C Survey

FB 20-45
11-18-20

-22 clear

ADS + 0.026 = 507 603

506 730 = 507 710

+ 0.005 − 0.026

507 246 = 507 220

Rite in the Rain

Eielson Monitor Wells — MW 22 — Unit 12

STA	+	HI	−	IFS	EL
Rebar CP 107	5 4664				504 497
		509 361			
MW 22			4 290		505 661
	4 1664				
		509 847			
MW 22 GRND				7 210	502 651
CP 107			5 352		001 −0
					504 495

T. Lail
S Wick

FB 20-45
11-19-20

-20°
clear

(13)

Desc

ADJ : + 0.023 = 504 520

Shot top PVC pipe on North side, black mark 505 704

502 660

Rite in the Rain

Elelson Monitor Wells — MW 29 — Line 13

Sta	+	HI	−	IFS	EL
CP 105	4.888	512.517			507.629
TP1	4.721	512.439	4.799		507.718
MW 29	5.274	512.285	5.425		~~507.417~~
MW 29 GRND				4.771	~~507.511~~ 507.485
TP 2	4.809	512.592	4.505		507.783
CP 105			4.965		~~0.003~~ 507.627

T.L
S.W

#3 20-45
11-19-20

-22° clear (14)

D e s c

ADJ -0.026 = 507.603

506.980

Shot Lip P.V.C pipe on North Side, Black Mark

Rita in the Rain

Fieldsaw Monitor Wells — MW 24 — Line 14

STA	+	HI	−	IFS	EL
Rebar CP-108	4.856				512.049
		516.905			
MW 24			2.497		~~514.408~~
	2.409				
		516.817			
MW 24 GRND				5.378	511.439
			4.771		~~0.002~~
CP-108					512.046

T.L
S.W

FB 20-45
11-19-20

20° clear (15)

DESC

ADJ: +0.005 = 512.045

Shot Lip PVC pipe north side, Black mark 514.403

511.434

Rotem the Rain

Elelson Monitor Wells MW 25 Line 15

STA	+	HI	−	IFS	EL
Rebar CP 109	6 1.164				503.742
		509.906			
MW 25			3.037		~~506.864~~
	3.092				
		509.961			
				5.914	~~504.047~~
MW 25 GROUND					
CP 109			6.217		0.601
					503.744

T.L
S.W

FB 20-45
11-19-20

18°
Clear

(16)

Desc
ADJ: -0.008 = 503.734
506.861
504.039

Rite in the Rain

Gielson Monitor Wells

Hiper Ga 184 @ A-6 HI: 5 33/16 1.624 M

STATIC START: 12:02 p.m

STATIC STOP: 3:09 p.m

STATIC FILE: 184_111920_A-6

Hiper V 14835 Base @ cp 101 HI: 5 58/16 1.701 M

FC 5000-2

STATIC START: 12:17 p.m

STATIC STOP: 3:18 p.m

STATIC FILE: 14835_111920_cp101

STORE	CODE	HI
227	MW 25	6 14

11-19-20 (17)

Hiper V 14813 @ Set Rebar cp 108 (near MW 24) HI: 5 16/16 1.572 M

STATIC START: 12:27 p.m

STATIC STOP: 12:59 p.m

STATIC FILE: 14813_111920_cp108

Hiper V 14813 @ Set Rebar cp 109 (near MW 25) HI: 5 14/16 1.572 M

STATIC START: 1:05 p.m

STATIC STOP: 1:37 pm.

STATIC FILE: 14813_111920_cp109

Hiper V 14813 @ Set Rebar cp 110 (near MW 23 + MW 33) HI: 5 16/16 1.572 M

STATIC START: 2:10 p.m

STATIC STOP: 2:41 p.m

STATIC FILE: 14813_111920_cp110

Carlson Monitor Wells

STA	+	HI	—	EL
CP 110	3.583			510.137
		513.720		
TP1			4.846	508.874
	7.562			
		516.436		
MW 33			4.774	511.662
	4.713			
MW33 GRND		516.375		512.205
CP 110			6.228	0.010
				510.147

Line 17

JES	EL
4.110	512.205

T.L
S.W

11-20-20

-20°
clear

(19)

ADJ: -0.007 = 510.130

511.655

Shut Up PVC pipe, North Side, Black Mark

~~ADJ: -0.005 511.657~~

512.258

~~512.260~~

Return to Table of Contents

Elelson Monitor Wells — Line 14

STA	T	H1	—	Fig	Elev
CP 110 Rebar	4 118				510 137
		514 255			
T.P.1			7 338		506 917
	4 121				
		511 038			
MW 23 A			8 328		502 710
	8 424				
		511 134			
MW B GRND				8 160	502 974
T.P. 2			1 996		509 138
	5 686				
		514 824			
CP 110			4 683		0 004
					510 141

T.C SW

PB 26-43

11-20-20

(21)

D e s c

ADS -0.007 = 510 130

502 703

Shot Top PVC pipe North Side, Black Mark

502 967

Rite in the Rain

Gelson Monitor Wells

HiperGa 184 @ cp 101 RBC 2" HI: 5.87 / 1.789 M

STATIC START: 11:19 a.m

STATIC STOP: 3:34 p.m

STATIC File: 184_112020_cp101

Hiper V 14835 Base @ 103 A-6 MON HI: 6.00 / 1.828 M

Hiper V 14813 Rover

STATIC START: 11:39 a.m

STATIC STOP: 3:26 p.m

STATIC File: 14835_112020_A-6

STAKE	STORE	CODE	HR
3	228	MW 03	5 sec

S.W

11-20-20

(24)

Near MW 01

Hiper V 14813 @ cp 111 (Set Rebar) HI: 5.10 / 1.573 M

STATIC START: 12:26 p.m

STATIC STOP: 1:24 p.m

STATIC File: 14813_112020_cp111

Near MW 03

Hiper V 14813 @ cp 112 (Set Rebar) HI: 5.10 / 1.573 M

STATIC START: 2:12 p.m

STATIC STOP: 2:43 p.m

STATIC File: 14813_112020_cp112

Eielson Monitor Wells MW 01

STA	+	HI	−	IFS	EL
Rebar CP 111	6.014				524.959
		530.973			
MW 01			2.683		528.290
	2.742				
		531.032			
				5.769	525.263
MW 01 GEND					
CP 111			6.071		0.001
					524.961

T.L
S.W

FIS 20-45
11-20-20

(23)

Desc

ADJ: + 0.017 = 524.976

Steel Lip pvc pipe North side, Black Marks 528.307

525.200

Rite in the Rain

Gielson Monitor Wells MW03 Line 21

STA	+	HI	−	IFS	EL
Rebar CP 112	5.662				535.230
		540.892			
MW 03			4.282		536.610
	4.294				
		540.906			
MW03 GRND				6.811	534.095
CP 112			5.661		0.006
					535.237

T.L
S.W

FB 20-45
11-20-20

24

Desc

Slot Lip pvc pipe, North Side, Black Mark

Adj: −0.0035 = 536.606

= 534.091

Gielson Monitor Wells

Hiper Ga 184 @ cp 101 (RBK 2") HI: 5.60 / 1.706 M

STATIC START: 9:05 a.m.

STATIC STOP: 1:15 p.m.

STATIC File: 184_112320_cp101

Hiper V 14835 Base @ 103 (A-6) HI: 5.90 / 1.798 M

Hiper V 14813 Rover

STATIC START: 9:34 a.m.

STATIC STOP: 1:01 p.m.

STATIC File: 14835_112320_A-6

STATION	STORE	CODE	HR
1	229	MW 01	7 16
2	230	MW 02	7 16

T. Lail
S. Wick

11-23-20

(25)

Hiper V 14813 @ cp 113 (Set rebar) (near MW02) HI: 5.14

STATIC START: 10:56 a.m.

STATIC STOP: 11:27 p.m.

STATIC File: 14813_112320_cp 113

Rite in the Rain

Gielson Monitor Wells

LINE 22

STA	+	HI	−	IFS	EL
Rebar cp 113	5.132				530.706
		535.838			
MW 02			2.994		532.844
	2.992	2			
		535.836			
MW 02 GRND				5.996	529.840
cp 113			5.130		0.000
					530.706

T.L
S.W

FB 20-45
11-23-20

-6°
Clear

D	E	S	C

Shot PVC Pipe @ Notch

Rite in the Rain

STA	Nelson +	Monitor HI	Wells −	IES	Line 23 EL
Rebar RBC CP-7	4.451				530.421
		534.872			
MW 07			2.058		532.814
	2.023				
		534.837			
MW 07 GRND				5.039	529.798
CP-7			4.415		0.001
					530.422

T.L
S.W

FB 20-45
11-23-20

(21)

D e S C

Δ_{DS} : − 0.097 = 530.324

Shot PVC Pipe 532.717

529.701

20-1341 MONITOR WELLS EILSON
~TIE IN MW#7-10~

J.OLIN 12/08/20 F.B. 20-11
N.ENSIGN 0°F CLOUDY

DC: FC5000-1
BASE: @CP101(RBC 2" 12136) HI: 5 85
- HIPER II #00341
ROVER:
- HIPER V #17983

PT	CODE	HR
4000	CK SHOT 102(0.09,0.09)	6 71
231	MW 8	6 71
232	MW 10	" "
233	MW 9	" "

BASE: MOVED TO PT#103(A-6)
- HIPER II #00341 HI: 5 34
ROVER:
- HIPER V #17983

PT	CODE	HR
234	MW 7	6 71
235	CP 7	6 71

MOVED BASE BACK TO PT#101(RBC 2" 12136)
HI: 5 53

PT	CODE	HR
236	MW 31	6 71

PT	CODE	HR
2102	CK SHOT 102(0.05,0.05)	6 71

Rite in the Rain

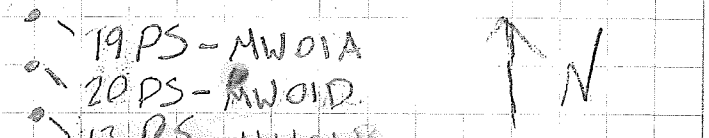
20-1341 MONITOR WELLS, N.P.
~SET CONTROL, TIE IN MWS, 3 LEVEL LOOP

DC: FC 5000-1
BASE: @ CP101 (RBC2" 12136)
-HIPER JR #00341 HI: 5 90
ROVER:
-HIPER V #17983

PT	CODE	HR

J. OLIN 12/09/20 F.B. 20-42
NO ENSIGN 0°F

MOOSE CREEK CLUSTER 1



MOOSE CREEK CLUSTER 2

Rite in the Rain

20-1341 F EAFB MW CONT'D

LEVEL: LEICA DNA 10
-S/N 333476
JOB: EAFB
LINE: 105 16 1

STA	BS	Hz	FS	INT	ELEV
	4381				507 629
CP105		512 010			
			3290		
TP3					508 720
	3 755				
		512 475			
MW16GND1				5 234	507 244
			5 824		
					~~506~~
MW16					
	6 036	512 683			506 647
TP4			4 106		508 577
	3 346	511 923			
CP105			4 306		507 617
$\Sigma_{BS/FS}$	17516		17530		
	$\Delta = 0^{012}$				

MC
JOM

FB 20-42
12/09/20

(26)

END OF DAY

Rite in the Rain

20-1341 EAFB MW ~~WELLS~~
~TIE IN MW WELLS, SET CONTROL, RUN LEVEL~

DC: FC 5000-1
STATIC SESSION ON A-6
RCVR: -HIPER GA #184 H1: 5 42/1.652M
STATIC ON: 10:19AM STATIC OFF: 1:17PM

BASE: @PT #101 (RBC 2" 12136)
-HIPER II #C0341 H1: 6.08/1.853M
STATIC ON: 10:37AM STATIC OFF: 1:28PM

ROVER:
-HIPER V #17983

PT	CODE	HR
~~106~~ 116	CP 106	1.204M/6 ±1
	STATIC ON: 10:53AM	STATIC OFF: 11:24AM
237	MW 12	6 ±1
~~107~~ 117	CP 107	6 ±1
	STATIC ON: 12:16PM	STATIC OFF: 12:45PM
238	MW 11	/1.204M

J. OLIN 12/10/20 F.B. 2042
N. ENSIGN -1°F SNOW SHOWERS

★ GOT ALL WORK DONE BESIDES MW4 BECAUSE OF NO ACCESS FROM LOCKED GATES.

ELEV = 516 584

ELEV = 515 203

Rite in the Rain

20-1341 EAFB MW

~ LEVEL LOOP FOR MW12 & CP106 ~

STA	HT	BS	FS	INT	ELEV
CP106		4.668			516 584
	521 252			Adj: +0.035 = 516 619	
GROUND		516 235		5.052	516 200
MW12			2.116		519 136
		2.654			519 171
	521 790				
CP106			5.204		516 586

CLOSE OUT = 0.002 ✓

J. OLIN 12/10/20 F.B. 20-42 28

N. ENSIGN 0°F

~ LEVEL LOOP FOR MW11 & CP107 ~

STA	HT	BS	FS	INT	ELEV
CP107		4.644			515 203
	519 841				Adj: +0.017
GROUND				4.273	515 574
					515 591
MW11			1.209		518 638
		1.239			518 655
	519 871				
CP 107			4.673		515 204

CLOSE OUT = 0.001 ✓

Rite in the Rain

20-1341 EAFB MW CONT~

STATIC ON PT #101
-HIPER GA #184 HI: 5 73 ON: 1:43PM OFF: 4:42PM
1.746M

STATIC ON A6 3 BASE:
-HIPER II #C0341 HI: 5 78 ON: 2:00PM OFF: 4:28PM
1.761M

ROVER:
-HIPER V #17983

PT	CODE	HR
239	MW 6	6 71
~~108~~ 118	CP 108	6 71

STATIC ON: 2:34PM STATIC OFF: 3:12PM / 1.204M
ELEV = 533 721

240 — MW4 — 6 71

109 — CP 109

~~STATIC ON:~~
~~STATIC OFF:~~

J. OLIN 12/10/20 F.B. 20-42
N. ENSIGN 1°F SNOW SHOWERS

LEVEL LOOP FOR MW 6 3 CP 108:

STA	HI	BS	FS	INT	ELEV	ADJ: -0.014
CP108		3.766			533 721	533 707
	537 487					
GROUND			4.272		533 215	533 201
MW6		4.660			532 827	532 813
	537 026	4.199				
CP108		3.304			533 724	

CLOSEOUT = 0.001

LEVEL LOOP FOR MW4 3 CP 109

STA	HI	BS	FS	INT	ELEV
CP109					
GROUND					
MW4					
CP109					

★ UNABLE TO REACH MW 4 BECAUSE EVERY ROAD HAD PADLOCKS THAT NEEDED COMBOS,

CLOSEOUT =

Rite in the Rain

20-1341 EAFB M.W.

STATIC GPS

1) RCVR: HiPer GA # 184 Hi = 5.37'
- SET UP ON CP 101
START - 10:13 STOP - 14:54

2) RCVR: HiPer II # 341 Hi = 5.45
- SET UP ON A6
- START RTK BASE STATION
START - 10:35 STOP - 14:42

3) RCVR: HiPer V # 17983 Hi = 5.45
- SET UP ON CP 109
START - 13:00 STOP - 15:32

FILE NAMES

1) 184_121520.TPS

2) 341_121520_A6.TPS

3) 17983_121520_CP109.TPS

N. ENSIGN
J. OWEN
10° F
CLEAR

FB 20-47
12/16/20

(16)

RTK GPS

DC: FC5000-1
- F/W 20-1341_SEARCH.ASE
BASE: HiPer II # 341 Hi = 5.45
- SET UP @ A6
ROVER: HiPer V # 17983

- CHECKED INTO CP 109
- Δ_{NEE} = (-0.015, 0.003, 0.06)
- STORED AS ~~109~~ STK 2106

Pt Nr	Hi	Desc
240	7.71	MONITOR WELL 04
109	↓	SET 5/8" REBAR NW OF MW04. 0.01 ABOVE GRADE

20-1341 EAFB M.W.
DIFF. LEVELING

LEVEL: LEICA DNA 10 #333746
JOB: EAFB
LINE: CP109-MW04

STA	BS	HI	FS	INT	ELEV
CP ~~101~~ 119	5.086				537.747
		542.833			
GND			4.667		538.166
MW04					541.321 ~~547.340~~
		1.512			
	1.322				
		542.643			
CP109			4.896		537.747
$\Sigma_{BS,FS}$	6.408		6.409		
	$\Delta = 0$				

TL
JOM

FB 20-47
12-15-20

(17)

ADJ: +0.019 = 537.766
5/8" REBAR SET 0.1' ABOVE GRADE
538.185
GROUND SHOT TAKEN ON S. OF MW 04 541.340
SHOT ON RIM OF PVC PIPE, ABOVE GRADE
N. SIDE

END OF DAY

Rite in the Rain

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EXPANDED PFOS/PFOA/PFBS SITE INSPECTION REPORT
EIELSON AFB AND MOOSE CREEK, ALASKA

ATTACHMENT H-3. DATASHEET – NGS FOR CORS SITE "FAIR"

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The NGS Data Sheet

See file dsdata.pdf for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.12.5.10
Starting Datasheet Retrieval...
1        National Geodetic Survey,   Retrieval Date = DECEMBER  4, 2020
 AF9534 ***********************************************************************
 AF9534  CORS         -  This is a GPS Continuously Operating Reference Station.
 AF9534  DESIGNATION -  GILMORE CREEK OBS CORS ARP
 AF9534  CORS_ID      -  FAIR
 AF9534  PID          -  AF9534
 AF9534  STATE/COUNTY-  AK/FAIRBANKS NORTH STAR
 AF9534  COUNTRY      -  US
 AF9534  USGS QUAD    -  FAIRBANKS D-2 NE (2017)
 AF9534
 AF9534                        *CURRENT SURVEY CONTROL
 AF9534  ______________________________________________________________________
 AF9534* NAD 83(2011) POSITION- 64 58 40.79584(N) 147 29 57.16002(W)   ADJUSTED
 AF9534* NAD 83(2011) ELLIP HT-   318.659 (meters)        (05/??/20)   ADJUSTED
 AF9534* NAD 83(2011) EPOCH   -  2010.00
 AF9534  ______________________________________________________________________
 AF9534  GEOID HEIGHT    -          9.477 (meters)                     GEOID12B
 AF9534  NAD 83(2011) X  - -2,281,620.821 (meters)                     COMP
 AF9534  NAD 83(2011) Y  - -1,453,596.937 (meters)                     COMP
 AF9534  NAD 83(2011) Z  -  5,756,961.499 (meters)                     COMP
 AF9534
 AF9534  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 AF9534  Standards:
 AF9534         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 AF9534            Horiz  Ellip           SD_N   SD_E   SD_h      (unitless)
 AF9534  -----------------------------------------------------------------
 AF9534  NETWORK    0.01   0.02           0.00   0.00   0.01     -0.00446600
 AF9534  -----------------------------------------------------------------
 AF9534
 AF9534
 AF9534.The coordinates were established by GPS observations
 AF9534.and adjusted by the National Geodetic Survey in May 2020.
 AF9534
 AF9534.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
 AF9534.been affixed to the stable North American Tectonic Plate.
 AF9534
 AF9534.The coordinates are valid at the epoch date displayed above
 AF9534.which is a decimal equivalence of Year/Month/Day.
```

```
AF9534
AF9534.Due to the release of the International GNSS Service (IGS) 2014
AF9534.realization of the International Terrestrial Reference Frame of 2014
AF9534.(ITRF2014), NGS reprocessed all NOAA CORS Network and some IGS stations
AF9534.using data collected between 1/1/1996 and 1/30/2017. The resulting ITRF2014
AF9534.epoch 2010.00 coordinates, referred to as Multi-Year CORS Solution 2
AF9534.(MYCS2), were transformed to NAD 83 (2011/PA11/MA11) maintaining the
AF9534.currently published epoch of 2010.00.
AF9534
AF9534.Additional information on MYCS2 is available at
AF9534.https://geodesy.noaa.gov/CORS/coords.shtml
AF9534
AF9534.Significant digits in the geoid height do not necessarily reflect accuracy.
AF9534.GEOID12B height accuracy estimate available here.
AF9534
AF9534.The PID for the CORS L1 Phase Center is DK6557.
AF9534
AF9534.Click photographs - Photos may exist for this station.
AF9534
AF9534.The XYZ, and position/ellipsoidal ht. are equivalent.
AF9534
AF9534.The ellipsoidal height was determined by GPS observations
AF9534.and is referenced to NAD 83.
AF9534
AF9534. The following values were computed from the NAD 83(2011) position.
AF9534
AF9534;                    North         East     Units Scale Factor Converg.
AF9534;UTM  06      - 7,206,095.607   476,439.702   MT  0.99960680   -0 27 08.5
AF9534
AF9534!             -  Elev Factor  x  Scale Factor =   Combined Factor
AF9534!UTM  06      -   0.99995015  x   0.99960680  =   0.99955697
AF9534
AF9534_U.S. NATIONAL GRID SPATIAL ADDRESS: 6WVT7643906095(NAD 83)
AF9534
AF9534                           SUPERSEDED SURVEY CONTROL
AF9534
AF9534  NAD 83(2011)-  64 58 40.79584(N)    147 29 57.16000(W) AD(2010.00) c
AF9534  ELLIP H (06/??/19)  318.658  (m)                       GP(2010.00) c c
AF9534  NAD 83(2011)-  64 58 40.79460(N)    147 29 57.15809(W) AD(2010.00) c
AF9534  ELLIP H (08/??/11)  318.683  (m)                       GP(2010.00) c c
AF9534  NAD 83(CORS)-  64 58 40.79494(N)    147 29 57.16002(W) AD(2003.00) c
AF9534  ELLIP H (10/??/06)  318.684  (m)                       GP(2003.00) c c
AF9534  NAD 83(CORS)-  64 58 40.79569(N)    147 29 57.16098(W) AD(2003.00) c
AF9534  ELLIP H (03/??/03)  318.679  (m)                       GP(2003.00) c c
AF9534  NAD 83(CORS)-  64 58 40.79765(N)    147 29 57.16346(W) AD(2002.00) c
AF9534  ELLIP H (03/??/02)  318.682  (m)                       GP(2002.00) c c
AF9534  NAD 83(CORS)-  64 58 40.79783(N)    147 29 57.16484(W) AD(1997.00) c
AF9534  ELLIP H (07/??/96)  318.703  (m)                       GP(1997.00) c c
AF9534  NAD 83(CORS)-  64 58 40.79787(N)    147 29 57.16488(W) AD(1996.00) c
```

```
 AF9534  ELLIP H (07/??/96)  318.705  (m)                        GP(1996.00) c c
 AF9534  NAD 83(CORS)-  64 58 40.79783(N)    147 29 57.16484(W) AD(1997.00) c
 AF9534  ELLIP H (07/??/95)  318.703  (m)                        GP(1997.00) c c
 AF9534
 AF9534.Superseded values are not recommended for survey control.
 AF9534
 AF9534.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 AF9534.See file dsdata.pdf to determine how the superseded data were derived.
 AF9534
 AF9534_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
 AF9534
 AF9534                          STATION DESCRIPTION
 AF9534
 AF9534'DESCRIBED BY NATIONAL GEODETIC SURVEY 2020
 AF9534'STATION IS A GPS CORS.  LATEST INFORMATION INCLUDING POSITIONS AND
 AF9534'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
 AF9534'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
 AF9534'   ftp://cors.ngs.noaa.gov/cors/README.txt
 AF9534'   ftp://cors.ngs.noaa.gov/cors/coord/coord_14
 AF9534'   ftp://cors.ngs.noaa.gov/cors/station_log
 AF9534'   https://geodesy.noaa.gov/CORS
1        National Geodetic Survey,   Retrieval Date = DECEMBER  4, 2020
 AF9535 ***********************************************************************
 AF9535  CORS        -  This is a GPS Continuously Operating Reference Station.
 AF9535  DESIGNATION -  GILMORE CREEK CORS MONUMENT
 AF9535  CORS_ID     -  FAIR
 AF9535  PID         -  AF9535
 AF9535  STATE/COUNTY-  AK/FAIRBANKS NORTH STAR
 AF9535  COUNTRY     -  US
 AF9535  USGS QUAD   -  FAIRBANKS D-2 NE (2017)
 AF9535
 AF9535                        *CURRENT SURVEY CONTROL
 AF9535  ______________________________________________________________________
 AF9535* NAD 83(2011) POSITION- 64 58 40.79584(N) 147 29 57.16002(W)   ADJUSTED
 AF9535* NAD 83(2011) ELLIP HT-   318.573 (meters)        (05/??/20)   ADJUSTED
 AF9535* NAD 83(2011) EPOCH   -  2010.00
 AF9535  ______________________________________________________________________
 AF9535  GEOID HEIGHT    -          9.477 (meters)                    GEOID12B
 AF9535  NAD 83(2011) X  - -2,281,620.790 (meters)                    COMP
 AF9535  NAD 83(2011) Y  - -1,453,596.917 (meters)                    COMP
 AF9535  NAD 83(2011) Z  -  5,756,961.421 (meters)                    COMP
 AF9535  LAPLACE CORR    -          0.27  (seconds)                   DEFLEC12B
 AF9535
 AF9535  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 AF9535  Standards:
 AF9535         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 AF9535            Horiz  Ellip           SD_N   SD_E   SD_h      (unitless)
 AF9535  ----------------------------------------------------------------------
 AF9535  NETWORK    0.01   0.02           0.00   0.00   0.01     -0.00446600
```

AF9535 ----------
AF9535
AF9535
AF9535.The horizontal coordinates were established by GPS observations
AF9535.and adjusted by the National Geodetic Survey in May 2020.
AF9535
AF9535.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
AF9535.been affixed to the stable North American Tectonic Plate.
AF9535
AF9535.The horizontal coordinates are valid at the epoch date displayed above
AF9535.which is a decimal equivalence of Year/Month/Day.
AF9535
AF9535.Due to the release of the International GNSS Service (IGS) 2014
AF9535.realization of the International Terrestrial Reference Frame of 2014
AF9535.(ITRF2014), NGS reprocessed all NOAA CORS Network and some IGS stations
AF9535.using data collected between 1/1/1996 and 1/30/2017. The resulting ITRF2014
AF9535.epoch 2010.00 coordinates, referred to as Multi-Year CORS Solution 2
AF9535.(MYCS2), were transformed to NAD 83 (2011/PA11/MA11) maintaining the
AF9535.currently published epoch of 2010.00.
AF9535
AF9535.Additional information on MYCS2 is available at
AF9535.https://geodesy.noaa.gov/CORS/coords.shtml
AF9535
AF9535.Significant digits in the geoid height do not necessarily reflect accuracy.
AF9535.GEOID12B height accuracy estimate available here.
AF9535
AF9535.Click photographs - Photos may exist for this station.
AF9535
AF9535.The XYZ, and position/ellipsoidal ht. are equivalent.
AF9535
AF9535.The Laplace correction was computed from DEFLEC12B derived deflections.
AF9535
AF9535.The ellipsoidal height was determined by GPS observations
AF9535.and is referenced to NAD 83.
AF9535
AF9535. The following values were computed from the NAD 83(2011) position.
AF9535
AF9535; North East Units Scale Factor Converg.
AF9535;SPC AK 3 - 1,223,686.909 429,228.017 MT 0.99996130 -1 21 30.8
AF9535;UTM 06 - 7,206,095.607 476,439.702 MT 0.99960680 -0 27 08.5
AF9535
AF9535! - Elev Factor x Scale Factor = Combined Factor
AF9535!SPC AK 3 - 0.99995016 x 0.99996130 = 0.99991146
AF9535!UTM 06 - 0.99995016 x 0.99960680 = 0.99955698
AF9535
AF9535_U.S. NATIONAL GRID SPATIAL ADDRESS: 6WVT7643906095(NAD 83)
AF9535
AF9535 SUPERSEDED SURVEY CONTROL
AF9535

```
AF9535  NAD 83(2011)-  64 58 40.79584(N)    147 29 57.16000(W) AD(2010.00) A
AF9535  ELLIP H (06/??/19)  318.572  (m)                       GP(2010.00) 4 1
AF9535  NAD 83(2011)-  64 58 40.79460(N)    147 29 57.15809(W) AD(2010.00) A
AF9535  ELLIP H (08/??/11)  318.597  (m)                       GP(2010.00) 4 1
AF9535  ELLIP H (02/10/07)  318.593  (m)                       GP(2007.00)
AF9535  NAD 83(2007)-  64 58 40.79569(N)    147 29 57.16098(W) AD(2007.00) 0
AF9535  NAD 83(CORS)-  64 58 40.79494(N)    147 29 57.16002(W) AD(2003.00) A
AF9535  ELLIP H (10/??/06)  318.598  (m)                       GP(2003.00) 4 1
AF9535  NAD 83(CORS)-  64 58 40.79569(N)    147 29 57.16098(W) AD(2003.00) A
AF9535  ELLIP H (03/??/03)  318.593  (m)                       GP(2003.00) 4 1
AF9535  NAD 83(CORS)-  64 58 40.79765(N)    147 29 57.16346(W) AD(2002.00) A
AF9535  ELLIP H (03/??/02)  318.595  (m)                       GP(2002.00) 4 1
AF9535  NAD 83(CORS)-  64 58 40.79783(N)    147 29 57.16484(W) AD(1997.00) A
AF9535  ELLIP H (07/??/96)  318.616  (m)                       GP(1997.00) 4 1
AF9535  NAD 83(CORS)-  64 58 40.79787(N)    147 29 57.16488(W) AD(1996.00) A
AF9535  ELLIP H (07/??/96)  318.619  (m)                       GP(1996.00) 4 1
AF9535  NAD 83(CORS)-  64 58 40.79783(N)    147 29 57.16484(W) AD(1997.00) A
AF9535  ELLIP H (07/??/95)  318.616  (m)                       GP(1997.00) 4 1
AF9535
AF9535.Superseded values are not recommended for survey control.
AF9535
AF9535.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AF9535.See file dsdata.pdf to determine how the superseded data were derived.
AF9535
AF9535_STAMPING: NONE
AF9535
AF9535                          STATION DESCRIPTION
AF9535
AF9535'THIS MONUMENT IS ASSOCIATED WITH CORS SITE 'FAIR'
AF9535'LATEST INFORMATION INCLUDING POSITIONS AND VELOCITIES
AF9535'ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
AF9535'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
AF9535'   ftp://cors.ngs.noaa.gov/cors/README.txt
AF9535'   ftp://cors.ngs.noaa.gov/cors/coord/coord_14
AF9535'   ftp://cors.ngs.noaa.gov/cors/station_log
AF9535'   https://geodesy.noaa.gov/CORS
AF9535'RECOVERED AS DESCRIBED.

*** retrieval complete.
Elapsed Time = 00:00:01
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EXPANDED PFOS/PFOA/PFBS SITE INSPECTION REPORT
EIELSON AFB AND MOOSE CREEK, ALASKA

ATTACHMENT H-4. DATASHEET – NGS MONUMENT A611

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The NGS Data Sheet

See file dsdata.pdf for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.12.5.10
Starting Datasheet Retrieval...
1        National Geodetic Survey,   Retrieval Date = OCTOBER 26, 2020
 TT2716 ***********************************************************************
 TT2716  DESIGNATION -  A 6
 TT2716  PID         -  TT2716
 TT2716  STATE/COUNTY-  AK/FAIRBANKS NORTH STAR
 TT2716  COUNTRY     -  US
 TT2716  USGS QUAD   -  FAIRBANKS C-1 NE (2016)
 TT2716
 TT2716                        *CURRENT SURVEY CONTROL
 TT2716  ______________________________________________________________________
 TT2716* NAD 83(1986) POSITION- 64 39 25.96   (N) 147 05 58.34   (W)   HD_HELD1
 TT2716* NAVD 88 ORTHO HEIGHT -   166.943 (meters)      547.71  (feet) ADJUSTED
 TT2716  ______________________________________________________________________
 TT2716  GEOID HEIGHT    -          9.740 (meters)                     GEOID12B
 TT2716  DYNAMIC HEIGHT  -        167.215 (meters)      548.60  (feet) COMP
 TT2716  MODELED GRAVITY -    982,206.9   (mgal)                       NAVD 88
 TT2716
 TT2716  VERT ORDER      -  FIRST     CLASS II
 TT2716
 TT2716.The horizontal coordinates were determined by differentially corrected
 TT2716.hand held GPS observations or other comparable positioning techniques
 TT2716.and have an estimated accuracy of +/- 3 meters.
 TT2716.
 TT2716.The orthometric height was determined by differential leveling and
 TT2716.adjusted by the NATIONAL GEODETIC SURVEY
 TT2716.in June 1991.
 TT2716
 TT2716.Significant digits in the geoid height do not necessarily reflect accuracy.
 TT2716.GEOID12B height accuracy estimate available here.
 TT2716
 TT2716.Click photographs - Photos may exist for this station.
 TT2716
 TT2716.The dynamic height is computed by dividing the NAVD 88
 TT2716.geopotential number by the normal gravity value computed on the
 TT2716.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 TT2716.degrees latitude (g = 980.6199 gals.).
 TT2716
 TT2716.The modeled gravity was interpolated from observed gravity values.
```

```
TT2716
TT2716
TT2716_U.S. NATIONAL GRID SPATIAL ADDRESS: 6WVS9524670256(NAD 83)
TT2716
TT2716                          SUPERSEDED SURVEY CONTROL
TT2716
TT2716  NGVD 29 (??/??/92)  165.38   (m)          542.6    (f) COMPUTED    1 2
TT2716
TT2716.Superseded values are not recommended for survey control.
TT2716
TT2716.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TT2716.See file dsdata.pdf to determine how the superseded data were derived.
TT2716
TT2716_MARKER: DD = SURVEY DISK
TT2716_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
TT2716_STAMPING: A 6 1944
TT2716_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
TT2716+STABILITY: SURFACE MOTION
TT2716
TT2716  HISTORY     - Date     Condition        Report By
TT2716  HISTORY     - 1944     MONUMENTED       DOD
TT2716  HISTORY     - 1964     GOOD             CGS
TT2716
TT2716                          STATION DESCRIPTION
TT2716
TT2716'DESCRIBED BY COAST AND GEODETIC SURVEY 1964
TT2716'2.3 MI S FROM EIELSON AFB.
TT2716'2.3 MILES SOUTH ALONG STATE HIGHWAY 2 FROM THE NORTH GATE TO EIELSON
TT2716'AIR FORCE BASE, 0.4 MILE SOUTH OF MILEPOST 339, 77 FEET WEST OF THE
TT2716'CENTERLINE OF THE HIGHWAY, 56 1/2 FEET SOUTHWEST OF TELEPHONE POLE
TT2716'2473, IN THE APPROXIMATE CENTER OF THREE BLACK AND WHITE WITNESS
TT2716'POSTS, AND ABOUT 1 FOOT LOWER THAN THE HIGHWAY.  A DISK SET IN THE TOP
TT2716'OF A CONCRETE POST PROJECTING 0.7 FOOT.

*** retrieval complete.
Elapsed Time = 00:00:02
```

EXPANDED PFOS/PFOA/PFBS SITE INSPECTION REPORT
EIELSON AFB AND MOOSE CREEK, ALASKA

ATTACHMENT H-5. PHOTOGRAPH OF NGS MONUMENT A611

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Photograph. Closeup of NGS Monument A611

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EXPANDED PFOS/PFOA/PFBS SITE INSPECTION REPORT
EIELSON AFB AND MOOSE CREEK, ALASKA

ATTACHMENT H-6. SURVEY BASE FILES

(Provided on a CD)

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EXPANDED PFOS/PFOA/PFBS SITE INSPECTION REPORT
EIELSON AFB AND MOOSE CREEK, ALASKA

ATTACHMENT H-7. DIFFERENTIAL CORRECTION LOGS

(Provided on a CD)

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

APPENDIX I – INVESTIGATION-DERIVED WASTE MANAGEMENT

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*** IN CASE OF EMERGENCY CALL 800-899-4672 ***

154666-KC

NON-HAZARDOUS WASTE MANIFEST

PO# 154656-6-3404-KC

Please print or type (Form designed for use on elite (12 pitch) typewriter) 200929028571

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. AK1570028646

Manifest Document No. 154665A

2. Page 1 of 3

3. Generator's Name and Mailing Address
US AIR FORCE, 354TH CES/CEOIC
2310 CENTRAL AVE, SUITE 100
EIELSON AFB, AK 99702-2299

4. Generator's Phone (907) 377-4342

US AIR FORCE, 354TH CES/CEOIC
2310 CENTRAL AVE, SUITE 100
EIELSON AFB, AK 99702-2299

5. Transporter 1 Company Name: NRC ALASKA LLC

6. US EPA ID Number: AKR000004184

A. State Transporter's ID

B. Transporter 1 Phone 907-258-1558

7. Transporter 2 Company Name: WEAVER BROTHERS

8. US EPA ID Number: AKD002848372

C. State Transporter's ID

D. Transporter 2 Phone 907-278-4526

9. Designated Facility Name and Site Address
US ECOLOGY IDAHO, INC.
20400 LEMLEY RD
GRAND VIEW, ID 83624

10. US EPA ID Number: IDD073114654

E. State Facility's ID

F. Facility's Phone (208) 834-2275

HM	11. WASTE DESCRIPTION	Containers No.	Containers Type	13. Total Quantity	14. Unit Wt./Vol.
a.	Material Not Regulated by DOT	8	DF	75	P
b.	Material Not Regulated by DOT	2	DF	15	P
c.					
d.					

G. Additional Descriptions for Materials Listed Above
1) USE 49389-0 PFOA/PFOS IDW WATER (EAFB DRUM# 2247)
2) USE 49389-0 PFOA/PFOS IDW WATER (EAFB DRUM# 2966)

H. Handling Codes for Wastes Listed Above
D31427 Send Original Manifest to Generator. Send Manifest Copy & CD only to NRC AK, 619 E. Ship Creek Ave., Ste. 319, Anchorage, AK 99501

15. Special Handling Instructions and Additional Information
Shipper's Certification: This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation

GENERATOR

18. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name: Carolyn Norton
Signature: Carolyn Norton
Date: Month 7 Day 30 Year 20

TRANSPORTER

17. Transporter Acknowledgement of Receipt of Materials
Printed/Typed Name: Eric Gau
Signature:
Date: Month 7 Day 30 Year 20

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: Jacob Graham
Signature:
Date: Month 9 Day 3 Year 20

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest, except as noted in Item 19
Printed/Typed Name: Corian Schmitz
Signature: Corian Schmitz
Date: Month 9 Day 4 Year 2020

NON-HAZARDOUS WASTE

CF14 © 2002 LABELMASTER® (800) 621-5808 www.labelmaster.com

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator ID Number	22. Page	23. Manifest Tracking Number
	AK1570028646	2	154666A

24. Generator's Name: US AIR FORCE, 354TH CES/CEOIC
2310 CENTRAL AVE. SUITE 100
EIELSON AFB, AK 99702-2299
(907) 377-4342

25. Transporter 3 Company Name: TOTE MARITIME ALASKA, LLC. — U.S. EPA ID Number: WAD070397955

26. Transporter 4 Company Name: EQ INDUSTRIAL SERVICES — U.S. EPA ID Number: MK435642742

27a HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes

32. Special Handling Instructions and Additional Information

GENERATOR

TRANSPORTER

33. Transporter Acknowledgment of Receipt of Materials
Printed/Typed Name: BD — Signature: BD — Month: 9 Day: 9 Year: 20

34. Transporter Acknowledgment of Receipt of Materials
Printed/Typed Name: Doug Ray — Signature: Doug Ray — Month: 9 Day: 17 Year: 20

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 3-05) Previous editions are obsolete

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator ID Number	22. Page	23. Manifest Tracking Number
	AK1570028646	3	154668A

24. Generator's Name: US AIR FORCE. 354 TH CES/CEOIC
2310 CENTRAL AVE. SUITE 100
EIELSON AFB. AK 99702-2299
(907) 377-4342

25. Transporter 5 Company Name: ~~STEVE FORLER TRUCKING~~ U.S. EPA ID Number: ~~AKR000205625~~

26. Transporter 6 Company Name: U.S. EPA ID Number:

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes

32. Special Handling Instructions and Additional Information

GENERATOR

33. Transporter Acknowledgment of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

34. Transporter Acknowledgment of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

TRANSPORTER

35. Discrepancy
Sec 25. omit ok per Dan Motta 9/29/2020

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

DESIGNATED FACILITY

CERTIFICATE OF DISPOSAL

March 2, 2021

US AIR FORCE
2310 CENTRAL AVE SUITE 100
EIELSON AFB, AK 99702

This is to certify that waste as defined on Waste Manifest number **154666A** was received by U.S. Ecology, Inc., on **9/29/2020**. The waste(s) were subsequently treated, if required by CFR Part 268 and U.S. Ecology's permits, and disposed of on **10/05/2020** in accordance with permits and laws regulating this facility.

Reference Number: 20092902851-154666A-1-1
Material: 8 5 GALLON POLY (BATCH WASTE)
Process: Solidification
Management Code: H132 Landfill or surface impoundment that will be closed as landfill

Facility: US ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654

Waste Stream #: 49389-0

Waste Type: NON-HAZARDOUS

Customer: NRC ALASKA, LLC

Printed Name: CORIAN SCHMITZ

Signature: Corian Schmitz

Title: RECEIVING CLERK

CERTIFICATE OF DISPOSAL

March 2, 2021

US AIR FORCE
2310 CENTRAL AVE SUITE 100
EIELSON AFB, AK 99702

This is to certify that waste as defined on Waste Manifest number **154666A** was received by U.S. Ecology, Inc., on **9/29/2020**. The waste(s) were subsequently treated, if required by CFR Part 268 and U.S. Ecology's permits, and disposed of on **10/05/2020** in accordance with permits and laws regulating this facility.

Reference Number: 20092902851-154666A-1-1
Material: 8 5 GALLON POLY (CRUSHED EMPTY CONTAINER)
Process: Solidification
Management Code: H132 Landfill or surface impoundment that will be closed as landfill

Facility: US ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654

Waste Stream #: 49389-0

Waste Type: NON-HAZARDOUS

Customer: NRC ALASKA, LLC

Printed Name: CORIAN SCHMITZ

Signature: Corian Schmitz

Title: RECEIVING CLERK

CERTIFICATE OF DISPOSAL

March 2, 2021

US AIR FORCE
2310 CENTRAL AVE SUITE 100
EIELSON AFB, AK 99702

This is to certify that waste as defined on Waste Manifest number **154666A** was received by U.S. Ecology, Inc., on **9/29/2020**. The waste(s) were subsequently treated, if required by CFR Part 268 and U.S. Ecology's permits, and disposed of on **10/05/2020** in accordance with permits and laws regulating this facility.

Reference Number: 20092902851-154666A-1-2
Material: 2 2 GALLON DRUM (BATCH WASTE)
Process: Solidification
Management Code: H132 Landfill or surface impoundment that will be closed as landfill

Facility: US ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654

Waste Stream #: 49389-0

Waste Type: NON-HAZARDOUS

Customer: NRC ALASKA, LLC

Printed Name: CORIAN SCHMITZ

Signature: Corian Schmitz

Title: RECEIVING CLERK

CERTIFICATE OF DISPOSAL

March 2, 2021

US AIR FORCE
2310 CENTRAL AVE SUITE 100
EIELSON AFB, AK 99702

This is to certify that waste as defined on Waste Manifest number **154666A** was received by U.S. Ecology, Inc., on **9/29/2020**. The waste(s) were subsequently treated, if required by CFR Part 268 and U.S. Ecology's permits, and disposed of on **10/05/2020** in accordance with permits and laws regulating this facility.

Reference Number: 20092902851-154666A-1-2
Material: 2 2 GALLON DRUM (CRUSHED EMPTY CONTAINER)
Process: Solidification
Management Code: H132 Landfill or surface impoundment that will be closed as landfill

Facility: US ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654

Waste Stream #: 49389-0

Waste Type: NON-HAZARDOUS

Customer: NRC ALASKA, LLC

Printed Name: CORIAN SCHMITZ

Signature: Corian Schmitz

Title: RECEIVING CLERK

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157927-KC

NON-HAZARDOUS WASTE MANIFEST

PO# 157927-6-3404-KC

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: AK1570028646

Manifest Document No.: 157927A

2. Page 1 of 3

3. Generator's Name and Mailing Address
US AIR FORCE, 354TH CES/CEOIC
2310 CENTRAL AVE, SUITE 100
EIELSON AFB, AK 99702-2299

4. Generator's Phone ((907) 377-4342

US AIR FORCE, 354TH CES/CEOIC
2310 CENTRAL AVE, SUITE 100
EIELSON AFB, AK 99702-2299

5. Transporter 1 Company Name: NRC ALASKA LLC

6. US EPA ID Number: AKR000004184

A. State Transporter's ID

B. Transporter 1 Phone: 907-258-1558

7. Transporter 2 Company Name: WEAVER BROTHERS

8. US EPA ID Number: AKD002848372

C. State Transporter's ID

D. Transporter 2 Phone: 907-278-4526

9. Designated Facility Name and Site Address
US ECOLOGY IDAHO, INC.
20400 LEMLEY RD
GRAND VIEW, ID 83624

10. US EPA ID Number: IDD073114654

E. State Facility's ID

F. Facility's Phone: (208) 834-2275

HM	11. WASTE DESCRIPTION	Containers No.	Containers Type	13. Total Quantity	14. Unit Wt./Vol.
a.	Material Not Regulated by DOT	1	DM	350	P
b.					
c.					
d.					

G. Additional Descriptions for Materials Listed Above
1) USE49095-0 CERCLA PFOA/PFOS WATER

H. Handling Codes for Wastes Listed Above
D33143 Send Original Manifest to Generator. Send Manifest Copy & CD only to NRC AK, 619 E. Ship Creek Ave., Ste. 319, Anchorage, AK 99501

15. Special Handling Instructions and Additional Information
Shipper's Certification: This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation

GENERATOR

16. **GENERATOR'S CERTIFICATION:** I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name: Carolyn Norton
Signature: Carolyn Norton
Date: Month 10 Day 21 Year 2020

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Bret Lang
Signature: Bret Lang
Date: Month 10 Day 21 Year 20

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name:
Signature:
Date: Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.

Printed/Typed Name:
Signature:
Date: Month Day Year

NON-HAZARDOUS WASTE

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UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator ID Number	22. Page	23. Manifest Tracking Number
	AK1570028646	2	157927A

24. Generator's Name: US AIR FORCE, 354TH CES/CEOIC
2310 CENTRAL AVE. SUITE 100
EIELSON AFB, AK 99702-2299
(907) 377-4342

25. Transporter 3 Company Name: TOTE MARITIME ALASKA, LLC. — U.S. EPA ID Number: WAD070397955

26. Transporter 4 Company Name: EQ INDUSTRIAL SERVICES — U.S. EPA ID Number: MIK435642742

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		

GENERATOR

32. Special Handling Instructions and Additional Information

TRANSPORTER

33. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

34. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 12-17) Previous editions are obsolete.

DESIGNATED FACILITY TO EPA's e-MANIFEST SYSTEM

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UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)

21. Generator ID Number	22. Page	23. Manifest Tracking Number
AK1570028646	3	157927A

24. Generator's Name: US AIR FORCE. 354TH CES/CEOIC
2310 CENTRAL AVE. SUITE 100
EIELSON AFB. AK 99702-2299
(907) 377-4342

25. Transporter 5 Company Name: STEVE FORLER TRUCKING — U.S. EPA ID Number: IDR000205625

26. Transporter 6 Company Name — U.S. EPA ID Number:

GENERATOR

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		

32. Special Handling Instructions and Additional Information

TRANSPORTER

33. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

34. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 12-17) Previous editions are obsolete.

DESIGNATED FACILITY TO EPA's e-MANIFEST SYSTEM

CERTIFICATE OF DISPOSAL

January 12, 2021

US AIR FORCE, 354TH CES/CEOIC
2310 CENTRAL AVE, SUITE 100
EIELSON AFB, AK 99702

This is to certify that waste as defined on Waste Manifest number **157927A** was received by U.S. Ecology, Inc., on **12/21/2020**. The waste(s) were subsequently treated, if required by CFR Part 268 and U.S. Ecology's permits, and disposed of on **01/05/2021** in accordance with permits and laws regulating this facility.

Reference Number: 20122104500-157927A-1-1
Material: 1 55 GALLON DRUM (CRUSHED EMPTY CONTAINER)
Process: Direct Landfill
Management Code: H132 Landfill or surface impoundment that will be closed as landfill

Facility: US ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654

Waste Stream #: 49095-0

Waste Type: NON-HAZARDOUS

Customer: NRC ALASKA, LLC

Printed Name: CORIAN SCHMITZ

Signature: Corian Schmitz

Title: RECEIVING CLERK

CERTIFICATE OF DISPOSAL

January 12, 2021

US AIR FORCE, 354TH CES/CEOIC
2310 CENTRAL AVE, SUITE 100
EIELSON AFB, AK 99702

This is to certify that waste as defined on Waste Manifest number **157927A** was received by U.S. Ecology, Inc., on **12/21/2020**. The waste(s) were subsequently treated, if required by CFR Part 268 and U.S. Ecology's permits, and disposed of on **01/05/2021** in accordance with permits and laws regulating this facility.

Reference Number: 20122104500-157927A-1-1
Material: 1 55 GALLON DRUM (BATCH WASTE)
Process: Solidification
Management Code: H132 Landfill or surface impoundment that will be closed as landfill

Facility: US ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654

Waste Stream #: 49095-0

Waste Type: NON-HAZARDOUS

Customer: NRC ALASKA, LLC

Printed Name: CORIAN SCHMITZ

Signature: Corian Schmitz

Title: RECEIVING CLERK

*** IN CASE OF EMERGENCY CALL 800-899-4672 ***

NON-HAZARDOUS WASTE MANIFEST

168124-KC

PO#168124-6-3404-KC

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NON-HAZARDOUS WASTE

GENERATOR

NON-HAZARDOUS WASTE MANIFEST	1. Generator's US EPA ID No. AK1570028646	Manifest Document No. 168124A	2. Page 1 of 2

3. Generator's Name and Mailing Address
US AIR FORCE, 354TH CES/CEIEC
2310 CENTRAL AVE, SUITE 100
EIELSON AFB, AK 99702-2299
4. Generator's Phone ((907) 377-4342

US AIR FORCE, 354TH CES/CEIEC
2310 CENTRAL AVE, SUITE 100
EIELSON AFB, AK 99702-2299

5. Transporter 1 Company Name	6. US EPA ID Number	A. State Transporter's ID
NRC ALASKA LLC	AKR000004184	B. Transporter 1 Phone 907-258-1558
7. Transporter 2 Company Name	8. US EPA ID Number	C. State Transporter's ID
WEAVER BROTHERS	AKD002848372	D. Transporter 2 Phone 907-278-4526
9. Designated Facility Name and Site Address	10. US EPA ID Number	E. State Facility's ID
US ECOLOGY IDAHO, INC. 20400 LEMLEY RD GRAND VIEW, ID 83624	IDD073114654	F. Facility's Phone (208) 834-2275

HM	11. WASTE DESCRIPTION	Containers No.	Containers Type	13. Total Quantity	14. Unit Wt./Vol.
a.	Material Not Regulated by DOT	2	DM	700	P
b.	Material Not Regulated by DOT	5	DF	300	P
c.					
d.					

G. Additional Descriptions for Materials Listed Above
1) USE49095-0 CERCLA PFOA/PFOS WATER 2144 DM#
2) USE49095-0 CERCLA PFOA/PFOS WATER 2247 DM#

H. Handling Codes for Wastes Listed Above
D87159 Send Original Manifest to Generator. Send Manifest Copy & CD only to NRC AK, 619 E. Ship Creek Ave., Ste. 319, Anchorage, AK 99501

15. Special Handling Instructions and Additional Information
Shipper's Certification: This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name	Signature	Date (Month Day Year)
Carolyn Norton	Carolyn Norton	7 13 21

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date (Month Day Year)
Royce Tribble JR	Royce Tribble JR	7 13 21

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date (Month Day Year)

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.

Printed/Typed Name	Signature	Date (Month Day Year)

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Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)

21. Generator ID Number	22. Page	23. Manifest Tracking Number
AK1570028646	2	168124A

24. Generator's Name: US AIR FORCE. 354TH CES/CEIEC
2310 CENTRAL AVE. SUITE 100
EIELSON AFB, AK 99702-2299
(907) 377-4342

25. Transporter 3 Company Name: TOTE MARITIME ALASKA, LLC. — U.S. EPA ID Number: WAD070397955

26. Transporter 4 Company Name: EQ INDUSTRIAL SERVICES — U.S. EPA ID Number: MK435642742

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes

GENERATOR

32. Special Handling Instructions and Additional Information

TRANSPORTER

33. Transporter Acknowledgment of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

34. Transporter Acknowledgment of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 12-17) Previous editions are obsolete.

DESIGNATED FACILITY TO EPA's e-MANIFEST SYSTEM

CERTIFICATE OF DISPOSAL

March 3, 2022

US AIR FORCE, 354TH CES/CEOIC
2310 CENTRAL AVE, SUITE 100
EIELSON AFB, AK 99702

This is to certify that waste as defined on Waste Manifest number **168124A** was received by U.S. Ecology, Inc., on **10/27/2021**. The waste(s) were subsequently treated, if required by CFR Part 268 and U.S. Ecology's permits, and disposed of on **01/12/2022** in accordance with permits and laws regulating this facility.

Reference Number: 21102704879-168124A-1-1
Material: 1 30 GALLON DRUM (BATCH WASTE)
Process: Solidification
Management Code: H132 Landfill or surface impoundment that will be closed as landfill

Facility: US ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654

Waste Stream #: 49095-0

Waste Type: NON-HAZARDOUS

Customer: US ECOLOGY ALASKA, LLC

Printed Name: CORIAN SCHMITZ

Signature: Corian Schmitz

Title: RECEIVING CLERK

CERTIFICATE OF DISPOSAL

March 3, 2022

US AIR FORCE, 354TH CES/CEOIC
2310 CENTRAL AVE, SUITE 100
EIELSON AFB, AK 99702

This is to certify that waste as defined on Waste Manifest number **168124A** was received by U.S. Ecology, Inc., on **10/27/2021**. The waste(s) were subsequently treated, if required by CFR Part 268 and U.S. Ecology's permits, and disposed of on **01/12/2022** in accordance with permits and laws regulating this facility.

Reference Number: 21102704879-168124A-1-1
Material: 1 55 GALLON DRUM (BATCH WASTE)
Process: Solidification
Management Code: H132 Landfill or surface impoundment that will be closed as landfill

Facility: US ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654

Waste Stream #: 49095-0

Waste Type: NON-HAZARDOUS

Customer: US ECOLOGY ALASKA, LLC

Printed Name: CORIAN SCHMITZ

Signature: Corian Schmitz

Title: RECEIVING CLERK

CERTIFICATE OF DISPOSAL

March 3, 2022

US AIR FORCE, 354TH CES/CEOIC
2310 CENTRAL AVE, SUITE 100
EIELSON AFB, AK 99702

This is to certify that waste as defined on Waste Manifest number **168124A** was received by U.S. Ecology, Inc., on **10/27/2021**. The waste(s) were subsequently treated, if required by CFR Part 268 and U.S. Ecology's permits, and disposed of on **01/12/2022** in accordance with permits and laws regulating this facility.

Reference Number: 21102704879-168124A-1-2
Material: 5 5 GALLON POLY (BATCH WASTE)
Process: Solidification
Management Code: H132 Landfill or surface impoundment that will be closed as landfill

Facility: US ECOLOGY IDAHO, INC.
20400 LEMLEY ROAD
GRAND VIEW, ID 83624
EPA ID: IDD073114654

Waste Stream #: 49095-0

Waste Type: NON-HAZARDOUS

Customer: US ECOLOGY ALASKA, LLC

Printed Name: CORIAN SCHMITZ

Signature: Corian Schmitz

Title: RECEIVING CLERK

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

APPENDIX J – ANALYTICAL LABORATORY REPORTS

(Provided on CD/DVD)

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

APPENDIX K – CHEMICAL DATA QUALITY REPORT

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TABLE OF CONTENTS

SECTION **PAGE**

1. Introduction 1
2. Analytical Laboratory and Test Methods 2
3. Data Review Process 3
3.1 Data Verification 3
3.2 Data Validation Procedures 3
3.3 Data Assessment 4
4. Sample Handling and Chain of Custody 4
5. Holding Time Compliance 5
6. Field Quality Assurance/Quality Control 5
6.1 Field Blanks 6
6.2 Trip Blanks 6
6.3 Equipment Blanks 6
6.4 Field Duplicates 8
7. Laboratory Quality Assurance/Quality Control 9
7.1 Low-Level Detections 9
7.2 Blank Contamination 9
7.3 Laboratory Control Samples 9
7.4 Matrix Spikes 10
7.5 Initial and Continuing Calibration 10
7.6 Extracted and Injected Internal Standards 10
7.7 Retention Times and Transition Ion Ratios 10
8. Summary of Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity 11
8.1 Precision 11
8.2 Accuracy 11
8.3 Representativeness 11
8.4 Completeness 11
8.5 Comparability 12
8.6 Sensitivity 12
9. Conclusions and Overall Data Validation Findings 12
10. References 14

TABLE(S)

Table K-1	Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Existing Wells.
Table K-2	Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Temporary Wells
Table K-3	Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Deep Cluster Wells and New Wells
Table K-4	Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Surface Water
Table K-5	Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Sediment Samples
Table K-6	Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Fire Station #1 (Soil)
Table K-7	Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Former Fire Training Area (Soil)
Table K-8	Summary of Analytical Results for Field, Equipment, and Trip Blanks
Table K-9	Summary of Completeness Calculations

ATTACHMENT(S)

Attachment K-1	Alaska Department of Environmental Conservation Checklists
Attachment K-2	Sample Summary Sheet

ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
%R	percent recovery
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
CDQR	Chemical Data Quality Report
CoC	chain-of-custody
DL	detection limit
DoD	Department of Defense
DQO	data quality objective
ELAP	Environmental Laboratory Accreditation Program
ELLE	Eurofins Lancaster Laboratories Environmental, Lancaster, Pennsylvania
EPA	U.S. Environmental Protection Agency
IDW	investigation derived waste
LCS	laboratory control sample
LOD	limit of detection
LOQ	limit of quantitation
MS	matrix spike
MSD	matrix spike duplicate
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutane sulfonate
PFDA	perfluoro-n-decanoic acid
PFHxA	perfluoro-n-hexanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QSM	Quality Systems Manual
RPD	relative percent difference
SDG	sample delivery group
SGS	SGS North America, Inc., Orlando, Florida
SM	Standard Method

ACRONYMS AND ABBREVIATIONS (concluded)

SOP	standard operating procedure
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force

1. INTRODUCTION

This Chemical Data Quality Report (CDQR) presents the data usability assessment and an overall quality assurance (QA) summary of the analytical data quality for sampling events performed between May 2019 to October 2020 in support of the Expanded Perfluorooctane Sulfonate (PFOS) Perfluorooctanoic Acid (PFOA), and Perfluorobutane Sulfonate (PFBS) Site Inspection Report for Eielson Air Force Base and Moose Creek, Alaska. This Chemical Data Quality Report has been prepared for the U.S. Army Corps of Engineers (USACE) under Contract No. W911KB-1-D-0018, Task Order W911KB18F0173. The complete analytical data summary tables with associated final data validation qualification flags are presented Table K-1 through Table K-8.

A QA/quality control (QC) program was implemented during the field investigation to ensure the generation of data of adequate and defensible quality. The specifications for the QA/QC program are outlined in the Expanded PFOA and PFOS Site Inspection Uniform Federal Policy-Quality Assurance Project Plan Work Plan for Eielson Air Force Base and Moose Creek, Alaska, referred to within this report as the "2019 QAPP" (U.S. Air Force [USAF], 2019). The QA/QC program was designed to minimize error, provide early identification and correction of potential problems, control the data acquisition process, and evaluate the performance of the sampling program. The QA/QC procedures were followed in the field as well as at the off-site laboratories. Results of the QA/QC program and a summary of the potential impact on data quality are presented in the sections below.

The data evaluation in this report focuses on environmental samples collected for off-site laboratory analysis. This data review focuses on criteria for the following QA/QC parameters and their effect on data quality and usability:

- Sample handling and chain of custody
- Holding time compliance
- Field QA/QC (i.e., field blanks, trip blanks, equipment blanks, and field duplicates)
- Laboratory QC (i.e., method blanks, laboratory control samples [LCS], extracted and injected internal standards, matrix spikes [MS]/matrix spike duplicates [MSD])
- Precision
- Accuracy
- Representativeness
- Completeness
- Comparability
- Sensitivity

The data were reviewed in accordance with the following documents:

- 2019 QAPP (USAF, 2019)
- U.S. Department of Defense (DoD) Quality Systems Manual for Environmental Laboratories, Version 5.1 (QSM) (DoD, 2017)

- DoD General Data Validation Guidelines (DoD, 2019)
- DoD Data Validation Guidelines Module 3: Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by QSM Table B-15 (DoD, 2020).
- State of Alaska Department of Environmental Conservation (ADEC) guidance document entitled: ADEC Technical Memorandum: Minimum Quality Assurance Requirements for Sample Handling, Reports, and Laboratory Data (ADEC, 2019a).

ADEC laboratory data review checklists were completed for sample delivery groups (SDGs) and are included in Attachment K-1.

In the absence of other guidance, method-, laboratory-, and/or standard operating procedure (SOP)-specific QC limits were also utilized to apply qualifiers to the data, as necessary.

2. ANALYTICAL LABORATORY AND TEST METHODS

The analysis of the environmental samples was performed by Eurofins Lancaster Laboratories Environmental (ELLE) in Lancaster, Pennsylvania, and SGS North America, Inc. (SGS), in Orlando, Florida.

The following 13 SDGs contain project data for samples collected in 2019: EIE02, EIE05, EIE06, EIE07, EIE08 (re-run for confirmation purposes only), EIE09, EIE10, EIE11, EIE12, EIE13, EIE14, FA69540, and FA69547.

The following 27 SDGs contain project data for samples collected in 2020: EIE15, EIE16, EIE17, EIE18, EIE19, EIE20, EIE21, 410-3081, 410-3082, 410-3098, 410-3323, 410-3412, 410-3415, 410-3851, 410-3854, 410-3855, 410-3856, 410-4116, 410-4213, 410-4215, 410-6332, 410-13937, 410-14108, 410-14665, 410-14670, 410-15101, 410-19226, and 410-15361.

The following three SDGs contain data for investigation derived waste (IDW) samples collected in 2019: EIE14, FA69540, and FA69547.

The following seven SDGs contain IDW data for samples collected in 2020: EIE17, EIE18, EIE19, 410-3081, 410-3412, 410-4213, and 410-19226.

Samples were analyzed in accordance with applicable specifications in the applicable laboratory SOPs, the DoD QSM (2017), and the 2019 QAPP, unless otherwise noted.

The following laboratory analytical methods were used:

- Per- and polyfluoroalkyl substances (PFAS) by U.S. Environmental Protection Agency (EPA) 537 modified using isotope dilution and liquid chromatography-tandem mass spectroscopy, compliant with DoD QSM Version 5.1, Table B-15 (2017).
- Total solids by Standard Methods for the Examination of Water and Wastewater Method (SM)2540 G (soils only).

Analytical results for soil samples are reported on a dry-weight basis.

3. DATA REVIEW PROCESS

The purpose of data validation and data quality review is to eliminate suspect analytical data and to assign data qualifiers, as appropriate, for potential data quality limitations discovered. The analytical data collected during the sampling event were verified and validated prior to use in this report. ADEC laboratory data review checklists are included in Attachments K-1.

3.1 DATA VERIFICATION

Data verification was performed as a completeness check to confirm that the required activities were conducted, the specified records are present, and the contents of the records are complete.

3.2 DATA VALIDATION PROCEDURES

The analytical data for project samples were validated following Stage 2A, as defined in the DoD Data Validation Guidelines (2019) and Data Validation Guidelines Module 3: Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by QSM Table B-15 (2020) in accordance with the DoD QSM (2017) and as specified in the 2019 QAPP (USAF, 2019).

The validation consisted of a review of the reported results; selected raw data were reviewed. The validation encompassed an evaluation of the following, as appropriate for the analytical method:

- Data package completeness
- Sample management (including sample preservation, handling, transport, chain-of-custody [CoC] protocol, holding times, and condition at laboratory receipt)
- Blank results
- LCS percent recoveries (%Rs)
- MS/MSD %Rs and relative percent differences (RPDs)
- Reported detection limits
- Extraction and internal standard recoveries
- Field RPDs
- Manual integrations
- Target analyte list verification
- Data qualifiers
- Retention times and transition ion ratios
- Verification of the electronic data reports

Qualitative rather than quantitative assessments of data quality were performed because the data validation guidelines produce qualitative results (B, QN, QH, QL, H, and R flags) rather than a numerical error or variability value associated with each data point) and because it is difficult to accurately quantify sources of error. The allowable final data qualifiers for definitive data and the hierarchy of data qualifiers, listed in order of the most severe through the least severe, are R, B, QN, QH, QL, and H. Data qualified with the "R" flag are considered unusable; however, no project

data were qualified with the "R" flag. Data qualified with the "QL" (detectable) flag are considered estimated minimum concentrations. If data were qualified, multiple qualifiers may be applied. The qualifiers that may be applied to data during validation are defined below.

- QH, QL, and QN indicate that the analyte result is considered an estimated value biased (high, low, uncertain) due to a quality control failure.
- H indicate analyte result is considered a low estimate due to hold time exceedance.
- B indicates that the analyte result is considered a high estimated value due to contamination present in an associated blank.
- R indicates that the analyte result is rejected due to various issues - result is not usable and only the flag is reported.

3.3 DATA ASSESSMENT

Data quality assessment was also completed for the analytical results for the collected samples. An assessment of data quality against the data quality objectives (DQOs) set forth in the 2019 QAPP (USAF, 2019) was performed to determine the usability in terms of precision, accuracy, representativeness, comparability, completeness, and sensitivity. The usability assessment considers whether data meet project quality objectives as they relate to the decision(s) to be made and evaluates whether data are suitable for making that decision. The usability assessment results are presented in Sections 8 and 9.

4. SAMPLE HANDLING AND CHAIN OF CUSTODY

Samples were shipped from Fairbanks, Alaska, by expedited courier service (FedEx or UPS) to ELLE and SGS. CoC records, laboratory sample receipt forms, and the case narratives were reviewed to determine whether sample-handling activities may have affected the integrity of the samples and the quality of the associated data.

The sample containers in the sample coolers were received at the laboratory intact and within the QAPP-specified QC limit for temperature range from zero to less than or equal to 6 degrees Celsius (°C), unless presented below. No qualification of sample data was performed based on sampling handling or condition of samples at laboratory receipt, with the exceptions listed below that are qualified QL, as estimated and biased low. Attachment K-1 also presents exceedances and associated qualified results.

- One sample shipment (SDG 410-3855) was received at ELLE with the temperature blank at 10.9 °C, above the QAPP-specified QC limit. With evidence of cooling, the laboratory was directed to proceed with analysis. Results for samples within SDG 410-3855 (20PS-BR01-SW-1, 20PS-BR02-SW-5, 20PS-BR99-SW-0606, 20PS-EB-0606, 20PS-FC01-SW-1, 20PS-FC03-SW-1, 20PS-ML01-SW-1, 20PS-ML02-SW-1, 20PS-ML02-SW-5, 20PS-MP01-SW-1, 20PS-MP02-SW-2, 20PS-MP99-SW-0603, 20PS-SP01-SW-1, 20PS-SP01-SW-5, 20PS-SP02-SW-1) are qualified as with QL flag due to elevated cooler temperature at laboratory receipt.
- One sample shipment (SDG 410-3856) was received at ELLE with the temperature blank at 12.2 °C, above the QAPP-specified QC limit. With evidence of cooling, the laboratory

was directed to proceed with analysis. Results for samples within SDG 410-3856 (20PS-BR02-SD-0, 20PS-BR99-SD-0606, 20PS-EB-AU-0604, 20PS-EB-BL-0604, 20PS-FBAM-0604, 20PS-FBAM-0607, 20PS-FBPM-0603, 20PS-FBPM-0606, 20PS-FC01-SD-0, 20PS-FC02-SD-0, 20PS-FC03-SD-0, 20PS-MC01-SD-0, 20PS-MC02-SD-0, 20PS-MC99-SD-0606, 20PS-ML02-SD-0, 20PS-MLP01-SD-0, 20PS-MLP02-SD-0, 20PS-MP01-SD-0, 20PS-MP02-SD-0, 20PS-MP99-SD-0604, 20PS-SH02-SD-0, 20PS-SH99-SD-0607, and 20PS-TK02-SD-0) are qualified with the QL flag due to elevated cooler temperature at laboratory receipt.

- One sample shipment (SDG 410-4116) was received at ELLE with the temperature blank at 11.8 ℃ due to delay in shipment. Samples were shipped via FedEx on Tuesday 9 June 2021 but were delayed and were received at the laboratory on Thursday 11 June 2021. The cooler temperature was elevated upon receipt, although packed with frozen PFAS-free gel ice. At a temperature of 11.8 ℃ there is evidence of cooling and based on the stability of the target analytes (PFAS), the laboratory was instructed to proceed with analysis. Results for samples within SDG 410-4116 (20PS-BL01-SD-0, 20PS-BL01-SW-0.5, 20PS-BL01-SW-4, 20PS-BL01-SW-8, 20PS-BL02-SD-0, 20PS-BL02-SW-0.5, 20PS-BL02-SW-4, 20PS-BL02-SW-8, 20PS-BL03-SD-0, 20PS-BL03-SW-0.5, 20PS-BL03-SW-4, 20PS-BL03-SW-8, 20PS-BL99-SD-0605, 20PS-BL99-SW-0605, 20PS-BL-EB-BOWL-0605, 20PS-BL-EB-PON-0605, and 20PS-BL-FBAM-0605) are qualified with the QL flag due to elevated cooler temperature at laboratory receipt.

- Sample results from the Birch Lake investigation are discussed in a separate document, the Birch Lake Technical Memo (USAF, 2021b).

5. HOLDING TIME COMPLIANCE

Samples were extracted and analyzed within the method specified holding times, with the exceptions listed below.

- Surface water samples 20PS-FC99-SW-0604 and 20PS-FC02-SW-1 were re-extracted outside the method holding time (14 days to exaction and analysis) by 8 days when the initial extraction standard labeled isotope %Rs were <5% below the QC limits, yielding unusable results. The results for these samples generated from the re-extraction were used in place of the initial results due to the extraction %Rs of the initial set of data. The re-extraction results are considered estimated with potential low bias and flagged with QL and H due to hold time exceedances.

- The analysis of the soil sample 19PS-FST1-SB06-7 was performed outside the 28-day holding time by 3 days for the 100-fold dilution for PFOS. The PFOS result for this sample has been qualified as low bias and flagged with QL and H, due to hold time exceedances.

6. FIELD QUALITY ASSURANCE/QUALITY CONTROL

Field QA/QC protocols are designed to monitor for potential contamination during the collection and transport of samples collected in the field and evaluate the precision of the sampling effort. The collection and analysis of field duplicates facilitates the evaluation of precision that considers

potential variables associated with sampling procedures and laboratory analyses. For this project, field QA/QC samples included field blanks, trip blanks, equipment blanks, and field duplicates. The purpose, preparation, frequency, and results of the field QC samples are summarized below as well as project sample data qualification based on the results of field QC samples. Attachment K-1 presents additional details on QC exceedances and associated qualified results within the checklists.

6.1 FIELD BLANKS

Field blank results are used to evaluate the potential for sample cross-contamination during field sampling. Field blanks were prepared in the field using analyte-free water obtained from the analytical laboratory. Although the 2019 QAPP (USAF, 2019) indicated that two field blanks would be collected each day, USACE provided subsequent input that this procedure was not necessary. After July 2019, field blanks were collected only once per day, and collection times alternated between AM and PM each day of sampling. This sampling protocol is a deviation from the 2019 QAPP (USAF, 2019); however, it does not impact quality or usability of data. The field blanks collected and analyzed for PFAS along with project samples collected in 2019 and 2020 are discussed below as well as in Attachment K-1.

Detections were reported for six field blanks out of the 50 field blanks. Fifteen samples with a total of 51 results for 15 samples were qualified due to field blank contamination. Field blank results were less than Project Action Levels (PALs) and did not contribute to project sample results exceeding project screening levels. Overall, field sampling performance was acceptable, and did not contribute to sample cross contamination did not impact data usability.

Field blank results are summarized in Table K-8. Fourteen field blanks were collected in 2019 and 36 field blanks were collected in 2020. The results for these field blanks are below the project-specific QC limit of ½ of the limit of quantitation (LOQ), with exceptions presented in Attachment K-1.

6.2 TRIP BLANKS

Trip blank results are used to evaluate potential cross-contamination during transportation from the project site to the off-site laboratory. Trip blanks were prepared at the laboratory using analyte-free water.

Four trip blanks were included in sample shipments in 2019 and analyzed for PFAS. The results of the trip blanks are below the project-specific QC limit of ½ of the LOQ and no qualification of project sample data was performed based on trip blank results. Trip blank results for 2019 are summarized in Table K-8. All trip blank results were ND.

Although the project planning document (USAF, 2019) indicated that trip blanks would be shipped with samples, subsequent input from the USACE indicates that trip blanks were not necessary for non-volatile samples. With concurrence from the USACE, trip blanks were eliminated from the sampling protocol after July 2019. This deviation from the 2019 QAPP does not impact quality or usability of data. Trip blank results were ND.

6.3 EQUIPMENT BLANKS

Equipment blank results are used to evaluate the potential for sample cross-contamination from

the sampling equipment used during sampling. Equipment blanks were prepared from analyte-free water obtained from the off-site laboratory that was rinsed over reusable sampling equipment after decontamination. The equipment blanks collected and analyzed for PFAS along with project samples collected during 2019 and 2020 are discussed below as well as in Attachment K-1.

Reusable sampling equipment included the screen -point groundwater sampler (SP16), a cutting shoe used for soil borings, an SS Monsoon Pump for groundwater (well clusters and all permanent well installations), and a stainless-steel clam gun for sediment sampling. A total of 20 equipment blanks, 4 associated with groundwater and 16 associated with soil samples, were collected, and analyzed for PFAS along with project samples collected during 2019 and 2020 as discussed below as well as in Attachment K-1.

Eight out of the 20 equipment blanks had detections. Equipment blank results were less than PALs and did not contribute to exceedances of PALs. Overall, field sampling performance was acceptable, and sample cross contamination did not impact data usability.

Equipment blank results are summarized in Table K-8. Six equipment blanks were collected in 2019 and 14 equipment blanks were collected in 2020. Eight equipment blanks out of the 20 equipment blanks had detections. Equipment blank results were less than project screening levels and did not contribute to project sample results exceeding project screening levels. Overall field sampling was good overall and did not contribute to sample cross contamination. The results for the equipment blanks are below the project-specific QC limit of ½ of the LOQ, with exceptions presented in Attachment L-1. Associated sample results with qualifications due to equipment blank detections are summarized belowK-1.

Equipment blank sample 19PS-EB-1020 results are non-detect except for PFOS. The PFOS results for the sample 19PS-TW35-1020 are considered biased estimated values and flagged with B, due to contamination present in the associated equipment blank.

Equipment blank sample 20PS-EB-0601 results are non-detect except for PFOS. The PFOS results for the sample 20PS-BL-SB10-5.5 are considered biased estimated values and flagged with B, due to contamination present in the associated equipment blank.

Equipment blank sample 20PS-EB-0603 results are non-detect except for PFOS. The PFOS soil results for the following samples are considered biased estimated values and flagged with B, due to contamination present in the associated equipment blank: 20PS-FST1-SB08-1, 20PS-FST1-SB09-7.5, 20PS-FST1-SB10-6, 20PS-FST1-SB12-1.

Equipment blank sample 19PS-EB-1017 results are non-detect except for PFOA, PFOS, and PFHxS. The PFOA soil results for the samples that are less than 10 times equipment blank include samples 19PS-FFTA-ENT-SB05-1, 19PS-FFTA-SB99-1017, 19PS-FFTA-ENT-SB07-1, 19PS-FFTA-ENT-SB07-7, 19PS-FFTA-ENT-SB08-1, and 19PS-FFTA-ENT-SB08-8.5. The PFOS soil results for the samples that are less than 10 times equipment blank include samples 19PS-FFTA-ENT-SB05-7.5, 19PS-FFTA-ENT-SB06-1, 19PS-FFTA-ENT-SB08-1, 19PS-FFTA-ENT-SB09-1. The PFHxS soil results for the samples that are less than 10 times equipment blank include samples 19PS-FFTA-ENT-SB05-1, 19PS-FFTA-SB99-1017, 19PS-FFTA-ENT-SB07-1, 19PS-FFTA-ENT-SB07-7, 19PS-FFTA-ENT-SB08-8.5,

19PS-FFTA-ENT-SB09-6, 19PS-FFTA-ENT-SB10-1, 19PS-FFTA-SB98-1017, and 19PS-FFTA-ENT-SB10-7.

Equipment blank sample 20PS-EB-1030 results are non-detect except for PFOS. The PFOS soil results for the samples 20PS-MW04-1031 and 20PS-MW99-1031 are considered biased estimated values and flagged with B, due to contamination present in the associated equipment blank.

6.4 FIELD DUPLICATES

Results of the field duplicates provide precision information for the entire measurement system, including sample collection, homogeneity, preparation, and analysis, as well as the variability of the sample matrix. A field duplicate is one of two samples collected from the same sampling location and representing the same sampling material. The field duplicate is collected, numbered, preserved, handled, stored, and analyzed using the same protocols and equipment as the associated original field sample. The identity of a sample as a field duplicate is not provided to the analytical laboratory.

Sixty-six field duplicates were collected and analyzed with project samples collected during 2019 and 2020. The field duplicate sample collection frequency met the minimum 10% requirement with one duplicate per day per matrix requirement specified in the 2019 QAPP (USAF, 2019).

The original and field duplicate samples and results are presented in the data summary result tables (Tables K-1 through K-7), for a total of 55 primary surface water samples with 11 duplicate samples surface water samples and 23 primary and 6 duplicate co-located sediment samples. Additional information about field duplicates is presented below.

- Groundwater field duplicates were collected at a frequency of 26%. For 145 primary groundwater samples, 38 field duplicates were collected. A field duplicate was collected every day of groundwater sampling, except for 17 October 2019; this is an identified deviation from the 2019 QAPP. Primary groundwater samples 19PS-TW16-1017 and 19PS-TW19-1017 sampled on 17 October 2019 do not have a daily associated project field duplicate sample. Sample results are not qualified based on lack of daily field duplicate and data quality and usability are not affected.
- Surface water field duplicates were collected at a frequency of 27%. For 41 primary surface water samples, 11 field duplicates were collected. A field duplicate was collected every day of surface water sampling.
- Soil field duplicates were collected at a frequency of 12%. For 73 primary soil samples, 9 field duplicates were collected. A field duplicate was collected every day of soil sampling.
- Sediment field duplicates were collected at a frequency of 35%. For 23 primary sediment samples, 8 field duplicates were collected. A field duplicate was collected every day of sediment sampling.

RPDs between the field duplicate and original sample results, are calculated for detected results. When analytes were present at concentrations below the LOQ in one or both samples, no valid comparison can be made. Field duplicate and original sample results and the calculated RPDs are presented in result summary Tables K-1 through K-7. RPDs in bold and yellow exceed QC limits

of less than 50% for soil sample results and less than 30% for water sample results. The RPDs for the results above LOQs for the samples identified in the summary tables are within the QC limits with the exceptions presented in Attachment K-1. Attachment K-1 presents QC exceedances and associated qualified results.

7. LABORATORY QUALITY ASSURANCE/QUALITY CONTROL

Laboratory QA/QC procedures were followed during sample analysis as required by the analytical methods and as specified within the 2019 QAPP. The following sections summarize the results of laboratory QA/QC.

7.1 LOW-LEVEL DETECTIONS

Detected sample results between the detection limit (DL) and LOQ have been flagged "J." The qualified results represent values determined at levels where the true value of the target compound could not be quantified with a high degree of confidence. The data user may consider these "J" qualified results estimated concentrations.

7.2 BLANK CONTAMINATION

Overall, the analytes detected in blanks were consistent with normal laboratory and field operations. Target analytes were not detected in method blanks above ½ LOQs or project sample results associated with these blanks are either greater than ten times the reported blank concentrations.

7.3 LABORATORY CONTROL SAMPLES

The results of analyses of LCSs for target analytes met the project-specified QC limits for %Rs and RPD or no qualification was required because indicated bias was high or the RPD was outside QC limits only, and no detectable results above the LOQs were reported for the associated project samples. LCS QC exceedances are presented in Attachment K-1 and qualification of sample results are summarized below.

- LCS %Rs for PFOS, perfluoro-n-decanoic acid (PFDA) and perfluoro-n-hexanoic acid (PFHxA) in extraction batch 19305002 are slightly below the project-specified QC acceptance limits of 70-130%. Associated samples 19PS-TW29-1019, 19-TW30-1019, 19PS-TW28-1019, 19PS-TW27-1019, 19PS-TW22-1019, and 19PS-TW25-1019 were re-extracted outside of the method holding time.
- LCS %R for PFOS in extraction batch 19305003, is slightly below the project-specified QC acceptance limits of 70-130%. Associated samples 19PS-TW31-1020, 19PS-TW32-1020, 19PS-TW33-1020, 19PS-TW99-1020, 19PS-TW34-1020, 19PS-TW35-1020 were re-extracted outside of the method holding time.

The data are reported from the initial extraction due to re-extraction batches hold time exceedances and LCS %R recoveries below project-specified QC limits. The re-extraction batches were used for confirmation purposes. Sample results were qualified as estimated low bias and flagged with QL, due to low LCS %Rs.

7.4 MATRIX SPIKES

MS/MSD sample pairs were prepared by the analytical laboratory using project samples. Additional sample volume was collected during sampling for the preparation of MS pairs following laboratory specifications. At the laboratory, known concentrations of target analytes were added to the sample material to prepare the MS/MSD samples. The MS/MSD samples were carried through the preparation and analytical procedures in the same manner as the associated field samples. The %Rs and RPDs of the spiked analytes in the MS/MSD samples were used to evaluate the effect of the sample matrix on accuracy and precision.

The preparation and analyses of MS/MSD sample sets were conducted at a frequency of one per preparatory batch, as specified by the 2019 QAPP (USAF, 2019), unless otherwise noted in Attachment K-1. The MS/MSD %Rs and RPDs were within project-specified QC limits, or no qualification was required, because indicated bias was high, and no detectable results above the LOQs were reported for the associated project samples or because the native analyte concentration in the sample selected for spiking was more than four times the amount spiked, with exceptions presented in Attachment K-1. Attachment K-1 presents MS/MSD %Rs and RPDs with QC exceedances, project samples processed without batched associated project sample MS/MSD samples and associated qualified results.

7.5 INITIAL AND CONTINUING CALIBRATION

The results of the initial instrument calibrations as well as initial calibration verification and continuing calibration verification standards are generally not evaluated during a Stage 2A validation. However, those results that are discussed in laboratory case narratives have been evaluated and presented in Attachment K-1.

7.6 EXTRACTED AND INJECTED INTERNAL STANDARDS

Labeled isotope extracted and injected internal standards were added to the environmental and QC samples and standards to monitor sensitivity and response during every analytical run as appropriate. The %Rs are within the project-specified QC limits for the project samples, with the exceptions presented in Attachment K-1. Attachment K-1 presents QC extracted and injected internal standard exceedances and associated qualified results.

7.7 RETENTION TIMES AND TRANSITION ION RATIOS

Retention times and ion ratios are used to help determine if the sample matrix interference has resulted in a potential bias by comparing the retention time against retention time limits and the transition ion ratio against the ion ratio of standards. The retention times for reported and detected results are within limits. Results with ion ratios that exceed QC limits (50 to 150%) have been qualified and flagged according to the May 2020 Data Validation Guidelines Module 3. Data Validation Guidelines Module 3 uses a J flag to indicate results are estimated rather than the QN qualifier listed in the QAPP. The transition ion ratios for detectable results are within QC limits, with exceptions presented in Attachment K-1. Attachment K-1 present QC retention times and transition ion ratios with exceedances and associated qualified results.

8. SUMMARY OF PRECISION, ACCURACY, REPRESENTATIVENESS, COMPLETENESS, COMPARABILITY, AND SENSITIVITY

The quality of the field sampling efforts and laboratory results were evaluated for compliance with DQOs through a review of overall precision, accuracy, representativeness, comparability, and completeness as well as sensitivity. Procedures used to assess data are in accordance with the respective analytical methods and the 2019 QAPP (USAF, 2019).

8.1 PRECISION

Precision is defined as the degree of agreement among repeated measurement of the same parameter. Precision also characterizes the natural variation of the matrix. Precision is evaluated using field duplicate samples to assess the potential bias of field and laboratory conditions on the results, and also through the use of MS pairs or sample duplicates to assess the laboratory's precision. The quantitative indicator of precision is the RPD between the results of field duplicates and the associated original samples, the laboratory MS/MSD pairs, or laboratory replicate and original sample.

Field duplicate RPDs and MS/MSD RPDs are within 2019 QAPP QC limits (USAF, 2019), unless otherwise noted in Attachment K-1. Field duplicate results were in control overall and show that the field activities adequately collected representative samples and that the laboratories could evaluate the matrix consistently.

8.2 ACCURACY

Accuracy measures the closeness of an observed value to the "true" value. Accuracy is evaluated using blank spike and MS sample recoveries, which are compared to QC limits specified in the 2019 QAPP (USAF, 2019). Matrix accuracy from extraction and internal standards and MS/MSDs are in control, unless otherwise noted in Attachment K-1. LCS accuracy are in control for the methods and analytes, unless otherwise noted in Attachment K-1. Overall, the method and matrix accuracy are acceptable.

8.3 REPRESENTATIVENESS

Data representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point or environmental conditions. The number and selection of samples were determined in the field to account accurately for site variations and sample matrices. The samples were properly stored and preserved. The DQO for representativeness was met. Sample data are representative of the site conditions at the time of sample collection.

8.4 COMPLETENESS

Completeness is a measure of the amount of usable data obtained versus the total possible planned data. The evaluation includes a comparison of the number of valid results divided by the possible number of individual results, expressed in a percentage. The completeness was calculated on a matrix basis.

The data completeness is defined as the percentage of usable data (usable data divided by the total possible data):

$$\% \text{ completeness} = 100 * \frac{\text{number of valid results (i.e., non-R flagged)}}{\text{number of results}}$$

There are no sample results qualified as unusable; therefore, the percent completeness is 100% for both soil and water samples. The project completeness goal of 90% usable data was met.

A summary of the percent of data qualified is shown in Table K-9.

For samples collected in 2019 and 2020, out of 5,012 results reported by the laboratory, a total of 869 (17.3%) data points were qualified as estimated (B, QH, QL, QN, H, or J) due to QC issues observed during data validation, including samples received at laboratory at elevated temperatures, field duplicate RPDs, LCSs, extracted and internal standard results, ion ratios, retention times, and hold time exceedances. The overall quality of the data is acceptable and the results, as qualified, are considered usable.

8.5 COMPARABILITY

Comparability is a qualitative indicator that expresses the confidence with which one data set can be compared to another. This goal is achieved by using SOPs to collect and analyze representative samples and reporting data in standardized formats.

The samples were reported in industry-standard units. Analytical protocols for the methods were followed. Results obtained are comparable to industry standards in that collection and analytical techniques followed approved, documented procedures.

The DQO for comparability was met. If field QC issues affecting comparability were identified, data were qualified as estimated.

8.6 SENSITIVITY

Sensitivity is the ability of an analytical system (i.e., sample preparation and instrumental analysis) to detect a target component in each sample matrix within a defined level of confidence. Factors affecting the sensitivity of an analytical system may include analytical system background (e.g., laboratory artifact or method blank contamination), sample matrix (e.g., mass spectrometry ion ratio change, co-elution of peaks, or baseline elevation), and instrument instability.

Sample dilutions required from matrix interference and/or high target analyte concentrations results in elevated limits of detections (LOD) for sample data. In addition, the reporting limits for samples with percent moisture were raised; however, LODs are lower than the corresponding project screening levels for nondetectable results. The DQO for sensitivity was met. If field QC issues affecting sensitivity were identified, data were qualified as estimated.

9. CONCLUSIONS AND OVERALL DATA VALIDATION FINDINGS

According to the results of data verification and validation, the data generated from the samples collected in 2019 and 2020 are of sufficient quality and quantity necessary for accomplishing project objectives. Sample results accurately indicate the presence and/or absence of target analyte contaminations at sampled locations. Samples were collected and analyzed as specified in the 2019

QAPP (USAF, 2019), except as noted within this report. Sample results are believed to be representative of site conditions at the time of collection. Results obtained are comparable to industry standards in that collection and analytical techniques followed approved, documented procedures (except as noted in this report) and results are reported in industry standard units. The data are complete, ~~and~~ the. The results are usable as qualified, and the quantitation limits for non-detectable reporting limits are below project screening levels meeting project objectives. The overall completeness of the data indicates that the quality of the analytical program and the laboratory and field procedures were sufficient to meet the project DQOs.

In general, the overall quality of the data was acceptable. The data quality was determined as acceptable or estimated. No reported results were rejected, and the project completeness goal was met. Acceptable data are associated with QC data that meet QC criteria, or with QC samples that did not meet QC criteria but DQOs were not affected. Estimated results are considered inaccurate due to a bias created by matrix interference or QC acceptance criteria, which were not met. The requirements of the project-specific 2019 QAPP (USAF, 2019) and DoD QSM (2017) were used to evaluate the acceptability of the data.

10. REFERENCES

Alaska Department of Environmental Conservation (ADEC), 2019a. *Minimum Quality Assurance Requirements for Sample Handling, Reports, and Laboratory Data*. October 2019.

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ADEC, 2019b. *Field Sampling Guidance*. October 2019.

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PFOS/PFOA were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with EPA Method 537 modified under DoD QSM Table B-15.

DoD, 2019. *General Data Validation Guidelines*. November 2019.

DoD, 2020. *Data Validation Guidelines Module 3: Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by QSM Table B-15*. May 2020.

U.S. Air Force, 2019. *Expanded Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) Site Inspection at Eielson Air Force Base and Moose Creek Uniform Federal Policy-Quality Assurance Project Plan Work Plan*, dated September 2019. (Work Plan).

Tables

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Table K-1. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Existing Wells

							Field Sample ID	19PS-AP-6078-0530		19PS-MW99-0530			20PS-DSAP-8D-0912		20-DSAP-8S-0416		20PS-DSAP-8S-0911		19-DSAP-10-0718	
							Location	AP-6078		AP-6078			20-DSAP-8D		20-DSAP-8S		20-DSAP-8S		20-DSAP-10	
							Sample Type	Primary		Field duplicate of 19PS-AP-6078			Primary		Primary		Primary		Primary	
							Laboratory Sample Delivery Group	EIE02		EIE02			410-13937		EIE15		410-13937		EIE07	
							Laboratory Sample ID	1071735		1071740			410-13937-13		1301264		410-13937-5		1105703	
							Sample Collection Date	30-May-2019		30-May-2019			12-Sep-2020		16-Apr-2020		11-Sep-2020		18-Jul-2019	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	RPD	Results	Q	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																				
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	**0.15** [0.0012]		**0.15** [0.0011]		0.0%	0.0073 [0.00088]		0.0018 [0.00095]	J	0.0018 [0.00088]		0.0032 [0.00088]	B
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	**0.038** [0.0012]		**0.037** [0.0011]		2.7%	0.0042 [0.00088]		0.00083 [0.00095]	J	0.0013 [0.00088]	J	0.0022 [0.00088]	
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070	**0.19** [0.0024]		**0.19** [0.0022]		0.5%	0.012 [0.0018]		0.0026 [0.0019]	J	0.0031 [0.0018]	J	0.0054 [0.0018]	B
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	0.0014 [0.0012]	J	0.0012 [0.0011]	J	15.4%	ND [0.00088]		ND [0.00095]		ND [0.00088]		ND [0.00088]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.16 [0.0011]		0.16 [0.0010]		0.0%	0.014 [0.00088]		0.0040 [0.00095]		0.0042 [0.00088]		0.011 [0.00088]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.017 [0.0012]	QL	0.017 [0.0011]	QL	0.0%	0.00087 [0.00088]	J	ND [0.00095]		ND [0.00088]		ND [0.00088]	
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.017 [0.0011]	QN	0.016 [0.0010]	QN	6.1%	0.0018 [0.00088]		0.00089 [0.00095]	J	0.00090 [0.00088]	J	0.0035 [0.00088]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.054 [0.0012]		0.051 [0.0011]		5.7%	0.0015 [0.00088]	J	ND [0.00095]		ND [0.00088]		0.0011 [0.00088]	J
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.0012]		ND [0.0011]		NA	ND [0.00088]		ND [0.00095]		ND [0.00088]		ND [0.00088]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.0012]		ND [0.0011]		NA	ND [0.00088]		ND [0.00095]		ND [0.00088]		ND [0.00088]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.0012]		ND [0.0011]		NA	ND [0.00088]		ND [0.00095]		ND [0.00088]		ND [0.00088]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.0012]		ND [0.0011]		NA	ND [0.00088]		ND [0.00095]		ND [0.00088]		ND [0.00088]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.0012]		ND [0.0011]		NA	ND [0.00088]		ND [0.00095]		ND [0.00088]		ND [0.00088]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0023]		ND [0.0022]		NA	ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.0023]		ND [0.0022]		NA	ND [0.00088]		ND [0.00095]		ND [0.00088]		ND [0.00088]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs between primary and field duplicate results exceed QC limits (≥30%)

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

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4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.
J = The analyte was positively identified; the quantitation is estimated.
QL,QH,QN = The analyte result is considered an estimated value with (low, high, uncertain) bias due to a quality control failure

Table K-1. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Existing Wells

Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Field Sample ID	19-DSAP-11-0718	Q	19-DSAP-13-0718	Q	20-DSAP-14-0416	Q	20PS-MW99-0416	Q	RPD	20PS-HCMW01-15-0918	Q	20PS-HCMW01-75-0918	Q
							Location	20-DSAP-11		20-DSAP-13		20-DSAP-14-0416		20-DSAP-14-0416			HCMW01-15		HCMW01-75	
							Sample Type	Primary		Primary		Primary		Field duplicate of 20-DSAP-14-0416			Primary		Primary	
							Laboratory Sample Delivery Group	EIE07		EIE07		EIE15		EIE15			410-14670		410-14670	
							Laboratory Sample ID	1105699		1105698		1301265		1301269			410-14670-9		410-14670-10	
							Sample Collection Date	18-Jul-2019		18-Jul-2019		16-Apr-2020		16-Apr-2020			18-Sep-2020		18-Sep-2020	
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																				
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070		0.0053 [0.00087]	B	0.0024 [0.00088]	B	0.010 [0.00094]		0.0085 [0.00084]		16%	0.0018 [0.00090]	J	0.0046 [0.00088]	J
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070		0.0030 [0.00087]		0.0016 [0.00088]	J	0.0038 [0.00094]		0.0034 [0.00084]		11%	0.0020 [0.00090]		0.0073 [0.00088]	
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070		0.0083 [0.0017]		0.0040 [0.0018]	B	0.014 [0.0019]		0.012 [0.0017]		15%	0.0038 [0.0018]	J	0.012 [0.0018]	J
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS		ND [0.00087]		ND [0.00088]		ND [0.00094]		ND [0.00084]		NA	ND [0.00090]		ND [0.00088]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS		0.0097 [0.00087]		0.0051 [0.00088]		0.0071 [0.00094]		0.0062 [0.00084]		14%	0.011 [0.00090]		0.023 [0.00088]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS		ND [0.00087]		ND [0.00088]		0.00065 [0.00094]	J	0.00058 [0.00084]	J	11%	ND [0.00090]		0.0078 [0.00088]	
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60		0.0013 [0.00087]	J	0.0019 [0.00088]		0.0011 [0.00094]	J	0.00092 [0.00084]	J	18%	0.0011 [0.00090]	J,QN	0.0019 [0.00088]	QN,QH
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS		0.00058 [0.00087]	J	ND [0.00088]		0.0013 [0.00094]	J	0.0012 [0.00084]	J	8.0%	ND [0.00090]		0.0091 [0.00088]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS		ND [0.00087]		ND [0.00088]		ND [0.00094]		ND [0.00084]		NA	ND [0.00090]		ND [0.00088]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS		ND [0.00087]		ND [0.00088]		ND [0.00094]		ND [0.00084]		NA	ND [0.00090]		ND [0.00088]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS		ND [0.00087]		ND [0.00088]		ND [0.00094]		ND [0.00084]		NA	ND [0.00090]		ND [0.00088]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS		ND [0.00087]		ND [0.00088]		ND [0.00094]		ND [0.00084]		NA	ND [0.00090]		ND [0.00088]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS		ND [0.00087]		ND [0.00088]		ND [0.00094]		ND [0.00084]		NA	ND [0.00090]		ND [0.00088]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS		ND [0.0010]		ND [0.0011]		ND [0.0011]		ND [0.0010]		NA	ND [0.0011]		ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS		ND [0.00087]		ND [0.00088]		ND [0.00094]		ND [0.00084]		NA	ND [0.00090]		ND [0.00088]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs between primary and field duplicate results exceed QC limits (≥30%)

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

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Table K-1. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Existing Wells

							Field Sample ID	20PS-HCMW02-15-0918		20PS-HCMW02-75-0918		20PS-HCMW03-15-0919		20PS-HCMW03-75-0919		20PS-HCMW04-15-0918		20PS-MW93-0918		
							Location	HCMW02-15		HCMW02-75		HCMW03-15		HCMW03-75		HCMW04-15		HCMW04-15		
							Sample Type	Primary		Primary		Primary		Primary		Primary		Field duplicate of 20PS-HCMW04-15-0918		
							Laboratory Sample Delivery Group	410-14670		410-14670		410-14665		410-14665		410-14670		410-14670		
							Laboratory Sample ID	410-14670-13		410-14670-14		410-14665-4		410-14665-5		410-14670-11		410-14670-15		
							Sample Collection Date	18-Sep-2020		18-Sep-2020		19-Sep-2020		19-Sep-2020		18-Sep-2020		18-Sep-2020		
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	RPD
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																			
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	**0.057** [0.00087]		**0.12** [0.00087]		**0.070** [0.00087]		0.0053 [0.00087]		ND [0.00086]		ND [0.00087]		NA
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.030 [0.00087]		0.025 [0.00087]		0.030 [0.00087]		0.0015 [0.00087]		ND [0.00086]		ND [0.00087]		NA
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070	**0.087** [0.0017]		**0.15** [0.0017]		**0.10** [0.0017]		0.0068 [0.0017]		ND [0.0017]		ND [0.0018]		NA
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	0.0018 [0.00087]		0.0016 [0.00087]	J	ND [0.00087]	J	ND [0.00087]	J	ND [0.00086]		ND [0.00087]		NA
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.086 [0.00087]		0.076 [0.00087]		0.093 [0.00087]		0.064 [0.00087]		0.0018 [0.00086]		0.0017 [0.00087]		5.7%
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.029 [0.00087]		0.013 [0.00087]		0.011 [0.00087]		0.0064 [0.00087]		ND [0.00086]		ND [0.00087]		NA
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0061 [0.00087]	J,QN	0.0047 [0.00087]	QN	0.011 [0.00087]	QN,QH	0.0075 [0.00087]	QN,QH	0.0012 [0.00086]	J,QN	0.0012 [0.00087]	J,QN	0.0%
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.033 [0.00087]	J	0.025 [0.00087]		0.040 [0.00087]		0.021 [0.00087]		ND [0.00086]		0.00044 [0.00087]	J	NA
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00087]		ND [0.00087]		ND [0.00087]		ND [0.00086]		ND [0.00087]		NA
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00087]		ND [0.00087]		ND [0.00087]		ND [0.00086]		ND [0.00087]		NA
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00087]		ND [0.00087]		ND [0.00087]		ND [0.00086]		ND [0.00087]		NA
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00087]		ND [0.00087]		ND [0.00087]		ND [0.00086]		ND [0.00087]		NA
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00087]		ND [0.00087]		ND [0.00087]		ND [0.00086]		ND [0.00087]		NA
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0010]		ND [0.0010]		ND [0.0010]		ND [0.0010]		ND [0.0010]		ND [0.0010]		NA
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00087]		ND [0.00087]		ND [0.00087]		ND [0.00086]		ND [0.00087]		NA

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs between primary and field duplicate results exceed QC limits (≥30%)

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

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Table K-1. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Existing Wells

Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Field Sample ID: 20PS-HCMW04-75-0918	Q	20PS-HCMW05-15-0919	Q	20PS-HCMW05-75-0919	Q	20PS-MW92-0919	Q	RPD	19-MW-BKG-01-0716	Q
Location:							HCMW04-75		HCMW05-15		HCMW05-75		HCMW05-75			MW-BKG-01	
Sample Type:							Primary		Primary		Primary		Field duplicate of 20PS-HCMW05-75-0919			Primary	
Laboratory Sample Delivery Group:							410-14670		410-14665		410-14665		410-14665			EIE05	
Laboratory Sample ID:							410-14670-12		410-14665-2		410-14665-3		410-14665-7			1105022	
Sample Collection Date:							18-Sep-2020		19-Sep-2020		19-Sep-2020		19-Sep-2020			16-Jul-2019	
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																	
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	ND [0.00088]		0.0031 [0.00089]		0.0050 [0.00088]		0.0047 [0.00089]		6.2%	0.00046 [0.00085]	J
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	ND [0.00088]		0.0024 [0.00089]		0.0049 [0.00088]		0.0048 [0.00089]		2.1%	ND [0.00085]	
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070	ND [0.0018]		0.0055 [0.0018]		0.0099 [0.0018]		0.0095 [0.0018]		4.1%	0.00046 [0.0017]	J
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00088]		0.00063 [0.00089]	J	0.00050 [0.00088]	J	ND [0.00089]		NA	ND [0.00085]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.00061 [0.00088]	J	0.0070 [0.00089]		0.028 [0.00088]		0.028 [0.00089]		0.0%	0.0020 [0.00085]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	ND [0.00088]		0.00082 [0.00089]	J	0.0029 [0.00088]		0.0030 [0.00089]		3.4%	ND [0.00085]	
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	ND [0.00088]		0.00050 [0.00089]	J,QN	0.0024 [0.00088]	QN,QH	0.0024 [0.00089]	QN,QH	0.0%	ND [0.00085]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	ND [0.00088]		0.0014 [0.00089]	J	0.0081 [0.00088]		0.0090 [0.00089]		11%	ND [0.00085]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00089]		ND [0.00088]		ND [0.00089]		NA	ND [0.00085]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00089]		ND [0.00088]		ND [0.00089]		NA	ND [0.00085]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00089]		ND [0.00088]		ND [0.00089]		NA	ND [0.00085]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00089]		ND [0.00088]		ND [0.00089]		NA	ND [0.00085]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00089]		ND [0.00088]		ND [0.00089]		NA	ND [0.00085]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0011]		NA	ND [0.0010]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00089]		ND [0.00088]		ND [0.00089]		NA	ND [0.00085]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs between primary and field duplicate results exceed QC limits (≥30%)

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Table K-1. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Existing Wells

							Field Sample ID	19-MW-BKG-04-0716		19PS-MW99-0716			19-MW-BKG-07-0716		19-MW-BKG-09-0717		19-MW-BKG-10-0717		19-PS-MW99-0717		
							Location	MW-BKG-04		MW-BKG-04			MW-BKG-07		MW-BKG-09		MW-BKG-10		MW-BKG-10		
							Sample Type	Primary		Field duplicate of 19-MW-BKG-04-0716			Primary		Primary		Primary		Field duplicate of 19-MW-BKG-10-0717		
							Laboratory Sample Delivery Group	EIE05		EIE05			EIE05		EIE06		EIE06		EIE06		
							Laboratory Sample ID	1105015		1105016			1105017		1105160		1105157		1105158		
							Sample Collection Date	16-Jul-2019		16-Jul-2019			16-Jul-2019		17-Jul-2019		17-Jul-2019		17-Jul-2019		
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	RPD	Results	Q	Results	Q	Results	Q	Results	Q	RPD
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																				
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.0013 [0.00090]	J	0.0018 [0.00088]	QH	32%	0.00073 [0.00088]	J	0.011 [0.00095]		ND [0.00089]		ND [0.00089]		NA
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.0022 [0.00090]		0.0026 [0.00088]	J,QN	17%	0.00068 [0.00088]	J	0.0030 [0.00095]	J	ND [0.00089]		ND [0.00089]		NA
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070	0.0035 [0.0018]	J	0.0044 [0.0018]	J,QN,QH	23%	0.0014 [0.0018]	J	0.014 [0.0019]	J	ND [0.0018]		ND [0.0018]		NA
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00090]		ND [0.00088]		NA	ND [0.00088]		ND [0.00095]		ND [0.00089]		ND [0.00089]		NA
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.011 [0.00090]		0.011 [0.00088]		0.0%	0.0035 [0.00088]		0.018 [0.00095]		0.00076 [0.00089]	J	0.00077 [0.00089]	J	1.3%
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.0033 [0.00090]		0.0035 [0.00088]		5.9%	0.00058 [0.00088]	J	0.0017 [0.00095]	J	ND [0.00089]		ND [0.00089]		NA
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0016 [0.00090]	J,QN	0.0016 [0.00088]	J,QN	0.0%	0.00095 [0.00088]	J,QN	0.0013 [0.00095]	J	ND [0.00089]		ND [0.00089]		NA
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.0072 [0.00090]		0.0081 [0.00088]		12%	0.00073 [0.00088]	J	0.0029 [0.00095]		ND [0.00089]		ND [0.00089]		NA
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00090]		ND [0.00088]		NA	ND [0.00088]		ND [0.00095]		ND [0.00089]		ND [0.00089]		NA
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00090]		ND [0.00088]		NA	ND [0.00088]		ND [0.00095]		ND [0.00089]		ND [0.00089]		NA
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00090]		ND [0.00088]		NA	ND [0.00088]		ND [0.00095]		ND [0.00089]		ND [0.00089]		NA
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00090]		ND [0.00088]		NA	ND [0.00088]		ND [0.00095]		ND [0.00089]		ND [0.00089]		NA
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00090]		ND [0.00088]		NA	ND [0.00088]		ND [0.00095]		ND [0.00089]		ND [0.00089]		NA
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0011]		ND [0.0011]		NA	ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0011]		NA
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00090]		ND [0.00088]		NA	ND [0.00088]		ND [0.00095]		ND [0.00089]		ND [0.00089]		NA

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs between primary and field duplicate results exceed QC limits (≥30%)

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.
J = The analyte was positively identified; the quantitation is estimated.
QL,QH,QN = The analyte result is considered an estimated value with (low, high, uncertain) bias due to a quality control failure

Table K-1. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Existing Wells

							Field Sample ID	19-MW-BKG-11-0716		19-MW-BKG-12-0716		19-02MW11-0717		20PS-MW-2-0924		19-NorthPoleWellA-0717		19-NorthPoleWellB-0717
							Location	MW-BKG-11		MW-BKG-12		02MW11		MW-2		North Pole Well A		North Pole Well B
							Sample Type	Primary		Primary		Primary		Primary		Primary		Primary
							Laboratory Sample Delivery Group	EIE05		EIE05		EIE06		410-15361		EIE06		EIE06
							Laboratory Sample ID	1105019		1105018		1105154		410-15361-3		1105152		1105153
							Sample Collection Date	16-Jul-2019		16-Jul-2019		17-Jul-2019		24-Sep-2020		17-Jul-2019		17-Jul-2019
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																		
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.0013 [0.00093]	J	0.018 [0.00094]		**0.083** [0.00092]		**0.16** [0.00087]		0.0014 [0.0012]	J	0.00093 [0.0013]	J
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.0021 [0.00093]	J	0.0038 [0.00094]		0.025 [0.00092]		**0.043** [0.00087]		ND [0.0013]		ND [0.0013]	
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070	0.0034 [0.0018]	J	0.022 [0.0018]		**0.11** [0.0018]		**0.20** [0.0017]		0.0014 [0.0025]		0.00093 [0.0026]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00093]		ND [0.00094]		0.00086 [0.00092]	J	0.0020 [0.00087]		ND [0.0013]		ND [0.0013]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.020 [0.00093]		0.012 [0.00094]		0.093 [0.00092]		0.18 [0.00087]		0.0019 [0.0012]		0.0026 [0.0013]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.0034 [0.00093]		0.0028 [0.00094]		0.012 [0.00092]		0.014 [0.00087]		ND [0.0013]		ND [0.0013]	
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0029 [0.00093]	QH,QN	0.0011 [0.00094]	J	0.012 [0.00092]		0.018 [0.00087]		ND [0.0011]		ND [0.0012]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.010 [0.00093]		0.0057 [0.00094]		0.044 [0.00092]		0.058 [0.00087]		ND [0.0013]		ND [0.0013]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00093]		ND [0.00094]		ND [0.00092]		ND [0.00087]		ND [0.0013]		ND [0.0013]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00093]		ND [0.00094]		ND [0.00092]		ND [0.00087]		ND [0.0013]		ND [0.0013]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00093]		ND [0.00094]		ND [0.00092]		ND [0.00087]		ND [0.0013]		ND [0.0013]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00093]		ND [0.00094]		ND [0.00092]		ND [0.00087]		ND [0.0013]		ND [0.0013]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00093]		ND [0.00094]		ND [0.00092]		ND [0.00087]		ND [0.0013]		ND [0.0013]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0010]		ND [0.0013]		ND [0.0013]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00093]		ND [0.00094]		0.0023 [0.00092]	J,QN	ND [0.00087]		ND [0.0013]		ND [0.0013]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs between primary and field duplicate results exceed QC limits (≥30%)

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.
J = The analyte was positively identified; the quantitation is estimated.
QL,QH,QN = The analyte result is considered an estimated value with (low, high, uncertain) bias due to a quality control failure

Table K-1. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Existing Wells

							Field Sample ID	19-USAP-1-0718		19PS-MW99-0718			20PS-USAP-1-0912		20PS-MW98-0912			20PS-USAP-2-0608		20PS-MW99-0608		
							Location	USAP-1		USAP-1			19-USAP -1		19-USAP -1			USAP-2		USAP-2		
							Sample Type	Primary		Field duplicate of 19-USAP-1-0718			Primary		Field duplicate of 20PS-USAP 1-0912			Primary		Field duplicate of 20PS-USAP-2 0608		
							Laboratory Sample Delivery Group	EIE07		EIE07			410-13937		410-13937			410-3851		410-3851		
							Laboratory Sample ID	1105700		1105704			410-13937-7		410-13937-10			410-3851-1		410-3851-2		
							Sample Collection Date	18-Jul-2019		18-Jul-2019			11-Sep-2020		12-Sep-2020			8-Jun-2020		8-Jun-2020		
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	RPD	Results	Q	Results	Q	RPD	Results	Q	Results	Q	RPD
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																					
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.025 [0.00089]	B	0.025 [0.00091]	B	0.0%	0.027 [0.00088]		0.029 [0.00087]		7.1%	ND [0.00087]		ND [0.00087]		NA
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.0092 [0.00089]		0.0090 [0.00091]		2.2%	0.010 [0.00088]		0.011 [0.00087]		10%	ND [0.00087]		0.0011 [0.00087]	J	NA
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070	0.034 [0.0018]	B	0.034 [0.0018]	B	0.6%	**0.037** [0.0018]		**0.040** [0.0017]		7.8%	ND [0.0017]		0.0011 [0.0017]	J	NA
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00089]		ND [0.00091]		NA	ND [0.00088]		ND [0.00087]		NA	ND [0.00087]		ND [0.00087]		NA
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.030 [0.00089]		0.030 [0.00091]		0.0%	0.036 [0.00088]		0.038 [0.00087]		5.4%	0.00047 [0.00087]	J	0.00075 [0.00087]	J	**46%**
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.0023 [0.00089]		0.0026 [0.00091]		12%	0.0024 [0.00088]		0.0026 [0.00087]		8.0%	ND [0.00087]		ND [0.00087]		NA
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0044 [0.00089]		0.0044 [0.00091]		0.0%	0.0052 [0.00088]	QN	0.0053 [0.00087]		1.9%	ND [0.00087]		0.0010 [0.00087]	J,QN	NA
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.0095 [0.00089]		0.0095 [0.00091]		0.0%	0.010 [0.00088]		0.0094 [0.00087]		6.2%	ND [0.00087]		0.00084 [0.00087]	J	NA
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00089]		ND [0.00091]		NA	ND [0.00088]		ND [0.00087]		NA	ND [0.00087]		ND [0.00087]		NA
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00089]		ND [0.00091]		NA	ND [0.00088]		ND [0.00087]		NA	ND [0.00087]		ND [0.00087]		NA
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00089]		ND [0.00091]		NA	ND [0.00088]		ND [0.00087]		NA	ND [0.00087]		ND [0.00087]		NA
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00089]		ND [0.00091]		NA	ND [0.00088]		ND [0.00087]		NA	ND [0.00087]		ND [0.00087]		NA
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00089]		ND [0.00091]		NA	ND [0.00088]		ND [0.00087]		NA	ND [0.00087]		ND [0.00087]		NA
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0011]		ND [0.0011]		NA	ND [0.0011]		ND [0.0010]		NA	ND [0.0010]		ND [0.0010]		NA
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00089]		ND [0.00091]		NA	ND [0.00088]		ND [0.00087]		NA	ND [0.00087]		ND [0.00087]		NA

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs between primary and field duplicate results exceed QC limits (≥30%)

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

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ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
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Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.
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QL,QH,QN = The analyte result is considered an estimated value with (low, high, uncertain) bias due to a quality control failure

Table K-1. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Existing Wells

						Field Sample ID	20-USAP-3-0512		20PS-MW99-0512		
						Location	USAP-3		USAP-3		
						Sample Type	Primary		Field duplicate of 20-USAP-3-0512		
						Laboratory Sample Delivery Group	EIE16		EIE16		
						Laboratory Sample ID	1314748		1314751		
						Sample Collection Date	12-May-2020		12-May-2020		
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	RPD
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]											
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.0039 [0.00087]	J	0.0031 [0.00091]		23%
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.0018 [0.00087]	J	0.0018 [0.00091]	J	0.0%
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070	0.0057 [0.0016]	J	0.0049 [0.0018]		15%
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00091]		NA
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.0054 [0.00087]		0.0045 [0.00091]		18%
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.00044 [0.00087]	J	ND [0.00091]		NA
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.00093 [0.00087]	J,QN	0.00091 [0.00091]	J	2.2%
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.0019 [0.00087]		0.0017 [0.00091]	J	11%
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00091]		NA
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00091]		NA
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00091]		NA
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00091]		NA
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00087]	QL	ND [0.00091]		NA
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0010]		ND [0.0011]		NA
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00091]		NA

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs between primary and field duplicate results exceed QC limits (≥30%)

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RPD = relative percent difference

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.
J = The analyte was positively identified; the quantitation is estimated.
QL,QH,QN = The analyte result is considered an estimated value with (low, high, uncertain) bias due to a quality control failure

Table K-2. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Temporary Wells

							Field Sample ID	19PS-TW01-1019		19PS-TW02-1015		19PS-TW03-1015		19PS-TW99-1015			19PS-TW04-1015		19PS-TW05-1015	
							Location	TW01		TW02		TW03		TW03			TW04		TW05	
							Sample Type	Primary		Primary		Primary		Field duplicate of 19PS-TW03-1015			Primary		Primary	
							Laboratory Sample Delivery Group	EIE11		EIE09		EIE09		EIE09			EIE09		EIE09	
							Laboratory Sample ID	1182620		1181985		1181986		1182000			1181989		1181990	
							Sample Collection Date	19-Oct-2019		15-Oct-2019		15-Oct-2019		15-Oct-2019			15-Oct-2019		15-Oct-2019	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	Results	Q	Results	Q	RPD	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																			
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	**0.39** [0.0093]	QL	0.00049 [0.00094]	J	0.0014 [0.00095]	J	0.0014 [0.00090]	J	0.0%	0.0018 [0.00095]	J	0.0014 [0.00092]	J
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	**0.036** [0.00093]		ND [0.00094]		0.00064 [0.00095]	J	0.00058 [0.00090]	J	10%	0.0018 [0.00095]	J	0.0016 [0.00092]	J
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070	**0.43** [0.010]	QL	0.00049 [0.0018]	J	0.0020 [0.0019]	J	0.0020 [0.0018]	J	3.0%	0.0036 [0.0019]	J	0.0030 [0.0018]	J
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	0.0015 [0.00093]	J	ND [0.00094]		ND [0.00095]		ND [0.00090]		NA	ND [0.00095]		ND [0.00092]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.12 [0.00093]		0.00099 [0.00094]	J	0.0050 [0.00095]		0.0050 [0.00090]		0.0%	0.0056 [0.00095]		0.0054 [0.00092]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.018 [0.00093]		ND [0.00094]		ND [0.00095]		ND [0.00090]		NA	ND [0.00095]		0.00072 [0.00092]	J
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.015 [0.00093]		0.00050 [0.00094]	J,QN	0.00051 [0.00095]	J,QN	0.00047 [0.00090]	J,QN	8.2%	0.00055 [0.00095]	J,QN	0.00060 [0.00092]	J
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.054 [0.00093]	QL	ND [0.00094]		0.00096 [0.00095]	J	0.0011 [0.00090]	J	14%	0.00070 [0.00095]	J	0.00085 [0.00092]	J
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00093]	QL	ND [0.00094]		ND [0.00095]		ND [0.00090]		NA	ND [0.00095]		ND [0.00092]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00093]		ND [0.00094]		ND [0.00095]		ND [0.00090]		NA	ND [0.00095]		ND [0.00092]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00093]		ND [0.00094]		ND [0.00095]		ND [0.00090]		NA	ND [0.00095]		ND [0.00092]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00093]		ND [0.00094]		ND [0.00095]		ND [0.00090]		NA	ND [0.00095]		ND [0.00092]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00093]		ND [0.00094]		ND [0.00095]		ND [0.00090]		NA	ND [0.00095]		ND [0.00092]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0011]		NA	ND [0.0011]		ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00093]		ND [0.00094]		ND [0.00095]		ND [0.00090]		NA	ND [0.00095]		ND [0.00092]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (≥30%)

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.
J = The analyte was positively identified; the quantitation is estimated.
QL,QN = The analyte result is considered an estimated value with (uncertain, low) bias due to a quality control failure

Table K-2. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Temporary Wells

							Field Sample ID		19PS-TW06-1016		19PS-TW07-1015		19PS-TW08-1015		19PS-TW09-1016		19PS-TW10-1018		19PS-TW11-1018	
							Location		TW06		TW07		TW08		TW09		TW10		TW11	
							Sample Type		Primary		Primary		Primary		Primary		Primary		Primary	
							Laboratory Sample Delivery Group		EIE09		EIE09		EIE09		EIE09		EIE10		EIE10	
							Laboratory Sample ID		1181991		1181992		1181993		1181994		1182041		1182028	
							Sample Collection Date		16-Oct-2019		15-Oct-2019		15-Oct-2019		16-Oct-2019		18-Oct-2019		18-Oct-2019	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																				
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	ND [0.00096]		0.00071 [0.00094]	J	0.00055 [0.00091]	J	0.0043 [0.00093]		0.0010 [0.00091]	J	0.00073 [0.00098]	J		
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	ND [0.00096]		0.00057 [0.00094]	J	ND [0.00091]		0.0045 [0.00093]		ND [0.00091]		ND [0.00098]			
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070	ND [0.0019]		0.0013 [0.0019]	J	0.00055 [0.0018]	J	0.0088 [0.0019]		0.0010 [0.0018]	J	0.00073 [0.0020]	J		
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00096]		ND [0.00094]		ND [0.00091]		ND [0.00093]		ND [0.00091]		ND [0.00098]			
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	ND [0.00096]		0.0031 [0.00094]		0.0016 [0.00091]	J	0.016 [0.00093]		0.0013 [0.00091]	J	ND [0.00098]			
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	ND [0.00096]		ND [0.00094]		ND [0.00091]		0.0050 [0.00093]		ND [0.00091]		ND [0.00098]			
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	ND [0.00096]		ND [0.00094]		ND [0.00091]		0.0012 [0.00093]	J	ND [0.00091]		ND [0.00098]			
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	ND [0.00096]		ND [0.00094]		ND [0.00091]		0.0044 [0.00093]		ND [0.00091]		ND [0.00098]			
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00096]		ND [0.00094]		ND [0.00091]		ND [0.00093]		ND [0.00091]		ND [0.00098]			
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00096]		ND [0.00094]		ND [0.00091]		ND [0.00093]		ND [0.00091]		ND [0.00098]			
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00096]		ND [0.00094]		ND [0.00091]		ND [0.00093]		ND [0.00091]		ND [0.00098]			
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00096]		ND [0.00094]		ND [0.00091]		ND [0.00093]		ND [0.00091]		ND [0.00098]			
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00096]		ND [0.00094]		ND [0.00091]		ND [0.00093]		ND [0.00091]		ND [0.00098]			
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0012]		ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0012]			
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00096]		ND [0.00094]		ND [0.00091]		ND [0.00093]		ND [0.00091]		ND [0.00098]			

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (≥30%)

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
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ND = nondetectable
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Table K-2. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Temporary Wells

							Field Sample ID	19PS-TW12-1018		19PS-TW13-1016		19PS-TW98-1016			19PS-TW14-1016		19PS-TW15-1016		19PS-TW16-1017	
							Location	TW12		TW13		TW13			TW14		TW15		TW16	
							Sample Type	Primary		Primary		Field duplicate of 19PS-TW13-1016			Primary		Primary		Primary	
							Laboratory Sample Delivery Group	EIE10		EIE09		EIE09			EIE09		EIE09		EIE12	
							Laboratory Sample ID	1182046		1181995		1182001			1181996		1181997		1183480	
							Sample Collection Date	18-Oct-2019		16-Oct-2019		16-Oct-2019			16-Oct-2019		16-Oct-2019		17-Oct-2019	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL		Results	Q	Results	Q	Results	Q	RPD	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																				
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070		0.00081 [0.00094]	J	0.0044 [0.00095]		ND [0.00095]		NA	0.0099 [0.00093]		0.018 [0.00097]		**0.054** [0.00095]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070		ND [0.00094]		0.00065 [0.00095]	J	ND [0.00095]		NA	0.0022 [0.00093]		0.0068 [0.00097]		0.018 [0.00095]	
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070		0.00081 [0.0019]	J	0.0051 [0.0019]	J	ND [0.0019]		NA	0.012 [0.0019]		0.025 [0.0019]		**0.072** [0.0019]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS		ND [0.00094]		ND [0.00095]		ND [0.00095]		NA	ND [0.00093]		ND [0.00097]		ND [0.00095]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS		0.00056 [0.00094]	J	0.0013 [0.00095]	J	ND [0.00095]		NA	0.0010 [0.00093]		0.028 [0.00097]		0.030 [0.00095]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS		ND [0.00094]		ND [0.00095]		ND [0.00095]		NA	0.00084 [0.00093]	J	0.0019 [0.00097]	J	0.0038 [0.00095]	
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60		ND [0.00094]		ND [0.00095]		ND [0.00095]		NA	0.0015 [0.00093]	J	0.0045 [0.00097]		0.0029 [0.00095]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS		ND [0.00094]		0.00062 [0.00095]	J	ND [0.00095]		NA	0.0018 [0.00093]	J	0.0063 [0.00097]		0.014 [0.00095]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS		ND [0.00094]		ND [0.00095]		ND [0.00095]		NA	ND [0.00093]		ND [0.00097]		ND [0.00095]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS		ND [0.00094]		ND [0.00095]		ND [0.00095]		NA	ND [0.00093]		ND [0.00097]		ND [0.00095]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS		ND [0.00094]		ND [0.00095]		ND [0.00095]		NA	ND [0.00093]		ND [0.00097]		ND [0.00095]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS		ND [0.00094]		ND [0.00095]		ND [0.00095]		NA	ND [0.00093]		ND [0.00097]		ND [0.00095]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS		ND [0.00094]		ND [0.00095]		ND [0.00095]		NA	ND [0.00093]		ND [0.00097]		ND [0.00095]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS		ND [0.0011]		ND [0.0011]		ND [0.0011]		NA	ND [0.0011]		ND [0.0012]		ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS		ND [0.00094]		ND [0.00095]		ND [0.00095]		NA	ND [0.00093]		ND [0.00097]		ND [0.00095]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (≥30%)

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

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3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
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Table K-2. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Temporary Wells

							Field Sample ID	19PS-TW17-1016		19PS-TW18-1016		19PS-TW19-1017		19PS-TW20-1018		19PS-TW99-1018			19PS-TW22-1019	
							Location	TW17		TW18		TW19		TW20		TW20			TW22	
							Sample Type	Primary		Primary		Primary		Primary		Field duplicate of 19PS-TW20-1018			Primary	
							Laboratory Sample Delivery Group	EIE09		EIE09		EIE12		EIE10		EIE10			EIE10	
							Laboratory Sample ID	1181998		1181999		1183481		1182042		1182043			1182044	
							Sample Collection Date	16-Oct-2019		16-Oct-2019		17-Oct-2019		18-Oct-2019		18-Oct-2019			19-Oct-2019	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	RPD	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																				
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070		**0.047** [0.00093]		0.0031 [0.00093]		0.0049 [0.00092]		ND [0.00092]		ND [0.00096]		NA	**0.36** [0.0090]	QL
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070		0.0069 [0.00093]		0.0013 [0.00093]	J	0.0030 [0.00092]		ND [0.00092]		ND [0.00096]		NA	**0.053** [0.00090]	
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070		**0.054** [0.0019]		0.0044 [0.0019]	J	0.0079 [0.0018]		ND [0.0018]		ND [0.0019]		NA	**0.41** [0.0099]	QL
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS		ND [0.00093]		ND [0.00093]		ND [0.00092]		ND [0.00092]		ND [0.00096]		NA	0.0022 [0.00090]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS		0.013 [0.00093]		0.0033 [0.00093]		0.0083 [0.00092]		ND [0.00092]		ND [0.00096]		NA	0.15 [0.00090]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS		0.0018 [0.00093]	J	ND [0.00093]		0.00095 [0.00092]	J	ND [0.00092]		ND [0.00096]		NA	0.015 [0.00090]	
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60		0.0015 [0.00093]	J	ND [0.00093]		0.0015 [0.00092]	J	ND [0.00092]		ND [0.00096]		NA	0.017 [0.00090]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS		0.0062 [0.00093]		ND [0.00093]		0.0032 [0.00092]		ND [0.00092]		ND [0.00096]		NA	0.069 [0.00090]	QL
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS		ND [0.00093]		ND [0.00093]		ND [0.00092]		ND [0.00092]		ND [0.00096]		NA	ND [0.00090]	QL
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS		ND [0.00093]		ND [0.00093]		ND [0.00092]		ND [0.00092]		ND [0.00096]		NA	ND [0.00090]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS		ND [0.00093]		ND [0.00093]		ND [0.00092]		ND [0.00092]		ND [0.00096]		NA	ND [0.00090]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS		ND [0.00093]		ND [0.00093]		ND [0.00092]		ND [0.00092]		ND [0.00096]		NA	ND [0.00090]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS		ND [0.00093]		ND [0.00093]		ND [0.00092]		ND [0.00092]		ND [0.00096]		NA	ND [0.00090]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS		ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0012]		NA	ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS		ND [0.00093]		ND [0.00093]		ND [0.00092]		ND [0.00092]		ND [0.00096]		NA	ND [0.00090]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (≥30%)

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.
J = The analyte was positively identified; the quantitation is estimated.
QL,QN = The analyte result is considered an estimated value with (uncertain, low) bias due to a quality control failure

Table K-2. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Temporary Wells

							Field Sample ID	19PS-TW23-1019		19PS-TW99-1019			19PS-TW24-1019		19PS-TW25-1019		19PS-TW26-1019		19PS-TW27-1019	
							Location	TW23		TW23			TW24		TW25		TW26		TW27	
							Sample Type	Primary		Field duplicate of 19PS-TW23-1019			Primary		Primary		Primary		Primary	
							Laboratory Sample Delivery Group	EIE11		EIE11			EIE11		EIE10		EIE11		EIE10	
							Laboratory Sample ID	1182627		1182618			1182621		1182045		1182619		1182040	
							Sample Collection Date	19-Oct-2019		19-Oct-2019			19-Oct-2019		19-Oct-2019		19-Oct-2019		19-Oct-2019	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	RPD	Results	Q	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																			
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	**0.34** [0.012]	QL,QN	**0.25** [0.0093]	QL,QN	**31%**	**0.26** [0.012]	QL	**0.042** [0.00089]	QL	0.029 [0.00093]	QL	0.00080 [0.00092]	J,(
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	**0.058** [0.0012]	QL,QN	**0.045** [0.00093]		25%	**0.11** [0.0012]		0.016 [0.00089]		0.013 [0.00093]		0.00094 [0.00092]	J
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070	**0.40** [0.013]	QL,QN	**0.30** [0.010]	QL,QN	30%	**0.37** [0.013]	QL	**0.058** [0.0018]	QL	**0.042** [0.0019]	QL	0.0017 [0.0018]	J,(
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	0.0022 [0.0012]	J,QL,QN	0.0018 [0.00093]	J	20%	0.0024 [0.0012]	J	0.00055 [0.00089]	J	ND [0.00093]		ND [0.00092]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.16 [0.0012]	QN	0.11 [0.00093]	QN	**37%**	0.23 [0.0012]		0.050 [0.00089]		0.038 [0.00093]		0.0026 [0.00092]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.017 [0.0012]	QL,QN	0.013 [0.00093]		27%	0.026 [0.0012]		0.0064 [0.00089]		0.0046 [0.00093]		0.00055 [0.00092]	J
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.015 [0.0012]	QL,QN	0.011 [0.00093]	QN	**31%**	0.024 [0.0012]		0.0055 [0.00089]	QN	0.0043 [0.00093]		ND [0.00092]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.077 [0.0012]	QL,QN	0.055 [0.00093]	QL,QN	**33%**	0.13 [0.0012]	QL	0.022 [0.00089]	QL	0.017 [0.00093]	QL	0.00099 [0.00092]	J,(
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.0012]	QL	ND [0.00093]	QL	NA	ND [0.0012]	QL	ND [0.00089]	QL	ND [0.00093]	QL	ND [0.00092]	QL
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.0012]	QL	ND [0.00093]		NA	ND [0.0012]		ND [0.00089]		ND [0.00093]		ND [0.00092]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.0012]	QL	ND [0.00093]		NA	ND [0.0012]		ND [0.00089]		ND [0.00093]		ND [0.00092]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.0012]	QL	ND [0.00093]		NA	ND [0.0012]		ND [0.00089]		ND [0.00093]		ND [0.00092]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.0012]	QL	ND [0.00093]		NA	ND [0.0012]		ND [0.00089]		ND [0.00093]		ND [0.00092]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0015]	QL	ND [0.0011]		NA	ND [0.0015]		ND [0.0011]		ND [0.0011]		ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	0.00069 [0.0012]	J,QL,QN	ND [0.00093]		NA	ND [0.0012]		ND [0.00089]		ND [0.00093]		ND [0.00092]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (≥30%)

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

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3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

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CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
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Q = qualifier
RPD = relative percent difference

Data Qualifiers:

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Table K-2. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Temporary Wells

							Field Sample ID	19PS-TW28-1019		19PS-TW29-1019		19PS-TW30-1019		19PS-TW31-1020		19PS-TW32-1020		19PS-TW33-1020	
							Location	TW28		TW29		TW30		TW31		TW32		TW33	
							Sample Type	Primary		Primary		Primary		Primary		Primary		Primary	
							Laboratory Sample Delivery Group	EIE10		EIE10		EIE10		EIE10		EIE10		EIE10	
							Laboratory Sample ID	1182039		1182037		1182038		1182029		1182030		1182031	
							Sample Collection Date	19-Oct-2019		19-Oct-2019		19-Oct-2019		20-Oct-2019		20-Oct-2019		20-Oct-2019	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																			
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070		**0.042** [0.00092]	QL	ND [0.00090]	QL	**0.040** [0.0013]	QL	**0.30** [0.0094]	QL	0.013 [0.00091]	QL	0.033 [0.00093]	QL
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070		0.0096 [0.00092]		0.00098 [0.00090]	J	0.0096 [0.0013]		0.031 [0.00094]		0.0014 [0.00091]	J	0.0035 [0.00093]	
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070		**0.052** [0.0018]	QL	0.00098 [0.0018]	J,QL	**0.050** [0.0026]	QL	**0.33** [0.01034]	QL	0.014 [0.00018]	J,QL	**0.037** [0.0019]	QL
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS		ND [0.00092]		ND [0.00090]		0.00094 [0.0013]	J	0.0015 [0.00094]	J	ND [0.00091]		ND [0.00093]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS		0.046 [0.00092]		0.0030 [0.00090]		0.036 [0.0013]		0.14 [0.00094]		0.0047 [0.00091]		0.017 [0.00093]	QL
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS		0.0043 [0.00092]		0.00056 [0.00090]	J	0.0051 [0.0013]		0.012 [0.00094]		0.00084 [0.00091]	J	0.0012 [0.00093]	J
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60		0.0049 [0.00092]		ND [0.00090]		0.0049 [0.0013]	QN,QH	0.013 [0.00094]		ND [0.00091]		0.00099 [0.00093]	J
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS		0.015 [0.00092]	QL	0.0013 [0.00090]	J,QL	0.018 [0.0013]	QL	0.041 [0.00094]		0.0014 [0.00091]	J	0.0029 [0.00093]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS		ND [0.00092]	QL	ND [0.00090]	QL	ND [0.0013]	QL	ND [0.00094]		ND [0.00091]		ND [0.00093]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS		ND [0.00092]		ND [0.00090]		ND [0.0013]		ND [0.00094]		ND [0.00091]		ND [0.00093]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS		ND [0.00092]		ND [0.00090]		ND [0.0013]		ND [0.00094]		ND [0.00091]		ND [0.00093]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS		ND [0.00092]		ND [0.00090]		ND [0.0013]		ND [0.00094]		ND [0.00091]		ND [0.00093]	QL,QN
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS		ND [0.00092]		ND [0.00090]		ND [0.0013]		ND [0.00094]		0.00084 [0.00091]	J	ND [0.00093]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS		ND [0.0011]		ND [0.0011]		ND [0.0015]		ND [0.0011]		ND [0.0011]		ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS		ND [0.00092]		ND [0.00090]		ND [0.0013]		ND [0.00094]		ND [0.00091]		ND [0.00093]	QL

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (≥30%)

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

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4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.
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QL,QN = The analyte result is considered an estimated value with (uncertain, low) bias due to a quality control failure

Table K-2. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Temporary Wells

							Field Sample ID	19PS-TW99-1020			19PS-TW34-1020		19PS-TW35-1020		20PS-TW36-0627		20PS-TW99-0627			20PS-TW37-0529	
							Location	TW33			TW34		TW35		TW36		TW37			TW37	
							Sample Type	Field duplicate of 19PS-TW33-1020			Primary		Primary		Primary		Field Duplicate of 20PS-TW36-0627			Primary	
							Laboratory Sample Delivery Group	EIE10			EIE10		EIE10		410-6332		410-6332			410-3098	
							Laboratory Sample ID	1182034			1182035		1182036		410-6332-1		410-6332-3			410-3098-10	
							Sample Collection Date	20-Oct-2019			20-Oct-2019		20-Oct-2019		27-Jun-2020		27-Jun-2020			29-May-2020	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	RPD	Results	Q	Results	Q	Results	Q	Results	Q	RPD	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																				
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	**0.035** [0.00093]	QL	5.9%	**0.060** [0.00090]	QL	0.0014 [0.00090]	J,B,QL	0.0036 [0.00093]		0.0039 [0.00093]		8.0%	0.0017 [0.00097]	J
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.0032 [0.00093]		9.0%	0.0071 [0.00090]		0.00046 [0.00090]	J	0.0022 [0.00093]		0.0018 [0.00093]	J	20%	0.0079 [0.00097]	
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070	**0.038** [0.0019]	QL	4.6%	**0.067** [0.0018]	QL	0.0019 [0.0018]	J,B,QL	0.0022 [0.0019]		0.0018 [0.0019]		20%	0.0096 [0.0019]	J
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00093]		NA	0.00060 [0.00090]	J	ND [0.00090]		ND [0.00093]		ND [0.00093]		NA	ND [0.00097]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.016 [0.00093]		6.1%	0.041 [0.00090]		0.0014 [0.00090]	J	0.0078 [0.00093]		0.0085 [0.00093]		8.6%	0.12 [0.00097]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.0012 [0.00093]	J	0.0%	0.0031 [0.00090]		0.00045 [0.00090]	J	0.0014 [0.0093]	J	0.0016 [0.0093]	J	13%	0.34 [0.0097]	
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0010 [0.00093]	J	1.0%	0.0027 [0.00090]		ND [0.00090]		0.00073 [0.00093]	J	0.00064 [0.00093]	J	13%	0.14 [0.00097]	QN,QH
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.0028 [0.00093]		3.5%	0.0098 [0.00090]		0.00081 [0.00090]	J	0.0038 [0.0093]		0.0035 [0.0093]		8.2%	0.84 [0.0097]	J
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00093]		NA	ND [0.00090]		ND [0.00090]		ND [0.00093]		ND [0.00093]		NA	ND [0.00097]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00093]		NA	ND [0.00090]		ND [0.00090]		ND [0.00093]		ND [0.00093]		NA	ND [0.00097]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00093]		NA	ND [0.00090]		ND 0.00000		ND [0.00093]		ND [0.00093]		NA	ND [0.00097]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00093]		NA	ND [0.00090]		ND [0.00090]		ND [0.00093]		ND [0.00093]		NA	ND [0.00097]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00093]		NA	ND [0.00090]		ND [0.00090]		ND [0.00093]		ND [0.00093]		NA	ND [0.00097]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0011]		NA	ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0011]		NA	ND [0.0012]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00093]		NA	ND [0.00090]		ND [0.00090]		ND [0.00093]		ND [0.00093]		NA	ND [0.00097]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (≥30%)

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Table K-2. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Temporary Wells

							Field Sample ID	20PS-TW99-0529			20PS-TW38-0529		20PS-TW39-0529		20PS-TW40-0529		20PS-TW41-0528		20PS-TW42-0627	
							Location	TW37			TW38		TW39		TW40		TW41		TW42	
							Sample Type	Field Duplicate of 20PS-TW37-0529			Primary		Primary		Primary		Primary		Primary	
							Laboratory Sample Delivery Group	410-3098			410-3098		410-3098		410-3098		410-3098		410-6332	
							Laboratory Sample ID	410-3098-4			410-3098-11		410-3098-13		410-3098-12		410-3098-9		410-6332-2	
							Sample Collection Date	29-May-2020			29-May-2020		29-May-2020		29-May-2020		28-May-2020		27-Jun-2020	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	RPD	Results	Q	Results	Q	Results	Q	Results [5]	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																				
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.0018 [0.00099]	J	5.7%	0.00056 [0.00095]	J	0.0017 [0.00098]	J	0.00054 [0.00097]	J	ND [0.00099]		**0.21** [0.00091]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.0075 [0.00099]	J	5.2%	ND [0.00095]		0.0029 [0.00098]		ND [0.00097]		ND [0.00099]		0.030 [0.00091]	
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070	0.0093 [0.0020]	J	3.2%	0.00056 [0.0019]	J	0.0046 [0.0020]	J	0.00054 [0.0019]	J	ND [0.0020]		0.030 [0.0018]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00099]		NA	ND [0.00095]		ND [0.00098]		ND [0.00097]		ND [0.00099]		0.0028 [0.00091]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.14 [0.00099]		15%	0.0032 [0.00095]		0.015 [0.00098]		0.0030 [0.00097]		ND [0.00099]		0.092 [0.00091]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.37 [0.00099]		8.5%	ND [0.00095]		0.0022 [0.00098]		ND [0.00097]		ND [0.00099]		0.016 [0.00091]	
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.14 [0.00099]	QH	0.0%	ND [0.00095]		0.0017 [0.00098]	J,QN	ND [0.00097]		ND [0.00099]		0.0068 [0.00091]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.86 [0.00099]	QN	2.4%	0.00051 [0.00095]	J	0.0045 [0.00098]	J	ND [0.00097]		0.0019 [0.00099]	J,QN	0.033 [0.00091]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00099]		NA	ND [0.00095]		ND [0.00098]		ND [0.00097]		ND [0.00099]		ND [0.00091]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00099]		NA	ND [0.00095]		ND [0.00098]		ND [0.00097]		ND [0.00099]		ND [0.00091]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00099]		NA	ND [0.00095]		ND [0.00098]		ND [0.00097]		ND [0.00099]		ND [0.00091]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00099]		NA	ND [0.00095]		ND [0.00098]		ND [0.00097]		ND [0.00099]		ND [0.00091]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00099]		NA	ND [0.00095]		ND [0.00098]		ND [0.00097]		ND [0.00099]		ND [0.00091]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0012]		NA	ND [0.0011]		ND [0.0012]		ND [0.0012]		ND [0.0012]		0.00066 [0.0011]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00099]		NA	ND [0.00095]		ND [0.00098]		ND [0.00097]		ND [0.00099]		0.0020 [0.00091]	J

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (≥30%)

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.
J = The analyte was positively identified; the quantitation is estimated.
QL,QN = The analyte result is considered an estimated value with (uncertain, low) bias due to a quality control failure

Table K-2. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Temporary Wells

Field Sample ID							20PS-TW46-0526		20PS-TW99-0526			20PS-TW47-0526		20PS-TW48-0526		20PS-TW49-0526		20PS-TW50-0527	
Location							TW46		TW46			TW47		TW48		TW49		TW50	
Sample Type							Primary		Field duplicate of 20PS-TW46-0526			Primary		Primary		Primary		Primary	
Laboratory Sample Delivery Group							EIE21		EIE21			EIE21		EIE21		EIE21		EIE21	
Laboratory Sample ID							1321915		1321914			1321918		1321919		1321920		1321922	
Sample Collection Date							26-May-2020		26-May-2020			27-May-2020		26-May-2020		26-May-2020		27-May-2020	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	RPD	Results	Q	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																			
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.031 [0.00094]	B	0.033 [0.00099]		6.3%	0.019 [0.00097]	B	0.034 [0.00098]	B,J	0.021 [0.00099]	J	0.014 [0.00098]	B,J
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.0049 [0.00094]	B	0.0053 [0.00099]	B	7.8%	0.0062 [0.00097]	B	0.012 [0.00098]	B	0.014 [0.00099]	B	0.012 [0.00098]	J
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070	**0.036** [0.0019]	B	**0.038** [0.0020]	B	6.5%	0.025 [0.0019]	B	**0.046** [0.0020]	B	**0.035** [0.0020]		0.026 [0.0020]	B
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00094]		ND [0.00099]		NA	ND [0.00097]		ND [0.00098]		ND [0.00099]		ND [0.00098]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.012 [0.00094]	B	0.013 [0.00099]	B	8.0%	0.020 [0.00097]	B	0.035 [0.00098]	B	0.016 [0.00099]	B	0.043 [0.00098]	B
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.0016 [0.00094]	J, B	0.0019 [0.00099]	J, B	17%	0.0014 [0.00097]	J,B	0.0026 [0.00098]	B	0.0014 [0.00099]	J,B	0.0037 [0.00098]	
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0017 [0.00094]	J, B	0.0017 [0.00099]	J, B	0.0%	0.0033 [0.00097]	B	0.0050 [0.00098]	B	0.0019 [0.00099]	J,B	0.0039 [0.00098]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.0044 [0.00094]	B	0.0047 [0.00099]	B	6.6%	0.0053 [0.00097]	B	0.011 [0.00098]	B	0.0050 [0.00099]	B	0.019 [0.00098]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00094]		ND [0.00099]		NA	ND [0.00097]		ND [0.00098]		ND [0.00099]		ND [0.00098]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00094]		ND [0.00099]		NA	ND [0.00097]		ND [0.00098]		ND [0.00099]		ND [0.00098]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00094]		ND [0.00099]		NA	ND [0.00097]		ND [0.00098]		ND [0.00099]		ND [0.00098]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00094]		ND [0.00099]		NA	ND [0.00097]		ND [0.00098]		ND [0.00099]		ND [0.00098]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00094]		ND [0.00099]		NA	ND [0.00097]		ND [0.00098]		ND [0.00099]		ND [0.00098]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0011]		ND [0.0012]		NA	ND [0.0012]		ND [0.0012]		ND [0.0012]		ND [0.0012]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00094]		ND [0.00099]		NA	ND [0.00097]		ND [0.00098]		ND [0.00099]		ND [0.00098]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (≥30%)

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

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EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
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Table K-2. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Temporary Wells

							Field Sample ID	20PS-TW99-0527			20PS-TW51-0527			20PS-TW52-0528		20PS-TW53-0527		20PS-TW55-0528		20PS-TW99-0528		
							Location	TW50			TW51			TW52		TW53		TW55		TW55		
							Sample Type	Field duplicate of 20PS-TW50-0527			Primary			Primary		Primary		Primary		Field duplicate of 20PS-TW55-0528		
							Laboratory Sample Delivery Group	EIE21			EIE21			410-3098		EIE21		410-3098		410-3098		
							Laboratory Sample ID	1321913			1321926			410-3098-8		1321923		410-3098-5		410-3098-3		
							Sample Collection Date	27-May-2020			27-May-2020			28-May-2020		27-May-2020		28-May-2020		28-May-2020		
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	RPD	Results	Q	Results [5]	Q	Results	Q	Results [5]	Q	Results [5]	Q	RPD
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																				
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.012 [0.00097]	B,J	15%	0.0039 [0.0010]	B	0.0073 [0.00097]		0.0098 [0.00096]	B	**0.046** [0.00098]		**0.051** [0.00099]		10%
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.012 [0.00097]	J	0.0%	0.0090 [0.0010]	B,J	0.0066 [0.00097]		0.0040 [0.00096]	B	0.020 [0.00098]		0.020 [0.00099]		0.0%
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070	0.024 [0.0019]	B	8.0%	0.013 [0.0020]	B	0.014 [0.0019]		0.014 [0.0019]	B	**0.066** [0.0020]		**0.071** [0.0020]		7.3%
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00097]		NA	0.0010 [0.0010]	J	ND [0.00097]		ND [0.00096]		ND [0.00098]		ND [0.00099]		NA
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.043 [0.00097]	B	0.0%	0.018 [0.0010]	B	0.013 [0.00097]		0.0067 [0.00096]	B	0.035 [0.00098]		0.039 [0.00099]		11%
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.0035 [0.00097]		5.6%	0.0022 [0.0010]		0.0020 [0.00097]		0.00098 [0.00096]	J	0.0047 [0.00098]		0.0052 [0.00099]		10%
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0036 [0.00097]		8.0%	0.0025 [0.0010]		0.0017 [0.00097]	J	0.0013 [0.00096]	J	0.0036 [0.00098]		0.0039 [0.00099]		8.0%
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.019 [0.00097]		0.0%	0.0072 [0.0010]		0.0075 [0.00097]		0.0051 [0.00096]		0.016 [0.00098]		0.018 [0.00099]		12%
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00097]		NA	ND [0.0010]		ND [0.00097]		ND [0.00096]		ND [0.00098]		ND [0.00099]		NA
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00097]		NA	ND [0.0010]		ND [0.00097]		ND [0.00096]		ND [0.00098]		ND [0.00099]		NA
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00097]		NA	ND [0.0010]		ND [0.00097]		ND [0.00096]		ND [0.00098]		ND [0.00099]		NA
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00097]		NA	ND [0.0010]		ND [0.00097]		ND [0.00096]		ND [0.00098]		ND [0.00099]		NA
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00097]		NA	ND [0.0010]		ND [0.00097]		ND [0.00096]		ND [0.00098]		ND [0.00099]		NA
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0012]		NA	ND [0.0012]		ND [0.0012]		ND [0.0012]		ND [0.0012]		ND [0.0012]		NA
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00097]		NA	ND [0.0010]		ND [0.00097]		ND [0.00096]		ND [0.00098]		ND [0.00099]		NA

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (≥30%)

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

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CASRN = Chemical Abstracts Service Registry No.
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µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

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Table K-2. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Temporary Wells

							Field Sample ID	20PS-TW56-0527		20PS-TW57-0527		20PS-TW58-0526		20PS-TW59-0528		20PS-TW60-0528	
							Location	TW56		TW57		TW58		TW59		TW60	
							Sample Type	Primary		Primary		Primary		Primary		Primary	
							Laboratory Sample Delivery Group	EIE21		EIE21		EIE21		410-3098		410-3098	
							Laboratory Sample ID	1321925		1321924		1321921		410-3098-6		410-3098-7	
							Sample Collection Date	27-May-2020		27-May-2020		26-May-2020		28-May-2020		28-May-2020	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	Results	Q	Results [5]	Q	Results [5]	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.0051 [0.0010]	B,J	0.0059 [0.00095]	B,J	0.027 [0.0010]	B	0.016 [0.00097]		0.014 [0.00098]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.0045 [0.0010]	B,J	0.013 [0.00095]		0.0075 [0.0010]	B	0.0066 [0.00097]		0.0048 [0.00098]	
Aggregate PFOA/PFOS	NS	µg/L	NS	0.070	NS	0.070	0.0096 [0.0020]	B,J	0.019 [0.0019]	B,J	0.035 [0.0020]	B	0.023 [0.0019]		0.019 [0.0019]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.0010]		ND [0.00095]		ND [0.0010]		ND [0.00097]		ND [0.00098]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.010 [0.0010]	B	0.016 [0.00095]	B	0.018 [0.0010]	B	0.017 [0.00097]		0.010 [0.00098]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.0014 [0.0010]	J	0.0020 [0.00095]		0.0022 [0.0010]		0.0015 [0.00097]	J	0.0016 [0.00098]	J
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0014 [0.0010]	J	0.0024 [0.00095]		0.0024 [0.0010]	B	0.0020 [0.00097]		0.0013 [0.00098]	J
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.0036 [0.0010]		0.0042 [0.00095]		0.0063 [0.0010]	B	0.0053 [0.00097]		0.0045 [0.00098]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.0010]		ND [0.00095]		ND [0.0010]		ND [0.00097]		ND [0.00098]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.0010]		ND [0.00095]		ND [0.0010]		ND [0.00097]		ND [0.00098]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.0010]		ND [0.00095]		ND [0.0010]		ND [0.00097]		ND [0.00098]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.0010]		ND [0.00095]		ND [0.0010]		ND [0.00097]		ND [0.00098]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.0010]		ND [0.00095]		ND [0.0010]		ND [0.00097]		ND [0.00098]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0012]		ND [0.0011]		ND [0.0012]		ND [0.0012]		ND [0.0012]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.0010]		ND [0.00095]		ND [0.0010]		ND [0.00097]		ND [0.00098]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (≥30%)

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

J = The analyte was positively identified; the quantitation is estimated.

QL,QN = The analyte result is considered an estimated value with (uncertain, low) bias due to a quality control failure

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Table K-3. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Deep Cluster Wells and New Wells

							Field Sample ID	19PS-MW01A-1029		19PS-MW99-1029			20PS-MW01A-0913		20PS-MW96-0913			19PS-MW01B-1030	
							Location	MW01A		MW01A			MW01A		MW01A			MW01B	
							Sample Type	Groundwater		Field duplicate of 19PS-MW01A-1029			Primary		Field duplicate of 20PS-MW01A-0913			Groundwater	
							Laboratory Sample Delivery Group	FA69547		FA69547			410-14108		410-14108			FA69547	
							Laboratory Sample ID	FA69547-1		FA69547-3			410-14108-2		410-14108-3			FA69547-5	
							Sample Collection Date	29-Oct-2019		29-Oct-2019			13-Sep-2020		13-Sep-2020			30-Oct-2019	
Analyte	CASRN	Units	ADEC Human Health Cleanup Levels [2]	EPA Lifetime Health Advisory Levels [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	RPD	Results	Q	Results	Q	RPD	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																		
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.015 [0.0077]		0.013 [0.0077]		15%	0.013 [0.00090]		0.013 [0.00089]		0.0%	ND [0.0077]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	ND [0.0077]		ND [0.0077]		NA	0.0036 [0.00090]		0.0034 [0.00089]		5.7%	ND [0.0077]	
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	0.015 [0.015]		0.013 [0.015]		15%	0.017 [0.0018]		0.016 [0.0018]		1.2%	ND [0.015]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.0077]		ND [0.0077]		NA	ND [0.00090]		ND [0.00089]		NA	ND [0.0077]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.0058 [0.0077]	J	0.0061 [0.0077]		3.7%	0.0092 [0.00090]		0.0090 [0.00089]		2.2%	ND [0.0077]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	ND [0.0077]		ND [0.0077]		NA	0.00083 [0.00090]	J	0.00088 [0.00089]	J	5.8%	ND [0.0077]	
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	ND [0.0077]		ND [0.0077]		NA	0.0010 [0.00090]	J	0.0011 [0.00089]	J	10%	ND [0.0077]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	ND [0.0077]		ND [0.0077]		NA	0.0034 [0.00090]		0.0031 [0.00089]		9.2%	ND [0.0077]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.0077]		ND [0.0077]		NA	ND [0.00090]		ND [0.00089]		NA	ND [0.0077]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.0077]		ND [0.0077]		NA	ND [0.00090]		ND [0.00089]		NA	ND [0.0077]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.0077]		ND [0.0077]		NA	ND [0.00090]		ND [0.00089]		NA	ND [0.0077]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.0077]		ND [0.0077]		NA	ND [0.00090]		ND [0.00089]		NA	ND [0.0077]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.0077]		ND [0.0077]		NA	ND [0.00090]		ND [0.00089]		NA	ND [0.0077]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.038]		ND [0.038]		NA	ND [0.0011]		ND [0.0011]		NA	ND [0.038]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.038]		ND [0.038]		NA	ND [0.00090]		ND [0.00089]		NA	ND [0.038]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

J = The analyte was positively identified; the quantitation is estimated.

QH,QN = The analyte result is considered an estimated value with (high, uncertain) bias due to a quality control failure

Table K-3. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Deep Cluster Wells and New Wells

							Field Sample ID	19PS-MW99-1030			20PS-MW01B-0913		20PS-MW01C-0531		20PS-MW01D-0531		20PS-MW99-0531			19PS-MW02A-1026	
							Location	MW01B			MW01B		MW01C		MW01D		MW01D			MW02A	
							Sample Type	Field duplicate of 19PS-MW01B-1030			Primary		Groundwater		Groundwater		Field duplicate of 20-MW01D-0531			Groundwater	
							Laboratory Sample Delivery Group	FA69547			410-14108		410-3082		410-3082		410-3082			FA69540	
							Laboratory Sample ID	FA69547-7			410-14108-4		410-3082-17		410-3082-16		410-3082-18			FA69540-3	
							Sample Collection Date	30-Oct-2019			13-Sep-2020		31-May-2020		31-May-2020		31-May-2020			26-Oct-2019	
Analyte	CASRN	Units	ADEC Human Health Cleanup Levels [2]	EPA Lifetime Health Advisory Levels [3]	EPA RSL [4]	PAL	Results	Q	RPD	Results	Q	Results	Q	Results	Q	Results	Q	RPD	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																				
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	ND [0.0077]		NA	ND [0.00086]		ND [0.00092]		ND [0.00091]		ND [0.00089]		NA	0.015 [0.0077]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	ND [0.0077]		NA	ND [0.00086]		ND [0.00092]		ND [0.00091]		ND [0.00089]		NA	0.011 [0.0077]	
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	ND [0.015]		NA	ND [0.0017]		ND [0.0018]		ND [0.0018]		ND [0.0018]		NA	0.026 [0.015]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.0077]		NA	ND [0.00086]		ND [0.00092]		ND [0.00091]		ND [0.00089]		NA	ND [0.0077]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	ND [0.0077]		NA	ND [0.00086]		ND [0.00092]		ND [0.00091]		ND [0.00089]		NA	0.024 [0.0077]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	ND [0.0077]		NA	ND [0.00086]		ND [0.00092]		ND [0.00091]		ND [0.00089]		NA	0.0031 [0.0077]	J
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	ND [0.0077]		NA	ND [0.00086]		ND [0.00092]		ND [0.00091]		ND [0.00089]		NA	0.0026 [0.0077]	J
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	ND [0.0077]		NA	ND [0.00086]		ND [0.00092]		ND [0.00091]		ND [0.00089]		NA	0.0097 [0.0077]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.0077]		NA	ND [0.00086]		ND [0.00092]		ND [0.00091]		ND [0.00089]		NA	ND [0.0077]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.0077]		NA	ND [0.00086]		ND [0.00092]		ND [0.00091]		ND [0.00089]		NA	ND [0.0077]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.0077]		NA	ND [0.00086]		ND [0.00092]		ND [0.00091]		ND [0.00089]		NA	ND [0.0077]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.0077]		NA	ND [0.00086]		ND [0.00092]		ND [0.00091]		ND [0.00089]		NA	ND [0.0077]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.0077]		NA	ND [0.00086]		ND [0.00092]		ND [0.00091]		ND [0.00089]		NA	ND [0.0077]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.038]		NA	ND [0.0010]		ND [0.0011]		ND [0.0011]		ND [0.0011]		NA	ND [0.038]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.038]		NA	ND [0.00086]		ND [0.00092]		ND [0.00091]		ND [0.00089]		NA	ND [0.038]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
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µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
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NS = not specified
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ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

J = The analyte was positively identified; the quantitation is estimated.

QH,QN = The analyte result is considered an estimated value with (high, uncertain) bias due to a quality control failure

Table K-3. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Deep Cluster Wells and New Wells

						Field Sample ID	19PS-MW99-1026			20PS-MW02A-0911		20PS-MW99-0911			19PS-MW02B-1027		19PS-MW99-1027		
						Location	MW02A			MW02A		MW02A			MW02B		MW02B		
						Sample Type	Field duplicate of 19PS-MW02A-1026			Primary		Field duplicate of 20PS-MW02A-0911			Groundwater		Field duplicate of 19PS-MW02B-1027		
						Laboratory Sample Delivery Group	FA69540			410-13937		410-13937			FA69540		FA69540		
						Laboratory Sample ID	FA69540-4			410-13937-2		410-13937-3			FA69540-6		FA69540-7		
						Sample Collection Date	26-Oct-2019			11-Sep-2020		11-Sep-2020			27-Oct-2019		27-Oct-2019		
Analyte	CASRN	Units	ADEC Human Health Cleanup Levels [2]	EPA Lifetime Health Advisory Levels [3]	EPA RSL [4]	PAL	Results	Q	RPD	Results	Q	Results	Q	RPD	Results	Q	Results	Q	RPD
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																			
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.015 [0.0077]		3.4%	0.026 [0.00090]		0.021 [0.00090]		21%	ND [0.0077]		ND [0.0077]		NA
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.011 [0.0077]		1.9%	0.017 [0.00090]		0.013 [0.00090]		27%	ND [0.0077]		ND [0.0077]		NA
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	0.025 [0.015]		2.7%	**0.043** [0.0018]		0.034 [0.0018]		23%	ND [0.015]		ND [0.015]		NA
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.0077]		NA	ND [0.00090]		ND [0.00090]		NA	ND [0.0077]		ND [0.0077]		NA
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.024 [0.0077]		2.5%	0.037 [0.00090]		0.031 [0.00090]		18%	ND [0.0077]		ND [0.0077]		NA
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.0030 [0.0077]	J	2.6%	0.0038 [0.00090]		0.0031 [0.00090]		20%	ND [0.0077]		ND [0.0077]		NA
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0026 [0.0077]	J	1.1%	0.0041 [0.00090]	QN,QH	0.0033 [0.00090]	QN,QH	22%	ND [0.0077]		ND [0.0077]		NA
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.0091 [0.0077]		6.7%	0.017 [0.00090]		0.014 [0.00090]		19%	ND [0.0077]		ND [0.0077]		NA
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.0077]		NA	ND [0.00090]		ND [0.00090]		NA	ND [0.0077]		ND [0.0077]		NA
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.0077]		NA	ND [0.00090]		ND [0.00090]		NA	ND [0.0077]		ND [0.0077]		NA
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.0077]		NA	ND [0.00090]		ND [0.00090]		NA	ND [0.0077]		ND [0.0077]		NA
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.0077]		NA	ND [0.00090]		ND [0.00090]		NA	ND [0.0077]		ND [0.0077]		NA
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.0077]		NA	ND [0.00090]		ND [0.00090]		NA	ND [0.0077]		ND [0.0077]		NA
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.038]		NA	ND [0.0011]		ND [0.0011]		NA	ND [0.038]		ND [0.038]		NA
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.038]		NA	ND [0.00090]		ND [0.00090]		NA	ND [0.038]		ND [0.038]		NA

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

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4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

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Data Qualifiers:

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Table K-3. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Deep Cluster Wells and New Wells

							Field Sample ID	20PS-MW02B-0911		20PS-MW02C-0521		20PS-MW99-0521			20PS-MW02D-0524		20PS-MW99-0524		
							Location	MW02B		MW02C		MW02C			MW02D		MW02D		
							Sample Type	Primary		Groundwater		Field Duplicate of 20PS-MW02C-0521			Groundwater		Field duplicate of 20PS-MW02D-0524		
							Laboratory Sample Delivery Group	410-13937		EIE20		EIE20			EIE20		EIE20		
							Laboratory Sample ID	410-13937-4		1320822		1320820			1320827		1320828		
							Sample Collection Date	11-Sep-2020		21-May-2020		21-May-2020			24-May-2020		24-May-2020		
Analyte	CASRN	Units	ADEC Human Health Cleanup Levels [2]	EPA Lifetime Health Advisory Levels [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	Results	Q	RPD	Results	Q	Results	Q	RPD
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																		
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.0022 [0.00089]		ND [0.00087]		ND [0.00088]		NA	ND [0.00087]		ND [0.00088]		NA
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.0021 [0.00089]		ND [0.00087]		ND [0.00088]		NA	ND [0.00087]		ND [0.00088]		NA
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	0.0043 [0.0018]		ND [0.0017]		ND [0.0018]		NA	ND [0.0017]		ND [0.0018]		NA
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00089]		ND [0.00087]		ND [0.00088]		NA	ND [0.00087]		ND [0.00088]		NA
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.0053 [0.00089]		ND [0.00087]		ND [0.00088]		NA	ND [0.00087]		ND [0.00088]		NA
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.00059 [0.00089]	J	ND [0.00087]		ND [0.00088]		NA	ND [0.00087]		ND [0.00088]		NA
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.00064 [0.00089]	J	ND [0.00087]		ND [0.00088]		NA	ND [0.00087]		ND [0.00088]		NA
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.0023 [0.00089]		ND [0.00087]		ND [0.00088]		NA	ND [0.00087]		ND [0.00088]		NA
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00089]		ND [0.00087]		ND [0.00088]		NA	ND [0.00087]		ND [0.00088]		NA
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00089]		ND [0.00087]		ND [0.00088]		NA	ND [0.00087]		ND [0.00088]		NA
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00089]		ND [0.00087]		ND [0.00088]		NA	ND [0.00087]		ND [0.00088]		NA
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00089]		ND [0.00087]		ND [0.00088]		NA	ND [0.00087]		ND [0.00088]		NA
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00089]		ND [0.00087]		ND [0.00088]		NA	ND [0.00087]		ND [0.00088]		NA
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0011]		ND [0.0010]		ND [0.0011]		NA	ND [0.0010]		ND [0.0011]		NA
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00089]		ND [0.00087]		ND [0.00088]		NA	ND [0.00087]		ND [0.00088]		NA

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

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4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

J = The analyte was positively identified; the quantitation is estimated.

QH,QN = The analyte result is considered an estimated value with (high, uncertain) bias due to a quality control failure

Table K-3. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Deep Cluster Wells and New Wells

							Field Sample ID	20PS-MW01-0924		20PS-MW88-0924			20PS-MW02-1029		20PS-MW03-0924		20PS-MW04-1031	
							Location	MW01		MW01			MW02		MW03		MW04	
							Sample Type	Primary		Field duplicate of 20PS-MW01-0924			Primary		Primary		Primary	
							Laboratory Sample Delivery Group	410-15361		410-15361			410-19226		410-15361		410-19226	
							Laboratory Sample ID	410-15361-2		410-15361-6			410-19226-5		410-15361-4		410-19226-12	
							Sample Collection Date	24-Sep-2020		24-Sep-2020			29-Oct-2020		24-Sep-2020		31-Oct-2020	
Analyte	CASRN	Units	ADEC Human Health Cleanup Levels [2]	EPA Lifetime Health Advisory Levels [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	RPD	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																	
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.034 [0.00087]		**0.035** [0.00088]		2.9%	0.0061 [0.00097]		0.0066 [0.00088]		###### [0.00096]	J,B
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.023 [0.00087]		0.023 [0.00088]		0.0%	0.0035 [0.00097]		0.0020 [0.00088]		0.0015 [0.00096]	J
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	**0.057** [0.0017]		**0.058** [0.0018]		1.7%	0.0096 [0.0019]		0.0086 [0.0018]		0.0020 [0.0019]	J,B
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00087]		0.0012 [0.00088]	J	NA	ND [0.00097]		ND [0.00088]		ND [0.00096]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.087 [0.00087]		0.094 [0.00088]		7.7%	0.0092 [0.00097]		0.0069 [0.00088]		0.0032 [0.00096]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.016 [0.00087]		0.018 [0.00088]		12%	0.0030 [0.00097]		0.00084 [0.00088]	J	0.0011 [0.00096]	J
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0074 [0.00087]	QN,QH	0.0074 [0.00088]	QN,QH	0.0%	0.00069 [0.00097]	J, QN	0.00092 [0.00088]	J,QN	ND [0.00096]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.035 [0.00087]		0.034 [0.00088]		2.9%	0.0043 [0.00097]		0.0024 [0.00088]	J	0.0016 [0.00096]	J
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00088]		NA	ND [0.00097]		ND [0.00088]		ND [0.00096]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00088]		NA	ND [0.00097]		ND [0.00088]		ND [0.00096]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00088]		NA	ND [0.00097]		ND [0.00088]		ND [0.00096]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00088]		NA	ND [0.00097]		ND [0.00088]		ND [0.00096]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00088]		NA	ND [0.00097]		ND [0.00088]		ND [0.00096]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0010]		ND [0.0011]		NA	ND [0.0012]		ND [0.0011]		ND [0.0012]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00088]		NA	ND [0.00097]		ND [0.00088]		ND [0.00096]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

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4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
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Table K-3. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Deep Cluster Wells and New Wells

							Field Sample ID	20PS-MW99-1031			20PS-MW05-1030		20PS-MW99-1030			20PS-MW06-1029		20PS-MW99-1029		
							Location	MW04			MW05		MW05			MW06		MW06		
							Sample Type	Field duplicate of 20PS-MW04-1031			Primary		Primary			Primary		Primary		
							Laboratory Sample Delivery Group	410-19226			410-19226		410-19226			410-19226		410-19226		
							Laboratory Sample ID	410-19226-13			410-19226-7		410-19226-8			410-19226-3		410-19226-6		
							Sample Collection Date	31-Oct-2020			30-Oct-2020		30-Oct-2020			29-Oct-2020		29-Oct-2020		
Analyte	CASRN	Units	ADEC Human Health Cleanup Levels [2]	EPA Lifetime Health Advisory Levels [3]	EPA RSL [4]	PAL	Results	Q	RPD	Results	Q	Results	Q	RPD	Results	Q	Results	Q	RPD
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																			
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	###### [0.00092]	J,B	28%	**0.049** [0.00094]	QN,B	0.033 [0.00099]	QN,B	**39%**	**0.055** [0.00087]		**0.055** [0.00096]		0.0%
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.0016 [0.00092]	J	6.5%	0.0094 [0.00094]	QN	0.0069 [0.00099]	QN	**31%**	0.028 [0.00087]		0.026 [0.00096]		7.4%
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	0.0023 [0.0018]	J,B	12%	**0.058** [0.0019]	QN,B	**0.040** [0.0020]	QN,B	**38%**	**0.083** [0.0017]		**0.081** [0.0019]		2.4%
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00092]		NA	0.0019 [0.00094]		0.0012 [0.00099]	J	**45%**	0.0015 [0.00087]	J	0.0015 [0.00096]	J	0.0%
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.0034 [0.00092]		6.1%	0.043 [0.00094]		0.032 [0.00099]		29%	0.086 [0.00087]		0.080 [0.00096]		7.2%
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.0011 [0.00092]	J	0.0%	0.0048 [0.00094]	QN	0.0032 [0.00099]	QN	**40%**	0.025 [0.00087]		0.025 [0.00096]		0.0%
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	###### [0.00092]	J, QN	NA	0.0020 [0.00094]	QH	0.0017 [0.00099]	J,QN	16%	0.0046 [0.00087]		0.0041 [0.00096]		11%
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.0019 [0.00092]		17%	0.0098 [0.00094]		0.0076 [0.00099]		25%	0.037 [0.00087]		0.033 [0.00096]		11%
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00092]		NA	ND [0.00094]		ND [0.00099]		NA	ND [0.00087]		ND [0.00096]		NA
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00092]		NA	ND [0.00094]		ND [0.00099]		NA	ND [0.00087]		ND [0.00096]		NA
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00092]		NA	ND [0.00094]		ND [0.00099]		NA	ND [0.00087]		ND [0.00096]		NA
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00092]		NA	ND [0.00094]		ND [0.00099]		NA	ND [0.00087]		ND [0.00096]		NA
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00092]		NA	ND [0.00094]		ND [0.00099]		NA	ND [0.00087]		ND [0.00096]		NA
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0011]		NA	ND [0.0011]		ND [0.0012]		NA	ND [0.0010]		ND [0.0012]		NA
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00092]		NA	ND [0.00094]		ND [0.00099]		NA	ND [0.00087]		ND [0.00096]		NA

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

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ADEC = Alaska Department of Environmental Conservation
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Table K-3. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Deep Cluster Wells and New Wells

							Field Sample ID		20PS-MW07-0921		20PS-MW90-0921			20PS-MW08-0921		20PS-MW09-0921		20PS-MW10-0921	
							Location		MW07		MW07			MW08		MW09		MW10	
							Sample Type		Primary		Field duplicate of 20PS-MW07-0921			Primary		Primary		Primary	
							Laboratory Sample Delivery Group		410-15101		410-15101			410-15101		410-15101		410-15101	
							Laboratory Sample ID		410-15101-2		410-15101-6			410-15101-3		410-15101-4		410-15101-5	
							Sample Collection Date		21-Sep-2020		21-Sep-2020			21-Sep-2020		21-Sep-2020		21-Sep-2020	
Analyte	CASRN	Units	ADEC Human Health Cleanup Levels [2]	EPA Lifetime Health Advisory Levels [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	RPD	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																		
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	**0.036** [0.00087]		**0.036** [0.00089]		0.0%	**0.068** [0.00086]		0.020 [0.00087]		ND [0.00085]			
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.019 [0.00087]		0.019 [0.00089]		0.0%	0.010 [0.00086]		0.0075 [0.00087]		ND [0.00085]			
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	**0.055** [0.0017]		**0.055** [0.0018]		0.0%	**0.078** [0.0017]		0.028 [0.0017]		ND [0.0017]			
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	0.0013 [0.00087]	J	0.0012 [0.00089]	J	8.0%	ND [0.00086]		ND [0.00087]		ND [0.00085]			
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.067 [0.00087]		0.067 [0.00089]		0.0%	0.028 [0.00086]		0.029 [0.00087]		0.0067 [0.00085]			
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.022 [0.00087]		0.022 [0.00089]		0.0%	0.0082 [0.00086]		0.0028 [0.00087]		ND [0.00085]			
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0049 [0.00087]		0.0048 [0.00089]		2.1%	0.0030 [0.00086]	QN,QH	0.0045 [0.00087]		0.0021 [0.00085]			
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.033 [0.00087]		0.034 [0.00089]		3.0%	0.015 [0.00086]		0.0082 [0.00087]		ND [0.00085]			
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00089]		NA	ND [0.00086]		ND [0.00087]		ND [0.00085]			
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00089]		NA	ND [0.00086]		ND [0.00087]		ND [0.00085]			
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00089]		NA	ND [0.00086]		ND [0.00087]		ND [0.00085]			
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00089]		NA	ND [0.00086]		ND [0.00087]		ND [0.00085]			
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00089]		NA	ND [0.00086]		ND [0.00087]		ND [0.00085]			
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0010]		ND [0.0011]		NA	ND [0.0010]		ND [0.0010]		ND [0.0010]			
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00089]		NA	ND [0.00086]		ND [0.00087]		ND [0.00085]			

Notes:

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QH,QN = The analyte result is considered an estimated value with (high, uncertain) bias due to a quality control failure

Table K-3. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Deep Cluster Wells and New Wells

							Field Sample ID		20PS-MW11-0923		20PS-MW12-0923		20PS-MW89-0923			20PS-MW13-0925		20PS-MW14-0923		20PS-MW15-0925	
							Location		MW11		MW12		MW12			MW13		MW14		MW15	
							Sample Type		Primary		Primary		Field duplicate of 20PS-MW12-0923			Primary		Primary		Primary	
							Laboratory Sample Delivery Group		410-15101		410-15101		410-15101			410-15361		410-15101		410-15361	
							Laboratory Sample ID		410-15101-10		410-15101-9		410-15101-15			410-15361-9		410-15101-14		410-15361-8	
							Sample Collection Date		23-Sep-2020		23-Sep-2020		23-Sep-2020			25-Sep-2020		23-Sep-2020		25-Sep-2020	
Analyte	CASRN	Units	ADEC Human Health Cleanup Levels [2]	EPA Lifetime Health Advisory Levels [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	Results	Q	RPD	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																					
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.0051 [0.00082]		0.015 [0.00087]	J	0.015 [0.00087]	J	0.0%	**0.038** [0.00088]		0.013 [0.00087]		**0.045** [0.00087]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.0027 [0.00082]		0.0053 [0.00087]		0.0053 [0.00087]		0.0%	0.018 [0.00088]		0.015 [0.00087]		0.015 [0.00087]	
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	0.0078 [0.0016]		0.020 [0.0017]	J	0.020 [0.0017]	J	0.0%	**0.056** [0.0018]		0.028 [0.0017]		**0.060** [0.0017]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00082]		ND [0.00087]		ND [0.00087]		NA	ND [0.00088]		0.00073 [0.00087]	J	ND [0.00087]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.012 [0.00082]		0.026 [0.00087]		0.026 [0.00087]		0.0%	0.043 [0.00088]		0.024 [0.00087]		0.029 [0.00087]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.0011 [0.00082]	J	0.0017 [0.00087]		0.0015 [0.00087]	J	13%	0.0044 [0.00088]		0.0029 [0.00087]		0.0032 [0.00087]	
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0016 [0.00082]		0.0043 [0.00087]		0.0045 [0.00087]		4.5%	0.0043 [0.00088]		0.0033 [0.00087]	QN,QH	0.0035 [0.00087]	QN,QH
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.0030 [0.00082]		0.0052 [0.00087]		0.0055 [0.00087]		5.6%	0.016 [0.00088]		0.016 [0.00087]		0.016 [0.00087]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00082]		ND [0.00087]		ND [0.00087]		NA	ND [0.00088]		ND [0.00087]		ND [0.00087]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00082]		ND [0.00087]		ND [0.00087]		NA	ND [0.00088]		ND [0.00087]		ND [0.00087]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00082]		ND [0.00087]		ND [0.00087]		NA	ND [0.00088]		ND [0.00087]		ND [0.00087]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00082]		ND [0.00087]		ND [0.00087]		NA	ND [0.00088]		ND [0.00087]		ND [0.00087]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00082]		ND [0.00087]		ND [0.00087]		NA	ND [0.00088]		ND [0.00087]		ND [0.00087]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.00099]		ND [0.0010]		ND [0.0010]		NA	ND [0.0011]		ND [0.0010]		ND [0.0010]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00082]		ND [0.00087]		ND [0.00087]		NA	ND [0.00088]		ND [0.00087]		ND [0.00087]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

J = The analyte was positively identified; the quantitation is estimated.

QH,QN = The analyte result is considered an estimated value with (high, uncertain) bias due to a quality control failure

Table K-3. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Deep Cluster Wells and New Wells

							Field Sample ID	20PS-MW17-0925		20PS-MW87-0925			20PS-MW18-0923		20PS-MW19-0923		20PS-MW20-0923		20PS-MW22-0917	
							Location	MW17		MW17			MW18		MW19		MW20		MW22	
							Sample Type	Primary		Field duplicate of 20PS-MW17-0925			Primary		Primary		Primary		Primary	
							Laboratory Sample Delivery Group	410-15361		410-15361			410-15101		410-15101		410-15101		410-14670	
							Laboratory Sample ID	410-15361-7		410-15361-11			410-15101-11		410-15101-13		410-15101-12		410-14670-4	
							Sample Collection Date	25-Sep-2020		25-Sep-2020			23-Sep-2020		23-Sep-2020		23-Sep-2020		17-Sep-2020	
Analyte	**CASRN**	**Units**	**ADEC Human Health Cleanup Levels [2]**	**EPA Lifetime Health Advisory Levels [3]**	**EPA RSL [4]**	**PAL**	**Results**	**Q**	**Results**	**Q**	**RPD**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																				
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.0087 [0.00088]	J	0.0093 [0.00087]	J	6.7%	0.0035 [0.00089]		0.0041 [0.00092]		0.0049 [0.00087]		0.0049 [0.00091]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.0028 [0.00088]		0.0028 [0.00087]		0.0%	0.0015 [0.00089]	J	0.0027 [0.00092]		0.013 [0.00087]		0.0048 [0.00091]	
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	0.012 [0.0018]	J	0.012 [0.0017]	J	5.1%	0.0050 [0.0018]	J	0.0068 [0.0018]		0.018 [0.0017]		0.0097 [0.0018]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00087]		NA	ND [0.00089]		ND [0.00092]		ND [0.00087]		ND [0.00091]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.011 [0.00088]		0.011 [0.00087]		0.0%	0.0040 [0.00089]		0.0066 [0.00092]		0.022 [0.00087]		0.010 [0.00091]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.00078 [0.00088]	J	0.00085 [0.00087]	J	8.6%	0.00053 [0.00089]	J	0.00059 [0.00092]	J	0.0035 [0.00087]		ND [0.00091]	
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0015 [0.00088]	J	0.0015 [0.00087]	J	0.0%	0.00066 [0.00089]	J,QN	0.0014 [0.00092]	J,QN	0.0025 [0.00087]		0.0015 [0.00091]	J
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.0019 [0.00088]		0.0018 [0.00087]		5.4%	0.0018 [0.00089]		0.0030 [0.00092]		0.016 [0.00087]		0.0013 [0.00091]	J
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00087]		NA	ND [0.00089]		ND [0.00092]		ND [0.00087]		ND [0.00091]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00087]		NA	ND [0.00089]		ND [0.00092]		ND [0.00087]		ND [0.00091]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00087]		NA	ND [0.00089]		ND [0.00092]		ND [0.00087]		ND [0.00091]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00087]		NA	ND [0.00089]		ND [0.00092]		ND [0.00087]		ND [0.00091]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00087]		NA	ND [0.00089]		ND [0.00092]		ND [0.00087]		ND [0.00091]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0011]		ND [0.0010]		NA	ND [0.0011]		ND [0.0011]		ND [0.0010]		ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00087]		NA	ND [0.00089]		ND [0.00092]		ND [0.00087]		ND [0.00091]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

J = The analyte was positively identified; the quantitation is estimated.

QH,QN = The analyte result is considered an estimated value with (high, uncertain) bias due to a quality control failure

Table K-3. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Deep Cluster Wells and New Wells

							Field Sample ID		20PS-MW23-0924		20PS-MW24-0917		20PS-MW25-0917		20PS-MW26-0914		20PS-MW27-0914		20PS-MW28-0914	
							Location		MW23		MW24		MW25		MW26		MW27		MW28	
							Sample Type		Primary		Primary		Primary		Primary		Primary		Primary	
							Laboratory Sample Delivery Group		410-15361		410-14670		410-14670		410-14108		410-14108		410-14108	
							Laboratory Sample ID		410-15361-5		410-14670-6		410-14670-7		410-14108-9		410-14108-8		410-14108-7	
							Sample Collection Date		24-Sep-2020		17-Sep-2020		17-Sep-2020		14-Sep-2020		14-Sep-2020		14-Sep-2020	
Analyte	CASRN	Units	ADEC Human Health Cleanup Levels [2]	EPA Lifetime Health Advisory Levels [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q		
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																				
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.011 [0.00088]		**0.047** [0.00091]		0.0041 [0.00089]		**0.040** [0.00091]		**0.065** [0.00092]		**0.046** [0.00090]			
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.0038 [0.00088]		0.015 [0.00091]		0.0031 [0.00089]		0.013 [0.00091]		0.024 [0.00092]		0.016 [0.00090]			
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	0.015 [0.0018]		**0.062** [0.0018]		0.0072 [0.0018]		**0.053** [0.0018]		**0.089** [0.0018]		**0.062** [0.0018]			
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00091]		ND [0.00089]		ND [0.00091]		0.00074 [0.00092]	J	ND [0.00090]			
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.015 [0.00088]		0.036 [0.00091]		0.0075 [0.00089]		0.037 [0.00091]		0.045 [0.00092]		0.031 [0.00090]			
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.0014 [0.00088]	J	0.0033 [0.00091]		0.00077 [0.00089]	J	0.0035 [0.00091]		0.0044 [0.00092]		0.0036 [0.00090]			
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0019 [0.00088]	QN,QH	0.0047 [0.00091]		0.0012 [0.00089]	J,QN	0.0038 [0.00091]	QN,QH	0.0043 [0.00092]	QN,QH	0.0032 [0.00090]	QN,QH		
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.0030 [0.00088]		0.0085 [0.00091]		0.0020 [0.00089]		0.013 [0.00091]		0.020 [0.00092]		0.016 [0.00090]			
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00091]		ND [0.00089]		ND [0.00091]		ND [0.00092]		ND [0.00090]			
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00091]		ND [0.00089]		ND [0.00091]		ND [0.00092]		ND [0.00090]			
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00091]		ND [0.00089]		ND [0.00091]		ND [0.00092]		ND [0.00090]			
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00091]		ND [0.00089]		ND [0.00091]		ND [0.00092]		ND [0.00090]			
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00091]		ND [0.00089]		ND [0.00091]		ND [0.00092]		ND [0.00090]			
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0011]			
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00088]		ND [0.00091]		ND [0.00089]		ND [0.00091]		ND [0.00092]		ND [0.00090]			

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

J = The analyte was positively identified; the quantitation is estimated.

QH,QN = The analyte result is considered an estimated value with (high, uncertain) bias due to a quality control failure

Table K-3. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Deep Cluster Wells and New Wells

							Field Sample ID	20PS-MW29-0913		20PS-MW30-0914		20PS-MW95-0914			20PS-MW31-0917		20PS-MW94-0917			20PS-MW32-0917		20PS-MW33-0917	
							Location	MW29		MW30		MW30			MW31		MW31			MW32		MW33	
							Sample Type	Primary		Primary		Field duplicate of 20PS-MW30-0914			Primary		Field duplicate of 20PS-MW31-0917			Primary		Primary	
							Laboratory Sample Delivery Group	410-14108		410-14108		410-14108			410-14670		410-14670			410-14670		410-14670	
							Laboratory Sample ID	410-14108-5		410-14108-6		410-14108-10			410-14670-2		410-14670-8			410-14670-3		410-14670-5	
							Sample Collection Date	13-Sep-2020		14-Sep-2020		14-Sep-2020			17-Sep-2020		17-Sep-2020			17-Sep-2020		17-Sep-2020	
Analyte	CASRN	Units	ADEC Human Health Cleanup Levels [2]	EPA Lifetime Health Advisory Levels [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	Results	Q	RPD	Results	Q	Results	Q	RPD	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																						
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.034 [0.00087]		0.016 [0.00091]		0.016 [0.00090]		0.0%	0.0049 [0.00091]		0.0055 [0.00089]		12%	0.0067 [0.00091]		0.0064 [0.00092]	J
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.015 [0.00087]		0.010 [0.00091]		0.011 [0.00090]		10%	0.0023 [0.00091]		0.0026 [0.00089]		12%	0.0033 [0.00091]		0.0089 [0.00092]	
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	**0.049** [0.0017]		0.026 [0.0018]		0.027 [0.0018]		3.8%	0.0072 [0.0018]		0.0081 [0.0018]		12%	0.010 [0.0018]		0.015 [0.0018]	J
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00091]		ND [0.00090]		NA	ND [0.00091]		ND [0.00089]		NA	ND [0.00091]		ND [0.00092]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.030 [0.00087]		0.026 [0.00091]		0.025 [0.00090]		3.9%	0.0064 [0.00091]		0.0074 [0.00089]		14%	0.0086 [0.00091]		0.019 [0.00092]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.0031 [0.00087]		0.0026 [0.00091]		0.0027 [0.00090]		3.8%	0.00080 [0.00091]	J	0.00098 [0.00089]	J	20%	0.0012 [0.00091]	J	ND [0.00092]	
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0036 [0.00087]	QH	0.0030 [0.00091]	QH	0.0028 [0.00090]		6.9%	0.00092 [0.00091]	J,QN	0.0010 [0.00089]	J,QN	8.3%	0.0012 [0.00091]	J	0.0022 [0.00092]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.016 [0.00087]		0.012 [0.00091]		0.011 [0.00090]		8.7%	0.0027 [0.00091]		0.0029 [0.00089]		7.1%	0.0036 [0.00091]		ND [0.00092]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00091]		ND [0.00090]		NA	ND [0.00091]		ND [0.00089]		NA	ND [0.00091]		ND [0.00092]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00091]		ND [0.00090]		NA	ND [0.00091]		ND [0.00089]		NA	ND [0.00091]		ND [0.00092]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00091]		ND [0.00090]		NA	ND [0.00091]		ND [0.00089]		NA	ND [0.00091]		ND [0.00092]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00091]		ND [0.00090]		NA	ND [0.00091]		ND [0.00089]		NA	ND [0.00091]		ND [0.00092]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00091]		ND [0.00090]		NA	ND [0.00091]		ND [0.00089]		NA	ND [0.00091]		ND [0.00092]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0010]		ND [0.0011]		ND [0.0011]		NA	ND [0.0011]		ND [0.0011]		NA	ND [0.0011]		ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00087]		ND [0.00091]		ND [0.00090]		NA	ND [0.00091]		ND [0.00089]		NA	ND [0.00091]		ND [0.00092]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

J = The analyte was positively identified; the quantitation is estimated.

QH,QN = The analyte result is considered an estimated value with (high, uncertain) bias due to a quality control failure

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Table K-4. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Surface Water

							Field Sample ID	20PS-CS-01-0912		20PS-MW97-0912			20PS-CS-02-0912		20PS-CS-03-0919		20PS-MW91-0919			20PS-BB01-SW-1	
							Location	Crescent Lake		Crescent Lake			Crescent Lake		Crescent Lake		Crescent Lake			Bathing Beauty Lake	
							Sample Type	Primary		Field duplicate of 20PS-CS-01-0912			Primary		Primary		Field duplicate of 20PS-CS-03-0919			Surface Water	
							Laboratory Sample Delivery Group	410-13937		410-13937			410-13937		410-14665		410-14665			410-4215	
							Laboratory Sample ID	410-13937-9		410-13937-11			410-13937-8		410-14665-6		410-14665-8			410-4215-14	
							Sample Collection Date	12-Sep-2020		12-Sep-2020			12-Sep-2020		19-Sep-2020		19-Sep-2020			9-Jun-2020	
Analyte	**CASRN**	**Units**	**ADEC Human Health Cleanup Level [2]**	**EPA Lifetime Health Advisory Level [3]**	**EPA RSL [4]**	**PAL**	**Results**	**Q**	**Results**	**Q**	**RPD**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**RPD**	**Results**	**Q**
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																			
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.0063 [0.00081]		0.0061 [0.00081]		3.2%	0.016 [0.00080]		0.0062 [0.00081]		0.0060 [0.00080]		3.3%	0.017 [0.00083]	J
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.0032 [0.00081]		0.0030 [0.00081]		6.5%	0.012 [0.00080]		0.0032 [0.00081]		0.0030 [0.00080]		6.5%	0.0038 [0.00083]	
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	0.0095 [0.0016]		0.0091 [0.0016]		4.3%	0.028 [0.0016]		0.0094 [0.0016]		0.0090 [0.0016]		4.3%	0.021 [0.0017]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00081]		ND [0.00081]		NA	ND [0.00080]		ND [0.00081]		ND [0.00080]		NA	ND [0.00083]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.0081 [0.00081]		0.0068 [0.00081]		17%	0.025 [0.00080]		0.0069 [0.00081]		0.0065 [0.00080]		6.0%	0.016 [0.00083]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.00095 [0.00081]	J	0.00085 [0.00081]	J	11%	0.0024 [0.00080]		0.00073 [0.00081]	J	0.00067 [0.00080]	J	8.6%	0.0016 [0.00083]	J
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0011 [0.00081]	J	0.0010 [0.00081]	J,QN	10%	0.0030 [0.00080]	QN	0.00096 [0.00081]	J	0.00087 [0.00080]	J,QN	10%	0.0024 [0.00083]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.0034 [0.00081]		0.0033 [0.00081]		3.0%	0.0082 [0.00080]		0.0028 [0.00081]		0.0027 [0.00080]		3.6%	0.0033 [0.00083]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00081]		ND [0.00081]		NA	ND [0.00080]		ND [0.00081]		ND [0.00080]		NA	ND [0.00083]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00081]		ND [0.00081]		NA	ND [0.00080]		ND [0.00081]		ND [0.00080]		NA	ND [0.00083]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00081]		ND [0.00081]		NA	ND [0.00080]		ND [0.00081]		ND [0.00080]		NA	ND [0.00083]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00081]		ND [0.00081]		NA	ND [0.00080]		ND [0.00081]		ND [0.00080]		NA	ND [0.00083]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00081]		ND [0.00081]		NA	ND [0.00080]		ND [0.00081]		ND [0.00080]		NA	ND [0.00083]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.00097]		ND [0.00097]		NA	ND [0.00096]		ND [0.00097]		ND [0.00096]		NA	ND [0.0010]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00081]		ND [0.00081]		NA	ND [0.00080]		ND [0.00081]		ND [0.00080]		NA	ND [0.00083]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

H = Analyte is considered low estimate due to a hold time exceedance.

J = The analyte was positively identified; the quantitation is estimated.

QL,QH,QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table K-4. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Surface Water

							Field Sample ID	20PS-BB02-SW-1		20PS-BB02-SW-5		20PS-BR01-SW-1		20PS-BR02-SW-1		20PS-BR99-SW-0606			20PS-BR02-SW-5	
							Location	Bathing Beauty Lake		Bathing Beauty Lake		Bear Lake		Bear Lake		Bear Lake			Bear Lake	
							Sample Type	Surface Water		Surface Water		Surface Water		Surface Water		Field Duplicate of 20PS-BR02-SW-1			Surface Water	
							Laboratory Sample Delivery Group	410-4215		410-4215		410-3855		410-3855		410-3855			410-3855	
							Laboratory Sample ID	410-4215-12		410-4215-13		410-3855-12		410-3855-14		410-3855-15			410-3855-16	
							Sample Collection Date	9-Jun-2020		9-Jun-2020		6-Jun-2020		6-Jun-2020		6-Jun-2020			6-Jun-2020	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	RPD	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																			
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.022 [0.00081]		0.019 [0.00092]		**0.044** [0.0010]	QL	**0.046** [0.00088]	QL	**0.042** [0.00089]	QL	9%	**0.053** [0.00086]	QL
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.0038 [0.00081]		0.0035 [0.00092]		0.016 [0.0010]	QL	0.017 [0.00088]	QL	0.017 [0.00089]	QL	0%	0.017 [0.00086]	QL
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	0.026 [0.0016]		0.023 [0.0018]		**0.060** [0.0020]	QL	**0.063** [0.0018]	QL	**0.059** [0.0018]	QL	7%	**0.070** [0.0017]	QL
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00081]		ND [0.00092]		0.00054 [0.0010]	J,QL	0.00053 [0.00088]	J,QL	0.00060 [0.00089]	J,QL	12%	0.00071 [0.00086]	J,QL
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.017 [0.00081]		0.017 [0.00092]		0.060 [0.0010]	QL	0.059 [0.00088]	QL	0.060 [0.00089]	QL	2%	0.063 [0.00086]	QL
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.0017 [0.00081]		0.0018 [0.00092]		0.0064 [0.0010]	QL	0.0062 [0.00088]	QL	0.0063 [0.00089]	QL	2%	0.0064 [0.00086]	QL
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0025 [0.00081]		0.0024 [0.00092]		0.0068 [0.0010]	QL,QN	0.0071 [0.00088]	QL,QN	0.0069 [0.00089]	QL	3%	0.0073 [0.00086]	QL
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.0035 [0.00081]		0.0033 [0.00092]		0.022 [0.0010]	QL	0.022 [0.00088]	QL	0.022 [0.00089]	QL	0%	0.023 [0.00086]	QL
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00081]		ND [0.00092]		ND [0.0010]	QL	ND [0.00088]	QL	ND [0.00089]	QL	NA	ND [0.00086]	QL
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00081]		ND [0.00092]		ND [0.0010]	QL	ND [0.00088]	QL	ND [0.00089]	QL	NA	ND [0.00086]	QL
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00081]		ND [0.00092]		ND [0.0010]	QL	ND [0.00088]	QL	ND [0.00089]	QL	NA	ND [0.00086]	QL
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00081]		ND [0.00092]		ND [0.0010]	QL	ND [0.00088]	QL	ND [0.00089]	QL	NA	ND [0.00086]	QL
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00081]		ND [0.00092]		ND [0.0010]	QL	ND [0.00088]	QL	ND [0.00089]	QL	NA	ND [0.00086]	QL
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.00097]		ND [0.0011]		ND [0.0012]	QL	ND [0.0011]	QL	ND [0.0011]	QL	NA	ND [0.0010]	QL
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00081]		ND [0.00092]		ND [0.0010]	QL	ND [0.00088]	QL	ND [0.00089]	QL	NA	ND [0.00086]	QL

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

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CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

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J = The analyte was positively identified; the quantitation is estimated.

QL,QH,QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table K-4. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Surface Water

							Field Sample ID	20PS-FC01-SW-1		20PS-FC02-SW-1		20PS-FC99-SW-0604			20PS-FC03-SW-1		20PS-GL01-SW-1		20PS-GL02-SW-1	
							Location	French Creek 01		French Creek 02		French Creek 02			French Creek 03		Grayling Lake		Grayling Lake	
							Sample Type	Surface Water		Surface Water		Field duplicate of 20PS-FC02-SW-1			Surface Water		Surface Water		Surface Water	
							Laboratory Sample Delivery Group	410-3855		410-3854		410-3854			410-3855		410-4213		410-4213	
							Laboratory Sample ID	410-3855-13		410-3854-1		410-3854-18			410-3855-11		410-4213-6		410-4213-7	
							Sample Collection Date	4-Jun-2020		4-Jun-2020		4-Jun-2020			4-Jun-2020		10-Jun-2020		10-Jun-2020	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	Results	Q	RPD	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																			
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.011 [0.00085]	QL	0.015 [0.00098]	QL,H	0.019 [0.00090]	QL,H	24%	0.018 [0.00081]	QL	ND [0.00091]		ND [0.00087]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.0022 [0.00085]	QL	ND [0.00098]	QL,H	0.0058 [0.00090]	QL,H	NA	0.0028 [0.00081]	QL	ND [0.00091]		ND [0.00087]	
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	0.013 [0.0017]	QL	0.0015 [0.0018]	QL,H	0.025 [0.0018]	QL,H	**177%**	0.021 [0.0016]	QL	ND [0.0018]		ND [0.0017]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00085]	QL	ND [0.00098]	QL,H	ND [0.00090]	H	NA	ND [0.00081]	QL	ND [0.00091]		ND [0.00087]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.0070 [0.00085]	QL	0.0087 [0.00098]	J,QL,H	0.015 [0.00090]	QL,H	**53%**	0.010 [0.00081]	QL	0.0010 [0.00091]	J	0.00090 [0.00087]	J
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.0011 [0.00085]	J,QL,QN	ND [0.00098]	QL,H	0.0042 [0.00090]	QL,H	NA	0.0014 [0.00081]	J,QL	ND [0.00091]		ND [0.00087]	
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.00063 [0.00085]	J,QL,QN	ND [0.00098]	QL,H	0.0011 [0.00090]	J,QL,H	NA	0.00095 [0.00081]	J,QL,QN	ND [0.00091]		ND [0.00087]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.0023 [0.00085]	QL	ND [0.00098]	QL,H	0.0077 [0.00090]	QL,H	NA	0.0031 [0.00081]	QL	ND [0.00091]		ND [0.00087]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00085]	QL	ND [0.00098]	QL,H	ND [0.00090]	H	NA	ND [0.00081]	QL	ND [0.00091]		ND [0.00087]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00085]	QL	ND [0.00098]	QL,H	ND [0.00090]	H	NA	ND [0.00081]	QL	ND [0.00091]		ND [0.00087]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00085]	QL	ND [0.00098]	QL,H	ND [0.00090]	H	NA	ND [0.00081]	QL	ND [0.00091]		ND [0.00087]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00085]	QL	ND [0.00098]	QL,H	ND [0.00090]	H	NA	ND [0.00081]	QL	ND [0.00091]		ND [0.00087]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00085]	QL	ND [0.00098]	QL,H	ND [0.00090]	H	NA	ND [0.00081]	QL	ND [0.00091]		ND [0.00087]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.00098]	QL	ND [0.0012]	QL,H	ND [0.0011]	H	NA	ND [0.00098]	QL	ND [0.0011]		ND [0.0010]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00085]	QL	ND [0.00098]	QL,H	ND [0.00090]	H	NA	ND [0.00081]	QL	ND [0.00091]		ND [0.00087]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

H = Analyte is considered low estimate due to a hold time exceedance.

J = The analyte was positively identified; the quantitation is estimated.

QL,QH,QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table K-4. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Surface Water

							Field Sample ID	20PS-GL99-SW-0610			20PS-GL02-SW-5		20PS-HL01-SW-1		20PS-HL02-SW-1		20PS-HL02-SW-5		20PS-MC01-SW-1	
							Location	Grayling Lake			Grayling Lake		Hidden Lake		Hidden Lake		Hidden Lake		Moose Creek	
							Sample Type	Field duplicate of 20PS-GL02-SW-1			Surface Water		Surface Water		Surface Water		Surface Water		Surface Water	
							Laboratory Sample Delivery Group	410-4213			410-4213		410-4215		410-4215		410-4215		410-3854	
							Laboratory Sample ID	410-4213-9			410-4213-8		410-4215-18		410-4215-16		410-4215-17		410-3854-3	
							Sample Collection Date	10-Jun-2020			10-Jun-2020		9-Jun-2020		9-Jun-2020		9-Jun-2020		6-Jun-2020	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	RPD	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																				
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	ND [0.00092]		NA	ND [0.00091]		0.00089 [0.00088]	J	0.00097 [0.00088]	J	0.00099 [0.00089]	J	**0.065** [0.00085]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	ND [0.00092]		NA	ND [0.00091]		0.00051 [0.00088]	J	0.00055 [0.00088]	J	0.00056 [0.00089]	J	0.029 [0.00085]	
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	ND [0.0018]		NA	ND [0.0018]		0.0014 [0.0018]	J	0.0015 [0.0018]	J	0.0016 [0.0018]	J	**0.094** [0.0017]		
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00092]		NA	ND [0.00091]		ND [0.00088]		ND [0.00088]		ND [0.00089]		0.00057 [0.00085]	J	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.0011 [0.00092]	J	20%	0.0011 [0.00091]	J	0.0031 [0.00088]		0.0027 [0.00088]		0.0026 [0.00089]		0.047 [0.00085]		
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	ND [0.00092]		NA	ND [0.00091]		ND [0.00088]		ND [0.00088]		ND [0.00089]		0.0052 [0.00085]		
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	ND [0.00092]		NA	ND [0.00091]		ND [0.00088]		ND [0.00088]		ND [0.00089]		0.0055 [0.00085]		
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	ND [0.00092]		NA	ND [0.00091]		0.00076 [0.00088]	J	0.00050 [0.00088]	J	0.00044 [0.00089]	J	0.027 [0.00085]		
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00092]		NA	ND [0.00091]		ND [0.00088]		ND [0.00088]		ND [0.00089]		ND [0.00085]		
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00092]		NA	ND [0.00091]		ND [0.00088]		ND [0.00088]		ND [0.00089]		ND [0.00085]		
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00092]		NA	ND [0.00091]		ND [0.00088]		ND [0.00088]		ND [0.00089]		ND [0.00085]		
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00092]		NA	ND [0.00091]		ND [0.00088]		ND [0.00088]		ND [0.00089]		ND [0.00085]		
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00092]		NA	ND [0.00091]		ND [0.00088]		ND [0.00088]		ND [0.00089]		ND [0.00085]		
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0011]		NA	ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0010]		
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00092]		NA	ND [0.00091]		ND [0.00088]		ND [0.00088]		ND [0.00089]		ND [0.00085]		

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

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3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

H = Analyte is considered low estimate due to a hold time exceedance.

J = The analyte was positively identified; the quantitation is estimated.

QL,QH,QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table K-4. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Surface Water

							Field Sample ID	20PS-MC02-SW-1		20PS-MLP01-SW-1		20PS-MLP01-SW-5		20PS-MLP02-SW-1		20PS-MLP02-SW-5		20PS-ML01-SW-1	
							Location	Moose Creek		Moose Creek Landing		Moose Creek Landing		Moose Creek Landing		Moose Creek Landing		Moose Lake	
							Sample Type	Surface Water		Surface Water		Surface Water		Surface Water		Surface Water		Surface Water	
							Laboratory Sample Delivery Group	410-3854		410-3854		410-3854		410-3854		410-3854		410-3855	
							Laboratory Sample ID	410-3854-2		410-3854-7		410-3854-8		410-3854-9		410-3854-10		410-3855-1	
							Sample Collection Date	6-Jun-2020		6-Jun-2020		6-Jun-2020		6-Jun-2020		6-Jun-2020		3-Jun-2020	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																			
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070		0.011 [0.00084]		**0.041** [0.00091]		**0.040** [0.00094]		**0.040** [0.00084]		**0.044** [0.00090]		**0.15** [0.00095]	QL
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070		0.0019 [0.00084]		0.019 [0.00091]		0.019 [0.00094]		0.020 [0.00084]		0.020 [0.00090]		0.022 [0.00095]	QL,B
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070		0.013 [0.0017]		**0.060** [0.0018]		**0.059** [0.0019]		**0.060** [0.0017]		**0.064** [0.0019]		**0.17** [0.0019]	QL,B
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS		ND [0.00084]		ND [0.00091]		ND [0.00094]		0.00045 [0.00084]	J	ND [0.00090]		0.0010 [0.00095]	J,QL,B
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS		0.0079 [0.00084]		0.033 [0.00091]		0.032 [0.00094]		0.033 [0.00084]		0.035 [0.00090]		0.10 [0.00095]	QL
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS		0.00070 [0.00084]	J	0.0039 [0.00091]		0.0039 [0.00094]		0.0038 [0.00084]		0.0040 [0.00090]		0.0086 [0.00095]	QL,B
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60		0.00058 [0.00084]	J,QN,B	0.0035 [0.00091]		0.0036 [0.00094]		0.0035 [0.00084]		0.0036 [0.00090]		0.0095 [0.00095]	QN,QL,B
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS		0.0018 [0.00084]	J	0.018 [0.00091]		0.017 [0.00094]		0.018 [0.00084]		0.018 [0.00090]		0.030 [0.00095]	QL,B
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS		ND [0.00084]		ND [0.00091]		ND [0.00094]		ND [0.00084]		ND [0.00090]		ND [0.00095]	QL
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS		ND [0.00084]		ND [0.00091]		ND [0.00094]		ND [0.00084]		ND [0.00090]		ND [0.00095]	QL
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS		ND [0.00084]		ND [0.00091]		ND [0.00094]		ND [0.00084]		ND [0.00090]		ND [0.00095]	QL
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS		ND [0.00084]		ND [0.00091]		ND [0.00094]		ND [0.00084]		ND [0.00090]		ND [0.00095]	QL
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS		ND [0.00084]		ND [0.00091]		ND [0.00094]		ND [0.00084]		ND [0.00090]		ND [0.00095]	QL
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS		ND [0.0010]		ND [0.0011]		ND [0.0011]		ND [0.0010]		ND [0.0011]		ND [0.0011]	QL
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS		ND [0.00084]		ND [0.00091]		ND [0.00094]		ND [0.00084]		ND [0.00090]		ND [0.00095]	QL

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

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J = The analyte was positively identified; the quantitation is estimated.

QL,QH,QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table K-4. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Surface Water

							Field Sample ID	20PS-ML02-SW-1		20PS-ML02-SW-5		20PS-MP01-SW-1		20PS-MP99-SW-0603			20PS-MP02-SW-2		20PS-PS01-SW-1	
							Location	Moose Lake		Moose Lake		Mullins Pit		Mullins Pit			Mullins Pit		Piledriver Slough	
							Sample Type	Surface Water		Surface Water		Surface Water		Field Duplicate of 20PS-MP01-SW-1			Surface Water		Surface Water	
							Laboratory Sample Delivery Group	410-3855		410-3855		410-3855		410-3855			410-3855		410-4215	
							Laboratory Sample ID	410-3855-2		410-3855-3		410-3855-7		410-3855-8			410-3855-9		410-4215-9	
							Sample Collection Date	3-Jun-2020		3-Jun-2020		3-Jun-2020		3-Jun-2020			3-Jun-2020		9-Jun-2020	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	Results	Q	Results	Q	RPD	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																			
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	**0.12** [0.00095]	QL,B	**0.13** [0.00093]	QL,B	0.00066 [0.00093]	J,QL,B	0.00062 [0.00092]	J,QL,B	6.3%	0.00055 [0.00092]	J,QL,B	**0.076** [0.00091]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.022 [0.00095]	QL,B	0.023 [0.00093]	QL,B	0.00047 [0.00093]	J,QL,B	0.00048 [0.00092]	J,QL,B	2.1%	ND [0.00092]	QL	0.029 [0.00091]	
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	**0.14** [0.0019]	QL,B	**0.15** [0.0018]	QL,B	0.00066 [0.0018]	J,QL,B	0.0011 [0.0018]	J,QL,B	**48%**	0.00055 [0.0018]	J,QL,B	**0.11** [0.0018]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	0.00089 [0.00095]	J,QL,B	0.00094 [0.00093]	J,QL,B	ND [0.00093]	QL	ND [0.00092]	QL	NA	ND [0.00092]	QL	0.00063 [0.00091]	J
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.10 [0.00095]	QL	0.10 [0.00093]	QL	0.00095 [0.00093]	J,QL,B	0.00098 [0.00092]	J,QL,B	3.1%	0.00092 [0.00092]	J,QL,B	0.051 [0.00091]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.0084 [0.00095]	QL,B	0.0084 [0.00093]	QL,B	ND [0.00093]	QL	ND [0.00092]	QL	NA	ND [0.00092]	QL	0.0056 [0.00091]	
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0092 [0.00095]	QN,QL,B	0.0096 [0.00093]	QN,QL,B	ND [0.00093]	QL	ND [0.00092]	QL	NA	ND [0.00092]	QL	0.0054 [0.00091]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.028 [0.00095]	QL,B	0.029 [0.00093]	QL,B	0.00055 [0.00093]	J,QL,B	0.00057 [0.00092]	J,QL,B	3.6%	0.00055 [0.00092]	J,QL,B	0.027 [0.00091]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00095]	QL	ND [0.00093]	QL	ND [0.00093]	QL	ND [0.00092]	QL	NA	ND [0.00092]	QL	ND [0.00091]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00095]	QL	ND [0.00093]	QL	ND [0.00093]	QL	ND [0.00092]	QL	NA	ND [0.00092]	QL	ND [0.00091]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00095]	QL	ND [0.00093]	QL	ND [0.00093]	QL	ND [0.00092]	QL	NA	ND [0.00092]	QL	ND [0.00091]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00095]	QL	ND [0.00093]	QL	ND [0.00093]	QL	ND [0.00092]	QL	NA	ND [0.00092]	QL	ND [0.00091]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00095]	QL	ND [0.00093]	QL	ND [0.00093]	QL	ND [0.00092]	QL	NA	ND [0.00092]	QL	ND [0.00091]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0011]	QL	ND [0.0011]	QL	ND [0.0011]	QL	ND [0.0011]	QL	NA	ND [0.0011]	QL	ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00095]	QL	ND [0.00093]	QL	ND [0.00093]	QL	ND [0.00092]	QL	NA	ND [0.00092]	QL	ND [0.00091]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

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NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

H = Analyte is considered low estimate due to a hold time exceedance.

J = The analyte was positively identified; the quantitation is estimated.

QL,QH,QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table K-4. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Surface Water

							Field Sample ID	20PS-PS99-SW-0609			20PS-PS02-SW-1		20PS-PS03-SW-1		20PS-PS99-SW-0608			20PS-SC01-SW-1		20PS-SC02-SW-1	
							Location	Piledriver Slough			Piledriver Slough		Piledriver Slough		Piledriver Slough			Scout Lake		Scout Lake	
							Sample Type	Field Duplicate of 20PS-PS01-SW-1			Surface Water		Surface Water		Field Duplicate of 20PS-PS03-SW-1			Surface Water		Surface Water	
							Laboratory Sample Delivery Group	410-4215			410-4215		410-4213		410-4213			410-4213		410-4213	
							Laboratory Sample ID	410-4215-8			410-4215-4		410-4213-1		410-4213-11			410-4213-5		410-4213-3	
							Sample Collection Date	9-Jun-2020			8-Jun-2020		8-Jun-2020		8-Jun-2020			10-Jun-2020		10-Jun-2020	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	RPD	Results	Q	Results	Q	Results	Q	RPD	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																				
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	**0.072** [0.00089]		5.4%	0.0020 [0.00085]		0.00052 [0.00083]	J	0.00078 [0.00084]	J	**40%**	ND [0.00089]		ND [0.00088]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.030 [0.00089]		3.4%	0.00066 [0.00085]	J	ND [0.00083]		ND [0.00084]		NA	ND [0.00089]		ND [0.00088]	
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	**0.10** [0.0018]		2.9%	0.0027 [0.0017]	J	0.00052 [0.0017]	J	0.00078 [0.0017]	J	**40%**	ND [0.0018]		ND [0.0018]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	0.00063 [0.00089]	J	0.0%	ND [0.00085]		ND [0.00083]		ND [0.00084]		NA	ND [0.00089]		ND [0.00088]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.051 [0.00089]		0.0%	0.0022 [0.00085]		0.0012 [0.00083]	J	0.0012 [0.00084]	J	0.0%	0.00070 [0.00089]	J	0.00071 [0.00088]	J
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.0054 [0.00089]		3.6%	0.00052 [0.00085]	J	ND [0.00083]		ND [0.00084]		NA	ND [0.00089]		ND [0.00088]	
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0055 [0.00089]		1.8%	ND [0.00085]		ND [0.00083]		ND [0.00084]		NA	ND [0.00089]		ND [0.00088]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.028 [0.00089]		3.6%	0.00077 [0.00085]	J	0.00043 [0.00083]	J	0.00047 [0.00084]	J	8.9%	ND [0.00089]		ND [0.00088]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00089]		NA	ND [0.00085]		ND [0.00083]		ND [0.00084]		NA	ND [0.00089]		ND [0.00088]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00089]		NA	ND [0.00085]		ND [0.00083]		ND [0.00084]		NA	ND [0.00089]		ND [0.00088]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00089]		NA	ND [0.00085]		ND [0.00083]		ND [0.00084]		NA	ND [0.00089]		ND [0.00088]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00089]		NA	ND [0.00085]		ND [0.00083]		ND [0.00084]		NA	ND [0.00089]		ND [0.00088]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00089]		NA	ND [0.00085]		ND [0.00083]		ND [0.00084]		NA	ND [0.00089]		ND [0.00088]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0011]		NA	ND [0.0010]		ND [0.0010]		ND [0.0010]		NA	ND [0.0011]		ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00089]		NA	ND [0.00085]		ND [0.00083]		ND [0.00084]		NA	ND [0.00089]		ND [0.00088]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

H = Analyte is considered low estimate due to a hold time exceedance.

J = The analyte was positively identified; the quantitation is estimated.

QL,QH,QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table K-4. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Surface Water

							Field Sample ID	20PS-SC02-SW-4		20PS-SH01-SW-1		20PS-SH02-SW-1		20PS-SH02-SW-4		20PS-SP01-SW-1		20PS-SP01-SW-5	
							Location	Scout Lake		Shoe Lake		Shoe Lake		Shoe Lake		Spruce Lake		Spruce Lake	
							Sample Type	Surface Water		Surface Water		Surface Water		Surface Water		Surface Water		Surface Water	
							Laboratory Sample Delivery Group	410-4213		410-3854		410-3854		410-3854		410-3855		410-3855	
							Laboratory Sample ID	410-4213-4		410-3854-15		410-3854-16		410-3854-17		410-3855-4		410-3855-5	
							Sample Collection Date	10-Jun-2020		7-Jun-2020		7-Jun-2020		7-Jun-2020		3-Jun-2020		3-Jun-2020	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																		
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	ND [0.00084]		ND [0.00080]		ND [0.00078]		0.00041 [0.00079]	J	**0.31** [0.00097]	QL	**0.33** [0.00092]	QL
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	ND [0.00084]		ND [0.00080]		ND [0.00078]		ND [0.00079]		0.025 [0.00097]	QL,B	0.025 [0.00092]	QL,B
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	ND [0.0017]		ND [0.0016]		ND [0.0016]		0.00041 [0.0016]	J	**0.34** [0.0019]	QL	**0.36** [0.0018]	QL
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00084]		ND [0.00080]		ND [0.00078]		ND [0.00079]		0.0022 [0.00097]	QL,B	0.0024 [0.00092]	QL,B
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.00063 [0.00084]	J	0.0011 [0.00080]	J	0.0011 [0.00078]	J	0.0011 [0.00079]	J	0.090 [0.00097]	QL	0.093 [0.00092]	QL
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	ND [0.00084]		ND [0.00080]		ND [0.00078]		ND [0.00079]		0.0087 [0.00097]	QL,B	0.0092 [0.00092]	QL,B
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	ND [0.00084]		ND [0.00080]		ND [0.00078]		ND [0.00079]		0.0073 [0.00097]	QN,QL,B	0.0073 [0.00092]	QN,QL,B
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	ND [0.00084]		ND [0.00080]		ND [0.00078]		ND [0.00079]		0.027 [0.00097]	QL,B	0.028 [0.00092]	QL,B
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00084]		ND [0.00080]		ND [0.00078]		ND [0.00079]		ND [0.00097]	QL	0.00046 [0.00092]	J,QL,B
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00084]		ND [0.00080]		ND [0.00078]		ND [0.00079]		ND [0.00097]	QL	ND [0.00092]	QL
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00084]		ND [0.00080]		ND [0.00078]		ND [0.00079]		ND [0.00097]	QL	ND [0.00092]	QL
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00084]		ND [0.00080]		ND [0.00078]		ND [0.00079]		ND [0.00097]	QL	ND [0.00092]	QL
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00084]		ND [0.00080]		ND [0.00078]		ND [0.00079]		ND [0.00097]	QL	ND [0.00092]	QL
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0010]		ND [0.00096]		ND [0.00093]		ND [0.00093]		ND [0.0012]	QL	ND [0.0011]	QL
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00084]		ND [0.00080]		ND [0.00078]		ND [0.00079]		ND [0.00097]	QL	ND [0.00092]	QL

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
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RPD = relative percent difference

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B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

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Table K-4. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Surface Water

							Field Sample ID	20PS-SP02-SW-1		20PS-TK01-SW-1		20PS-TK99-SW-0607			20PS-TK02-SW-1		20PS-TK02-SW-5		20PS-ZP01-SW-1	
							Location	Spruce Lake		Tar Kettle Lake		Tar Kettle Lake			Tar Kettle Lake		Tar Kettle Lake		Z Pit	
							Sample Type	Surface Water		Surface Water		Field Duplicate of 20PS-TK01-SW-1			Surface Water		Surface Water		Surface Water	
							Laboratory Sample Delivery Group	410-3855		410-3854		410-3854			410-3854		410-3854		410-3854	
							Laboratory Sample ID	410-3855-6		410-3854-11		410-3854-12			410-3854-13		410-3854-14		410-3854-4	
							Sample Collection Date	3-Jun-2020		7-Jun-2020		7-Jun-2020			7-Jun-2020		7-Jun-2020		6-Jun-2020	
Analyte	CASRN	Units	ADEC Human Health Cleanup Level [2]	EPA Lifetime Health Advisory Level [3]	EPA RSL [4]	PAL	Results	Q	Results	Q	Results	Q	RPD	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																			
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	**0.50** [0.00097]	QL	ND [0.00081]		ND [0.00079]		NA	ND [0.00099]		ND [0.00099]		0.0036 [0.00095]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.026 [0.00097]	QL,B	ND [0.00081]		ND [0.00079]		NA	ND [0.00099]		ND [0.00099]		0.0021 [0.00095]	
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	**0.53** [0.0019]	QL	ND [0.0016]		ND [0.0016]		NA	ND [0.0020]		ND [0.0020]		0.0057 [0.0019]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	0.0029 [0.00097]	QL,B	ND [0.00081]		ND [0.00079]		NA	ND [0.00099]		ND [0.00099]		ND [0.00095]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.096 [0.00097]	QL	ND [0.00081]		ND [0.00079]		NA	ND [0.00099]		ND [0.00099]		0.0034 [0.00095]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.0089 [0.00097]	QL,B	ND [0.00081]		ND [0.00079]		NA	ND [0.00099]		ND [0.00099]		0.0013 [0.00095]	J
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.0070 [0.00097]	QN,QL,B	ND [0.00081]		ND [0.00079]		NA	ND [0.00099]		ND [0.00099]		0.00050 [0.00095]	J
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.029 [0.00097]	QL,B	ND [0.00081]		ND [0.00079]		NA	ND [0.00099]		ND [0.00099]		0.0021 [0.00095]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	0.00077 [0.00097]	J,QL,B	ND [0.00081]		ND [0.00079]		NA	ND [0.00099]		ND [0.00099]		ND [0.00095]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00097]	QL	ND [0.00081]		ND [0.00079]		NA	ND [0.00099]		ND [0.00099]		ND [0.00095]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00097]	QL	ND [0.00081]		ND [0.00079]		NA	ND [0.00099]		ND [0.00099]		ND [0.00095]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00097]	QL	ND [0.00081]		ND [0.00079]		NA	ND [0.00099]		ND [0.00099]		ND [0.00095]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00097]	QL	ND [0.00081]		ND [0.00079]		NA	ND [0.00099]		ND [0.00099]		ND [0.00095]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0012]	QL	ND [0.00098]		ND [0.00095]		NA	ND [0.0012]		ND [0.0012]		ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00097]	QL	ND [0.00081]		ND [0.00079]		NA	ND [0.00099]		ND [0.00099]		ND [0.00095]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

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J = The analyte was positively identified; the quantitation is estimated.

QL,QH,QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table K-4. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Surface Water

						Field Sample ID	20PS-ZP99-SW-0606			20PS-ZP01-SW-3	
						Location	Z Pit			Z Pit	
						Sample Type	Field Duplicate of 20PS-ZP01-SW-1			Surface Water	
						Laboratory Sample Delivery Group	410-3854			410-3854	
						Laboratory Sample ID	410-3854-5			410-3854-6	
						Sample Collection Date	6-Jun-2020			6-Jun-2020	
Analyte	**CASRN**	**Units**	**ADEC Human Health Cleanup Level [2]**	**EPA Lifetime Health Advisory Level [3]**	**EPA RSL [4]**	**PAL**	**Results**	**Q**	**RPD**	**Results**	**Q**
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]											
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.40	0.070	NS	0.070	0.0036 [0.00090]		0.0%	0.0038 [0.00085]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.40	0.070	NS	0.070	0.0021 [0.00090]		0.0%	0.0021 [0.00085]	
Aggregate PFOS/PFOA	NS	µg/L	NS	0.070	NS	0.070	0.0057 [0.0018]		0.0%	0.0059 [0.0017]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	NS	NS	NS	NS	ND [0.00090]		NA	ND [0.00085]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	NS	NS	NS	NS	0.0036 [0.00090]		5.7%	0.0034 [0.00085]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	NS	NS	NS	NS	0.0012 [0.00090]	J	8.0%	0.0012 [0.00085]	J
Perfluorobutane sulfonate (PFBS)	375-73-5	µg/L	NS	NS	0.60	0.60	0.00066 [0.00090]	J,QN,B	28%	0.00070 [0.00085]	J
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	NS	NS	NS	NS	0.0017 [0.00090]	J	21%	0.0017 [0.00085]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	NS	NS	NS	NS	ND [0.00090]		NA	ND [0.00085]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	NS	NS	NS	NS	ND [0.00090]		NA	ND [0.00085]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	NS	NS	NS	NS	ND [0.00090]		NA	ND [0.00085]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	NS	NS	NS	NS	ND [0.00090]		NA	ND [0.00085]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	NS	NS	NS	NS	ND [0.00090]		NA	ND [0.00085]	
NMeFOSAA	2355-31-9	µg/L	NS	NS	NS	NS	ND [0.0011]		NA	ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	NS	NS	NS	NS	ND [0.00090]		NA	ND [0.00085]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

Results shown in bold and highlighted blue are between ½ LHA and the LHA.

RPDs shown in bold and yellow exceed QC limits (>30%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2 Alaska Department of Environmental Conservation (ADEC) Groundwater Cleanup Levels (2020), Alaska Administrative Code Title 18, Chapter 75.345, Table C for Human Health. November.

3 EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the Health Advisory Level (0.070 µg/L).

4 EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
µg/L = microgram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

H = Analyte is considered low estimate due to a hold time exceedance.

J = The analyte was positively identified; the quantitation is estimated.

QL,QH,QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table K-5. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Sediment Samples

							Field Sample ID	20PS-BB02-SD-0		20PS-BR02-SD-0		20PS-BR99-SD-0606			20PS-FC01-SD-0		20PS-FC02-SD-0		20PS-FC03-SD-0	
							Location	Bathing Beauty Lake		Bear Lake		Bear Lake			French Creek 01		French Creek 02		French Creek 03	
							Sample Type	Sediment		Sediment		Field duplicate of 20PS-BB02-SD-0			Sediment		Sediment		Sediment	
							Laboratory Sample Delivery Group	410-4215		410-3856		410-3856			410-3856		410-3856		410-3856	
							Laboratory Sample ID	410-4215-11		410-3856-7		410-3856-8			410-3856-6		410-3856-5		410-3856-4	
							Sample Collection Date	9-Jun-2020		6-Jun-2020		6-Jun-2020			4-Jun-2020		4-Jun-2020		4-Jun-2020	
Analyte	CASRN	Units	Human Health [2]	Migration to Groundwater [3]	RSLs [4]	PAL	Results	Q	Results	Q	Results	Q	RPD	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																			
Perfluorooctane sulfonate (PFOS)	1763-23-1	mg/kg	1.6	0.0017	0.126	0.126	ND [0.00042]		0.0015 [0.00049]	QL,QN	0.0034 [0.00088]	QL,QN	**78%**	0.0013 [0.00089]	QL	0.0014 [0.00065]	QL	0.0011 [0.00081]	QL,J
Perfluorooctanoic acid (PFOA)	335-67-1	mg/kg	1.6	0.0030	0.126	0.126	ND [0.00042]		ND [0.00049]	QL	ND [0.00088]	QL	NA	ND [0.00089]	QL	ND [0.00065]	QL	ND [0.00081]	QL
Perfluorononanoic acid (PFNA)	375-95-1	mg/kg	NS	NS	NS	NS	ND [0.00042]		ND [0.00049]	QL	ND [0.00088]	QL	NA	ND [0.00089]	QL	ND [0.00065]	QL	ND [0.00081]	QL
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	mg/kg	NS	NS	NS	NS	ND [0.00042]		ND [0.00049]	QL	ND [0.00088]	QL	NA	ND [0.00089]	QL	ND [0.00065]	QL	ND [0.00081]	QL
Perfluoroheptanoic acid (PFHpA)	375-85-9	mg/kg	NS	NS	NS	NS	ND [0.00042]		ND [0.00049]	QL	ND [0.00088]	QL	NA	ND [0.00089]	QL	ND [0.00065]	QL	ND [0.00081]	QL
Perfluorobutane sulfonate (PFBS)	375-73-5	mg/kg	NS	NS	1.9	1.9	ND [0.0017]		ND [0.0020]	QL	ND [0.0035]	QL	NA	ND [0.0036]	QL	ND [0.0026]	QL	ND [0.0032]	QL
Perfluorohexanoic acid (PFHxA)	307-24-4	mg/kg	NS	NS	NS	NS	ND [0.00042]		ND [0.00049]	QL	ND [0.00088]	QL	NA	ND [0.00089]	QL	ND [0.00065]	QL	ND [0.00081]	QL
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	NS	NS	NS	NS	ND [0.00042]		ND [0.00049]	QL	ND [0.00088]	QL	NA	ND [0.00089]	QL	ND [0.00065]	QL	ND [0.00081]	QL
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	NS	NS	NS	NS	ND [0.00042]		ND [0.00049]	QL	ND [0.00088]	QL	NA	ND [0.00089]	QL	ND [0.00065]	QL	ND [0.00081]	QL
Perfluorododecanoic acid (PFDoA)	307-55-1	mg/kg	NS	NS	NS	NS	ND [0.00042]		ND [0.00049]	QL	ND [0.00088]	QL	NA	ND [0.00089]	QL	ND [0.00065]	QL	ND [0.00081]	QL
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	mg/kg	NS	NS	NS	NS	ND [0.00042]		ND [0.00049]	QL	ND [0.00088]	QL	NA	ND [0.00089]	QL	ND [0.00065]	QL	ND [0.00081]	QL
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	mg/kg	NS	NS	NS	NS	ND [0.00042]		ND [0.00049]	QL	ND [0.00088]	QL	NA	ND [0.00089]	QL	ND [0.00065]	QL	ND [0.00081]	QL
NMeFOSAA	2355-31-9	mg/kg	NS	NS	NS	NS	ND [0.00042]		ND [0.00049]	QL	ND [0.00088]	QL	NA	ND [0.00089]	QL	ND [0.00065]	QL	ND [0.00081]	QL
NEtFOSAA	2991-50-6	mg/kg	NS	NS	NS	NS	ND [0.00042]		ND [0.00049]	QL	ND [0.00088]	QL	NA	ND [0.00089]	QL	ND [0.00065]	QL	ND [0.00081]	QL
Miscellaneous																			
Moisture by SM2540G	NS	%	NS	NS	NS	NS	12.1		23.0		58.3			55.3		38.2		50.4	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

RPDs shown in bold and yellow exceed QC limits (>50%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1. PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2. ADEC Soil Cleanup Levels (November 2020), Alaska Administrative Code Title 18, Chapter 75.341, Table B1, Method 2, human health, under 40-inch zone.

3. ADEC Soil Cleanup Levels (November 2020), 18 Alaska Administrative Code 75.341 Table B1, Method 2, migration to groundwater.

4. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
mg/kg = milligram(s) per kilogram
ND = nondetectable
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.
J = The analyte was positively identified; the quantitation is estimated.
QL,QN = Analyte result is considered an estimated value biased (low, uncertain) due to a quality control failure.

Table K-5. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Sediment Samples

							Field Sample ID	20PS-GL02-SD-0		20PS-GL99-SD-0610			20PS-HL02-SD-0		20PS-MC01-SD-0		20PS-MC99-SD-0606			20PS-MC02-SD-0	
							Location	Grayling Lake		Grayling Lake			Hidden Lake		Moose Creek		Moose Creek			Moose Creek	
							Sample Type	Sediment		Field duplicate of 20PS-GL02-SD-0			Sediment		Sediment		Field duplicate of 20PS-MC01-SD-0			Sediment	
							Laboratory Sample Delivery Group	410-4215		410-4215			410-4215		410-3856		410-3856			410-3856	
							Laboratory Sample ID	410-4215-3		410-4215-10			410-4215-15		410-3856-10		410-3856-11			410-3856-9	
							Sample Collection Date	10-Jun-2020		10-Jun-2020			9-Jun-2020		6-Jun-2020		6-Jun-2020			6-Jun-2020	
Analyte	CASRN	Units	Human Health [2]	Migration to Groundwater [3]	RSLs [4]	PAL	Results	Q	Results	Q	RPD	Results	Q	Results	Q	Results	Q	RPD	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																				
Perfluorooctane sulfonate (PFOS)	1763-23-1	mg/kg	1.6	0.0017	0.126	0.126	ND [0.00049]		ND [0.00046]		NA	ND [0.00048]		0.0055 [0.00076]	QL	0.0043 [0.00071]	QL	24%	0.00042 [0.00076]	QL,J
Perfluorooctanoic acid (PFOA)	335-67-1	mg/kg	1.6	0.0030	0.126	0.126	ND [0.00049]		ND [0.00046]		NA	ND [0.00048]		ND [0.00076]	QL	ND [0.00071]	QL	NA	ND [0.00076]	QL
Perfluorononanoic acid (PFNA)	375-95-1	mg/kg	NS	NS	NS	NS	ND [0.00049]		ND [0.00046]		NA	ND [0.00048]		ND [0.00076]	QL	ND [0.00071]	QL	NA	ND [0.00076]	QL
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	mg/kg	NS	NS	NS	NS	ND [0.00049]		ND [0.00046]		NA	ND [0.00048]		ND [0.00076]	QL	ND [0.00071]	QL	NA	ND [0.00076]	QL
Perfluoroheptanoic acid (PFHpA)	375-85-9	mg/kg	NS	NS	NS	NS	ND [0.00049]		ND [0.00046]		NA	ND [0.00048]		ND [0.00076]	QL	ND [0.00071]	QL	NA	ND [0.00076]	QL
Perfluorobutane sulfonate (PFBS)	375-73-5	mg/kg	NS	NS	1.9	1.9	ND [0.0020]		ND [0.0019]		NA	ND [0.0019]		ND [0.0030]	QL	ND [0.0028]	QL	NA	ND [0.0030]	QL
Perfluorohexanoic acid (PFHxA)	307-24-4	mg/kg	NS	NS	NS	NS	ND [0.00049]		ND [0.00046]		NA	ND [0.00048]		ND [0.00076]	QL	ND [0.00071]	QL	NA	ND [0.00076]	QL
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	NS	NS	NS	NS	ND [0.00049]		ND [0.00046]		NA	ND [0.00048]		ND [0.00076]	QL	ND [0.00071]	QL	NA	ND [0.00076]	QL
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	NS	NS	NS	NS	ND [0.00049]		ND [0.00046]		NA	ND [0.00048]		ND [0.00076]	QL	ND [0.00071]	QL	NA	ND [0.00076]	QL
Perfluorododecanoic acid (PFDoA)	307-55-1	mg/kg	NS	NS	NS	NS	ND [0.00049]		ND [0.00046]		NA	ND [0.00048]		ND [0.00076]	QL	ND [0.00071]	QL	NA	ND [0.00076]	QL
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	mg/kg	NS	NS	NS	NS	ND [0.00049]		ND [0.00046]		NA	ND [0.00048]		ND [0.00076]	QL	ND [0.00071]	QL	NA	ND [0.00076]	QL
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	mg/kg	NS	NS	NS	NS	ND [0.00049]		ND [0.00046]		NA	ND [0.00048]		ND [0.00076]	QL	ND [0.00071]	QL	NA	ND [0.00076]	QL
NMeFOSAA	2355-31-9	mg/kg	NS	NS	NS	NS	ND [0.00049]		ND [0.00046]		NA	ND [0.00048]		ND [0.00076]	QL	ND [0.00071]	QL	NA	ND [0.00076]	QL
NEtFOSAA	2991-50-6	mg/kg	NS	NS	NS	NS	ND [0.00049]		ND [0.00046]		NA	ND [0.00048]		ND [0.00076]	QL	ND [0.00071]	QL	NA	ND [0.00076]	QL
Miscellaneous																				
Moisture by SM2540G	NS	%	NS	NS	NS	NS	21.9		18.8			21.6		49.8		48.7			51.0	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

RPDs shown in bold and yellow exceed QC limits (>50%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1. PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).
2. ADEC Soil Cleanup Levels (November 2020), Alaska Administrative Code Title 18, Chapter 75.341, Table B1, Method 2, human health, under 40-inch zone.
3. ADEC Soil Cleanup Levels (November 2020), 18 Alaska Administrative Code 75.341 Table B1, Method 2, migration to groundwater.
4. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
mg/kg = milligram(s) per kilogram
ND = nondetectable
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:
B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.
J = The analyte was positively identified; the quantitation is estimated.
QL,QN = Analyte result is considered an estimated value biased (low, uncertain) due to a quality control failure.

Table K-5. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Sediment Samples

							Field Sample ID		20PS-MLP01-SD-0		20PS-MLP02-SD-0		20PS-ML02-SD-0		20PS-MP01-SD-0		20PS-MP02-SD-0		20PS-MP99-SD-0604		
							Location		Moose Creek Landing		Moose Creek Landing		Moose Lake		Mullins Pit		Mullins Pit		Mullins Pit		
							Sample Type		Sediment		Sediment		Sediment		Sediment		Sediment		Field duplicate of 20PS-MP02-SD-0		
							Laboratory Sample Delivery Group		410-3856		410-3856		410-3856		410-3856		410-3856		410-3856		
							Laboratory Sample ID		410-3856-12		410-3856-13		410-3856-1		410-3856-17		410-3856-2		410-3856-3		
							Sample Collection Date		6-Jun-2020		6-Jun-2020		4-Jun-2020		4-Jun-2020		4-Jun-2020		4-Jun-2020		
Analyte	CASRN	Units	Human Health [2]	Migration to Groundwater [3]	RSLs [4]	PAL	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	RPD
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																					
Perfluorooctane sulfonate (PFOS)	1763-23-1	mg/kg	1.6	0.0017	0.126	0.126	0.0036 [0.00050]	QL	0.0018 [0.00061]	QL	0.0033 [0.00065]	QL	ND [0.00067]	QL	ND [0.00048]	QL	ND [0.00047]	QL	NA		
Perfluorooctanoic acid (PFOA)	335-67-1	mg/kg	1.6	0.0030	0.126	0.126	0.00032 [0.00050]	QL,J	ND [0.00061]	QL	ND [0.00065]	QL	ND [0.00067]	QL	ND [0.00048]	QL	ND [0.00047]	QL	NA		
Perfluorononanoic acid (PFNA)	375-95-1	mg/kg	NS	NS	NS	NS	ND [0.00050]	QL	ND [0.00061]	QL	ND [0.00065]	QL	ND [0.00067]	QL	ND [0.00048]	QL	ND [0.00047]	QL	NA		
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	mg/kg	NS	NS	NS	NS	ND [0.00050]	QL	ND [0.00061]	QL	ND [0.00065]	QL	ND [0.00067]	QL	ND [0.00048]	QL	ND [0.00047]	QL	NA		
Perfluoroheptanoic acid (PFHpA)	375-85-9	mg/kg	NS	NS	NS	NS	ND [0.00050]	QL	ND [0.00061]	QL	ND [0.00065]	QL	ND [0.00067]	QL	ND [0.00048]	QL	ND [0.00047]	QL	NA		
Perfluorobutane sulfonate (PFBS)	375-73-5	mg/kg	NS	NS	1.9	1.9	ND [0.0020]	QL	ND [0.0025]	QL	ND [0.0026]	QL	ND [0.0027]	QL	ND [0.0019]	QL	ND [0.0019]	QL	NA		
Perfluorohexanoic acid (PFHxA)	307-24-4	mg/kg	NS	NS	NS	NS	ND [0.00050]	QL	ND [0.00061]	QL	ND [0.00065]	QL	ND [0.00067]	QL	ND [0.00048]	QL	ND [0.00047]	QL	NA		
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	NS	NS	NS	NS	ND [0.00050]	QL	ND [0.00061]	QL	ND [0.00065]	QL	ND [0.00067]	QL	ND [0.00048]	QL	ND [0.00047]	QL	NA		
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	NS	NS	NS	NS	ND [0.00050]	QL	ND [0.00061]	QL	ND [0.00065]	QL	ND [0.00067]	QL	ND [0.00048]	QL	ND [0.00047]	QL	NA		
Perfluorododecanoic acid (PFDoA)	307-55-1	mg/kg	NS	NS	NS	NS	ND [0.00050]	QL	ND [0.00061]	QL	ND [0.00065]	QL	ND [0.00067]	QL	ND [0.00048]	QL	ND [0.00047]	QL	NA		
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	mg/kg	NS	NS	NS	NS	ND [0.00050]	QL	ND [0.00061]	QL	ND [0.00065]	QL	ND [0.00067]	QL	ND [0.00048]	QL	ND [0.00047]	QL	NA		
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	mg/kg	NS	NS	NS	NS	ND [0.00050]	QL	ND [0.00061]	QL	ND [0.00065]	QL	ND [0.00067]	QL	ND [0.00048]	QL	ND [0.00047]	QL	NA		
NMeFOSAA	2355-31-9	mg/kg	NS	NS	NS	NS	ND [0.00050]	QL	ND [0.00061]	QL	ND [0.00065]	QL	ND [0.00067]	QL	ND [0.00048]	QL	ND [0.00047]	QL	NA		
NEtFOSAA	2991-50-6	mg/kg	NS	NS	NS	NS	ND [0.00050]	QL	ND [0.00061]	QL	ND [0.00065]	QL	ND [0.00067]	QL	ND [0.00048]	QL	ND [0.00047]	QL	NA		
Miscellaneous																					
Moisture by SM2540G	NS	%	NS	NS	NS	NS	20.0		38.6		38.2		40.2		16.6		14.3				

Notes:

Results shown in bold and highlighted red exceed the screening levels.

RPDs shown in bold and yellow exceed QC limits (>50%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1. PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2. ADEC Soil Cleanup Levels (November 2020), Alaska Administrative Code Title 18, Chapter 75.341, Table B1, Method 2, human health, under 40-inch zone.

3. ADEC Soil Cleanup Levels (November 2020), 18 Alaska Administrative Code 75.341 Table B1, Method 2, migration to groundwater.

4. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation

CASRN = Chemical Abstracts Service Registry No.

EPA = U.S. Environmental Protection Agency

mg/kg = milligram(s) per kilogram

ND = nondetectable

NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid

NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

NS = not specified

NA = not applicable

ND = nondetectable

PAL = project action level

Q = qualifier

RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

J = The analyte was positively identified; the quantitation is estimated.

QL,QN = Analyte result is considered an estimated value biased (low, uncertain) due to a quality control failure.

Table K-5. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Sediment Samples

							Field Sample ID	20PS-PS01-SD-0		20PS-PS99-SD-0609			20PS-PS02-SD-0		20PS-PS03-SD-0		20PS-PS99-SD-0608			20PS-SC02-SD-0		20PS-SH02-SD-0	
							Location	Piledriver Slough		Piledriver Slough			Piledriver Slough		Piledriver Slough		Piledriver Slough			Scout Lake		Shoe Lake	
							Sample Type	Sediment		Field duplicate of 20PS-PS01-SD-0			Sediment		Sediment		Field Duplicate of 20PS-PS03-SD-0			Sediment		Sediment	
							Laboratory Sample Delivery Group	410-4215		410-4215			410-4215		410-4215		410-4215			410-4215		410-3856	
							Laboratory Sample ID	410-4215-7		410-4215-21			410-4215-6		410-4215-1		410-4215-2			410-4215-20		410-3856-15	
							Sample Collection Date	9-Jun-2020		9-Jun-2020			8-Jun-2020		8-Jun-2020		8-Jun-2020			10-Jun-2020		7-Jun-2020	
Analyte	CASRN	Units	Human Health [2]	Migration to Groundwater [3]	RSLs [4]	PAL	Results	Q	Results	Q	RPD	Results	Q	Results	Q	Results	Q	RPD	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																						
Perfluorooctane sulfonate (PFOS)	1763-23-1	mg/kg	1.6	0.0017	0.126	0.126	0.0028 [0.00056]		0.0039 [0.00080]		**33%**	ND [0.0026]		ND [0.00051]		ND [0.00056]		NA	ND [0.00039]		ND [0.00054]	QL
Perfluorooctanoic acid (PFOA)	335-67-1	mg/kg	1.6	0.0030	0.126	0.126	ND [0.00056]		ND [0.00080]		NA	ND [0.0026]		ND [0.00051]		ND [0.00056]		NA	ND [0.00039]		ND [0.00054]	QL
Perfluorononanoic acid (PFNA)	375-95-1	mg/kg	NS	NS	NS	NS	ND [0.00056]		ND [0.00080]		NA	ND [0.0026]		ND [0.00051]		ND [0.00056]		NA	ND [0.00039]		ND [0.00054]	QL
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	mg/kg	NS	NS	NS	NS	ND [0.00056]		ND [0.00080]		NA	ND [0.0026]		ND [0.00051]		ND [0.00056]		NA	ND [0.00039]		ND [0.00054]	QL
Perfluoroheptanoic acid (PFHpA)	375-85-9	mg/kg	NS	NS	NS	NS	ND [0.00056]		ND [0.00080]		NA	ND [0.0026]		ND [0.00051]		ND [0.00056]		NA	ND [0.00039]		ND [0.00054]	QL
Perfluorobutane sulfonate (PFBS)	375-73-5	mg/kg	NS	NS	1.9	1.9	ND [0.0022]		ND [0.0032]		NA	ND [0.010]		ND [0.0020]		ND [0.0022]		NA	ND [0.0016]		ND [0.0022]	QL
Perfluorohexanoic acid (PFHxA)	307-24-4	mg/kg	NS	NS	NS	NS	ND [0.00056]		ND [0.00080]		NA	ND [0.0026]		ND [0.00051]		ND [0.00056]		NA	ND [0.00039]		ND [0.00054]	QL
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	NS	NS	NS	NS	ND [0.00056]		ND [0.00080]		NA	ND [0.0026]		ND [0.00051]		ND [0.00056]		NA	ND [0.00039]		ND [0.00054]	QL
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	NS	NS	NS	NS	ND [0.00056]		ND [0.00080]		NA	ND [0.0026]		ND [0.00051]		ND [0.00056]		NA	ND [0.00039]		ND [0.00054]	QL
Perfluorododecanoic acid (PFDoA)	307-55-1	mg/kg	NS	NS	NS	NS	ND [0.00056]		ND [0.00080]		NA	ND [0.0026]		ND [0.00051]		ND [0.00056]		NA	ND [0.00039]		ND [0.00054]	QL
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	mg/kg	NS	NS	NS	NS	ND [0.00056]		ND [0.00080]		NA	ND [0.0026]		ND [0.00051]		ND [0.00056]		NA	ND [0.00039]		ND [0.00054]	QL
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	mg/kg	NS	NS	NS	NS	ND [0.00056]		ND [0.00080]		NA	ND [0.0026]		ND [0.00051]		ND [0.00056]		NA	ND [0.00039]		ND [0.00054]	QL
NMeFOSAA	2355-31-9	mg/kg	NS	NS	NS	NS	ND [0.00056]		ND [0.00080]		NA	ND [0.0026]		ND [0.00051]		ND [0.00056]		NA	ND [0.00039]		ND [0.00054]	QL
NEtFOSAA	2991-50-6	mg/kg	NS	NS	NS	NS	ND [0.00056]		ND [0.00080]		NA	ND [0.0026]		ND [0.00051]		ND [0.00056]		NA	ND [0.00039]		ND [0.00054]	QL
Miscellaneous																						
Moisture by SM2540G	NS	%	NS	NS	NS	NS	34.5		52.4			85.1		23.1		29.5			6.3		31.9	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

RPDs shown in bold and yellow exceed QC limits (>50%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1. PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).
2. ADEC Soil Cleanup Levels (November 2020), Alaska Administrative Code Title 18, Chapter 75.341, Table B1, Method 2, human health, under 40-inch zone.
3. ADEC Soil Cleanup Levels (November 2020), 18 Alaska Administrative Code 75.341 Table B1, Method 2, migration to groundwater.
4. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation
CASRN = Chemical Abstracts Service Registry No.
EPA = U.S. Environmental Protection Agency
mg/kg = milligram(s) per kilogram
ND = nondetectable
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
NS = not specified
NA = not applicable
ND = nondetectable
PAL = project action level
Q = qualifier
RPD = relative percent difference

Data Qualifiers:
B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.
J = The analyte was positively identified; the quantitation is estimated.
QL,QN = Analyte result is considered an estimated value biased (low, uncertain) due to a quality control failure.

Table K-5. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Sediment Samples

						Field Sample ID	20PS-SH99-SD-0607			20PS-TK02-SD-0		
						Location	Shoe Lake			Tar Kettle Lake		
						Sample Type	Field duplicate of 20PS-SH02-SD-0			Sediment		
						Laboratory Sample Delivery Group	410-3856			410-3856		
						Laboratory Sample ID	410-3856-16			410-3856-14		
						Sample Collection Date	7-Jun-2020			7-Jun-2020		
Analyte	**CASRN**	**Units**	**Human Health [2]**	**Migration to Groundwater [3]**	**RSLs [4]**	**PAL**	**Results**	**Q**	**RPD**	**Results**	**Q**
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]											
Perfluorooctane sulfonate (PFOS)	1763-23-1	mg/kg	1.6	0.0017	0.126	0.126	0.00036 [0.00055]	QL,J	NA	ND [0.00053]	QL
Perfluorooctanoic acid (PFOA)	335-67-1	mg/kg	1.6	0.0030	0.126	0.126	ND [0.00055]	QL	NA	ND [0.00053]	QL
Perfluorononanoic acid (PFNA)	375-95-1	mg/kg	NS	NS	NS	NS	ND [0.00055]	QL	NA	ND [0.00053]	QL
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	mg/kg	NS	NS	NS	NS	ND [0.00055]	QL	NA	ND [0.00053]	QL
Perfluoroheptanoic acid (PFHpA)	375-85-9	mg/kg	NS	NS	NS	NS	ND [0.00055]	QL	NA	ND [0.00053]	QL
Perfluorobutane sulfonate (PFBS)	375-73-5	mg/kg	NS	NS	1.9	1.9	ND [0.0022]	QL	NA	ND [0.0021]	QL
Perfluorohexanoic acid (PFHxA)	307-24-4	mg/kg	NS	NS	NS	NS	ND [0.00055]	QL	NA	ND [0.00053]	QL
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	NS	NS	NS	NS	ND [0.00055]	QL	NA	ND [0.00053]	QL
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	NS	NS	NS	NS	ND [0.00055]	QL	NA	ND [0.00053]	QL
Perfluorododecanoic acid (PFDoA)	307-55-1	mg/kg	NS	NS	NS	NS	ND [0.00055]	QL	NA	ND [0.00053]	QL
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	mg/kg	NS	NS	NS	NS	ND [0.00055]	QL	NA	ND [0.00053]	QL
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	mg/kg	NS	NS	NS	NS	ND [0.00055]	QL	NA	ND [0.00053]	QL
NMeFOSAA	2355-31-9	mg/kg	NS	NS	NS	NS	ND [0.00055]	QL	NA	ND [0.00053]	QL
NEtFOSAA	2991-50-6	mg/kg	NS	NS	NS	NS	ND [0.00055]	QL	NA	ND [0.00053]	QL
Miscellaneous											
Moisture by SM2540G	NS	%	NS	NS	NS	NS	28.8			26.7	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

RPDs shown in bold and yellow exceed QC limits (>50%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1. PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2. ADEC Soil Cleanup Levels (November 2020), Alaska Administrative Code Title 18, Chapter 75.341, Table B1, Method 2, human health, under 40-inch zone.

3. ADEC Soil Cleanup Levels (November 2020), 18 Alaska Administrative Code 75.341 Table B1, Method 2, migration to groundwater.

4. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation

CASRN = Chemical Abstracts Service Registry No.

EPA = U.S. Environmental Protection Agency

mg/kg = milligram(s) per kilogram

ND = nondetectable

NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid

NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

NS = not specified

NA = not applicable

ND = nondetectable

PAL = project action level

Q = qualifier

RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

J = The analyte was positively identified; the quantitation is estimated.

QL,QN = Analyte result is considered an estimated value biased (low, uncertain) due to a quality control failure.

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Table K-6. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Fire Station #1 (Soil)

							Field Sample ID	19PS-FST1-SB02-1		19PS-FST1-SB02-7		19PS-FST1-SB03-1		19PS-FST1-SB03-6		19PS-FST1-SB04-1
							Location	SB02		SB02		SB03		SB03		SB04
							Sample Type	Primary		Primary		Primary		Primary		Primary
							Laboratory Sample Delivery Group	EIE13		EIE13		EIE13		EIE13		EIE13
							Laboratory Sample ID	1185514		1185515		1185516		1185517		1185510
							Sample Collection Date	21-Oct-2019		21-Oct-2019		21-Oct-2019		21-Oct-2019		21-Oct-2019
Analyte	CASRN	Units	Human Health [2]	Migration to Groundwater [3]	RSLs [4]	PAL	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																
Perfluorooctane sulfonate (PFOS)	1763-23-1	mg/kg	1.6	0.0017	0.126	0.126	**1.9** [0.044]		**0.66** [0.0049]		**0.93** [0.0041]		**0.57** [0.0049]		**1.8** [0.045]	
Perfluorooctanoic acid (PFOA)	335-67-1	mg/kg	1.6	0.0030	0.126	0.126	0.0099 [0.00044]		0.081 [0.0049]		0.0034 [0.00041]		0.039 [0.00049]		0.0012 [0.00045]	
Perfluorononanoic acid (PFNA)	375-95-1	mg/kg	NS	NS	NS	NS	0.030 [0.00044]		0.00070 [0.00049]	J	0.0050 [0.00041]		0.0034 [0.00049]		0.016 [0.00045]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	mg/kg	NS	NS	NS	NS	0.0087 [0.00044]		0.22 [0.0049]		0.0054 [0.00041]		0.077 [0.0049]		0.0037 [0.00045]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	mg/kg	NS	NS	NS	NS	0.0012 [0.00044]		0.0085 [0.00049]		0.00055 [0.00041]	J	0.0043 [0.00049]		0.00036 [0.00045]	J
Perfluorobutane sulfonate (PFBS)	375-73-5	mg/kg	NS	NS	1.9	1.9	ND [0.0018]		0.0032 [0.0020]		ND [0.0016]		0.00059 [0.002]	J	ND [0.0018]	
Perfluorohexanoic acid (PFHxA)	307-24-4	mg/kg	NS	NS	NS	NS	0.0011 [0.00044]		0.020 [0.00049]		0.00063 [0.00041]		0.017 [0.00049]		0.00049 [0.00045]	J
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	NS	NS	NS	NS	ND [0.00044]		0.0013 [0.00049]		0.0035 [0.00041]		0.00036 [0.00049]	J	0.00065 [0.00045]	J
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	NS	NS	NS	NS	ND [0.00044]		ND [0.00049]		ND [0.00041]		ND [0.00049]		ND [0.00045]	
Perfluorododecanoic acid (PFDoA)	307-55-1	mg/kg	NS	NS	NS	NS	ND [0.00044]		ND [0.00049]		ND [0.00041]		ND [0.00049]		ND [0.00045]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	mg/kg	NS	NS	NS	NS	ND [0.00044]		ND [0.00049]		ND [0.00041]		ND [0.00049]		ND [0.00045]	
Perfluorotetradecanoic acid (PFTA)	376-06-7	mg/kg	NS	NS	NS	NS	ND [0.00044]		ND [0.00049]		ND [0.00041]		ND [0.00049]		ND [0.00045]	
NMeFOSAA	2355-31-9	mg/kg	NS	NS	NS	NS	ND [0.00044]		0.00046 [0.00049]	J	0.00065 [0.00041]	J	ND [0.00049]		ND [0.00045]	
NEtFOSAA	2991-50-6	mg/kg	NS	NS	NS	NS	ND [0.00044]		ND [0.00049]		0.0018 [0.00041]	J	ND [0.00049]		ND [0.00045]	
Miscellaneous																
Moisture by SM2540G	NS	%	NS	NS	NS	NS	14.0 [0.50]		22.1 [0.50]		6.8 [0.50]		20.3 [0.50]		12.8 [0.50]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

RPDs shown in bold and yellow exceed QC limits (>50%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1. PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2. ADEC Soil Cleanup Levels (November 2020), Alaska Administrative Code Title 18, Chapter 75.341, Table B1, Method 2, human health, under 40-inch zone.

3. ADEC Soil Cleanup Levels (November 2020), 18 Alaska Administrative Code 75.341 Table B1, Method 2, migration to groundwater.

4. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation

CASRN = Chemical Abstracts Service Registry No.

EPA = U.S. Environmental Protection Agency

mg/kg = milligram(s) per kilogram

ND = nondetectable

NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid

NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

NS = not specified

NA = not applicable

ND = nondetectable

PAL = project action level

Q = qualifier

RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

H = Analyte is considered low estimate due to a hold time exceedance.

J = The analyte was positively identified; the quantitation is estimated.

QL,QH,QN = Analyte result is considered an estimated value biased (low,high,uncertain) due to a quality control failure.

Table K-6. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Fire Station #1 (Soil)

Analyte	CASRN	Units	Human Health [2]	Migration to Groundwater [3]	RSLs [4]	PAL	Field Sample ID	19PS-FST1-SB04-8		19PS-FST1-SB05-1		19PS-FST1-SB99-1021			19PS-FST1-SB05-8		19PS-FST1-SB06-1	
							Location	SB04		SB05		SB05			SB05		SB06	
							Sample Type	Primary		Primary		Field duplicate of 19PS-FST1-SB05-1			Primary		Primary	
							Laboratory Sample Delivery Group	EIE13		EIE13		EIE13			EIE13		EIE13	
							Laboratory Sample ID	1185511		1185504		1185520			1185505		1185508	
							Sample Collection Date	21-Oct-2019		21-Oct-2019		21-Oct-2019			21-Oct-2019		21-Oct-2019	
								Results	Q	Results	Q	Results	Q	RPD	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																		
Perfluorooctane sulfonate (PFOS)	1763-23-1	mg/kg	1.6	0.0017	0.126	0.126		**0.98** [0.0050]		**1.8** [0.043]		**1.9** [0.044]		5.4%	**0.84** [0.0041]		**0.53** [0.0042]	
Perfluorooctanoic acid (PFOA)	335-67-1	mg/kg	1.6	0.0030	0.126	0.126		0.10 [0.00050]		0.0099 [0.00043]		0.015 [0.00044]		41%	0.065 [0.0041]	QH	0.0029 [0.00042]	
Perfluorononanoic acid (PFNA)	375-95-1	mg/kg	NS	NS	NS	NS		0.0028 [0.00050]		0.014 [0.00043]		0.013 [0.00044]		7.4%	0.0016 [0.00041]		0.0065 [0.00042]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	mg/kg	NS	NS	NS	NS		0.11 [0.0050]		0.013 [0.00043]		0.019 [0.00044]		38%	0.093 [0.0041]	QH	0.0058 [0.00042]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	mg/kg	NS	NS	NS	NS		0.0065 [0.00050]		0.00086 [0.00043]		0.00078 [0.00044]		10%	0.0047 [0.00041]		0.00022 [0.00042]	J
Perfluorobutane sulfonate (PFBS)	375-73-5	mg/kg	NS	NS	1.9	1.9		0.00081 [0.0020]	J	ND [0.0017]		ND [0.0018]		NA	0.0035 [0.0016]		ND [0.0017]	
Perfluorohexanoic acid (PFHxA)	307-24-4	mg/kg	NS	NS	NS	NS		0.016 [0.00050]		0.0011 [0.00043]		0.0011 [0.00044]		0.0%	0.017 [0.00041]		0.00022 [0.00042]	J
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	NS	NS	NS	NS		0.00097 [0.00050]		0.0012 [0.00043]		0.0016 [0.00044]		29%	0.00052 [0.00041]	J	0.00075 [0.00042]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	NS	NS	NS	NS		ND [0.00050]		ND [0.00043]		0.00038 [0.00044]	J	NA	ND [0.00041]		ND [0.00042]	
Perfluorododecanoic acid (PFDoA)	307-55-1	mg/kg	NS	NS	NS	NS		ND [0.00050]		0.00024 [0.00043]	J	0.00039 [0.00044]	J	48%	ND [0.00041]		ND [0.00042]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	mg/kg	NS	NS	NS	NS		ND [0.00050]		ND [0.00043]		ND [0.00044]		NA	ND [0.00041]		ND [0.00042]	
Perfluorotetradecanoic acid (PFTA)	376-06-7	mg/kg	NS	NS	NS	NS		ND [0.00050]		ND [0.00043]		ND [0.00044]		NA	ND [0.00041]		ND [0.00042]	
NMeFOSAA	2355-31-9	mg/kg	NS	NS	NS	NS		ND [0.00050]		0.00042 [0.00043]	J	0.00078 [0.00044]	J	**60%**	ND [0.00041]		ND [0.00042]	
NEtFOSAA	2991-50-6	mg/kg	NS	NS	NS	NS		ND [0.00050]		0.0016 [0.00043]	J	0.0019 [0.00044]	J	17%	ND [0.00041]		ND [0.00042]	
Miscellaneous																		
Moisture by SM2540G	NS	%	NS	NS	NS	NS		20.1 [0.50]		12.6 [0.50]		11.3 [0.50]		NA	8.9 [0.50]		10.0 [0.50]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

RPDs shown in bold and yellow exceed QC limits (>50%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1. PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

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3. ADEC Soil Cleanup Levels (November 2020), 18 Alaska Administrative Code 75.341 Table B1, Method 2, migration to groundwater.

4. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

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Table K-6. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Fire Station #1 (Soil)

							Field Sample ID		19PS-FST1-SB06-7		19PS-FST1-SB07-1		19PS-FST1-SB07-8		20PS-FST1-SB08-1		20PS-FST1-SB08-7.5	
							Location		SB06		SB07		SB07		SB08		SB08	
							Sample Type		Primary		Primary		Primary		Primary		Primary	
							Laboratory Sample Delivery Group		EIE13		EIE13		EIE13		410-3415		410-3415	
							Laboratory Sample ID		1185509		1185512		1185513		410-3415-2		410-3415-3	
							Sample Collection Date		21-Oct-2019		21-Oct-2019		21-Oct-2019		3-Jun-2020		3-Jun-2020	
Analyte	CASRN	Units	Human Health [2]	Migration to Groundwater [3]	RSLs [4]	PAL	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																		
Perfluorooctane sulfonate (PFOS)	1763-23-1	mg/kg	1.6	0.0017	0.126	0.126	**1.3** [0.042]	QL,H	**0.43** [0.0046]		**0.67** [0.0049]		0.0077 [0.00039]	B	**0.17** [0.0055]			
Perfluorooctanoic acid (PFOA)	335-67-1	mg/kg	1.6	0.0030	0.126	0.126	0.061 [0.00042]		0.0029 [0.00046]		0.084 [0.00049]		ND [0.00039]		0.0023 [0.00055]			
Perfluorononanoic acid (PFNA)	375-95-1	mg/kg	NS	NS	NS	NS	0.0031 [0.00042]		0.017 [0.00046]		ND [0.00049]		ND [0.00039]		0.0011 [0.00055]			
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	mg/kg	NS	NS	NS	NS	0.070 [0.0042]		0.0073 [0.00046]		0.29 [0.0049]		0.00056 [0.00039]	J	0.0047 [0.00055]			
Perfluoroheptanoic acid (PFHpA)	375-85-9	mg/kg	NS	NS	NS	NS	0.0015 [0.00042]		0.00029 [0.00046]	J	0.010 [0.00049]		ND [0.00039]		ND [0.00055]			
Perfluorobutane sulfonate (PFBS)	375-73-5	mg/kg	NS	NS	1.9	1.9	0.00044 [0.0017]	J	ND [0.0018]		0.0032 [0.0020]		ND [0.0015]		ND [0.0022]			
Perfluorohexanoic acid (PFHxA)	307-24-4	mg/kg	NS	NS	NS	NS	0.0094 [0.00042]		0.00033 [0.00046]	J	0.019 [0.00049]		ND [0.00039]		0.00046 [0.00055]	J		
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	NS	NS	NS	NS	0.0014 [0.00042]		ND [0.00046]		ND [0.00049]		ND [0.00039]		ND [0.00055]			
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	NS	NS	NS	NS	0.00023 [0.00042]	J	ND [0.00046]		ND [0.00049]		ND [0.00039]		ND [0.00055]			
Perfluorododecanoic acid (PFDoA)	307-55-1	mg/kg	NS	NS	NS	NS	0.00026 [0.00042]	J	ND [0.00046]		ND [0.00049]		ND [0.00039]		ND [0.00055]			
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	mg/kg	NS	NS	NS	NS	ND [0.00042]		ND [0.00046]		ND [0.00049]		ND [0.00039]		ND [0.00055]			
Perfluorotetradecanoic acid (PFTA)	376-06-7	mg/kg	NS	NS	NS	NS	ND [0.00042]		ND [0.00046]		ND [0.00049]		ND [0.00039]		ND [0.00055]			
NMeFOSAA	2355-31-9	mg/kg	NS	NS	NS	NS	0.00068 [0.00042]	J	ND [0.00046]		ND [0.00049]		ND [0.00039]		ND [0.00055]			
NEtFOSAA	2991-50-6	mg/kg	NS	NS	NS	NS	0.00047 [0.00042]	J	ND [0.00046]		ND [0.00049]		ND [0.00039]		ND [0.00055]			
Miscellaneous																		
Moisture by SM2540G	NS	%	NS	NS	NS	NS	7.7 [0.50]		13.0 [0.50]		18.8 [0.50]		2.4		31.2			

Notes:

Results shown in bold and highlighted red exceed the screening levels.

RPDs shown in bold and yellow exceed QC limits (>50%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1. PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2. ADEC Soil Cleanup Levels (November 2020), Alaska Administrative Code Title 18, Chapter 75.341, Table B1, Method 2, human health, under 40-inch zone.

3. ADEC Soil Cleanup Levels (November 2020), 18 Alaska Administrative Code 75.341 Table B1, Method 2, migration to groundwater.

4. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation

CASRN = Chemical Abstracts Service Registry No.

EPA = U.S. Environmental Protection Agency

mg/kg = milligram(s) per kilogram

ND = nondetectable

NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid

NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

NS = not specified

NA = not applicable

ND = nondetectable

PAL = project action level

Q = qualifier

RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

H = Analyte is considered low estimate due to a hold time exceedance.

J = The analyte was positively identified; the quantitation is estimated.

QL,QH,QN = Analyte result is considered an estimated value biased (low,high,uncertain) due to a quality control failure.

Table K-6. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Fire Station #1 (Soil)

							Field Sample ID		20PS-FST1-SB09-1		20PS-FST1-SB09-7.5		20PS-FST1-SB99-0603			20PS-FST1-SB10-1		20PS-FST1-SB10-6	
							Location		SB09		SB09		SB09			SB10		SB10	
							Sample Type		Primary		Primary		Field Duplicate of 20PS-FST1-SB09-7.5			Primary		Primary	
							Laboratory Sample Delivery Group		410-3415		410-3415		410-3415			410-3415		410-3415	
							Laboratory Sample ID		410-3415-4		410-3415-5		410-3415-1			410-3415-6		410-3415-7	
							Sample Collection Date		3-Jun-2020		3-Jun-2020		3-Jun-2020			3-Jun-2020		3-Jun-2020	
Analyte	CASRN	Units	Human Health [2]	Migration to Groundwater [3]	RSLs [4]	PAL	Results	Q	Results	Q	Results	Q	RPD	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																	
Perfluorooctane sulfonate (PFOS)	1763-23-1	mg/kg	1.6	0.0017	0.126	0.126	**0.28** [0.0040]		0.11 [0.0041]	B,QN	**0.20** [0.0044]	QN	**58%**	**0.51** [0.0046]		0.050 [0.00039]	B
Perfluorooctanoic acid (PFOA)	335-67-1	mg/kg	1.6	0.0030	0.126	0.126	0.0029 [0.00040]		0.018 [0.00041]		0.012 [0.00044]		40%	0.0089 [0.00046]		0.0076 [0.00039]	
Perfluorononanoic acid (PFNA)	375-95-1	mg/kg	NS	NS	NS	NS	0.015 [0.00040]		ND [0.00041]		0.00025 [0.00044]	J	NA	0.0031 [0.00046]		ND [0.00039]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	mg/kg	NS	NS	NS	NS	0.021 [0.00040]		0.038 [0.00041]		0.034 [0.00044]		11%	0.011 [0.00046]		0.014 [0.00039]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	mg/kg	NS	NS	NS	NS	0.00079 [0.00040]		0.00066 [0.00041]		0.00069 [0.00044]		4.4%	0.00097 [0.00046]	J	0.00064 [0.00039]	
Perfluorobutane sulfonate (PFBS)	375-73-5	mg/kg	NS	NS	1.9	1.9	ND [0.0016]		0.00045 [0.0016]	J	0.00058 [0.0018]	J	25%	ND [0.0018]		ND [0.0016]	
Perfluorohexanoic acid (PFHxA)	307-24-4	mg/kg	NS	NS	NS	NS	0.00073 [0.00040]		0.0014 [0.00041]		0.0021 [0.00044]		40%	0.00087 [0.00046]		0.0020 [0.00039]	
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	NS	NS	NS	NS	ND [0.00040]		ND [0.00041]		ND [0.00044]		NA	0.0023 [0.00046]		ND [0.00039]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	NS	NS	NS	NS	ND [0.00040]		ND [0.00041]		ND [0.00044]		NA	ND [0.00046]		ND [0.00039]	
Perfluorododecanoic acid (PFDoA)	307-55-1	mg/kg	NS	NS	NS	NS	ND [0.00040]		ND [0.00041]		ND [0.00044]		NA	ND [0.00046]		ND [0.00039]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	mg/kg	NS	NS	NS	NS	ND [0.00040]		ND [0.00041]		ND [0.00044]		NA	ND [0.00046]		ND [0.00039]	
Perfluorotetradecanoic acid (PFTA)	376-06-7	mg/kg	NS	NS	NS	NS	ND [0.00040]		ND [0.00041]		ND [0.00044]		NA	ND [0.00046]		ND [0.00039]	
NMeFOSAA	2355-31-9	mg/kg	NS	NS	NS	NS	ND [0.00040]		ND [0.00041]		ND [0.00044]		NA	ND [0.00046]		ND [0.00039]	
NEtFOSAA	2991-50-6	mg/kg	NS	NS	NS	NS	ND [0.00040]		ND [0.00041]		ND [0.00044]		NA	ND [0.00046]		ND [0.00039]	
Miscellaneous																	
Moisture by SM2540G	NS	%	NS	NS	NS	NS	5.0		4.2		10.7			14.9		1.9	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

RPDs shown in bold and yellow exceed QC limits (>50%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1. PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2. ADEC Soil Cleanup Levels (November 2020), Alaska Administrative Code Title 18, Chapter 75.341, Table B1, Method 2, human health, under 40-inch zone.

3. ADEC Soil Cleanup Levels (November 2020), 18 Alaska Administrative Code 75.341 Table B1, Method 2, migration to groundwater.

4. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation

CASRN = Chemical Abstracts Service Registry No.

EPA = U.S. Environmental Protection Agency

mg/kg = milligram(s) per kilogram

ND = nondetectable

NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid

NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

NS = not specified

NA = not applicable

ND = nondetectable

PAL = project action level

Q = qualifier

RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

H = Analyte is considered low estimate due to a hold time exceedance.

J = The analyte was positively identified; the quantitation is estimated.

QL,QH,QN = Analyte result is considered an estimated value biased (low,high,uncertain) due to a quality control failure.

Table K-6. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Fire Station #1 (Soil)

							Field Sample ID	20PS-FST1-SB11-1		20PS-FST1-SB11-6		20PS-FST1-SB12-1		20PS-FST1-SB12-8		20PS-FST1-SB13-1	
							Location	SB11		SB11		SB12		SB12		SB13	
							Sample Type	Primary		Primary		Primary		Primary		Primary	
							Laboratory Sample Delivery Group	410-3415		410-3415		410-3415		410-3415		410-3415	
							Laboratory Sample ID	410-3415-8		410-3415-9		410-3415-10		410-3415-11		410-3415-12	
							Sample Collection Date	3-Jun-2020		3-Jun-2020		3-Jun-2020		3-Jun-2020		3-Jun-2020	
Analyte	**CASRN**	**Units**	**Human Health [2]**	**Migration to Groundwater [3]**	**RSLs [4]**	**PAL**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																
Perfluorooctane sulfonate (PFOS)	1763-23-1	mg/kg	1.6	0.0017	0.126	0.126	**0.76** [0.043]		**0.27** [0.0043]		0.099 [0.0041]	B	**1.7** [0.038]		**8.9** [0.042]	QH
Perfluorooctanoic acid (PFOA)	335-67-1	mg/kg	1.6	0.0030	0.126	0.126	0.0053 [0.00043]		0.11 [0.0043]		0.0026 [0.00041]		0.0077 [0.00038]		0.0034 [0.00042]	
Perfluorononanoic acid (PFNA)	375-95-1	mg/kg	NS	NS	NS	NS	0.010 [0.00043]		0.00047 [0.00043]	J	0.0046 [0.00041]		ND [0.00038]		0.0067 [0.00042]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	mg/kg	NS	NS	NS	NS	0.0019 [0.00043]		0.15 [0.0043]		0.0037 [0.00041]		0.018 [0.00038]		0.0078 [0.00042]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	mg/kg	NS	NS	NS	NS	0.00087 [0.00043]		0.0044 [0.00043]		ND [0.00041]		0.00061 [0.00038]		0.00042 [0.00042]	J
Perfluorobutane sulfonate (PFBS)	375-73-5	mg/kg	NS	NS	1.9	1.9	ND [0.0017]		0.0026 [0.0017]		ND [0.0016]		0.00049 [0.0015]	J	ND [0.0017]	
Perfluorohexanoic acid (PFHxA)	307-24-4	mg/kg	NS	NS	NS	NS	0.00049 [0.00043]	J	0.024 [0.00043]		0.00023 [0.00041]	J	0.011 [0.00038]		0.0042 [0.00042]	
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	NS	NS	NS	NS	0.0033 [0.00043]		ND [0.00043]		ND [0.00041]		0.00048 [0.00038]	J	0.00033 [0.00042]	J
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	NS	NS	NS	NS	0.0014 [0.00043]	J	ND [0.00043]		ND [0.00041]		ND [0.00038]		ND [0.00042]	
Perfluorododecanoic acid (PFDoA)	307-55-1	mg/kg	NS	NS	NS	NS	0.0011 [0.00043]		ND [0.00043]		ND [0.00041]		ND [0.00038]		ND [0.00042]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	mg/kg	NS	NS	NS	NS	0.00022 [0.00043]	J	ND [0.00043]		ND [0.00041]		ND [0.00038]		ND [0.00042]	
Perfluorotetradecanoic acid (PFTA)	376-06-7	mg/kg	NS	NS	NS	NS	ND [0.00043]		ND [0.00043]		ND [0.00041]		ND [0.00038]		ND [0.00042]	
NMeFOSAA	2355-31-9	mg/kg	NS	NS	NS	NS	0.00040 [0.00043]	J	ND [0.00043]		ND [0.00041]		ND [0.00038]		ND [0.00042]	
NEtFOSAA	2991-50-6	mg/kg	NS	NS	NS	NS	0.0017 [0.00043]	J	ND [0.00043]		ND [0.00041]		0.00026 [0.00038]	J	0.0011 [0.00042]	J
Miscellaneous																
Moisture by SM2540G	NS	%	NS	NS	NS	NS	12.5		8.6		7.4		2.1		11.0	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

RPDs shown in bold and yellow exceed QC limits (>50%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1. PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).
2. ADEC Soil Cleanup Levels (November 2020), Alaska Administrative Code Title 18, Chapter 75.341, Table B1, Method 2, human health, under 40-inch zone.
3. ADEC Soil Cleanup Levels (November 2020), 18 Alaska Administrative Code 75.341 Table B1, Method 2, migration to groundwater.
4. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

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mg/kg = milligram(s) per kilogram

ND = nondetectable

NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid

NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

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NA = not applicable

ND = nondetectable

PAL = project action level

Q = qualifier

RPD = relative percent difference

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H = Analyte is considered low estimate due to a hold time exceedance.

J = The analyte was positively identified; the quantitation is estimated.

QL,QH,QN = Analyte result is considered an estimated value biased (low,high,uncertain) due to a quality control failure.

Table K-6. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Fire Station #1 (Soil)

							Field Sample ID	20PS-FST1-SB13-7.5		20PS-FST1-SB14-1		20PS-FST1-SB14-8	
							Location	SB13		SB14		SB14	
							Sample Type	Primary		Primary		Primary	
							Laboratory Sample Delivery Group	410-3415		410-3415		410-3415	
							Laboratory Sample ID	410-3415-13		410-3415-14		410-3415-15	
							Sample Collection Date	3-Jun-2020		3-Jun-2020		3-Jun-2020	
Analyte	**CASRN**	**Units**	**Human Health [2]**	**Migration to Groundwater [3]**	**RSLs [4]**	**PAL**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]												
Perfluorooctane sulfonate (PFOS)	1763-23-1	mg/kg	1.6	0.0017	0.126	0.126	**2.3** [0.040]		**0.19** [0.0041]		**0.87** [0.0040]	
Perfluorooctanoic acid (PFOA)	335-67-1	mg/kg	1.6	0.0030	0.126	0.126	**2.0** [0.040]		0.0029 [0.00041]		**0.30** [0.0040]	
Perfluorononanoic acid (PFNA)	375-95-1	mg/kg	NS	NS	NS	NS	0.0083 [0.00040]		0.0020 [0.00041]		0.0019 [0.00040]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	mg/kg	NS	NS	NS	NS	0.71 [0.0040]		0.010 [0.0040]		0.49 [0.0040]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	mg/kg	NS	NS	NS	NS	0.019 [0.00040]		0.00073 [0.00041]	J	0.010 [0.00040]	
Perfluorobutane sulfonate (PFBS)	375-73-5	mg/kg	NS	NS	1.9	1.9	0.0091 [0.0016]		ND [0.0016]		0.0091 [0.0016]	
Perfluorohexanoic acid (PFHxA)	307-24-4	mg/kg	NS	NS	NS	NS	0.020 [0.00040]		0.0011 [0.00041]		0.023 [0.00040]	
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	NS	NS	NS	NS	0.0016 [0.00040]		0.0042 [0.00041]		0.00032 [0.00040]	J
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	NS	NS	NS	NS	ND [0.00040]		0.00052 [0.00041]	J	ND [0.00040]	
Perfluorododecanoic acid (PFDoA)	307-55-1	mg/kg	NS	NS	NS	NS	ND [0.00040]		ND [0.00041]		ND [0.00040]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	mg/kg	NS	NS	NS	NS	ND [0.00040]		ND [0.00041]		ND [0.00040]	
Perfluorotetradecanoic acid (PFTA)	376-06-7	mg/kg	NS	NS	NS	NS	ND [0.00040]		ND [0.00041]		ND [0.00040]	
NMeFOSAA	2355-31-9	mg/kg	NS	NS	NS	NS	0.00027 [0.00040]	J	0.00047 [0.00041]	J	ND [0.00040]	
NEtFOSAA	2991-50-6	mg/kg	NS	NS	NS	NS	0.00020 [0.00040]	J	0.0012 [0.00041]	J	ND [0.00040]	
Miscellaneous												
Moisture by SM2540G	NS	%	NS	NS	NS	NS	6.3		6.0		5.0	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

RPDs shown in bold and yellow exceed QC limits (>50%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1. PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2. ADEC Soil Cleanup Levels (November 2020), Alaska Administrative Code Title 18, Chapter 75.341, Table B1, Method 2, human health, under 40-inch zone.

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4. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

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H = Analyte is considered low estimate due to a hold time exceedance.

J = The analyte was positively identified; the quantitation is estimated.

QL,QH,QN = Analyte result is considered an estimated value biased (low,high,uncertain) due to a quality control failure.

Table K-7. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Former Fire Training Area (Soil)

Analyte	CASRN	Units	Human Health [2]	Migration to Groundwater [3]	RSLs [4]	PAL	Field Sample ID / Location / Sample Type / Laboratory Sample Delivery Group / Laboratory Sample ID / Sample Collection Date	Results	Q	Field Sample ID / Location / Sample Type / Laboratory Sample Delivery Group / Laboratory Sample ID / Sample Collection Date	Results	Q	RPD	Field Sample ID / Location / Sample Type / Laboratory Sample Delivery Group / Laboratory Sample ID / Sample Collection Date	Results	Q
								19PS-FFTA-ENT-SB04-1 SB04 Soil EIE14 1188774 27-Oct-2019			19PS-FFTA-SB99-1027 SB04 Field duplicate of 19PS-FFTA-ENT-SB04-1 EIE14 1188778 27-Oct-2019			19PS-FFTA-ENT-SB04-6.5 SB04 Soil EIE14 1188775 27-Oct-2019		
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																
Perfluorooctane sulfonate (PFOS)	1763-23-1	mg/kg	1.6	0.0017	0.126	0.126		0.0040 [0.00043]	QN		0.027 [0.00041]	QN	**148%**		0.097 [0.0044]	QN
Perfluorooctanoic acid (PFOA)	335-67-1	mg/kg	1.6	0.0030	0.126	0.126		ND [0.00043]			0.00025 [0.00041]	J	NA		**0.13** [0.0044]	QN
Perfluorononanoic acid (PFNA)	375-95-1	mg/kg	NS	NS	NS	NS		ND [0.00043]			ND [0.00041]		NA		0.00025 [0.00044]	J
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	mg/kg	NS	NS	NS	NS		ND [0.00043]			0.00056 [0.00041]	J	NA		0.24 [0.0044]	QN
Perfluoroheptanoic acid (PFHpA)	375-85-9	mg/kg	NS	NS	NS	NS		ND [0.00043]			ND [0.00041]		NA		0.0013 [0.00044]	
Perfluorobutane sulfonate (PFBS)	375-73-5	mg/kg	NS	NS	1.9	1.9		ND [0.0017]			ND [0.0017]		NA		ND [0.0018]	
Perfluorohexanoic acid (PFHxA)	307-24-4	mg/kg	NS	NS	NS	NS		ND [0.00043]			ND [0.00041]		NA		0.0041 [0.00044]	J
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	NS	NS	NS	NS		ND [0.00043]			0.00026 [0.00041]	J	NA		ND [0.00044]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	NS	NS	NS	NS		ND [0.00043]			ND [0.00041]		NA		ND [0.00044]	
Perfluorododecanoic acid (PFDoA)	307-55-1	mg/kg	NS	NS	NS	NS		ND [0.00043]			ND [0.00041]		NA		ND [0.00044]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	mg/kg	NS	NS	NS	NS		ND [0.00043]			ND [0.00041]		NA		ND [0.00044]	
Perfluorotetradecanoic acid (PFTA)	376-06-7	mg/kg	NS	NS	NS	NS		ND [0.00043]			ND [0.00041]		NA		ND [0.00044]	
NMeFOSAA	2355-31-9	mg/kg	NS	NS	NS	NS		ND [0.00043]			ND [0.00041]		NA		ND [0.00044]	
NEtFOSAA	2991-50-6	mg/kg	NS	NS	NS	NS		0.00031 [0.00043]	J		ND [0.00041]		NA		ND [0.00044]	
Miscellaneous																
Moisture by SM2540G	NS	%	NS	NS	NS	NS		10.5 [0.50]			10.4 [0.50]		NA		14.1 [0.50]	

Analyte	CASRN	Units	Human Health [2]	Migration to Groundwater [3]	RSLs [4]	PAL	Field Sample ID / Location / Sample Type / Laboratory Sample Delivery Group / Laboratory Sample ID / Sample Collection Date	Results	Q	Field Sample ID / Location / Sample Type / Laboratory Sample Delivery Group / Laboratory Sample ID / Sample Collection Date	Results	Q	RPD	Field Sample ID / Location / Sample Type / Laboratory Sample Delivery Group / Laboratory Sample ID / Sample Collection Date	Results	Q
								19PS-FFTA-ENT-SB05-1 SB05 Soil EIE12 1183462 17-Oct-2019			19PS-FFTA-SB99-1017 SB05 Field duplicate of 19PS-FFTA ENT-SB05-1 EIE12 1183466 17-Oct-2019			19PS-FFTA-ENT-SB05-7.5 SB05 Soil EIE12 1183463 17-Oct-2019		
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																
Perfluorooctane sulfonate (PFOS)	1763-23-1	mg/kg	1.6	0.0017	0.126	0.126		**0.33** [0.0043]	QN		**0.15** [0.0046]	QN	**75%**		0.0012 [0.00048]	B
Perfluorooctanoic acid (PFOA)	335-67-1	mg/kg	1.6	0.0030	0.126	0.126		0.0024 [0.00043]	B		0.0029 [0.00046]	B	19%		**0.15** [0.048]	QN
Perfluorononanoic acid (PFNA)	375-95-1	mg/kg	NS	NS	NS	NS		0.0048 [0.00043]	QN		0.0017 [0.00046]	QN	**95%**		ND [0.00048]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	mg/kg	NS	NS	NS	NS		0.0065 [0.00043]	B		0.0057 [0.00046]	B	13%		0.31 [0.048]	QN
Perfluoroheptanoic acid (PFHpA)	375-85-9	mg/kg	NS	NS	NS	NS		0.00032 [0.00043]	J		0.00056 [0.00046]	J	**55%**		0.0037 [0.00048]	QH,QN
Perfluorobutane sulfonate (PFBS)	375-73-5	mg/kg	NS	NS	1.9	1.9		ND [0.0017]			ND [0.0018]		NA		0.00098 [0.0019]	J,QH,QN
Perfluorohexanoic acid (PFHxA)	307-24-4	mg/kg	NS	NS	NS	NS		0.0011 [0.00043]			0.0011 [0.00046]		0%		0.0062 [0.00048]	
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	NS	NS	NS	NS		0.0066 [0.00043]	QN		0.0035 [0.00046]	QN	**61%**		ND [0.00048]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	NS	NS	NS	NS		0.0027 [0.00043]			0.0032 [0.00046]		17%		ND [0.00048]	
Perfluorododecanoic acid (PFDoA)	307-55-1	mg/kg	NS	NS	NS	NS		0.00043 [0.00043]	J		0.00074 [0.00046]		**53%**		ND [0.00048]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	mg/kg	NS	NS	NS	NS		ND [0.00043]			ND [0.00046]		NA		ND [0.00048]	
Perfluorotetradecanoic acid (PFTA)	376-06-7	mg/kg	NS	NS	NS	NS		ND [0.00043]			ND [0.00046]		NA		ND [0.00048]	
NMeFOSAA	2355-31-9	mg/kg	NS	NS	NS	NS		ND [0.00043]			ND [0.00046]		NA		ND [0.00048]	
NEtFOSAA	2991-50-6	mg/kg	NS	NS	NS	NS		0.00034 [0.00043]	J		0.00046 [0.00046]	J	30%		ND [0.00048]	
Miscellaneous																
Moisture by SM2540G	NS	%	NS	NS	NS	NS		15.7 [0.50]			18.1 [0.50]		NA		18.8 [0.50]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

RPDs shown in bold and yellow exceed QC limits (>50%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1. PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

2. ADEC Soil Cleanup Levels (November 2020), Alaska Administrative Code Title 18, Chapter 75.341, Table B1, Method 2, human health, under 40-inch zone.

3. ADEC Soil Cleanup Levels (November 2020), 18 Alaska Administrative Code 75.341 Table B1, Method 2, migration to groundwater.

4. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation

CASRN = Chemical Abstracts Service Registry No.

EPA = U.S. Environmental Protection Agency

mg/kg = milligram(s) per kilogram

ND = nondetectable

NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid

NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

NS = not specified

NA = not applicable

ND = nondetectable

PAL = project action level

Q = qualifier

RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

J = The analyte was positively identified; the quantitation is estimated.

QL,QH,QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table K-7. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Former Fire Training Area (Soil)

							Field Sample ID	19PS-FFTA-ENT-SB06-1		19PS-FFTA-ENT-SB06-7		19PS-FFTA-ENT-SB07-1		19PS-FFTA-ENT-SB07-7		19PS-FFTA-ENT-SB08-1		19PS-FFTA-ENT-SB08-8.5	
							Location	SB06		SB06		SB07		SB07		SB08		SB08	
							Sample Type	Soil		Soil		Soil		Soil		Soil		Soil	
							Laboratory Sample Delivery Group	EIE12		EIE12		EIE12		EIE12		EIE12		EIE12	
							Laboratory Sample ID	1183473		1183474		1183467		1183468		1183469		1183470	
							Sample Collection Date	17-Oct-2019		17-Oct-2019		17-Oct-2019		17-Oct-2019		17-Oct-2019		17-Oct-2019	
Analyte	CASRN	Units	Human Health [2]	Migration to Groundwater [3]	RSLs [4]	PAL	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																		
Perfluorooctane sulfonate (PFOS)	1763-23-1	mg/kg	1.6	0.0017	0.126	0.126	0.0022 [0.00041]	B	**1.3** [0.051]		0.057 [0.00040]		**0.73** [0.0045]		0.012 [0.00046]	B	**0.53** [0.040]	
Perfluorooctanoic acid (PFOA)	335-67-1	mg/kg	1.6	0.0030	0.126	0.126	ND [0.00041]		0.022 [0.00051]		0.0011 [0.00040]	B	0.0018 [0.00045]	B	0.00025 [0.00046]	J,B	0.0019 [0.00040]	B
Perfluorononanoic acid (PFNA)	375-95-1	mg/kg	NS	NS	NS	NS	ND [0.00041]		0.0041 [0.00051]		0.00022 [0.00040]	J	0.0024 [0.00045]		0.00050 [0.00046]	J	0.00060 [0.00040]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	mg/kg	NS	NS	NS	NS	ND [0.00041]		0.040 [0.00051]		0.0069 [0.00040]	B	0.0053 [0.00045]	B	ND [0.00046]		0.0023 [0.00040]	B
Perfluoroheptanoic acid (PFHpA)	375-85-9	mg/kg	NS	NS	NS	NS	ND [0.00041]		0.0035 [0.00051]		0.00031 [0.00040]	J	ND [0.00045]		ND [0.00046]		0.00052 [0.00040]	J
Perfluorobutane sulfonate (PFBS)	375-73-5	mg/kg	NS	NS	1.9	1.9	ND [0.0017]		0.00074 [0.0020]	J	ND [0.0016]		ND [0.0018]		ND [0.0018]		ND [0.0016]	
Perfluorohexanoic acid (PFHxA)	307-24-4	mg/kg	NS	NS	NS	NS	ND [0.00041]		0.0072 [0.00051]		0.0013 [0.00040]		0.00082 [0.00045]		ND [0.00046]		0.0013 [0.00040]	
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	NS	NS	NS	NS	ND [0.00041]		ND [0.00051]		0.0019 [0.00040]		0.0011 [0.00045]		0.00052 [0.00046]	J	0.00022 [0.00040]	J
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	NS	NS	NS	NS	ND [0.00041]		ND [0.00051]		0.0025 [0.00040]		0.00041 [0.00045]	J	0.00029 [0.00046]	J	ND [0.00040]	
Perfluorododecanoic acid (PFDoA)	307-55-1	mg/kg	NS	NS	NS	NS	ND [0.00041]		ND [0.00051]		0.00073 [0.00040]		ND [0.00045]		ND [0.00046]		ND [0.00040]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	mg/kg	NS	NS	NS	NS	ND [0.00041]		ND [0.00051]		ND [0.00040]		ND [0.00045]		ND [0.00046]		ND [0.00040]	
Perfluorotetradecanoic acid (PFTA)	376-06-7	mg/kg	NS	NS	NS	NS	ND [0.00041]		ND [0.00051]		ND [0.00040]		ND [0.00045]		ND [0.00046]		ND [0.00040]	
NMeFOSAA	2355-31-9	mg/kg	NS	NS	NS	NS	ND [0.00041]		ND [0.00051]		ND [0.00040]		ND [0.00045]		ND [0.00046]		ND [0.00040]	
NEtFOSAA	2991-50-6	mg/kg	NS	NS	NS	NS	ND [0.00041]		ND [0.00051]		0.00022 [0.00040]	J	ND [0.00045]		ND [0.00046]		ND [0.00040]	
Miscellaneous																		
Moisture by SM2540G	NS	%	NS	NS	NS	NS	11.2 [0.50]		24.4 [0.50]		8.6 [0.50]		16.8 [0.50]		19.3 [0.50]		4.2 [0.50]	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

RPDs shown in bold and yellow exceed QC limits (>50%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1. PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).
2. ADEC Soil Cleanup Levels (November 2020), Alaska Administrative Code Title 18, Chapter 75.341, Table B1, Method 2, human health, under 40-inch zone.
3. ADEC Soil Cleanup Levels (November 2020), 18 Alaska Administrative Code 75.341 Table B1, Method 2, migration to groundwater.
4. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation

CASRN = Chemical Abstracts Service Registry No.

EPA = U.S. Environmental Protection Agency

mg/kg = milligram(s) per kilogram

ND = nondetectable

NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid

NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

NS = not specified

NA = not applicable

ND = nondetectable

PAL = project action level

Q = qualifier

RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

J = The analyte was positively identified; the quantitation is estimated.

QL,QH,QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table K-7. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Former Fire Training Area (Soil)

Analyte	CASRN	Units	Human Health [2]	Migration to Groundwater [3]	RSLs [4]	PAL	Field Sample ID / Location / Sample Type / Laboratory Sample Delivery Group / Laboratory Sample ID / Sample Collection Date: 19PS-FFTA-ENT-SB09-1 / SB09 / Soil / EIE12 / 1183471 / 17-Oct-2019	Q	19PS-FFTA-ENT-SB09-6 / SB09 / Soil / EIE12 / 1183472 / 17-Oct-2019	Q	19PS-FFTA-ENT-SB10-1 / SB10 / Soil / EIE12 / 1183475 / 17-Oct-2019	Q	19PS-FFTA-SB98-1017 / SB10 / Field duplicate of 19PS-FFTA-ENT-SB10-1 / EIE12 / 1183477 / 17-Oct-2019	Q	RPD	19PS-FFTA-ENT-SB10-7 / SB10 / Soil / EIE12 / 1183476 / 17-Oct-2019	Q	20PS-FFTA-ENT-SB11-1 / SB11 / Soil / 410-3082 / 410-3082-2 / 30-May-2020	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																			
Perfluorooctane sulfonate (PFOS)	1763-23-1	mg/kg	1.6	0.0017	0.126	0.126	0.0035 [0.00046]	B,QL	**3.4** [0.041]	QN	**2.4** [0.043]	QN,J	**1.4** [0.053]	QN	**53%**	**0.50** [0.0044]	QL	**9.1** [0.048]	QL,QN
Perfluorooctanoic acid (PFOA)	335-67-1	mg/kg	1.6	0.0030	0.126	0.126	ND [0.00046]	QL	0.0070 [0.00041]		0.012 [0.00043]	J	0.015 [0.00053]	J	22%	0.0083 [0.00044]	QL	**0.15** [0.048]	QL,QN
Perfluorononanoic acid (PFNA)	375-95-1	mg/kg	NS	NS	NS	NS	0.00044 [0.00046]	J,QL	0.0028 [0.00041]		0.0048 [0.00043]		0.0039 [0.00053]		21%	0.0020 [0.00044]	QL	0.051 [0.00048]	QL,QN
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	mg/kg	NS	NS	NS	NS	ND [0.00046]	QL	0.014 [0.00041]	B	0.0072 [0.00043]	B	0.0074 [0.00053]	B	2.7%	0.0022 [0.00044]	B,QL	1.7 [0.048]	QL,QN
Perfluoroheptanoic acid (PFHpA)	375-85-9	mg/kg	NS	NS	NS	NS	ND [0.00046]	QL	0.0011 [0.00041]		0.0012 [0.00043]		0.0013 [0.00053]		8.0%	0.00070 [0.00044]	QL	0.011 [0.00048]	QL,QN
Perfluorobutane sulfonate (PFBS)	375-73-5	mg/kg	NS	NS	1.9	1.9	ND [0.0018]	QL	ND [0.0016]		ND [0.0017]		ND [0.0021]		NA	ND [0.0018]	QL	0.011 [0.0019]	QL,QN
Perfluorohexanoic acid (PFHxA)	307-24-4	mg/kg	NS	NS	NS	NS	ND [0.00046]	QL	0.0039 [0.00041]		0.0024 [0.00043]		0.0025 [0.00053]		4%	0.0016 [0.00044]	QL	0.024 [0.00048]	J,QL,QN
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	NS	NS	NS	NS	ND [0.00046]	QL	0.0020 [0.00041]	J	0.0038 [0.00043]	J	0.0025 [0.00053]		41%	0.0013 [0.00044]	QL	0.011 [0.00048]	QL,QN
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	NS	NS	NS	NS	ND [0.00046]	QL	0.00043 [0.00041]	J	0.00049 [0.00043]	J	0.00055 [0.00053]	J	12%	0.00029 [0.00044]	J,QL	ND [0.00048]	QL,QN
Perfluorododecanoic acid (PFDoA)	307-55-1	mg/kg	NS	NS	NS	NS	ND [0.00046]	QL	ND [0.00041]		0.00045 [0.00043]	J	0.00034 [0.00053]	J	28%	0.00027 [0.00044]	J,QL	0.00056 [0.00048]	J,QL,QN
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	mg/kg	NS	NS	NS	NS	ND [0.00046]	QL	ND [0.00041]		ND [0.00043]		ND [0.00053]		NA	ND [0.00044]	QL	ND [0.00048]	QL,QN
Perfluorotetradecanoic acid (PFTA)	376-06-7	mg/kg	NS	NS	NS	NS	ND [0.00046]	QL	ND [0.00041]		ND [0.00043]		ND [0.00053]		NA	ND [0.00044]	QL	ND [0.00048]	QL,QN
NMeFOSAA	2355-31-9	mg/kg	NS	NS	NS	NS	ND [0.00046]	QL	ND [0.00041]		ND [0.00043]		ND [0.00053]		NA	ND [0.00044]	QL	ND [0.00048]	QL,QN
NEtFOSAA	2991-50-6	mg/kg	NS	NS	NS	NS	ND [0.00046]	QL	0.00076 [0.00041]	J	0.0020 [0.00043]	J	0.0016 [0.00053]	J	22%	0.0014 [0.00044]	J,QL	ND [0.00048]	QL,QN
Miscellaneous																			
Moisture by SM2540G	NS	%	NS	NS	NS	NS	19.1 [0.50]		7.8 [0.50]		9.5 [0.50]		25.1 [0.50]		**62%**	10.5 [0.50]		18.4	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

RPDs shown in bold and yellow exceed QC limits (>50%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1. PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).
2. ADEC Soil Cleanup Levels (November 2020), Alaska Administrative Code Title 18, Chapter 75.341, Table B1, Method 2, human health, under 40-inch zone.
3. ADEC Soil Cleanup Levels (November 2020), 18 Alaska Administrative Code 75.341 Table B1, Method 2, migration to groundwater.
4. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation

CASRN = Chemical Abstracts Service Registry No.

EPA = U.S. Environmental Protection Agency

mg/kg = milligram(s) per kilogram

ND = nondetectable

NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid

NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

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NA = not applicable

ND = nondetectable

PAL = project action level

Q = qualifier

RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

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Table K-7. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Former Fire Training Area (Soil)

							Field Sample ID	20PS-FFTA-SB99-0530			20PS-FFTA-ENT-SB11-7.5		20PS-FFTA-ENT-SB12-1		20PS-FFTA-ENT-SB12-7		20PS-FFTA-ENT-SB13-1		20PS-FFTA-ENT-SB13-6.5	
							Location	SB11			SB11		SB12		SB12		SB13		SB13	
							Sample Type	Field Duplicate of 20PS-FFTA-ENT-SB11-1			Soil		Soil		Soil		Soil		Soil	
							Laboratory Sample Delivery Group	410-3082			410-3082		410-3082		410-3082		410-3082		410-3082	
							Laboratory Sample ID	410-3082-4			410-3082-3		410-3082-5		410-3082-6		410-3082-7		410-3082-8	
							Sample Collection Date	30-May-2020			30-May-2020		30-May-2020		30-May-2020		30-May-2020		30-May-2020	
Analyte	CASRN	Units	Human Health [2]	Migration to Groundwater [3]	RSLs [4]	PAL	Results	Q	RPD	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																				
Perfluorooctane sulfonate (PFOS)	1763-23-1	mg/kg	1.6	0.0017	0.126	0.126	**16** [0.047]	QN,QH	**55%**	0.0014 [0.00049]		**6.4** [0.050]	QH	0.0040 [0.00038]		0.0025 [0.00047]		0.0011 [0.00048]	
Perfluorooctanoic acid (PFOA)	335-67-1	mg/kg	1.6	0.0030	0.126	0.126	0.040 [0.00047]	QN	**116%**	0.0029 [0.00049]		0.024 [0.00050]	QL	0.0093 [0.00038]		0.00058 [0.00047]	J	**0.15** [0.048]	
Perfluorononanoic acid (PFNA)	375-95-1	mg/kg	NS	NS	NS	NS	0.037 [0.00047]		32%	ND [0.00049]		0.019 [0.00050]		ND [0.00038]		ND [0.00047]		ND [0.00048]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	mg/kg	NS	NS	NS	NS	0.39 [0.047]	QN	**125%**	0.0084 [0.00049]		0.12 [0.050]		0.026 [0.00038]		0.0014 [0.00047]		0.59 [0.048]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	mg/kg	NS	NS	NS	NS	0.0055 [0.00047]	QN	**67%**	0.011 [0.00049]		0.0024 [0.00050]		0.0025 [0.00038]		ND [0.00047]		0.0022 [0.00048]	
Perfluorobutane sulfonate (PFBS)	375-73-5	mg/kg	NS	NS	1.9	1.9	0.0062 [0.0019]	QN	**56%**	0.029 [0.0020]		0.0020 [0.0020]	J	0.0037 [0.0015]		ND [0.0019]		0.00069 [0.0019]	J
Perfluorohexanoic acid (PFHxA)	307-24-4	mg/kg	NS	NS	NS	NS	0.016 [0.00047]		40%	0.12 [0.00049]		0.0055 [0.00050]		0.018 [0.00038]		0.00064 [0.00047]	J	0.0060 [0.00048]	
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	NS	NS	NS	NS	0.015 [0.00047]		31%	ND [0.00049]		0.0085 [0.00050]		ND [0.00038]		ND [0.00047]		ND [0.00048]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	NS	NS	NS	NS	0.0015 [0.00047]	J, QN	NA	ND [0.00049]		0.0072 [0.00050]		ND [0.00038]		ND [0.00047]		ND [0.00048]	
Perfluorododecanoic acid (PFDoA)	307-55-1	mg/kg	NS	NS	NS	NS	ND [0.00047]		NA	ND [0.00049]		0.0015 [0.00050]		ND [0.00038]		ND [0.00047]		ND [0.00048]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	mg/kg	NS	NS	NS	NS	ND [0.00047]		NA	ND [0.00049]		0.00035 [0.00050]	J	ND [0.00038]		ND [0.00047]		ND [0.00048]	
Perfluorotetradecanoic acid (PFTA)	376-06-7	mg/kg	NS	NS	NS	NS	ND [0.00047]		NA	ND [0.00049]		ND [0.00050]		ND [0.00038]		ND [0.00047]		ND [0.00048]	
NMeFOSAA	2355-31-9	mg/kg	NS	NS	NS	NS	ND [0.00047]		NA	ND [0.00049]		ND [0.00050]		ND [0.00038]		ND [0.00047]		ND [0.00048]	
NEtFOSAA	2991-50-6	mg/kg	NS	NS	NS	NS	ND [0.00047]		NA	ND [0.00049]		0.0027 [0.00050]		ND [0.00038]		ND [0.00047]		ND [0.00048]	
Miscellaneous																				
Moisture by SM2540G	NS	%	NS	NS	NS	NS	18.8			23.3		22.5		4.2		20.5		24.8	

Notes:

Results shown in bold and highlighted red exceed the screening levels.

RPDs shown in bold and yellow exceed QC limits (>50%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1. PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).
2. ADEC Soil Cleanup Levels (November 2020), Alaska Administrative Code Title 18, Chapter 75.341, Table B1, Method 2, human health, under 40-inch zone.
3. ADEC Soil Cleanup Levels (November 2020), 18 Alaska Administrative Code 75.341 Table B1, Method 2, migration to groundwater.
4. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation

CASRN = Chemical Abstracts Service Registry No.

EPA = U.S. Environmental Protection Agency

mg/kg = milligram(s) per kilogram

ND = nondetectable

NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid

NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

NS = not specified

NA = not applicable

ND = nondetectable

PAL = project action level

Q = qualifier

RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

J = The analyte was positively identified; the quantitation is estimated.

QL,QH,QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

Table K-7. Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Former Fire Training Area (Soil)

							Field Sample ID		20PS-FFTA-ENT-SB14-1		20PS-FFTA-ENT-SB14-7.5		20PS-FFTA-ENT-SB15-1		20PS-FFTA-ENT-SB15-7		20PS-FFTA-ENT-SB16-1		20PS-FFTA-ENT-SB16-7	
							Location		SB14		SB14		SB15		SB15		SB16		SB16	
							Sample Type		Soil		Soil		Soil		Soil		Soil		Soil	
							Laboratory Sample Delivery Group		410-3082		410-3082		410-3082		410-3082		410-3082		410-3082	
							Laboratory Sample ID		410-3082-9		410-3082-10		410-3082-11		410-3082-12		410-3082-13		410-3082-14	
							Sample Collection Date		30-May-2020		30-May-2020		30-May-2020		30-May-2020		30-May-2020		30-May-2020	
Analyte	CASRN	Units	Human Health [2]	Migration to Groundwater [3]	RSLs [4]	PAL	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																				
Perfluorooctane sulfonate (PFOS)	1763-23-1	mg/kg	1.6	0.0017	0.126	0.126	0.061 [0.00043]		0.028 [0.00053]		0.014 [0.00040]		**2.3** [0.046]	QH	0.014 [0.00040]		**15** [0.048]	QH		
Perfluorooctanoic acid (PFOA)	335-67-1	mg/kg	1.6	0.0030	0.126	0.126	0.00033 [0.00043]	J	0.028 [0.00053]		0.00059 [0.00040]	J	0.0025 [0.00046]		0.010 [0.00040]		0.019 [0.00048]			
Perfluorononanoic acid (PFNA)	375-95-1	mg/kg	NS	NS	NS	NS	ND [0.00043]		0.00045 [0.00053]	J	ND [0.00040]		ND [0.00046]		ND [0.00040]		0.013 [0.00048]			
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	mg/kg	NS	NS	NS	NS	0.0013 [0.00043]		0.12 [0.053]		0.00080 [0.00040]		0.0056 [0.00046]		0.0039 [0.00040]		0.022 [0.00048]			
Perfluoroheptanoic acid (PFHpA)	375-85-9	mg/kg	NS	NS	NS	NS	ND [0.00043]		0.0012 [0.00053]		0.00040 [0.00040]	J	0.0011 [0.00046]		0.0029 [0.00040]		0.0024 [0.00048]			
Perfluorobutane sulfonate (PFBS)	375-73-5	mg/kg	NS	NS	1.9	1.9	ND [0.0017]		ND [0.0021]		ND [0.0016]		ND [0.0019]		ND [0.0016]		ND [0.0019]			
Perfluorohexanoic acid (PFHxA)	307-24-4	mg/kg	NS	NS	NS	NS	0.00040 [0.00043]	J	0.0095 [0.00053]		0.0045 [0.00040]		0.0096 [0.00046]		0.018 [0.00040]		0.014 [0.00048]			
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	NS	NS	NS	NS	ND [0.00043]		ND [0.00053]		ND [0.00040]		0.0019 [0.00046]		ND [0.00040]		0.0018 [0.00048]			
Perfluoroundecanoic acid (PFUnA)	2058-94-8	mg/kg	NS	NS	NS	NS	ND [0.00043]		ND [0.00053]		ND [0.00040]		ND [0.00046]		ND [0.00040]		0.00027 [0.00048]	J		
Perfluorododecanoic acid (PFDoA)	307-55-1	mg/kg	NS	NS	NS	NS	ND [0.00043]		ND [0.00053]		ND [0.00040]		0.00027 [0.00046]	J	ND [0.00040]		ND [0.00048]			
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	mg/kg	NS	NS	NS	NS	ND [0.00043]		ND [0.00053]		ND [0.00040]		ND [0.00046]		ND [0.00040]		ND [0.00048]			
Perfluorotetradecanoic acid (PFTA)	376-06-7	mg/kg	NS	NS	NS	NS	ND [0.00043]		ND [0.00053]		ND [0.00040]		ND [0.00046]		ND [0.00040]		ND [0.00048]			
NMeFOSAA	2355-31-9	mg/kg	NS	NS	NS	NS	0.00069 [0.00043]	J	ND [0.00053]		ND [0.00040]		ND [0.00046]		ND [0.00040]		ND [0.00048]			
NEtFOSAA	2991-50-6	mg/kg	NS	NS	NS	NS	0.0060 [0.00043]		ND [0.00053]		ND [0.00040]		ND [0.00046]		ND [0.00040]		0.00051 [0.00048]	J		
Miscellaneous																				
Moisture by SM2540G	NS	%	NS	NS	NS	NS	8.8		27.2		2.4		17.0		2.0		17.7			

Notes:

Results shown in bold and highlighted red exceed the screening levels.

RPDs shown in bold and yellow exceed QC limits (>50%)

Results are reported with the limit of detection (LOD) in brackets [ ].

1. PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).
2. ADEC Soil Cleanup Levels (November 2020), Alaska Administrative Code Title 18, Chapter 75.341, Table B1, Method 2, human health, under 40-inch zone.
3. ADEC Soil Cleanup Levels (November 2020), 18 Alaska Administrative Code 75.341 Table B1, Method 2, migration to groundwater.
4. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

ADEC = Alaska Department of Environmental Conservation

CASRN = Chemical Abstracts Service Registry No.

EPA = U.S. Environmental Protection Agency

mg/kg = milligram(s) per kilogram

ND = nondetectable

NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid

NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

NS = not specified

NA = not applicable

ND = nondetectable

PAL = project action level

Q = qualifier

RPD = relative percent difference

Data Qualifiers:

B = Analyte result is considered a high biased estimated value due to contamination present in the method or trip blank. Results less than 10 times the reported blank concentration are flagged to indicate bias.

J = The analyte was positively identified; the quantitation is estimated.

QL,QH,QN = Analyte result is considered an estimated value biased (low, high, uncertain) due to a quality control failure.

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Table K-8. Summary of Analytical Field, Equipment, and Trip Blank Results

	Field Sample ID		19PS-FBPM-0530		19PS-TB-0530		19PS-TBGW-0716		19PS-FBAM-0716		19PS-FBPM-0717		19PS-TBGW-0717		19PS-FBPM-0718		19PS-TBGW-0718	
	Sample Type		Field Blank		Trip Blank		Trip Blank		Field Blank		Field Blank		Trip Blank		Field Blank		Trip Blank	
	Laboratory Sample Delivery Group		EIE02		EIE02		EIE05		EIE05		EIE06		EIE06		EIE07		EIE07	
	Laboratory Sample ID		1071738		1071739		1105023		1105024		1105159		1105161		1105705		1105706	
	Sample Collection Date		30-May-2019		30-May-2019		16-Jul-2019		16-Jul-2019		17-Jul-2019		17-Jul-2019		18-Jul-2019		18-Jul-2019	
Analyte	**CASRN**	**Units**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																		
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	ND [0.0011]		ND [0.0011]		ND [0.00091]		ND [0.00086]		ND [0.00091]		ND [0.00090]		0.0037 [0.00091]		ND [0.00090]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	ND [0.0011]		ND [0.0011]		ND [0.00091]		ND [0.00086]		ND [0.00091]		ND [0.00090]		ND [0.00091]		ND [0.00090]	
Aggregate PFOA/PFOS	NS	µg/L	ND [0.0022]		ND [0.0022]		ND [0.0018]		ND [0.0017]		ND [0.0018]		ND [0.0018]		0.0037 [0.0018]		ND [0.0018]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	ND [0.0011]		ND [0.0011]		ND [0.00091]		ND [0.00086]		ND [0.00091]		ND [0.00090]		ND [0.00091]		ND [0.00090]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	ND [0.0010]		ND [0.00097]		ND [0.00091]		ND [0.00086]		ND [0.00091]		ND [0.00090]		ND [0.00091]		ND [0.00090]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	ND [0.0011]		ND [0.0011]		ND [0.00091]		ND [0.00086]		ND [0.00091]		ND [0.00090]		ND [0.00091]		ND [0.00090]	
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	ND [0.0010]		ND [0.00097]		ND [0.00091]		ND [0.00086]		ND [0.00091]		ND [0.00090]		ND [0.00091]		ND [0.00090]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	ND [0.0011]		ND [0.0011]		ND [0.00091]		ND [0.00086]		ND [0.00091]		ND [0.00090]		ND [0.00091]		ND [0.00090]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	ND [0.0011]		ND [0.0011]		ND [0.00091]		ND [0.00086]		ND [0.00091]		ND [0.00090]		ND [0.00091]		ND [0.00090]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	ND [0.0011]		ND [0.0011]		ND [0.00091]		ND [0.00086]		ND [0.00091]		ND [0.00090]		ND [0.00091]		ND [0.00090]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	ND [0.0011]		ND [0.0011]		ND [0.00091]		ND [0.00086]		ND [0.00091]		ND [0.00090]		ND [0.00091]		ND [0.00090]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	ND [0.0011]		ND [0.0011]		ND [0.00091]		ND [0.00086]		ND [0.00091]		ND [0.00090]		ND [0.00091]		ND [0.00090]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	ND [0.0011]		ND [0.0011]		ND [0.00091]		ND [0.00086]		ND [0.00091]		ND [0.00090]		ND [0.00091]		ND [0.00090]	
NMeFOSAA	2355-31-9	µg/L	ND [0.0022]		ND [0.0021]		ND [0.0011]		ND [0.0010]		ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	ND [0.0022]		ND [0.0021]		ND [0.00091]		ND [0.00086]		ND [0.00091]		ND [0.00090]		ND [0.00091]		ND [0.00090]	

Notes:

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1,

CASRN = Chemical Abstracts Service Registry No.
NS = not specified
µg/L = microgram(s) per liter
ND = nondetectable
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
Q = qualifier
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

J = The analyte was positively identified; the quantitation is estimated.

QL,QN = The analyte result is considered an estimated value with (low, uncertain) bias due to a quality control failure

Table K-8. Summary of Analytical Field, Equipment, and Trip Blank Results

Field Sample ID			19PS-FBPM-1015		19PS-EB-1016		19PS-FBAM-1016		19PS-EB-1017		19PS-FFTA-FBAM-1017		19PS-EB-1018		19PS-FBPM-1018	
Sample Type			Field Blank		Equipment Blank		Field Blank		Equipment Blank		Field Blank		Equipment Blank		Field Blank	
Laboratory Sample Delivery Group			EIE09		EIE09		EIE09		EIE12		EIE12		EIE11		EIE11	
Laboratory Sample ID			1182003		1182004		1182002		1183478		1183479		1182622		1182624	
Sample Collection Date			15-Oct-2019		16-Oct-2019		16-Oct-2019		17-Oct-2019		17-Oct-2019		18-Oct-2019		18-Oct-2019	
Analyte	**CASRN**	**Units**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	ND [0.00091]		ND [0.00091]		ND [0.00088]		0.0015 [0.00086]	J	ND [0.00088]		ND [0.00095]		ND [0.00091]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	ND [0.00091]		ND [0.00091]		ND [0.00088]		0.00067 [0.00086]	J	ND [0.00088]		ND [0.00095]		ND [0.00091]	
Aggregate PFOA/PFOS	NS	µg/L	ND [0.0018]		ND [0.0018]		ND [0.0018]		0.0022 [0.0017]		ND [0.0018]		ND [0.0019]		ND [0.0018]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	ND [0.00091]		ND [0.00091]		ND [0.00088]		ND [0.00086]		ND [0.00088]		ND [0.00095]		ND [0.00091]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	ND [0.00091]		ND [0.00091]		ND [0.00088]		0.002 [0.00086]		ND [0.00088]		ND [0.00095]		ND [0.00091]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	ND [0.00091]		ND [0.00091]		ND [0.00088]		ND [0.00086]		ND [0.00088]		ND [0.00095]		ND [0.00091]	
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	ND [0.00091]		ND [0.00091]		ND [0.00088]		ND [0.00086]		ND [0.00088]		ND [0.00095]		ND [0.00091]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	ND [0.00091]		ND [0.00091]		ND [0.00088]		ND [0.00086]		ND [0.00088]		ND [0.00095]		ND [0.00091]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	ND [0.00091]		ND [0.00091]		ND [0.00088]		ND [0.00086]		ND [0.00088]		ND [0.00095]		ND [0.00091]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	ND [0.00091]		ND [0.00091]		ND [0.00088]		ND [0.00086]		ND [0.00088]		ND [0.00095]		ND [0.00091]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	ND [0.00091]		ND [0.00091]		ND [0.00088]		ND [0.00086]		ND [0.00088]		ND [0.00095]		ND [0.00091]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	ND [0.00091]		ND [0.00091]		ND [0.00088]		ND [0.00086]		ND [0.00088]		ND [0.00095]		ND [0.00091]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	ND [0.00091]		ND [0.00091]		ND [0.00088]		ND [0.00086]		ND [0.00088]		ND [0.00095]		ND [0.00091]	
NMeFOSAA	2355-31-9	µg/L	ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0010]		ND [0.0011]		ND [0.0011]		ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	ND [0.00091]		ND [0.00091]		ND [0.00088]		ND [0.00086]		ND [0.00088]		ND [0.00095]		ND [0.00091]	

Notes:

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1,

CASRN = Chemical Abstracts Service Registry No.

µg/L = microgram(s) per liter

NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid

NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

NS = not specified

ND = nondetectable

Q = qualifier

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

J = The analyte was positively identified; the quantitation is estimated.

QL,QN = The analyte result is considered an estimated value with (low, uncertain) bias due to a quality control failure

Table K-8. Summary of Analytical Field, Equipment, and Trip Blank Results

		Field Sample ID	19PS-FBAM-1019		19PS-EB-1020		19PS-FBAM-1020		19PS-EB-1021		19PS-FBPM-1021		19PS-EB-1026		19PS-FBPM-1026	
		Sample Type	Field Blank		Equipment Blank		Field Blank		Equipment Blank		Field Blank		Equipment Blank		Field Blank	
		Laboratory Sample Delivery Group	EIE11		EIE11		EIE11		EIE13		EIE13		FA69540		FA69540	
		Laboratory Sample ID	1182626		1182625		1182623		1185518		1185519		FA69540-1		FA69540-2	
		Sample Collection Date	19-Oct-2019		20-Oct-2019		20-Oct-2019		21-Oct-2019		21-Oct-2019		26-Oct-2019		26-Oct-2019	
Analyte	CASRN	Units	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	ND [0.00088]	QL	0.0010 [0.00090]	J, QL	ND [0.00086]	QL	0.0012 [0.00092]	J, QL	ND [0.00086]	QL	ND [0.0077]		ND [0.0077]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	ND [0.00088]		ND [0.00090]		ND [0.00086]		ND [0.00092]		ND [0.00086]		ND [0.0077]		ND [0.0077]	
Aggregate PFOA/PFOS	NS	µg/L	ND [0.0017]		0.0010 [0.0018]		ND [0.0017]		0.0012 [0.0018]	J	ND [0.0017]		ND [0.015]		ND [0.015]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	ND [0.00088]		ND [0.00090]		ND [0.00086]		ND [0.00092]		ND [0.00086]		ND [0.0077]		ND [0.0077]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	ND [0.00088]		ND [0.00090]		ND [0.00086]		ND [0.00092]		ND [0.00086]		ND [0.0077]		ND [0.0077]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	ND [0.00088]		ND [0.00090]		ND [0.00086]		ND [0.00092]		ND [0.00086]		ND [0.0077]		ND [0.0077]	
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	ND [0.00088]		ND [0.00090]		ND [0.00086]		ND [0.00092]		ND [0.00086]		ND [0.0077]		ND [0.0077]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	ND [0.00088]	QL	ND [0.00090]	QL	ND [0.00086]	QL	ND [0.00092]		ND [0.00086]		ND [0.0077]		ND [0.0077]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	ND [0.00088]	QL	ND [0.00090]	QL	ND [0.00086]	QL	ND [0.00092]		ND [0.00086]		ND [0.0077]		ND [0.0077]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	ND [0.00088]		ND [0.00090]		ND [0.00086]		ND [0.00092]		ND [0.00086]		ND [0.0077]		ND [0.0077]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	ND [0.00088]		ND [0.00090]		ND [0.00086]		ND [0.00092]		ND [0.00086]		ND [0.0077]		ND [0.0077]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	ND [0.00088]		ND [0.00090]		ND [0.00086]		ND [0.00092]		ND [0.00086]		ND [0.0077]		ND [0.0077]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	ND [0.00088]		ND [0.00090]		ND [0.00086]		ND [0.00092]		ND [0.00086]		ND [0.0077]		ND [0.0077]	
NMeFOSAA	2355-31-9	µg/L	ND [0.0011]		ND [0.0011]		ND [0.0010]		ND [0.0011]		ND [0.001]		ND [0.038]		ND [0.038]	
NEtFOSAA	2991-50-6	µg/L	ND [0.00088]		ND [0.00090]		ND [0.00086]		ND [0.00092]		ND [0.00086]		ND [0.038]		ND [0.038]	

Notes:

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1,

CASRN = Chemical Abstracts Service Registry No.
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Table K-8. Summary of Analytical Field, Equipment, and Trip Blank Results

	Field Sample ID		19PS-FBAM-1027		19PS-FBPM-1029		19PS-FBPM-1030		20PS-FBPM-0416		20PS-FBPM-0512		20PS-FBPM-0521		20PS-FBAM-0522		20PS-EB-0522	
	Sample Type		Field Blank		Field Blank		Field Blank		Field Blank		Field Blank		Field Blank		Field Blank		Equipment Blank	
	Laboratory Sample Delivery Group		FA69540		FA69547		FA69547		EIE15		EIE16		EIE20		EIE20		EIE20	
	Laboratory Sample ID		FA69540-5		FA69547-2		FA69547-6		1301268		1314752		1320821		1320826		1320825	
	Sample Collection Date		27-Oct-2019		29-Oct-2019		30-Oct-2019		16-Apr-2020		12-May-2020		21-May-2020		22-May-2020		22-May-2020	
Analyte	**CASRN**	**Units**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																		
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	0.013 [0.0077]		ND [0.0077]		ND [0.0077]		ND [0.00096]		ND [0.00089]		ND [0.00085]		ND [0.00091]		ND [0.00094]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	ND [0.0077]		ND [0.0077]		ND [0.0077]		ND [0.00096]		ND [0.00089]		ND [0.00085]		ND [0.00091]		ND [0.00094]	
Aggregate PFOA/PFOS	NS	µg/L	0.013 [0.015]		ND [0.015]		ND [0.015]		ND [0.0019]		ND [0.0018]		ND [0.0019]		ND [0.0018]		ND [0.0019]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	ND [0.0077]		ND [0.0077]		ND [0.0077]		ND [0.00096]		ND [0.00089]		ND [0.00085]		ND [0.00091]		ND [0.00094]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	ND [0.0077]		ND [0.0077]		ND [0.0077]		ND [0.00096]		ND [0.00089]		ND [0.00085]		ND [0.00091]		ND [0.00094]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	ND [0.0077]		ND [0.0077]		ND [0.0077]		ND [0.00096]		ND [0.00089]		ND [0.00085]		ND [0.00091]		ND [0.00094]	
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	ND [0.0077]		ND [0.0077]		ND [0.0077]		ND [0.00096]		ND [0.00089]		ND [0.00085]		ND [0.00091]		ND [0.00094]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	ND [0.0077]		ND [0.0077]		ND [0.0077]		ND [0.00096]		ND [0.00089]		ND [0.00085]		ND [0.00091]		ND [0.00094]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	ND [0.0077]		ND [0.0077]		ND [0.0077]		ND [0.00096]		ND [0.00089]		ND [0.00085]		ND [0.00091]		ND [0.00094]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	ND [0.0077]		ND [0.0077]		ND [0.0077]		ND [0.00096]		ND [0.00089]		ND [0.00085]		ND [0.00091]		ND [0.00094]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	ND [0.0077]		ND [0.0077]		ND [0.0077]		ND [0.00096]		ND [0.00089]		ND [0.00085]		ND [0.00091]		ND [0.00094]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	ND [0.0077]		ND [0.0077]		ND [0.0077]		ND [0.00096]		ND [0.00089]		ND [0.00085]		ND [0.00091]		ND [0.00094]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	ND [0.0077]		ND [0.0077]		ND [0.0077]		ND [0.00096]		ND [0.00089]		ND [0.00085]		ND [0.00091]		ND [0.00094]	
NMeFOSAA	2355-31-9	µg/L	ND [0.038]		ND [0.038]		ND [0.038]		ND [0.0012]		ND [0.0011]		ND [0.0010]		ND [0.0011]		ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	ND [0.038]		ND [0.038]		ND [0.038]		ND [0.00096]		ND [0.00089]		ND [0.00085]		ND [0.00091]		ND [0.00094]	

Notes:

Results are reported with the limit of detection (LOD) in brackets [ ].

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Table K-8. Summary of Analytical Field, Equipment, and Trip Blank Results

Field Sample ID			20PS-FBPM-0524		20PS-FBAM-0526		20PS-FBPM-0527		20PS-FBAM-0528		20PS-FBPM-0529		20PS-FBAM-0530		20PS-EB-0530		20PS-FBPM-0531	
Sample Type			Field Blank		Field Blank		Field Blank		Field Blank		Field Blank		Field Blank		Equipment Blank		Field Blank	
Laboratory Sample Delivery Group			EIE20		EIE21		EIE21		410-3098		410-3098		410-3082		410-3082		410-3082	
Laboratory Sample ID			1320829		1321911		1321912		410-3098-1		410-3098-2		410-3082-1		410-3082-15		410-3082-19	
Sample Collection Date			24-May-2020		26-May-2020		27-May-2020		28-May-2020		29-May-2020		30-May-2020		30-May-2020		31-May-2020	
Analyte	**CASRN**	**Units**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																		
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	ND [0.00093]		0.046 [0.00097]	B	0.0010 [0.00098]	J,B	ND [0.00094]		ND [0.00092]		ND [0.00089]		0.0027 [0.00091]		ND [0.00091]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	ND [0.00093]		0.0012 [0.00097]	J	ND [0.00098]		ND [0.00094]		ND [0.00092]		ND [0.00089]		ND [0.00091]		ND [0.00091]	
Aggregate PFOA/PFOS	NS	µg/L	ND [0.0019]		0.047 [0.0019]	B	0.0010 [0.0020]	J,B	ND [0.0019]		ND [0.0018]		ND [0.0018]		0.0027 [0.0018]		ND [0.0018]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	ND [0.00093]		ND [0.00097]		ND [0.00098]		ND [0.00094]		ND [0.00092]		ND [0.00089]		ND [0.00091]		ND [0.00091]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	ND [0.00093]		0.0085 [0.00097]	B	0.00062 [0.00098]	J,B	ND [0.00094]		ND [0.00092]		ND [0.00089]		ND [0.00091]		ND [0.00091]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	ND [0.00093]		0.00074 [0.00097]	J	ND [0.00098]		ND [0.00094]		ND [0.00092]		ND [0.00089]		ND [0.00091]		ND [0.00091]	
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	ND [0.00093]		0.0021 [0.00097]		ND [0.00098]		ND [0.00094]		ND [0.00092]		ND [0.00089]		ND [0.00091]		ND [0.00091]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	ND [0.00093]		0.0084 [0.00097]		ND [0.00098]		ND [0.00094]		ND [0.00092]		ND [0.00089]		ND [0.00091]		ND [0.00091]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	ND [0.00093]		ND [0.00097]		ND [0.00098]		ND [0.00094]		ND [0.00092]		ND [0.00089]		ND [0.00091]		ND [0.00091]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	ND [0.00093]		ND [0.00097]		ND [0.00098]		ND [0.00094]		ND [0.00092]		ND [0.00089]		ND [0.00091]		ND [0.00091]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	ND [0.00093]		ND [0.00097]		ND [0.00098]		ND [0.00094]		ND [0.00092]		ND [0.00089]		ND [0.00091]		ND [0.00091]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	ND [0.00093]		ND [0.00097]		ND [0.00098]		ND [0.00094]		ND [0.00092]		ND [0.00089]		ND [0.00091]		ND [0.00091]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	ND [0.00093]		ND [0.00097]		ND [0.00098]		ND [0.00094]		ND [0.00092]		ND [0.00089]		ND [0.00091]		ND [0.00091]	
NMeFOSAA	2355-31-9	µg/L	ND [0.0011]		ND [0.0012]		ND [0.0012]		ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	ND [0.00093]		ND [0.00097]		ND [0.00098]		ND [0.00094]		ND [0.00092]		ND [0.00089]		ND [0.00091]		ND [0.00091]	

Notes:

Results are reported with the limit of detection (LOD) in brackets [ ].

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µg/L = microgram(s) per liter

NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid

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Table K-8. Summary of Analytical Field, Equipment, and Trip Blank Results

		Field Sample ID	20PS-BL-FBPM-0601		20PS-EB-0601		20PS-BL-FBAM-0602		20PS-FBPM-0603		20PS-FBAM-0604		20PS-EB-AU-0604		20PS-EB-BL-0604	
		Sample Type	Field Blank		Equipment Blank		Field Blank		Field Blank		Field Blank		Equipment Blank		Equipment Blank	
		Laboratory Sample Delivery Group	410-3323		410-3323		410-3323		410-3856		410-3856		410-3856		410-3856	
		Laboratory Sample ID	410-3323-27		410-3323-26		410-3323-26		410-3856-20		410-3856-21		410-3856-19		410-3856-18	
		Sample Collection Date	1-Jun-2020		1-Jun-2020		2-Jun-2020		3-Jun-2020		4-Jun-2020		4-Jun-2020		4-Jun-2020	
Analyte	CASRN	Units	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	ND [0.00087]		0.0026 [0.00097]		ND [0.00092]		0.015 [0.00090]	QL	ND [0.00095]	QL	ND [0.00097]		ND [0.00096]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	ND [0.00087]		ND [0.00097]		ND [0.00092]		0.016 [0.00090]	QL	ND [0.00095]	QL	ND [0.00097]		ND [0.00096]	
Aggregate PFOA/PFOS	NS	µg/L	ND [0.0017]		0.0026 [0.0019]		ND [0.0018]		0.031 [0.0018]	QL	ND [0.0019]	QL	ND [0.0019]		ND [0.0019]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	ND [0.00087]		ND [0.00097]		ND [0.00092]		0.0018 [0.00090]	QL	ND [0.00095]	QL	ND [0.00097]		ND [0.00096]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	ND [0.00087]		ND [0.00097]		ND [0.00092]		0.0017 [0.00090]	J,QL	ND [0.00095]	QL	ND [0.00097]		ND [0.00096]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	ND [0.00087]		ND [0.00097]		ND [0.00092]		0.0023 [0.00090]	QL	ND [0.00095]	QL	ND [0.00097]		ND [0.00096]	
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	ND [0.00087]		ND [0.00097]		ND [0.00092]		0.010 [0.00090]	QL	ND [0.00095]	QL	ND [0.00097]		ND [0.00096]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	ND [0.00087]		ND [0.00097]		ND [0.00092]		0.016 [0.00090]	QL	ND [0.00095]	QL	ND [0.00097]		ND [0.00096]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	ND [0.00087]		ND [0.00097]		ND [0.00092]		0.0022 [0.00090]	QL	ND [0.00095]	QL	ND [0.00097]		ND [0.00096]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	ND [0.00087]		ND [0.00097]		ND [0.00092]		ND [0.00090]	QL	ND [0.00095]	QL	ND [0.00097]		ND [0.00096]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	ND [0.00087]		ND [0.00097]		ND [0.00092]		0.00056 [0.00090]	J,QL	ND [0.00095]	QL	ND [0.00097]		ND [0.00096]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	ND [0.00087]		ND [0.00097]		ND [0.00092]		ND [0.00090]	QL	ND [0.00095]	QL	ND [0.00097]		ND [0.00096]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	ND [0.00087]		ND [0.00097]		ND [0.00092]		ND [0.00090]	QL	ND [0.00095]	QL	ND [0.00097]		ND [0.00096]	
NMeFOSAA	2355-31-9	µg/L	ND [0.0010]		ND [0.0012]		ND [0.0011]		ND [0.0011]	QL	ND [0.0011]	QL	ND [0.0012]		ND [0.0012]	
NEtFOSAA	2991-50-6	µg/L	ND [0.00087]		ND [0.00097]		ND [0.00092]		ND [0.00090]	QL	ND [0.00095]	QL	ND [0.00097]		ND [0.00096]	

Notes:

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QL,QN = The analyte result is considered an estimated value with (low, uncertain) bias due to a quality control failure

Table K-8. Summary of Analytical Field, Equipment, and Trip Blank Results

Field Sample ID			20PS-BL-EB-BOWL-0605		20PS-BL-EB-PON-0605		20PS-FBPM-0606		20PS-EB-0606		20PS-FBAM-0607		20PS-FBPM-0608		20PS-FBAM-0609	
Sample Type			Equipment Blank		Equipment Blank		Field Blank		Equipment Blank		Field Blank		Field Blank		Field Blank	
Laboratory Sample Delivery Group			410-4116		410-4116		410-3856		410-3855		410-3856		410-4215		410-4215	
Laboratory Sample ID			410-4116-14		410-4116-15		410-3856-22		410-3855-10		410-3856-23		410-4215-5		410-4215-19	
Sample Collection Date			5-Jun-2020		5-Jun-2020		6-Jun-2020		6-Jun-2020		7-Jun-2020		8-Jun-2020		9-Jun-2020	
Analyte	**CASRN**	**Units**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	ND [0.00082]	QL	ND [0.00097]	QL	ND [0.00093]	QL	ND [0.00093]		ND [0.00095]	QL	ND [0.00089]		ND [0.00091]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	ND [0.00082]	QL	ND [0.00097]	QL	ND [0.00093]	QL	ND [0.00093]		ND [0.00095]	QL	ND [0.00089]		ND [0.00091]	
Aggregate PFOA/PFOS	NS	µg/L	ND [0.0016]	QL	ND [0.0019]	QL	ND [0.0019]	QL	ND [0.0019]		ND [0.0019]	QL	ND [0.0018]		ND [0.0018]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	ND [0.00082]	QL	ND [0.00097]	QL	ND [0.00093]	QL	ND [0.00093]		ND [0.00095]	QL	ND [0.00089]		ND [0.00091]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	ND [0.00082]	QL	ND [0.00097]	QL	ND [0.00093]	QL	ND [0.00093]		ND [0.00095]	QL	ND [0.00089]		ND [0.00091]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	ND [0.00082]	QL	ND [0.00097]	QL	ND [0.00093]	QL	ND [0.00093]		ND [0.00095]	QL	ND [0.00089]		ND [0.00091]	
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	ND [0.00082]	QL	ND [0.00097]	QL	ND [0.00093]	QL	ND [0.00093]		ND [0.00095]	QL	ND [0.00089]		ND [0.00091]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	ND [0.00082]	QL	ND [0.00097]	QL	ND [0.00093]	QL	ND [0.00093]		ND [0.00095]	QL	ND [0.00089]		ND [0.00091]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	ND [0.00082]	QL	ND [0.00097]	QL	ND [0.00093]	QL	ND [0.00093]		ND [0.00095]	QL	ND [0.00089]		ND [0.00091]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	ND [0.00082]	QL	ND [0.00097]	QL	ND [0.00093]	QL	ND [0.00093]		ND [0.00095]	QL	ND [0.00089]		ND [0.00091]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	ND [0.00082]	QL	ND [0.00097]	QL	ND [0.00093]	QL	ND [0.00093]		ND [0.00095]	QL	ND [0.00089]		ND [0.00091]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	ND [0.00082]	QL	ND [0.00097]	QL	ND [0.00093]	QL	ND [0.00093]		ND [0.00095]	QL	ND [0.00089]		ND [0.00091]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	ND [0.00082]	QL	ND [0.00097]	QL	ND [0.00093]	QL	ND [0.00093]		ND [0.00095]	QL	ND [0.00089]		ND [0.00091]	
NMeFOSAA	2355-31-9	µg/L	ND [0.00099]	QL	ND [0.0012]	QL	ND [0.0011]	QL	ND [0.0011]		ND [0.0011]	QL	ND [0.0011]		ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	ND [0.00082]	QL	ND [0.00097]	QL	ND [0.00093]	QL	ND [0.00093]		ND [0.00095]	QL	ND [0.00089]		ND [0.00091]	

Notes:

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1,

CASRN = Chemical Abstracts Service Registry No.
NS = not specified
µg/L = microgram(s) per liter
ND = nondetectable
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
Q = qualifier
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

J = The analyte was positively identified; the quantitation is estimated.

QL,QN = The analyte result is considered an estimated value with (low, uncertain) bias due to a quality control failure

Table K-8. Summary of Analytical Field, Equipment, and Trip Blank Results

Field Sample ID			20PS-BL-FBAM-0605		20PS-FBPM-0610		20PS-FBAM-0627		20PS-FBAM-0911		20PS-EB-0911		20PS-FBPM-0912		20PS-FBAM-0913		20PS-FBPM-0914	
Sample Type			Field Blank		Field Blank		Field Blank		Field Blank		Equipment Blank		Field Blank		Field Blank		Field Blank	
Laboratory Sample Delivery Group			410-4116		410-4213		410-6332		410-13937		410-13937		410-13937		410-14108		410-14108	
Laboratory Sample ID			410-4116-16		410-4213-10		410-6332-4		410-13937-1		410-13937-1		410-13937-12		410-14108-1		410-14108-11	
Sample Collection Date			5-Jun-2020		10-Jun-2020		27-Jun-2020		11-Sep-2020		11-Sep-2020		12-Sep-2020		13-Sep-2020		14-Sep-2020	
Analyte	**CASRN**	**Units**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																		
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	ND [0.00094]	QL	ND [0.00091]		ND [0.00093]		ND [0.00086]		ND [0.00093]		ND [0.00087]		ND [0.00085]		ND [0.00089]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	ND [0.00094]	QL	ND [0.00091]		ND [0.00093]		ND [0.00086]		ND [0.00093]		ND [0.00087]		ND [0.00085]		ND [0.00089]	
Aggregate PFOA/PFOS	NS	µg/L	ND [0.0019]	QL	ND [0.0018]		ND [0.0019]		ND [0.0017]		ND [0.0019]		ND [0.0017]		ND [0.0017]		ND [0.0017]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	ND [0.00094]	QL	ND [0.00091]		ND [0.00093]		ND [0.00086]		ND [0.00093]		ND [0.00087]		ND [0.00085]		ND [0.00089]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	ND [0.00094]	QL	ND [0.00091]		ND [0.00093]		ND [0.00086]		ND [0.00093]		ND [0.00087]		ND [0.00085]		ND [0.00089]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	ND [0.00094]	QL	ND [0.00091]		ND [0.00093]		ND [0.00086]		ND [0.00093]		ND [0.00087]		ND [0.00085]		ND [0.00089]	
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	ND [0.00094]	QL	ND [0.00091]		ND [0.00093]		ND [0.00086]		ND [0.00093]		ND [0.00087]		ND [0.00085]		ND [0.00089]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	ND [0.00094]	QL	ND [0.00091]		ND [0.00093]		ND [0.00086]		ND [0.00093]		ND [0.00087]		ND [0.00085]		ND [0.00089]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	ND [0.00094]	QL	ND [0.00091]		ND [0.00093]		ND [0.00086]		ND [0.00093]		ND [0.00087]		ND [0.00085]		ND [0.00089]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	ND [0.00094]	QL	ND [0.00091]		ND [0.00093]		ND [0.00086]		ND [0.00093]		ND [0.00087]		ND [0.00085]		ND [0.00089]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	ND [0.00094]	QL	ND [0.00091]		ND [0.00093]		ND [0.00086]		ND [0.00093]		ND [0.00087]		ND [0.00085]		ND [0.00089]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	ND [0.00094]	QL	ND [0.00091]		ND [0.00093]		ND [0.00086]		ND [0.00093]		ND [0.00087]		ND [0.00085]		ND [0.00089]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	ND [0.00094]	QL	ND [0.00091]		ND [0.00093]		ND [0.00086]		ND [0.00093]		ND [0.00087]		ND [0.00085]		ND [0.00089]	
NMeFOSAA	2355-31-9	µg/L	ND [0.0011]	QL	ND [0.0011]		ND [0.0011]		ND [0.0010]		ND [0.0011]		ND [0.0010]		ND [0.0010]		ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	ND [0.00094]	QL	ND [0.00091]		ND [0.00093]		ND [0.00086]		ND [0.00093]		ND [0.00087]		ND [0.00085]		ND [0.00089]	

Notes:

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1,

CASRN = Chemical Abstracts Service Registry No.
NS = not specified
µg/L = microgram(s) per liter
ND = nondetectable
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
Q = qualifier
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

J = The analyte was positively identified; the quantitation is estimated.

QL,QN = The analyte result is considered an estimated value with (low, uncertain) bias due to a quality control failure

Table K-8. Summary of Analytical Field, Equipment, and Trip Blank Results

Field Sample ID			20PS-FBAM-0917		20PS-FBPM-0918		20PS-FBAM-0919		20PS-FBPM-0921		20PS-EB-0921		20PS-FBAM-0923		20PS-FBPM-0924		20PS-FBPM-0925	
Sample Type			Field Blank		Field Blank		Field Blank		Field Blank		Equipment Blank		Field Blank		Field Blank		Field Blank	
Laboratory Sample Delivery Group			410-14670		410-14670		410-14665		410-15101		410-15101		410-15101		410-15361		410-15361	
Laboratory Sample ID			410-14670-1		410-14670-16		410-14665-1		410-15101-1		410-15101-7		410-15101-8		410-15361-1		410-15361-10	
Sample Collection Date			17-Sep-2020		18-Sep-2020		19-Sep-2020		21-Sep-2020		21-Sep-2020		23-Sep-2020		24-Sep-2020		25-Sep-2020	
Analyte	**CASRN**	**Units**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]																		
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	ND [0.00087]		ND [0.00085]		ND [0.00084]		ND [0.00084]		ND [0.00089]		ND [0.00085]		ND [0.00085]		ND [0.00086]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	ND [0.00087]		ND [0.00085]		ND [0.00084]		ND [0.00084]		ND [0.00089]		ND [0.00085]		ND [0.00085]		ND [0.00086]	
Aggregate PFOA/PFOS	NS	µg/L	ND [0.0017]		ND [0.0017]		ND [0.0017]		ND [0.0017]		ND [0.0018]		ND [0.0017]		ND [0.0017]		ND [0.0017]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	ND [0.00087]		ND [0.00085]		ND [0.00084]		ND [0.00084]		ND [0.00089]		ND [0.00085]		ND [0.00085]		ND [0.00086]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	ND [0.00087]		ND [0.00085]		ND [0.00084]		ND [0.00084]		ND [0.00089]		ND [0.00085]		ND [0.00085]		ND [0.00086]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	ND [0.00087]		ND [0.00085]		ND [0.00084]		ND [0.00084]		ND [0.00089]		ND [0.00085]		ND [0.00085]		ND [0.00086]	
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	ND [0.00087]		ND [0.00085]		ND [0.00084]		ND [0.00084]		ND [0.00089]		ND [0.00085]		ND [0.00085]		ND [0.00086]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	ND [0.00087]		ND [0.00085]		ND [0.00084]		ND [0.00084]		ND [0.00089]		ND [0.00085]		ND [0.00085]		ND [0.00086]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	ND [0.00087]		ND [0.00085]		ND [0.00084]		ND [0.00084]		ND [0.00089]		ND [0.00085]		ND [0.00085]		ND [0.00086]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	ND [0.00087]		ND [0.00085]		ND [0.00084]		ND [0.00084]		ND [0.00089]		ND [0.00085]		ND [0.00085]		ND [0.00086]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	ND [0.00087]		ND [0.00085]		ND [0.00084]		ND [0.00084]		ND [0.00089]		ND [0.00085]		ND [0.00085]		ND [0.00086]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	ND [0.00087]		ND [0.00085]		ND [0.00084]		ND [0.00084]		ND [0.00089]		ND [0.00085]		ND [0.00085]		ND [0.00086]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	ND [0.00087]		ND [0.00085]		ND [0.00084]		ND [0.00084]		ND [0.00089]		ND [0.00085]		ND [0.00085]		ND [0.00086]	
NMeFOSAA	2355-31-9	µg/L	ND [0.0010]		ND [0.0010]		ND [0.0010]		ND [0.0010]		ND [0.0011]		ND [0.0010]		ND [0.0010]		ND [0.0010]	
NEtFOSAA	2991-50-6	µg/L	ND [0.00087]		ND [0.00085]		ND [0.00084]		ND [0.00084]		ND [0.00089]		ND [0.00085]		ND [0.00085]		ND [0.00086]	

Notes:

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1,

CASRN = Chemical Abstracts Service Registry No.
NS = not specified
µg/L = microgram(s) per liter
ND = nondetectable
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
Q = qualifier
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

J = The analyte was positively identified; the quantitation is estimated.

QL,QN = The analyte result is considered an estimated value with (low, uncertain) bias due to a quality control failure

Table K-8. Summary of Analytical Field, Equipment, and Trip Blank Results

	Field Sample ID		20PS-EB-0925		20PS-FBPM-1029		20PS-EB-1029		20PS-FBAM-1030		20PS-EB-1030		20PS-FBAM-1031	
	Sample Type		Equipment Blank		Field Blank		Equipment Blank		Field Blank		Equipment Blank		Field Blank	
	Laboratory Sample Delivery Group		410-15361		410-19226		410-19226		410-19226		410-19226		410-19226	
	Laboratory Sample ID		410-15361-12		410-19226-4		410-19226-1		410-19226-9		410-19226-10		410-19226-11	
	Sample Collection Date		25-Sep-2020		29-Oct-2020		29-Oct-2020		30-Oct-2020		30-Oct-2020		31-Oct-2020	
Analyte	**CASRN**	**Units**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**	**Results**	**Q**
Per- and Perfluoroalkyl Substances (PFAS) by EPA 537 modified [1]														
Perfluorooctane sulfonate (PFOS)	1763-23-1	µg/L	ND [0.00085]		ND [0.00090]		ND [0.00094]		0.00053 [0.00091]	J	0.0019 [0.00094]		ND [0.00093]	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	ND [0.00085]		ND [0.00090]		ND [0.00094]		ND [0.00091]		ND [0.00094]		ND [0.00093]	
Aggregate PFOA/PFOS	NS	µg/L	ND [0.0017]		ND [0.0018]		ND [0.0019]		ND [0.0018]		ND [0.0019]		ND [0.0019]	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	ND [0.00085]		ND [0.00090]		ND [0.00094]		ND [0.00091]		ND [0.00094]		ND [0.00093]	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	µg/L	ND [0.00085]		ND [0.00090]		ND [0.00094]		ND [0.00091]		ND [0.00094]		ND [0.00093]	
Perfluoroheptanoic acid (PFHpA)	375-85-9	µg/L	ND [0.00085]		ND [0.00090]		ND [0.00094]		ND [0.00091]		ND [0.00094]		ND [0.00093]	
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	ND [0.00085]		ND [0.00090]		ND [0.00094]		ND [0.00091]		ND [0.00094]		ND [0.00093]	
Perfluorohexanoic acid (PFHxA)	307-24-4	µg/L	ND [0.00085]		ND [0.00090]		ND [0.00094]		ND [0.00091]		ND [0.00094]		ND [0.00093]	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	ND [0.00085]		ND [0.00090]		ND [0.00094]		ND [0.00091]		ND [0.00094]		ND [0.00093]	
Perfluoroundecanoic acid (PFUnA)	2058-94-8	µg/L	ND [0.00085]		ND [0.00090]		ND [0.00094]		ND [0.00091]		ND [0.00094]		ND [0.00093]	
Perfluorododecanoic acid (PFDoDA)	307-55-1	µg/L	ND [0.00085]		ND [0.00090]		ND [0.00094]		ND [0.00091]		ND [0.00094]		ND [0.00093]	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	µg/L	ND [0.00085]		ND [0.00090]		ND [0.00094]		ND [0.00091]		ND [0.00094]		ND [0.00093]	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	µg/L	ND [0.00085]		ND [0.00090]		ND [0.00094]		ND [0.00091]		ND [0.00094]		ND [0.00093]	
NMeFOSAA	2355-31-9	µg/L	ND [0.0010]		ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0011]		ND [0.0011]	
NEtFOSAA	2991-50-6	µg/L	ND [0.00085]		ND [0.00090]		ND [0.00094]		ND [0.00091]		ND [0.00094]		ND [0.00093]	

Notes:

Results are reported with the limit of detection (LOD) in brackets [ ].

1 PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1,

CASRN = Chemical Abstracts Service Registry No.
NS = not specified
µg/L = microgram(s) per liter
ND = nondetectable
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
Q = qualifier
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

Data Qualifiers:

B = The result is considered a high biased estimated value due to contamination present in associated blank.

J = The analyte was positively identified; the quantitation is estimated.

QL,QN = The analyte result is considered an estimated value with (low, uncertain) bias due to a quality control failure

Table K-9. Summary of Completeness Calculations

Analyte Group	Method [1]	Matrix	# Analytes	# Samples	# Results	# Qualified	# Rejected Results	% Rejected Results	% Complete	% Qualified
PFAS	EPA 537 Mod	Soil	14	82	1,148	101	0	0%	100%	8.8%
PFAS	EPA 537 Mod	Sediment	14	31	434	211	0	0%	100%	49%
PFAS	EPA 537 Mod	Ground Water	14	193	2,702	187	0	0%	100%	6.9%
PFAS	EPA 537 Mod	Surface Water	14	52	728	370	0	0%	100%	51%
Total				358	5,012	869	0	0%	100%	17%

% = percent

= number

PFAS = per- and polyfluoroalkyl substances

[1] PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).

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Attachment K-1
Alaska Department of Environmental Conservation Checklists

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Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

9 September 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-3081-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-3081-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One cooler was received at ELLE with the temperature blank at 1.4 degrees Celsius (^{o}C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

410-3081-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist.

Injection standards were outside of the QC limits for both the initial extraction and the re-extraction, values were reported from the initial extraction and discussed further in the checklist.

The batch CCV associated with 20PS-IDWW-MW01C was above criteria for d5-NEtFOSAA and sample results were non-detect; therefore, results were not qualified. Data quality or usability are not affected.

Report revised to add flags to ion ratio report. Data quality or usability are not affected.

410-3081-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist. CCV discussed above.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist. CCV discussed above.

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

410-3081-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs.

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

410-3081-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCSs.

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

Yes☐ No☐ N/A☒ Comments:

LCSD not required by method.

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

Comments:

No %R results are outside QC limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No project samples in this SDG were selected for spiking

410-3081-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☐ No☐ N/A☒ Comments:

No project MS/MSD results are associated this SDG.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

.RPDs between MS and MSD are not evaluated when based on non-project samples

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

Comments:

No samples were affected due to %R or RPD.

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

Yes☐ No☐ N/A☒ Comments:

No samples were affected due to %R or RPD.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

410-3081-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exception:

The extracted standard %Rs for 13C2 PFTeDA, , d3-NMeFOSAA, d5-NEtFOSAA, 13C2-PFDoDA, 13C7 PFUnA are below project-specified QC limits and 13C9 PFNA and 13C3-PFBS are above project -specified QC limits in sample 20PS-IDWW05 and 20PS-IDWW05-reextracted indicating uncertain bias. Sample results for associated target analyte perfluorobutanesulfonic acid (PFBS), perfluorohexanoic acid (PFHxA), perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) have been qualified as uncertain and flagged with QN for positive detects. Sample results for associated target analyte perfluorononanoic acid (PFNA), N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA), and N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA) are non-detectable for this sample, therefore results are not qualified.

Injection standard 13C3-PFBA peak areas were below the lower area limits for project samples: 20PS-IDWW05. Sample results for associated target analyte PFBS are qualified as QH for positive hits above the LOQ when injection standard peak areas are below the lower limit. Results are not qualified or flagged based on injection standard peak areas below limits when results are non-detect.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria, with the following exceptions:

- The ion ratios for sample 20PS-IDWW05 are outside criteria for PFBS.

Results with ion ratio exceeding criteria are qualified as estimated and flagged J, indicating result are estimated due to matrix interference or the presence of isomers in the sample at different ratios than the ratio of isomers present in the calibration standard.

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

Yes☒ No☐ N/A☐ Comments:

See above.

410-3081-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Data quality or usability affected?

Comments:

Data are usable as qualified.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☐ No☒ N/A☐ Comments:

This SDG contains IDW samples only; therefore, no field duplicates were submitted for this SDG.

410-3081-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Submitted blind to lab?

Yes☐ No☐ N/A☒ Comments:

No field duplicates were submitted for this SDG

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☐ No☐ N/A☒ Comments:

No field duplicates were submitted for this SDG

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality or usability are not affected.

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

Yes☐ No☐ N/A☒ Comments:

No decontamination or equipment blanks were submitted in this SDG.

i. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

No decontamination or equipment blanks were submitted in this SDG.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

410-3081-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

   a. Defined and appropriate?

      Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

15 July 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-3082-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-3082-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One cooler was received at ELLE with the temperature blank at 1.4 degrees Celsius (^{o}C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

410-3082-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

410-3082-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist Re-extraction results are presented in hardcopy report and SEDDs. Re-extraction results are for confirmation purposes only. Re-extraction was performed within hold times. It is recommended to use primary analytical results.

Injection standards were outside of the QC limits for both the initial extraction and the re-extraction, values were reported from the initial extraction and discussed further in the checklist.

The integration for perfluorooctanoic acid (PFOA) and perfluorohexanesulfonic acid (PFHxS) have been corrected for samples 20PS-FFTA-ENT-SB13-6.5, 20PS-FFTA-ENT-SB14-1, and 20PS-FFTA-ENT-SB15-1, due to missing branched isomer for PFOA and PFHxS. Sample results have been revised due to re-integration of PFOA results for 20PS-FFTA-ENT-SB14-1 and 20PS-FFTA-ENT-SB15-1. Data quality or usability are not affected.

To correctly report perfluoroundecanoic acid (PFUnDA) and NEtFOSA results for samples 20PS-FFTA-SB99-0530 and 20PS-FFTA-ENT-SB16-7 results have been re-integrated. Results for PFUnDA have been revised for associated samples and NEtFOSA results remain non-detect after re-integration. Data quality or usability are not affected.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist. Re-integration discussed above.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist. Re-integration discussed above.

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

410-3082-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs.

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

410-3082-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist

410-3082-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

No %R results or RPD are outside QC limits

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

MS/MSD set was requested and performed on a project sample for this SDG at a minimum rate per matrix of 1 per 20 samples for sampling event.

Note that MS/MSD samples were not prepared with project samples as noted below. No qualification has been performed based on these identified issues as LCSs were included.

MS/MSD samples were not included in the preparative batch 11067 for PFAS for samples 20PS-FBAM-0530, 20SPMW01C-0531, 20PS-MW99-0531.

MS/MSD samples were not included in the preparative batch 11365 for PFAS for samples 20PS-FFTA-ENT-SB16-7.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

410-3082-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☐ No☒ N/A☐ Comments:

%Rs are within QC limits for MS/MSD with the following exceptions:

The %R for MS and MSD result prepared with 20PS-FFTA-ENT-SB12-1 recovered outside project-specified QC limits for perfluorooctanoic acid (PFOA), perfluorohexanesulfonic acid (PFHxS) and perfluorooctanesulfonic acid (PFOS). The associated results for PFHxS and PFOS were greater than 4x times the spike amount. Results are not qualified based on MS/MSD % R when sample amount is greater than 4x times the spike amount. The associated result for PFOA is qualified as bias low due to matrix effect and flagged with QL.

The %R for MSD results prepared with 20PS-FFTA-ENT-SB11-1 recovered below project-specified QC limits for the 14 reported PFAS. Results have been qualified with QL indicating analyte results are considered an estimated value biased low due to MSD failure.

The %Rs for MS/MSDs are not evaluated when prepared with non-project samples.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

RPDs are within QC limits for MS/MSD with the following exception:

The RPD between the MS and MSD results for sample 20PS-FFTA-ENT-SB11-1 exceeded project-specified criteria and qualified with QN indicating uncertain bias.

RPDs between MS and MSD are not evaluated when based on non-project samples

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

Comments:

The %R for MSD results prepared with 20PS-FFTA-ENT-SB11-1 recovered below project-specified QC limits. Associated sample results have been qualified with QL indicating low bias due to matrix effect. The RPD between the MS and MSD results prepared with 20PS-FFTA-ENT-SB11-1 exceeded project-specified QC limits. Associated sample result have been qualified with QN indicating uncertain bias due to matrix effect.

410-3082-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

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

Comments:

Data are usable as qualified.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

410-3082-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

410-3082-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %R for 13C2-PFTeDA are below project-specified QC limits in sample 20PS-FBAM-530, indicating potential uncertain bias. Sample results for associated target analyte perfluorotetradecanoic acid (PFTeDA) are non-detectable for these sample, therefore result not qualified.

Extraction standard %R for d3-NMeFOSAA, d5-NEtFOSAA and, are below project-specified QC limits in sample 20PS-FFTA-ENT-SB11-1 and 20PS-FFTA-SB99-0530 – RE indicating uncertain bias. Sample results for associated target analytes N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA) and N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA) are non-detectable for these samples, therefore results are not qualified.

Extracted standards %R for d3-NMeFOSAA, are below project-specified QC limits in 20PS-FFTA-SB99-0530. Sample result for associated target analyte NMeFOSAA are non-detectable for this sample, therefore result not qualified.

Extracted standards %R for d5-NEtFOSAA, are above project-specified QC limits in 20PS-MW01C-0531. Sample result for associated target analyte NEtFOSAA are non-detectable for these sample, therefore result not qualified

Injection standard 13C4 PFOS peak areas were below the lower area limits for project samples: 20PS-FFTA-ENT-SB15-7, 20PS-FFTA-ENT-SB12-1, 20PS-FFTA-ENT-SB16-7, and 20PS-FFTA-SB99-0530. Sample results for associated target analyte PFOS are qualified as QH for positive hits above the LOQ when injection standard peak areas are below the lower limit. Results are not qualified or flagged based on injection standard peak areas below limits when results are non-detect.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria, with the following exceptions:

- The ion ratios for sample 20PS-FFTA-ENT-SB11-1 are outside criteria for PFHxA.
- The ion ratios for sample 20PS-FFTA-SB99-0530 are outside criteria for perfluoroundecanoic acid (PFUnA).

Results with ion ratio exceeding criteria are qualified as estimated and flagged J, indicating result are estimated due to matrix interference or the presence of isomers in the sample at different ratios than the ratio of isomers present in the calibration standard.

410-3082-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Results are not qualified or flagged based on low extraction standard recovery when associated results are non-detect. Results are qualified as discussed above for injection standards and ion ratios that did not meet criteria.

iv. Data quality or usability affected?

Comments:

Data are usable as qualified.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

410-3082-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Two field duplicate samples were included in this SDG

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:
20PS-FFTA-ENT-SB11-1 and field duplicate sample 20PS-FFTA-SB99-0530
20PS-MW01D-0531 and field duplicate sample 20PS-MW99-0531

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits with the following exceptions:

The results between the primary and the field duplicate pair 20PS-FFTA-ENT-SB11-1 and 20PS-FFTA-SB99-0530 for perfluorohexanesulfonic acid (PFHxS), perfluoro-n-octanoic acid (PFOA), perfluoro-n-heptanoic acid (PFHpA), perfluorobutanesulfonic acid (PFBS), and perfluorooctanesulfonic acid (PFOS) exceed project-specified criteria of RPD greater 50% for soil samples. Results have been qualified with QN indicating uncertain bias due to disagreement between primary and field duplicate pair.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)
Comments:

Data are usable as qualified.

410-3082-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

One equipment blank: 20PS-EB-0530
Two field blanks: 20PS-FBAM-0530 and 20PS-FBPM-0531.

i. All results less than LOQ and project specified objectives?

Yes☐ No☒ N/A☐ Comments:

The equipment blank sample 20PS-EB-0530 result for PFOS is above the LOQ at 0.0027 µg/L.
Field blank sample 20PS-FBAM-0530 results are non-detect and below ½ LOQ
Field blank sample 20PS-FBPM-0531 results are non-detect and below ½ LOQ.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Samples associated with equipment blank included 20PS-FFTA-ENT-SB11-1, 20PS-FFTA-ENT-SB11-7.5, 20PS-FFTA-ENT-SB12-1, 20PS-FFTA-ENT-SB12-7, 20PS-FFTA-ENT-SB13-1, 20PS-FFTA-ENT-SB13-6.5, 20PS-FFTA-ENT-SB14-1, 20PS-FFTA-ENT-SB14-7.5, 20PS-FFTA-ENT-SB15-1, 20PS-FFTA-ENT-SB15-7, 20PS-FFTA-ENT-SB16-1, and 20PS-FFTA-ENT-SB16-7 and PFOS sample results were greater than 10 x the EB, therefore not qualified.

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

24 June 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-3098-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-3098-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One cooler was received at ELLE with the temperature blank at 3.2 degrees Celsius (^{o}C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

410-3098-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

Injection standards were outside of the QC limits for both the initial extraction and the re-extraction, values were reported from the initial extraction and discussed further in the checklist

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist
Re-extraction results are presented in hardcopy report and SEDDs. Re-extraction results are for confirmation purposes only. Re-extraction was performed outside hold times and associated method blank had detects. It is recommended to use primary analytical results.

Perfluorooctanoic acid (PFOA) integration has been corrected for sample 20PS-TW37-0529, due to missing branched isomer for PFOA. Results for PFOA and remain the same with re-integration. Data quality or usability are not affected.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist. Re-integration discussed above.

410-3098-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist. Re-integration discussed above.

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

410-3098-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs.

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

410-3098-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist

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

Comments:

No %R results or RPD are outside QC limits

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

410-3098-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

RPDs are within QC limits for MS/MSD.

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

Comments:

No samples were affected due to %R or RPD limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

410-3098-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

410-3098-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %R for 13C2-PFTeDA are below project-specified QC limits in sample 20PS-TW99-0529-RE, 20PS-TW59-0528, 20PS-TW41-0528, 20PS-TW37-0529-RE, 20PS-TW39-0529-RE, indicating potential uncertain bias. Sample results for associated target analyte perfluorotetradecanoic acid (PFTeDA) are non-detectable for these sample, therefore result not qualified.

Extraction standard %R for 13C3-PFBS are above project-specified QC limits in sample 20PS-TW99-0529, 20PS-TW41-0528, 20PS-TW37-0529, 20PS-TW39-0529, 20PS-TW39-0529-RE, and project matrix spike duplicate (MSD) sample (primary sample 20PS-TW55-0528), indicating potential uncertain bias. Sample results for associated target analyte perfluorobutanesulfonic acid (PFBS) are qualified as bias uncertain and flagged with QN, for positive hits, when extraction standard % Rs are outside QC limits. Results are not qualified or flagged based on extraction standard %R when associated results are non-detect.MS/MSD results are not qualified based on extraction standard % R; therefore, MSD result not qualified.

Extracted standards %R for 13C2-PFDoDA are below project-specified QC limits in 20PS-TW99-0529, 20PS-TW59-0528. Sample result for associated target analyte perfluorododecanoic acid (PFDoA)are non-detectable for these sample, therefore result not qualified.

Extracted standards %R for 13C5-PFHxA are below project-specified QC limits in 20PS-TW99-0529, 20PS-TW41-0528. Sample result for associated target analyte perfluorohexanoic acid (PFHxA) are qualified as bias uncertain and flagged with QN, for positive hits, when extraction standard % Rs are outside QC limits. Results are not qualified or flagged based on extraction standard %R when associated results are non-detect.

Extracted standards %R for 13C2-PFTeDA, 13C3-PFBS, 13C4-PFHpA, 13C8-PFOA, d3-NMeFOSAA, d5-NEtFOSAA, 13C2-PFDoDA, 13C3-PFHxS, 13C5-PFHxA, 13C6-PFDA, 13C7-PFUnA, 13C9-PFNA are below project-specified QC limits in 20PS-TW59-0528-RE. Sample result for associated target analyte PFTeDA, PFBS, Perfluoroheptanoic acid (PFHpA), Perfluorooctanoic acid (PFOA), N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA), NEtFOSAA, PFDoA, Perfluorohexanesulfonic acid (PFHxS), PFHxA, Perfluorodecanoic acid (PFDA), Perfluoroundecanoic acid (PFUnDA), Perfluorononanoic acid (PFNA) are qualified as bias uncertain and flagged with QN, for positive hits, when extraction standard % Rs are outside QC limits. Results are not qualified or flagged based on extraction standard %R when associated results are non-detect.

Extracted standards %R for 13C2-PFTeDA, d3-NMeFOSAA, d5-NEtFOSAA, 13C2-PFDoDA, 13C5-PFHxA, 13C6-PFDA, 13C7-PFUnA, are below project-specified QC limits in 20PS-TW41-0528-RE. Sample result for associated target analyte PFTeDA, PFBS, PFHpA, PFOA, NMeFOSAA,

410-3098-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

NEtFOSAA, PFDoA, PFHxS, PFHxA, PFDA, PFUnDA are non-detectable for these sample, therefore result not qualified.

Injection standard 13C3-PFBA peak areas were below the lower area limits for project samples: 20PS-TW99-0529, 20PS-TW41-0528, 20PS-TW37-0529, 20PS-TW39-0529, 20PS-TW37-0529 RE, 20PS-TW41-0528 RE, and 20PS-TW39-0529 RE. Sample results for associated target analyte PFBS are qualified as QH for positive hits above the LOQ when injection standard peak areas are below the lower limit. Results are not qualified or flagged based on injection standard peak areas below limits when results are non-detect.

The retention times are within the QC limits, for project samples and the ion ratios, for each detect reported did not exceed criteria:

The ion ratios for sample 20PS-TW99-0529 are outside criteria for PFOA.
The ion ratios for sample 20PS-TW59-0528 are outside criteria for and PFHpA
The ion ratios for sample 20PS-TW37-0529 are outside criteria for PFHxA
The ion ratios for sample 20PS-TW37-0529_RE are outside criteria for PFHxA, PFOA and PFHpA
The ion ratios for sample 20PS-TW38-0529 are outside criteria for PFHxA and PFOA
The ion ratios for sample 20PS-TW40-0529 are outside criteria for PFHxA and PFOA
The ion ratios for sample 20PS-TW39-0529_RE are outside criteria for PFOS, PFHxA and PFNA

Results with ion ratio outside criteria are qualified as estimated and flagged J, indicating result are estimated due to matrix interference or the presence of isomers in the sample at different ratios than the ratio of isomers present in the calibration standard.

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

Yes☒ No☐ N/A☐ Comments:

Data flags are discussed above.

iv. Data quality or usability affected?

Comments:

Data are usable as qualified.

410-3098-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Two field duplicate samples were included in this SDG

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:
20PS-TW37-0529 and field duplicate sample 20PS-TW99-0529
20PS-TW55-0528 and field duplicate sample 20PS-TW99-0528

410-3098-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and data usability are not affected.

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

Yes☒ No☐ N/A☐ Comments:

Two field blanks: 20PS-FBAM-0528 and 20PS-FBPM-0529.

i. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Field blank sample 20PS-FBAM-0528 results are non-detect and below ½ LOQ
Field blank sample 20PS-FBPM-0529 results are non-detect and below ½ LOQ.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

410-3098-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

   a. Defined and appropriate?

      Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Sean Arnold

Title:

Scientist II

Date:

25 June 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-3412-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-3412-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

CoC information was complete

One cooler was received at ELLE with the temperature blank at 2.6 degrees Celsius (°C).

Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

One cooler was received at ELLE with the temperature blank at 2.6 degrees Celsius (°C).

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

   Yes☒ No☐ N/A☐ Comments:

Samples were received properly preserved.

410-3412-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist. Missing flags for ion ratios outside control limits have been revised and sample results re-integrated. Re-integration did not result in changes to associated sample results. Data quality or usability are not affected.

c. Were all corrective actions documented?

Yes☐ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist. Re-integration discussed above.

410-3412-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist. Re-integration discussed above.

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

410-3412-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganics analysis were included in this SDG.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS and LCSD

410-3412-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist

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

Comments:

No samples were affected due to %R or RPD limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality or usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

This SDG contains IDW water samples only; therefore, no project samples in this SDG were selected for spiking.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☐ No☐ N/A☒ Comments:

No MS/MSD results are associated with the project samples in this SDG.

410-3412-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☐ No☐ N/A☒ Comments:

RPDs between MS and MSD are not evaluated when based on non-project samples

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

Comments:

No samples were affected due to %R or RPD.

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

Yes☐ No☐ N/A☒ Comments:

No samples were affected due to %R or RPD

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

Comments:

Data quality or usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

410-3412-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☒ No☐ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %Rs for 13C8-PFOS are above project-specified QC limits in samples 20PS-IDWW06 and 20PS-IDWW07 indicating uncertain bias. The IDW sample results for associated target analyte, perfluorooctane sulfonate (PFOS), are qualified QN, estimated with uncertain bias.

Extraction standard %Rs for 13C2-PFDoDA are below project-specified QC limits in samples 20PS-IDWW06 and 20PS-IDWW07 indicating uncertain bias. The IDW sample result for associated target analyte, perfluorododecanoic acid (PFDoDA), are non-detectable for these samples, therefore results are not qualified.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria.

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

Yes☒ No☐ N/A☐ Comments:

iv. Data quality or usability affected?

Comments:

Data are useable as qualified.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

410-3412-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☐ No☒ N/A☐ Comments:

This SDG contains IDW water samples only; therefore, no field duplicates were submitted for this SDG

ii. Submitted blind to lab?

Yes☐ No☐ N/A☒ Comments:

No field duplicates were submitted for this SDG

410-3412-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☐ No☐ N/A☒ Comments:

No field duplicates were submitted for this SDG

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality or usability are not affected.

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

Yes☐ No☐ N/A☒ Comments:

No decontamination or equipment blanks were submitted in this SDG

i. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

No decontamination or equipment blanks were submitted in this SDG

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

410-3412-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

No additional qualification of associated sample data has been deemed necessary, based on sample condition and quality control.

Laboratory Data Review Checklist

Completed By:

Sean Arnold

Title:

Scientist II

Date:

13 July 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-3415-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-3415-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One cooler was received at ELLE with the temperature blank outside to QAPP-specified QC limit at 2.6 degrees Celsius (^{o}C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

410-3415-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality and usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist. The integration for perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), and perfluorohexanesulfonic acid (PFHxS) have been corrected for samples 20PS-FST1-SB08-1, 20PS-FST1-SB09-1, 20PS-FST1-SB10-1, 20PS-FST1-SB10-6, and 20PS-FST1-SB14-1, due to missing branched isomer for PFOA, PFOS, and PFHxS. Re-integration did not result in revisions to associated sample results. Data quality or usability are not affected.

c. Were all corrective actions documented?

Yes☐ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist. Re-integration discussed above.

410-3415-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist. Re-integration discussed above.

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

410-3415-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs.

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

410-3415-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPDs are reported based on MS/MSD and discussed further in this checklist

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

Comments:

No %R results are outside QC limits

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

410-3415-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD or parent sample results are greater than 4 times the spike added.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

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

Comments:

%Rs and RPDs are within QC limits for MS/MSD or parent sample results are greater than 4 times the spike added.

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

Yes☐ No☐ N/A☒ Comments:

No qualification of sample data are required.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

410-3415-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %R for d3-NMeFOSAA is below project-specified QC limit in sample 20PS-FST1-SB12-8, indicating potential uncertain bias. Sample results for associated target analyte NMeFOSAA are non-detectable for these sample, therefore the result is not qualified.

Injection standard 13C4 PFOS peak areas were below the lower area limits for project samples: 20PS-FST1-SB13-1. Sample results for associated target analyte PFOS are qualified as QH for positive hits above the LOQ when injection standard peak areas are below the lower limit. Results are not qualified or flagged based on injection standard peak areas below limits when results are non-detect.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria, with the following exceptions:

- The ion ratios for sample 20PS-FST1-SB08-7.5 are outside criteria for PFHxA.
- The ion ratios for sample 20PS-FST1-SB10-1 are outside criteria for PFHpA.
- The ion ratios for sample 20PS-FST1-SB11-1 are outside criteria for PFUnA.
- The ion ratios for sample 20PS-FST1-SB11-1 are outside criteria for PFTrDA.
- The ion ratios for sample 20PS-FST1-SB12-1 are outside criteria for PFHxA.
- The ion ratios for sample 20PS-FST1-SB14-1 are outside criteria for NMeFOSAA and PFHpA.

Results with ion ratio exceeding criteria are qualified as estimated and flagged J, indicating result are estimated due to matrix interference or the presence of isomers in the sample at different ratios than the ratio of isomers present in the calibration standard.

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

Yes☐ No☐ N/A☒ Comments:

No qualification of sample data are required.

iv. Data quality or usability affected?

Comments:

Data quality and usability are not affected.

410-3415-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

One field duplicate sample was included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:
20PS-FST1-SB09-7.5 and field duplicate sample 20PS-FST1-SB99-0603

410-3415-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☐ No☒ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits with the following exceptions

The results between the primary and the field duplicate pair 20PS-FST1-SB09-7.5 and field duplicate sample 20PS-FST1-SB99-0603 for perfluorooctanesulfonic acid (PFOS) exceed project-specified criteria of RPD greater 50% for soil samples. Results have been qualified with QN indicating uncertain bias due to disagreement between primary and field duplicate pair

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)
Comments:

Data are usable as qualified.

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

Yes☒ No☐ N/A☐ Comments:

One equipment blank: 20PS-EB-0603.

i. All results less than LOQ and project specified objectives?

Yes☐ No☒ N/A☐ Comments:

Equipment blank sample 20PS-EB-0603 results are non-detect with the exception of PFOS. Samples associated with equipment blank include: 20PS-FST1-SB08-1, 20PS-FST1-SB08-7.5, 20PS-FST1-SB09-1, 20PS-FST1-SB09-7.5, 20PS-FST1-SB10-1, 20PS-FST1-SB10-6, 20PS-FST1-SB11-1, 20PS-FST1-SB11-6, 20PS-FST1-SB12-1, 20PS-FST1-SB12-8, 20PS-FST1-SB13-1, 20PS-FST1-SB13-7.5, 20PS-FST1-SB14-1, 20PS-FST1-SB14-8. Sample results less than or equal to 10 times the equipment blank are qualified as estimated due to potential contamination detected in the equipment blank.. The soil sample raw results are compared to the equipment blank.

410-3415-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

PFOS soil results for the following samples are considered biased estimated values and flagged with B, due to contamination present in the associated equipment blank, 20PS-EB-0603: 20PS-FST1-SB08-1, 20PS-FST1-SB09-7.5, 20PS-FST1-SB10-6, 20PS-FST1-SB12-1.

iii. Data quality or usability affected?

Comments:

Data are usable as qualified.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

September 6, 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-3851-1

Laboratory Report Date:

July 15, 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-3851-1

Laboratory Report Date:

July 15, 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One cooler was received at ELLE with the temperature blank at 4.7 degrees Celsius (^{o}C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

410-3851-1

Laboratory Report Date:

July 15, 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist

c. Were all corrective actions documented?

Yes☐ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

410-3851-1

Laboratory Report Date:

July 15, 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs

410-3851-1

Laboratory Report Date:

July 15, 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

410-3851-1

Laboratory Report Date:

July 15, 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist

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

Comments:

No %R results are outside QC limits

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

410-3851-1

Laboratory Report Date:

July 15, 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

RPDs are within QC limits for MS/MSD.

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

Comments:

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

410-3851-1

Laboratory Report Date:

July 15, 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %R for 13C2-PFTeDA are below project-specified QC limits in sample 20-USAP-2-0608 and 20PS-MW99-0608 indicating uncertain bias. Sample results for associated target analyte perfluorotetradecanoic acid (PFTeDA) are non-detectable for these samples, therefore result not qualified.

Extraction standard %R for 13C3PFBS are above project-specified QC limits in sample 20-USAP-2-0608 and 20PS-MW99-0608 indicating uncertain bias. Sample results for associated target analyte perfluorobutanesulfonic acid (PFBS) are qualified as bias uncertain and flagged with QN, for positive hits, when extraction standard % Rs are outside QC limits. Results are not qualified or flagged based on extraction standard %R when associated results are non-detect.

The ion ratio and retention times, of detected results, met laboratory control limits.

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

Yes☐ No☐ N/A☒ Comments:

In this case results are not qualified or flagged based on low extraction standard %R recovery when associated results are non-detect.

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

410-3851-1

Laboratory Report Date:

July 15, 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

One field duplicate sample was included in this SDG

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:
20-USAP-2-0608 and field duplicate sample 20PS-MW99-0608

410-3851-1

Laboratory Report Date:

July 15, 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and data usability are not affected.

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

Yes☐ No☐ N/A☒ Comments:

Decontamination equipment blanks were not necessary for this sampling effort. Dedicated sampling equipment used for sampling.
Associated Field blank 20PS-FBPM-0608 results are less than ½ LOQ and reported in SDG 410-4215.

i. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Equipment blanks were not sampled.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

410-3851-1

Laboratory Report Date:

July 15, 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

   a. Defined and appropriate?

      Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Sean Arnold

Title:

Scientist II

Date:

15 July 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-3854-1

Laboratory Report Date:

14 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-3854-1

Laboratory Report Date:

14 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One cooler was received at ELLE with the temperature blank outside to QAPP-specified QC limit at 5.8 degrees Celsius (^{o}C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

410-3854-1

Laboratory Report Date:

14 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality and usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist. Re-extraction results are presented in hardcopy report and SEDDs. Re-extraction results are for confirmation purposes only. Re-extraction was performed outside hold times and associated method blank had detects. It is recommended to use primary analytical results with the exception of extraction standards less than (<) 5 percent (%), see section 6dii.

Injection standards were outside of the QC limits for both the initial extraction and the re-extraction, values were reported from the initial extraction and discussed further in the checklist.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

410-3854-1

Laboratory Report Date:

14 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☐ No☒ N/A☐ Comments:

Sample 20PS-FC99-SW-0604 and 20PS-FC02-SW-1 were re-extracted outside the method holding time when the recovery for all extraction standard labeled isotopes %R were <5% below the QC acceptance limits and results were non-detectable. The re-extraction results are considered estimated with potential low bias, and flagged with QL,H due to hold time exceedances, see section 6dii.

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data usable as qualified.

410-3854-1

Laboratory Report Date:

14 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs.

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

410-3854-1

Laboratory Report Date:

14 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

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

Yes☐ No☐ N/A☒ Comments:

RPDs are reported based on MS/MSD and discussed further in this checklist

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

Comments:

No %R results are outside QC limits

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

410-3854-1

Laboratory Report Date:

14 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD with the following exceptions.

The MS %R for target analyte, PFOS, is above project-specified QC limits in sample 20PS-FC02-SW-1. Associated sample results are non-detectable for these sample, therefore result not qualified.

The MS %R for target analyte, PFTrDA, is below project-specified QC limits in sample 20PS-FC02-SW-1, indicating potential low bias. Associated sample (20PS-FC02-SW-1 and 20PS-FC99-SW-0604) results are qualified as estimated with potential low bias, QL.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

RPDs are within QC limits for MS/MSD.

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

Comments:

%Rs and RPDs are within QC limits for MS/MSD or not affected with the exception of PFTrDA in samples 20PS-FC02-SW-1 and the associated field duplicate 20PS-FC99-SW-0604.

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

Yes☒ No☐ N/A☐ Comments:

410-3854-1

Laboratory Report Date:

14 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

Data usable as qualified.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

410-3854-1

Laboratory Report Date:

14 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %Rs for all target analytes are <5% and below project-specified QC limits in the initial extraction of samples 20PS-FC02-SW-1 and 20PS-FC99-SW-0604. Results for the re-extraction of theses samples were used in place of the initial results. Initial results are rejected based on the extraction % R < 5% and initial results non-detect, whereas the re-extraction results extraction standard %Rs are within QC limits with detectable results.

Extraction standard %Rs for 13C2-PFTeDA are below project-specified QC limits in samples 20PS-MC02-SW-1, 20PS-MC01-SW-1, 20PS-ZP01-SW-1, 20PS-MLP01-SW-1, 20PS-MLP02-SW-1, 20PS-MLP02-SW-5, and 20PS-TK99-SW-0607, indicating potential uncertain bias. Sample results for associated target analyte perfluorotetradecanoic acid (PFTeDA) are non-detectable for these samples, therefore results are not qualified.

Extraction standard %Rs for 13C3-PFBS are above project-specified QC limits in samples 20PS-MC02-SW-1 and 20PS-ZP99-SW-0606, indicating potential uncertain bias. Sample results for associated target analyte, perfluorobutanesulfonic acid (PFBS) detected above the LOD are qualified as estimated with no discernable bias, QN, while analytical results that are non-detectable for these samples do not require qualification.

Injection standard 13C3-PFBA peak areas were below the lower area limits for project sample 20PS-MC01-SW-1. Sample results for associated target analyte PFBS are qualified as QH for positive hits above the LOQ when injection standard peak areas are below the lower limit. Results are not qualified or flagged based on injection standard peak areas below limits when results are non-detect.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria.

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

Yes☒ No☐ N/A☐ Comments:

Potential flags are discussed above.

410-3854-1

Laboratory Report Date:

14 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Data quality or usability affected?

Comments:

Data are usable as qualified.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Three field duplicate samples were included in this SDG

410-3854-1

Laboratory Report Date:

14 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:
20PS-FC02-SW-1 and field duplicate sample 20PS-FC99-SW-0604
20PS-ZP01-SW-1 and field duplicate sample 20PS-ZP99-SW-0606
20PS-TK01-SW-1 and field duplicate sample 20PS-TK99-SW-0607

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

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and data usability are not affected.

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

Yes☐ No☐ N/A☒ Comments:

No decontamination or equipment blanks were submitted in this SDG.

i. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

No decontamination or equipment blanks were submitted in this SDG.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

410-3854-1

Laboratory Report Date:

14 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Data quality or usability affected?

Comments:

No decontamination or equipment blanks were submitted in this SDG.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Sean Arnold

Title:

Scientist II

Date:

13 July 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-3855-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-3855-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One cooler was received at ELLE with the temperature blank outside to QAPP-specified QC limit at 10.9 degrees Celsius (^{o}C). Associated sample results are qualified as estimated values with low-bias, QL.

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

410-3855-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition, properly preserved and on ice. Samples were shipped via FedEx on Tuesday 9 June were delayed and received Thursday 11 June. The cooler temperature was elevated upon receipt packed with frozen PFAS-free gel ice. At a temperature of 10.9 ^{o}C there is evidence of cooling. Based on the stability of the target analytes (PFAS) analysis proceeded. Results are qualified as bias low estimated and flagged with QL.

e. Data quality or usability affected?

Comments:

Data are usable as qualified.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist.
The integration for perfluorooctanoic acid (PFOA) and perfluorohexanesulfonic acid (PFHxS) have been corrected for samples 20PS-MP01-SW-1, 20PS-MP99-SW-0603, and 20PS-MP02-SW-2, due to missing branched isomer for PFOA and PFHxS. Sample results have been revised due to re-integration of PFOA results for 20PS-MP01-SW-1 and 20PS-MP99-SW-0603. Data quality or usability are not affected.

410-3855-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist. Re-integration discussed above.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist. Re-integration discussed above.

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

410-3855-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs.

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

410-3855-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist

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

Comments:

No %R results are outside QC limits

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

410-3855-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

Project sample 20PS-BR02-SW-1 was used to prepare MS/MSD samples in prep batch 12843.

Note that MS/MSD samples were not prepared with project samples as noted below. No qualification has been performed based on these identified issues as LCSs were included.

- MS/MSDs were not included in the preparative batch 12820 or re-prep preparative batch 16589 for sample 20PS-BR02-SW-5.

MS/MSDs were prepared with a project sample for this SDG and at a rate of 1 set per 20 samples for sampling event..

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

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

Comments:

RPDs are within QC limits for MS/MSD.

410-3855-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %Rs for 13C2-PFTeDA are below project-specified QC limits in sample 20PS-ML01-SW-1, 20PS-ML02-SW-1, 20PS-ML02-SW-5, 20PS-SP01-SW-1, 20PS-SP01-SW-5, 20PS-MP01-SW-1, 20PS-FC01-SW-1, 20PS-BR02-SW-1, and 20PS-BR02-SW-5, indicating potential uncertain bias. Sample results for associated target analyte perfluorotetradecanoic acid (PFTeDA) are non-detectable for these sample, therefore result not qualified.

Extraction standard %RS for 13C3-PFBS are above project-specified QC limits in sample 20PS-ML02-SW-5, 20PS-SP01-SW-1, 20PS-SP02-SW-5, 20PS-SP02-SW-1, 20PS-FC03-SW-1, and 20PS-FC01-SW-1, indicating potential uncertain bias. Sample results for associated target analyte perfluorobutanesulfonic acid (PFBS) are qualified as bias uncertain and flagged with QN, for positive hits, when extraction standard % Rs are outside QC limits. Results are not qualified or flagged based on extraction standard %R when associated results are non-detect.

The ion ratio and retention times of detected results met laboratory control limits with the exception of the PFBS ion ratio for sample 20PS-FC01-SW-1 exceeds laboratory criteria. The PFBS results are qualified with a J flag indicating results are estimated positive detections.

410-3855-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

See above.

iv. Data quality or usability affected?

Comments:

Data are usable as qualified.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

410-3855-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Two field duplicate samples were included in this SDG

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:
20PS-MP01-SW-1 and field duplicate sample 20PS-MP99-SW-0603
20PS-BR02-SW-1 and field duplicate sample 20PS-BR99-SW-0606

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and data usability are not affected.

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

Yes☒ No☐ N/A☐ Comments:

One equipment blank: 20PS-EB-0606.
One field blank: 20PS-FBPM-0603 (submitted under SDG 410-3856-1)

410-3855-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

i. All results less than LOQ and project specified objectives?

Yes☐ No☒ N/A☐ Comments:

Equipment blank sample 20PS-EB-0606 results are non-detect and below ½ LOQ
Field blank sample 20PS-FBPM-0603 target analyte results for PFHxA, PFHpA, PFOA, PFNA, PFDA, PFBS, PFHxS, and PFOS are above the QAPP-specified QC limit of ½ the LOQ. Detected results within 10 times the blank results for each analyte are qualified and flagged as estimated due to blank contamination and flagged with a B. Results below the LOD require no qualification. The associated field blank results are reported in SDG 410-3856-1.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

iii. Data quality or usability affected?

Comments:

Data are usable as qualified.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Sean Arnold

Title:

Scientist II

Date:

15 July 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-3856-1

Laboratory Report Date:

13 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-3856-1

Laboratory Report Date:

13 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One cooler was received at ELLE with the temperature blank outside to QAPP-specified QC limit at 12.2 degrees Celsius (^{o}C). Associated sample results are qualified as estimated values with low-bias, QL.

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

410-3856-1

Laboratory Report Date:

13 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition, properly preserved and on ice. Samples were shipped via FedEx on Tuesday 9 June were delayed and received Thursday 11 June. The cooler temperature was elevated upon receipt packed with frozen PFAS-free gel ice. At a temperature of 12.2 ^{o}C there is evidence of cooling. Based on the stability of the target analytes (PFAS) analysis proceeded. Results are qualified as bias low estimated and flagged with QL.

e. Data quality or usability affected?

Comments:

Data usable as qualfied.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

410-3856-1

Laboratory Report Date:

13 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

Sample 20PS-FBPM-0603 was re-extracted outside the method holding time when the recovery for all labeled isotopes was outside the QC acceptance limits. Both sets of data are reported and associated sample results have been qualified based on initial field blank results.

c. All soils reported on a dry weight basis?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data usable as qualified.

410-3856-1

Laboratory Report Date:

13 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☐ No☒ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs, with the exception of MB 410-16589/1-A of prep batch 16589. MB 410-16589/1-A had detects greater than ½ LOQ for perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), perfluorohexanesulfonic acid (PFHxS), and perfluoroheptanoic acid (PFHpA) This MB was the re-extraction MB for field blank 20PS-FBPM-0603.

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

MB 410-16589/1-A prep batch 16589 had results within ½ LOQ for PFOS, PFOA, PFHxS, and PFHpA. One sample was affected due to the detects, the re-extract for field blank 20PS-FBPM-0603.

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

Yes☐ No☒ N/A☐ Comments:

The results for the Field Blank 20PS-FBPM-0603 from the initial prep and analysis were used to evaluate project samples not the re-extracted results.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

410-3856-1

Laboratory Report Date:

13 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCSLCSD.

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

Yes☐ No☐ N/A☒ Comments:

RPDs are within QC limits for LCS/LCSD.

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

Comments:

No %R or RPD results are outside QC limits

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

410-3856-1

Laboratory Report Date:

13 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

RPDs are within QC limits for MS/MSD.

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

Comments:

%Rs and RPDs are within QC limits for MS/MSD.

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

Yes☒ No☐ N/A☐ Comments:

410-3856-1

Laboratory Report Date:

13 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

Data quality or usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☒ No☐ N/A☐ Comments:

The extraction and injected internal standards %Rs are within the project-specified QC limits for the project samples.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria.

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

Yes☐ No☐ N/A☒ Comments:

No data qualification required.

iv. Data quality or usability affected?

Comments:

Data quality and usability are not affected.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

410-3856-1

Laboratory Report Date:

13 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Four field duplicate samples were included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:
20PS-MP02-SD-0 and field duplicate sample 20PS-MP99-SD-0604
20PS-BR02-SD-0 and field duplicate sample 20PS-BR99-SD-0606
20PS-MC01-SD-0 and field duplicate sample 20PS-MC99-SD-0606
20PS-SH02-SD-0 and field duplicate sample 20PS-SH99-SD-0607

410-3856-1

Laboratory Report Date:

13 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits with the following exception.
In field duplicate/sample pair 20PS-BR99-SD-0606/20PS-BR02-SD-0, the RPD for analyte perfluorooctanesulfonic acid, was outside the QC limit. These results are qualified with QN for the primary and associated field duplicate to indicate uncertain bias due to non-homogenous results.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)
Comments:

Data are usable as qualified.

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

Yes☐ No☐ N/A☒ Comments:

Two equipment blanks: 20PS-EB-BL-0604 and 20PS-EB-AU-0604
and four field blanks: 20PS-FBPM-0603 (parent samples submitted under SDG 410-3855-1), 20PS-FBAM-0604, 20PS-FBPM-0606, and 20PS-FBAM-0607 were included in this SDG.

i. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Equipment blank and field blank samples results are non-detect and below ½ LOQ with the following exceptions:

Field blank sample 20PS-FBPM-0603 target analyte results for PFHxA, PFHpA, PFOA, PFNA, PFDA, PFBS, PFHxS, and PFOS are above the QAPP-specified QC limit of ½ the LOQ. Detected results within 10 times the blank results for each analyte are qualified as estimated due to blank contamination, B, while results below the LOD require no qualification. The associated samples for this field blank are reported in SDG 410-3855-1.

410-3856-1

Laboratory Report Date:

13 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Samples affected by field blank 20PS-FBPM-0603 detects are reported in SDG 410-3855-1.

iii. Data quality or usability affected?

Comments:

Data are usable as qualified.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Sean Arnold

Title:

Scientist II

Date:

14 July 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-4213-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-4213-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One cooler was received at ELLE with the temperature blank outside to QAPP-specified QC limit at 5.5 degrees Celsius (^{o}C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

410-4213-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality and usability not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist. Perfluorooctanoic acid (PFOA) integration has been corrected for sample 20PS-PS03-SW-1, due to missing branched isomer for PFOA. Results are non-detect for PFOA and remain the same with re-integration. Data quality or usability are not affected.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist. Re-integration discussed above.

410-4213-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist. Re-integration discussed above.

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

410-4213-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs.

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

410-4213-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist

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

Comments:

No %R or RPD results are outside QC limits

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

410-4213-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

RPD are within QC limits for MS/MSD.

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

Comments:

%Rs and RPDs are within QC limits for MS/MSD.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

410-4213-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %Rs for 13C7-PFUnA, d3-NMeFOSAA, and d5-NEtFOSAA are below project-specified QC limits in sample 20PS-IDW-08 indicating uncertain bias. Sample results for associated target analytes perfluoroundecanoic acid (PFUnA), NMeFOSAA, and NEtFOSAA are non-detectable for this sample, therefore the result not qualified.

Extraction standard %Rs for 13C2-PFDoDA are below project-specified QC limits in samples 20PS-IDW-08 20PS-SC02-SW-4, 20PS-GL02-SW-5, and 20PS-PS99-SW-0608, indicating uncertain bias. Sample results for associated target analyte perfluorododecanoic acid (PFDoDA) are non-detectable for these samples, therefore results are not qualified.

Extraction standard %Rs for 13C2-PFTeDA are below project-specified QC limits in samples 20PS-IDW-08, 20PS-SC02-SW-1, 20PS-SC02-SW-4 , 20PS-GL02-SW-5, 20PS-GL99-SW-0610 and 20PS-PS99-SW-0608, indicating uncertain bias. Sample results for associated target analyte perfluorotetradecanoic acid (PFTeDA) are non-detectable for these samples, therefore results are not qualified.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

iv. Data quality or usability affected?

Comments:

Data quality and usability are not affected.

410-4213-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Two field duplicate samples were included in this SDG

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:
20PS-GL02-SW-1 and field duplicate sample 20PS-GL99-SW-0610
20PS-PS03-SW-1 and field duplicate sample 20PS-PS99-SW-0608

410-4213-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results were not calculated as neither sample had results above the LOQs.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and data usability are not affected.

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

Yes☐ No☐ N/A☒ Comments:

One field blank: 20PS-FBPM-0610.

i. All results less than LOQ and project specified objectives?

Yes☐ No☒ N/A☐ Comments:

Field blank sample 20PS-FBPM-0610 results are non-detect and below ½ LOQ

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

iii. Data quality or usability affected?

Comments:

Data quality and usability are not affected.

410-4213-1

Laboratory Report Date:

13 January 2021

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

   a. Defined and appropriate?

      Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

8 September 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-4215-1

Laboratory Report Date:

28 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-4215-1

Laboratory Report Date:

28 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☐ No☒ N/A☐ Comments:

   One cooler was received at ELLE with the temperature blank outside to QAPP-specified QC limit at 3.2 degrees Celsius (^{o}C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

410-4215-1

Laboratory Report Date:

28 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition. Sample bottle labeled 20PS-PS99-SD-0609 was received and submitted for analysis, but not listed on CoC.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist
Re-extraction results are for confirmation purposes only.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

410-4215-1

Laboratory Report Date:

28 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs

410-4215-1

Laboratory Report Date:

28 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

410-4215-1

Laboratory Report Date:

28 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist

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

Comments:

No %R results are outside QC limits

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

410-4215-1

Laboratory Report Date:

28 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

RPDs are within QC limits for MS/MSD

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

Comments:

%Rs and RPDs are within QC limits for MS/MSD.

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

Yes☐ No☐ N/A☒ Comments:

No qualification of sample data are required.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

410-4215-1

Laboratory Report Date:

28 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %Rs for 13C2-PFTeDA are below project-specified QC limit in samples 20PS-PS02-SW-1, 20PS-PS99-SW-0609, 20PS-PS01-SW-1, 20PS-BB02-SW-1, 20PS-BB02-SW-5, 20PS-BB01-SW-1, 20PS-HL02-SW-5, and 20PS-HL01-SW-1; indicating uncertain bias. Sample results for associated target analyte perfluorotetradecanoic acid are non-detectable for these sample, therefore the result is not qualified.

Extraction standard %Rs for 13C2-PFDoDA are below project-specified QC limit in samples 20PS-PS99-SW-0609 and 20PS-PS01-SW-1 indicating uncertain bias. Sample results for associated target analyte perfluorododecanoic acid (PFDoA) are non-detectable for these sample, therefore the result is not qualified.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria, with the following exceptions:

- The ion ratios for sample 20PS-BB01-SW-1are outside criteria for PFOS.

Results with ion ratio exceeding criteria are qualified as estimated and flagged J, indicating result are estimated due to matrix interference or the presence of isomers in the sample at different ratios than the ratio of isomers present in the calibration standard.

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

Yes☐ No☐ N/A☒ Comments:

No qualification of sample data are required.

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

410-4215-1

Laboratory Report Date:

28 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Five field duplicate samples were included in this SDG.

410-4215-1

Laboratory Report Date:

28 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:
20PS-GL02-SD-0 and field duplicate sample 20PS-GL99-SD-0610
20PS-PS01-SW-1 and field duplicate sample 20PS-PS99-SW-0609
20PS-PS01-SD-0 and field duplicate sample 20PS-PS99-SD-0609
20PS-PS03-SD-0 and field duplicate sample 20PS-PS99-SD-0608
20PS-PS03-SW-1 and field duplicate sample 20PS-PS99-SW-0608

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and data usability are not affected.

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

Yes☒ No☐ N/A☐ Comments:

Three equipment blanks were collected and identified as 20PS-BL-0604, 20PS-EB-AU-0604, and 20PS-EB-0606 (reported in SDGs 410-3855-1 and 410-3856-1).

Two field blanks were collected and identified as 20PS-FBPM-0608 and 20PS-FBAM-0609.

i. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Equipment blank sample results and field blank results are non-detect and below ½ LOQ.

410-4215-1

Laboratory Report Date:

28 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No samples affected.

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

14 July 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-6332-1

Laboratory Report Date:

9 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-6332-1

Laboratory Report Date:

9 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One cooler was received at ELLE with the temperature blank at 3.6 degrees Celsius (^{o}C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

410-6332-1

Laboratory Report Date:

9 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

410-6332-1

Laboratory Report Date:

9 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs.

410-6332-1

Laboratory Report Date:

9 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

410-6332-1

Laboratory Report Date:

9 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist

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

Comments:

No %R results or RPD are outside QC limits

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

410-6332-1

Laboratory Report Date:

9 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

RPDs are within QC limits for MS/MSD.

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

Comments:

No samples were affected due to %R or RPD limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☒ No☐ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria.

410-6332-1

Laboratory Report Date:

9 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

The %Rs are within the project-specified QC limits for the project samples.

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

410-6332-1

Laboratory Report Date:

9 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

One field duplicate sample was included in this SDG

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:
20PS-TW36-0627 and field duplicate sample 20PS-TW99-0627

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)
Comments:

Data quality and data usability are not affected.

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

Yes☒ No☐ N/A☐ Comments:

One field blank: 20PS-FBAM-0627.

i. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Field blank sample 20PS-FBAM-0627 results are non-detect and below ½ LOQ

410-6332-1

Laboratory Report Date:

9 July 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected..

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

25 October 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-13937

Laboratory Report Date:

28 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-13937

Laboratory Report Date:

28 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☐ No☒ N/A☐ Comments:

   One cooler was received at ELLE within the QAPP-specified QC limit at 0.4 degrees Celsius (^{o}C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

410-13937

Laboratory Report Date:

28 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition and no discrepancies were noted:

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

Injection standards were outside of the QC limits for both the initial extraction and the re-extraction, values were reported from the initial extraction and discussed further in the checklist.

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist
Re-extraction results are presented in hardcopy report and SEDDs. Re-extraction results are for confirmation purposes only. Re-extraction was performed outside hold times and associated method blank had detects. It is recommended to use primary analytical results.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

410-13937

Laboratory Report Date:

28 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

410-13937

Laboratory Report Date:

28 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

410-13937

Laboratory Report Date:

28 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist.

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

Comments:

No qualification of sample data are required.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

410-13937

Laboratory Report Date:

28 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

Project samples 20PS-MW02A-0911 and 20PS-CS01-0912 were used to prepare MS/MSD samples. The following samples were analyzed with project MS/MSD: 20PS-CS01-0912, 20PS-MW98-0912, 20PS-FBPM-0912, 20PS-DSAP-8D-0912, 20PS-MW02A-0911, 20PS-MW99-0911, 20PS-MW02B-0911, 20PS-DSAP-8S-0911, 20PS-EB-0911,

MS/MSD samples were not prepared with a project sample in preparatory batch 45276 and 45511. The Quality Assurance Project Plan requires that a MS and MSD are included in each extraction batch. In this case, the laboratory separated project samples into multiple extraction batches and only had enough sample volume to prepare MS/MSDs as requested on the chain-of-custody record; therefore, the following samples in extraction batch 45276 and 45511 were analyzed without associated project MS/MSD: 20PS-USAP-1-0912, 20PS-CS-02-0912, 20PS-MW97-0912, and 20PS-FBAM-0911. No qualification will be performed on the basis of the lack of MS/MSD in this preparatory batch.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☐ No☒ N/A☐ Comments:

RPDs are within QC limits (30%) between the MS/MSD with the exception of the perfluorotridecanoic acid MS/MSD RPD for 20PS-CS01-0912 with a RPD of 50%. Results are not qualified when RPD exceed project-specific criteria and sample result is non detectable.

410-13937

Laboratory Report Date:

28 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

%Rs and RPDs are within QC limits for MS/MSD, with the exception noted above.

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

Yes☐ No☐ N/A☒ Comments:

No qualification of sample data are required.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

410-13937

Laboratory Report Date:

28 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %Rs for 13C3 PFBS are above project-specified QC limit in samples 20PS-MW02A-0911, 20PS-MW99-0911, 20PS-USAP-1-0912, 20PS-CS-02-0912, 20PS-MW97-0912 indicating uncertain bias. Sample results for associated target analyte perfluorobutanesulfonic acid (PFBS) are qualified as bias uncertain and flagged with QN for positive hits if extraction standard % Rs are outside QC limits.

Extraction standard %Rs for 13C2 PFTeDA are below project-specified QC limit in samples 20PS-CS01-0912 and 20PS-MW99-011 indicating uncertain bias. Sample results for associated target analyte perfluorotetradecanoic acid are non-detectable for these samples, therefore the result is not qualified.

Extraction standard %R for 13C2-PFDoDA is below project-specified QC limit in sample 20PS-CS01-0912 indicating uncertain bias. Sample result for associated target analyte perfluorododecanoic acid are non-detectable for this sample, therefore the result is not qualified.

Injection standard 13C3-PFBA peak areas were below the lower area limits for project samples: 20PS-MW99-0911 and 20PS-MW02A-0911 Sample results for associated target analyte PFBS are qualified as QH for positive hits above the LOQ when injection standard peak areas are below the lower limit. Results are not qualified or flagged based on injection standard peak areas below limits when results are non-detect.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria

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

Yes☐ No☐ N/A☒ Comments:

No qualification of sample data are required.

410-13937

Laboratory Report Date:

28 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Four field duplicate samples were included in this SDG.

410-13937

Laboratory Report Date:

28 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:
20PS-MW02A-0911and field duplicate sample 20PS-MW99-0911.
20PS-USAP-1-0912 and field duplicate sample 20PS-MW98-0912.
20PS-CS-01-0912 and field duplicate sample 20PS-MW97-0912

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and data usability are not affected.

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

Yes☒ No☐ N/A☐ Comments:

One equipment blank was collected and identified as 20PS-EB-0911.

Two field blanks were collected and identified as 20PS-FBAM-0911 and 20PS-FBPM-0912..

i. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Equipment blank sample results and field blank results are non-detect and below ½ LOQ.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No samples affected.

410-13937

Laboratory Report Date:

28 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

25 October 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-14108

Laboratory Report Date:

23 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-14108

Laboratory Report Date:

23 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☐ No☒ N/A☐ Comments:

   One cooler was received at ELLE within the QAPP-specified QC limit at 0.5 degrees Celsius (°C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

410-14108

Laboratory Report Date:

23 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition and the following discrepancies were noted:
Sample ID were revised after arrival at laboratory via email on 09/18/2020.

Original ID	New ID
20PS-MW13-0914	20PS-MW26-0914
20PS-MW14-0914	20PS-MW27-0914
20PS-MW15-0914	20PS-MW28-0914
20PS-MW16-0913	20PS-MW29-0913
20PS-MW17-0914	20PS-MW30-0914

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

Injection standards were outside of the QC limits for both the initial extraction and the re-extraction, values were reported from the initial extraction and discussed further in the checklist.

Sample IDs were revised after arrival at the laboratory as follows:

Original ID	New ID
20PS-MW13-0914	20PS-MW26-0914
20PS-MW14-0914	20PS-MW27-0914
20PS-MW15-0914	20PS-MW28-0914
20PS-MW16-0913	20PS-MW29-0913
20PS-MW17-0914	20PS-MW30-0914

410-14108

Laboratory Report Date:

23 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

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

Yes☒ No☐ N/A☐ Comments:

410-14108

Laboratory Report Date:

23 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

410-14108

Laboratory Report Date:

23 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist.

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

Comments:

No qualification of sample data are required.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

410-14108

Laboratory Report Date:

23 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

Project sample 20PS-MW02A-0913 was used to prepare MS/MSD samples.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☐ No☒ N/A☐ Comments:

RPDs are within QC limits (30%) between the MS/MSD with the exception of the perfluorodecanoic acid MS/MSD RPD for 20PS-MW01A-0913 with a RPD of 59%. Results are not qualified when RPD exceed project-specific criteria and sample result is non detectable.

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

Comments:

%Rs and RPDs are within QC limits for MS/MSD, with the exception noted above.

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

Yes☐ No☐ N/A☒ Comments:

No qualification of sample data are required.

410-14108

Laboratory Report Date:

23 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %Rs for 13C3 PFBS are above project-specified QC limit in samples 20PS-MW28-0914, 20PS-MW27-0914, 20PS-MW26-0914, indicating uncertain bias. Sample results for associated target analyte perfluorobutanesulfonic acid (PFBS) are qualified as bias uncertain and flagged with QN for positive hits if extraction standard % Rs are outside QC limits.

Extraction standard %Rs for 13C2 PFTeDA are below project-specified QC limit in samples 20PS-MW28-0914, 20PS-MW27-0914, and 20PS-MW30-0914 indicating uncertain bias. Sample results for associated target analyte perfluorotetradecanoic acid are non-detectable for these sample, therefore the result is not qualified.

Injection standard 13C3-PFBA peak areas were below the lower area limits for project samples, 20PS-MW29-0913, 20PS-MW30-0914, 20PS-MW28-0914, 20PS-MW27-0914 and 20PS-MW26-0914. Sample results for associated target analyte PFBS are qualified as QH for positive hits above the LOQ when injection standard peak areas are below the lower limit. Results are not qualified or flagged based on injection standard peak areas below limits when results are non-detect.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria.

410-14108

Laboratory Report Date:

23 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

No qualification of sample data are required.

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

410-14108

Laboratory Report Date:

23 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Four field duplicate samples were included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:
20PS-MW30-0914 and field duplicate sample 20PS-MW95-0914.
20PS-MW01A-0913 and field duplicate sample 20PS-MW96-0913.

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and data usability are not affected.

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

Yes☒ No☐ N/A☐ Comments:

Equipment blanks reported in different SDGs.

Two field blanks were collected and identified as 20PS-FBAM-0913 and 20PS-FBPM-0914...

i. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Equipment blank sample results and field blank results are non-detect and below ½ LOQ.

410-14108

Laboratory Report Date:

23 September 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No samples affected.

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

25 October 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-14665

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-14665

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☐ No☒ N/A☐ Comments:

   One cooler was received at ELLE within the QAPP-specified QC limit at 0.9 degrees Celsius (°C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

410-14665

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition and the following discrepancy was noted:
The sample ID on the sample bottle was used for sample 20PS-HCMW05-75-0919. The bottle label did not match the information listed on the Chain-of-Custody (COC).

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist.
Injection standards were outside of the QC limits for both the initial extraction and the re-extraction, values were reported from the initial extraction and discussed further in the checklist

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

410-14665

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

410-14665

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

410-14665

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist.

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

Comments:

No qualification of sample data are required.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

410-14665

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

Project sample 20PS-HCMW05-15-0919 was used to prepare MS/MSD samples. The following samples were analyzed with project MS/MSD: 20PS-FBAM-0919, 20PS-HCMW05-15-0919, 20PS-HCMW05-75-0919, 20PS-HCMW03-15-0919 (rerun), 20PS-CS-03-0919, 20PS-MW92-0919 (rerun), and 20PS-MW91-0919.

MS/MSD samples were not prepared with a project sample in preparatory batch 47968 and 49331. The Quality Assurance Project Plan requires that a MS and MSD are included in each extraction batch. In this case, the laboratory separated project samples into multiple extraction batches and only had enough sample volume to prepare MS/MSDs as requested on the chain-of-custody record; therefore, the following samples in extraction batch 45276 and 45511 were analyzed without associated project MS/MSD: 20PS-HCMW05-75-0919 (rerun), 20PS-MW92-0919, 20PS-HCMW03-15-0919, 20PS-HCMW03-75-0919, and 20PS-MW91-0919 (rerun). No qualification will be performed on the basis of the lack of MS/MSD in this preparatory batch.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

RPDs are within QC limits (30%) for MS/MSD .

410-14665

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

%Rs and RPDs are within QC limits for MS/MSD.

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

Yes☐ No☐ N/A☒ Comments:

No qualification of sample data are required.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

410-14665

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %Rs for 13C3 PFBS are above project-specified QC limit in samples 20PS-HCMW05-15-0919, 20PS-HCMW05-75-0919, 20PS-HCMW03-15-0919, 20PS-HCMW03-75-0919, 20PS-MW92-0919, and 20PS-MW91-0919, indicating uncertain bias. Sample results for associated target analyte perfluorobutanesulfonic acid (PFBS) are qualified as bias uncertain and flagged with QN for positive hits if extraction standard % Rs are outside QC limits.

Extraction standard %Rs for 13C2 PFTeDA are below project-specified QC limit in samples 20PS-HCMW05-15-0919, 20PS-HCMW05-75-0919, and 20PS-MW92-0919, indicating uncertain bias. Sample results for associated target analyte perfluorotetradecanoic acid are non-detectable for these sample, therefore the result is not qualified.

Injection standard 13C3-PFBA peak areas were below the lower area limits for project samples: 20PS-HCMW05-15-0919 20PS-HCMW03-15-0919, 20PS-HCMW05-75-0919, 20PS-CS-03-0919, 20PS-MW92-0919, and 20PS-HCMW03-75-0919. Sample results for associated target analyte PFBS are qualified as QH for positive hits above the LOQ when injection standard peak areas are below the lower limit. Results are not qualified or flagged based on injection standard peak areas below limits when results are non-detect.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria

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

Yes☐ No☐ N/A☒ Comments:

No qualification of sample data are required.

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

410-14665

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Four field duplicate samples were included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:
20PS-HCMW05-75-0919 and field duplicate sample 20PS-MW92-0919
20PS-CS-03-0912and field duplicate sample 20PS-MW91-0919

410-14665

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and data usability are not affected.

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

Yes☒ No☐ N/A☐ Comments:

Equipment blanks reported in different SDGs.

One field blank was collected and identified as 20PS-FBAM-0919..

i. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Equipment blank sample results and field blank results are non-detect and below ½ LOQ.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No samples affected.

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

410-14665

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

   a. Defined and appropriate?

      Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

25 October 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-14670

Laboratory Report Date:

06 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-14670

Laboratory Report Date:

06 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☐ No☒ N/A☐ Comments:

   One cooler was received at ELLE within the QAPP-specified QC limit at 0.8 degrees Celsius (°C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

410-14670

Laboratory Report Date:

06 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist. Injection standards were outside of the QC limits for both the initial extraction and the re-extraction, values were reported from the initial extraction and discussed further in the checklist.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

410-14670

Laboratory Report Date:

06 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs

410-14670

Laboratory Report Date:

06 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

410-14670

Laboratory Report Date:

06 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist.

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

Comments:

No qualification of sample data are required.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

Project samples 20PS-MW31-0917 was used to prepare MS/MSD samples.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

410-14670

Laboratory Report Date:

06 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

RPDs are within QC limits (30%) for MS/MSD .

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

Comments:

%Rs and RPDs are within QC limits for MS/MSD.

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

Yes☐ No☐ N/A☒ Comments:

No qualification of sample data are required.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

410-14670

Laboratory Report Date:

06 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %Rs for 13C3 PFBS are above project-specified QC limit in samples 20PS-MW31-0917, 20PS-MW22-0917, 20PS-MW24-0917, 20PS-MW25-0917, 20PS-MW94-0917, 20PS-HCMW01-15-0918, 20PS-HCMW01-75-0918, 20PS-HCMW02-15-0918, 20PS-HCMW02-75-0918, 20PS-HCMW04-15-0918, and 20PS-MW93-0918 indicating uncertain bias. Sample results for associated target analyte perfluorobutanesulfonic acid (PFBS) are qualified as bias uncertain and flagged with QN for positive hits if extraction standard % Rs are outside QC limits.

Injection standard 13C3-PFBA peak areas were below the lower area limits for project samples 20PS-MW25-0917, 20PS-HCMW01-15-0918, 20PS-HCMW04-15-0918, 20PS-HCMW02-15-0918, 20PS-MW93-0918. Sample results for associated target analyte PFBS are qualified as QH for positive hits above the LOQ when injection standard peak areas are below the lower limit. Results are not qualified or flagged based on injection standard peak areas below limits when results are non-detect.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria, with the following exceptions:

The ion ratios for samples 20PS-HCMW01-15-0918, 20PS-MW33-0917 and 20PS-HCMW01-75-0918 are outside criteria for PFOS. Results with ion ratio exceeding criteria are qualified as estimated and flagged J, indicating result are estimated due to matrix interference or the presence of isomers in the sample at different ratios than the ratio of isomers present in the calibration standard

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

Yes☐ No☐ N/A☒ Comments:

No qualification of sample data are required.

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

410-14670

Laboratory Report Date:

06 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Four field duplicate samples were included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:
20PS-MW31-0917and field duplicate sample 20PS-MW94-0917
20PS-HCMW04-15-0918 and field duplicate sample 20PS-MW93-0918

410-14670

Laboratory Report Date:

06 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and data usability are not affected.

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

Yes☒ No☐ N/A☐ Comments:

Equipment blanks reported in different SDGs.

Two field blanks were collected and identified as 20PS-FBPM-0917and 20PS-FBPM-0918.

i. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Equipment blank sample results and field blank results are non-detect and below ½ LOQ.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No samples affected.

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

410-14670

Laboratory Report Date:

06 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

   a. Defined and appropriate?

      Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

25 October 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-15101

Laboratory Report Date:

02 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-15101

Laboratory Report Date:

02 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☐ No☒ N/A☐ Comments:

   One cooler was received at ELLE within the QAPP-specified QC limit at 0.1 degrees Celsius (^{o}C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

410-15101

Laboratory Report Date:

02 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist. Injection standards were outside of the QC limits for both the initial extraction and the re-extraction, values were reported from the initial extraction and discussed further in the checklist.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

410-15101

Laboratory Report Date:

02 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs

410-15101

Laboratory Report Date:

02 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

410-15101

Laboratory Report Date:

02 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist

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

Comments:

No %R results are outside QC limits

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

Project sample 20PS-MW07-0921 was used to prepare MS/MSD samples.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

410-15101

Laboratory Report Date:

02 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

RPDs are within QC limits for MS/MSD

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

Comments:

%Rs and RPDs are within QC limits for MS/MSD.

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

Yes☐ No☐ N/A☒ Comments:

No qualification of sample data are required.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

410-15101

Laboratory Report Date:

02 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %Rs for 13C3 PFBS are above project-specified QC limit in samples 20PS-MW08-0921, 20PS-MW18-0923, 20PS-MW19-0923, 20PS-MW14-0923; indicating uncertain bias. Sample results for associated target analyte perfluorobutanesulfonic acid (PFBS) are qualified as bias uncertain and flagged with QN for positive hits if extraction standard % Rs are outside QC limits. Extraction standard %Rs for 13C2 PFTeDA are below project-specified QC limit in samples 20PS-MW12-0923,20PS-MW19-0923, and 20PS-MW14-0923 indicating uncertain bias. Sample results for associated target analyte perfluorotetradecanoic acid are non-detectable for these sample, therefore the result is not qualified.

Injection standard 13C3-PFBA peak areas were below the lower area limits for project samples: 20PS-MW08-0921, 20PS-MW19-0923, and 20PS-MW14-0923. Sample results for associated target analyte PFBS are qualified as QH for positive hits above the LOQ when injection standard peak areas are below the lower limit. Results are not qualified or flagged based on injection standard peak areas below limits when results are non-detect.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria, with the following exceptions:

- Ion ratios for sample 20PS-MW12-0923 are outside criteria for PFOS and PFDA.
- Ion ratios for samples 20PS-MW14-0923 and 20PS-MW90-0921 are outside criteria for PFDA.
- Ion ratios for sample 20PS-MW89-0923 are outside criteria for PFOS.

Results with ion ratio exceeding criteria are qualified as estimated and flagged J, indicating result are estimated due to matrix interference or the presence of isomers in the sample at different ratios than the ratio of isomers present in the calibration standard."

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

Yes☐ No☐ N/A☒ Comments:

No qualification of sample data are required.

410-15101

Laboratory Report Date:

02 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Four field duplicate samples were included in this SDG.

410-15101

Laboratory Report Date:

02 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:
20PS-MW12-0923and field duplicate sample 20PS-MW89-0923
20PS-MW07-0921and field duplicate sample 20PS-MW90-0921

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and data usability are not affected.

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

Yes☒ No☐ N/A☐ Comments:

One equipment blank was collected and identified as 20PS-EB-0921.

Two field blanks were collected and identified as 20PS-FBPM-0921and 20PS-FBAM-0923.

i. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Equipment blank sample results and field blank results are non-detect and below ½ LOQ.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No samples affected.

410-15101

Laboratory Report Date:

02 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

25 October 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-15361-1

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-15361-1

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☐ No☒ N/A☐ Comments:

   One cooler was received at ELLE within the QAPP-specified QC limit at 0.5 degrees Celsius (°C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

410-15361-1

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

410-15361-1

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs

410-15361-1

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☐ No☒ N/A☐ Comments:

%Rs are within QC limits for LCS, with the following exceptions:

The LCS %R for perfluorodecanoic acid was above QC limits (LCS 410-50171/2-A, prep batch 50171) associated samples 20PS-MW01-0924, and 20PS-MW01-0924MS/MSD.Results are not qualified when LCS %R exceed project-specific criteria and sample result is non detectable.

410-15361-1

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist.

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

Comments:

No qualification of sample data are required.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

Project sample 20PS-MW01-0924 was used to prepare MS/MSD samples; however, was the only project sample in preparatory batch.

MS/MSD samples were not prepared with a project sample in preparatory batches 49004, 50008, and 50415. The Quality Assurance Project Plan requires that a MS and MSD are included in each extraction batch. In this case, the laboratory separated project samples into multiple extraction batches and only had enough sample volume to prepare MS/MSDs as requested on the chain-of-custody record; therefore, the following samples in extraction batch 19302003 were analyzed without associated project MS/MSD: 20PS-FBPM-0924, 20PS-MW-2-0924, 20PS-MW03-0924, 20PS-MW23-0924, 20PS-MW88-0924, 20PS-MW17-0925, 20PS-MW15-0925, 20PS-MW13-0925, 20PS-FBPM-0925, 20PS-MW87-0925, and 20PS-EB-0925. No qualification will be performed on the basis of the lack of MS/MSD in this preparatory batch.

410-15361-1

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☐ No☒ N/A☐ Comments:

RPDs are within QC limits (30%) between the MS/MSD with the exception of the perfluorotridecanoic acid MS/MSD RPD for 20PS-MW01-0924 with a RPD of 32%. Results are not qualified when RPD exceed project-specific criteria and sample result is non detectable

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

Comments:

%Rs and RPDs are within QC limits for MS/MSD, with the exception noted above.

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

Yes☐ No☐ N/A☒ Comments:

No qualification of sample data are required.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

410-15361-1

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %Rs for 13C3 PFBS are above project-specified QC limit in samples 20PS-MW01-0924 20PS-MW03-0924, 20PS-MW88-0924, 20PS-MW23-0924, and 20PS-20PS-MW15-0925, indicating uncertain bias. Sample results for associated target analyte perfluorobutanesulfonic acid (PFBS) are qualified as bias uncertain and flagged with QN for positive hits if extraction standard % Rs are outside QC limits.

Extraction standard %Rs for 13C2 PFTeDA are below project-specified QC limit in sample 20PS-MW01-0924 indicating uncertain bias. The analyte perfluorotetradecanoic acid is non-detectable for this sample, therefore the result is not qualified.

Injection standard 13C3-PFBA peak areas were below the lower area limits for project samples: 20PS-MW01-0924, 20PS-MW03-0924, 20PS-MW23-0924, 20PS-MW88-0924, 20PS-MW15-0925, and 20PS-MW13-0925. Sample results for associated target analyte PFBS are qualified as QH for positive hits above the LOQ when injection standard peak areas are below the lower limit. Results are not qualified or flagged based on injection standard peak areas below limits when results are non-detect.

- The retention times are within the QC limits for project samples and the ion ratios, for each detect reported, did not exceed criteria, with the following exceptions:The ion ratios for sample 20PS-MW17-0925 are outside criteria for PFOS.
- The ion ratios for sample 20PS-MW03-0924 are outside criteria for PFHxA.

Results with ion ratio exceeding criteria are qualified as estimated and flagged J, indicating result are estimated due to matrix interference or the presence of isomers in the sample at different ratios than the ratio of isomers present in the calibration standard

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

Yes☐ No☐ N/A☒ Comments:

No qualification of sample data are required.

410-15361-1

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Four field duplicate samples were included in this SDG.

410-15361-1

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:
20PS-MW01-0924 and field duplicate sample 20PS-MW88-0924
20PS-MW17-0925 and field duplicate sample 20PS-MW87-0925

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and data usability are not affected.

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

Yes☒ No☐ N/A☐ Comments:

One equipment blank was collected and identified as 20PS-EB-0925.

Two field blanks were collected and identified as 20PS-FBPM-0924and 20PS-FBPM-0925.

i. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Equipment blank sample results and field blank results are non-detect and below ½ LOQ.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No samples affected.

410-15361-1

Laboratory Report Date:

13 October 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Christopher Ma

Title:

Chemist I

Date:

17 November 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

410-19226

Laboratory Report Date:

17 November 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

410-19226

Laboratory Report Date:

17 November 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☐ No☒ N/A☐ Comments:

   One cooler was received at ELLE within the QAPP-specified QC limit at 0.8 degrees Celsius (°C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

410-19226

Laboratory Report Date:

17 November 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☒ No☐ N/A☐ Comments:

Some sample containers had label times which differed from the CoC. The times listed on the CoC were used for sample login.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist Re-extraction results are presented in hardcopy report and SEDDs. Re-extraction results are for confirmation purposes only. Re-extraction was performed within hold times. It is recommended to use primary analytical results.

Injection standards were outside of the QC limits for both the initial extraction and the re-extraction, values were reported from the initial extraction and discussed further in the checklist.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

410-19226

Laboratory Report Date:

17 November 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

410-19226

Laboratory Report Date:

17 November 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☐ No☒ N/A☐ Comments:

%Rs are within QC limits for LCSs.

410-19226

Laboratory Report Date:

17 November 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

LCS/LCSD RPDs are within QC limits.

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

Comments:

LCS/LCSD %Rs and RPDs are within QC limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

Project sample 20PS-MW06-1029 was used to prepare MS/MSD samples.

MS/MSD samples were not prepared with a project sample in preparatory batches 63876 and 64363. The Quality Assurance Project Plan requires that a MS and MSD are included in each extraction batch. In this case, the laboratory separated project samples into multiple extraction batches and only had enough sample volume to prepare MS/MSDs as requested on the chain-of-custody record; therefore, the following samples in extraction batches 63876 and 64363 were analyzed without associated project MS/MSD: 20PS-MW02-1029, 20PS-MW05-1030, 20PS-MW99-1030, 20PS-MW04-1031, 20PS-MW99-1031, 20PS-IDWW-1029. No qualification will be performed on the basis of the lack of MS/MSD in this preparatory batch.

410-19226

Laboratory Report Date:

17 November 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☐ No☒ N/A☐ Comments:

RPDs are within QC limits (30%) between the MS/MSD.

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

Comments:

%Rs and RPDs are within QC limits for MS/MSD, with the exception noted above.

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

Yes☐ No☐ N/A☒ Comments:

No qualification of sample data are required.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

410-19226

Laboratory Report Date:

17 November 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

410-19226

Laboratory Report Date:

17 November 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %R for 13C2 PFTeDA is below project-specified QC limit in sample 20PS-MW04-1031 indicating uncertain bias. The analyte perfluorotetradecanoic acid is non-detectable for this sample, therefore the result is not qualified.

Extraction standard %Rs for 13C3 PFBS are above project-specified QC limit in sample 20PS-MW02-1029, 20PS-MW99-1030, 20PS-MW04-1031, 20PS-MW99-1031 indicating uncertain bias. Sample results for associated target analyte perfluorobutanesulfonic acid (PFBS) are qualified as bias uncertain and flagged with QN for positive hits if extraction standard % Rs are outside QC limits.

Extraction standard %Rs for d3-NMeFOSAA are below project-specified QC limit in sample 20PS-IDWW-1029 indicating uncertain bias. The analyte NMeFOSAA is non-detectable for this sample, therefore the result is not qualified.

Extraction standard %Rs for d5-NEtFOSAA are below project-specified QC limit in sample 20PS-IDWW-1029 indicating uncertain bias. The analyte NEtFOSAA is non-detectable for this sample, therefore the result is not qualified.

Extraction standard %Rs for 13C2-PFDoDA are below project-specified QC limit in sample 20PS-IDWW-1029 indicating uncertain bias. The analyte perfluorododecanoic acid is non-detectable for this sample, therefore the result is not qualified.

Extraction standard %Rs for 13C7 PFUnA are below project-specified QC limit in sample 20PS-IDWW-1029 indicating uncertain bias. The analyte perfluoroundecanoic acid is non-detectable for this sample, therefore the result is not qualified.

Injection standard 13C3-PFBA peak areas were below the lower area limits for project samples: 20PS-MW02-1029, 20PS-MW99-1030, 20PS-MW05-1030, 20PS-MW04-1031, and 20PS-MW99-1031. Sample results for associated target analyte PFBS are qualified as QH for positive hits above the LOQ when injection standard peak areas are below the lower limit. Results are not qualified or flagged based on injection standard peak areas below limits when results are non-detect.

Injection standard 13C2 PFDA peak areas were below the lower area limits for IDW sample: 20PS-IDWW-1029. Sample results for associated target analyte PFDA, are qualified as QH for positive hits above the LOQ when injection standard peak areas are below the lower limit. Results are not qualified or flagged based on injection standard peak areas below limits when results are non-detect.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria.

410-19226

Laboratory Report Date:

17 November 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

No qualification of sample data are required.

iv. Data quality or usability affected?

Comments:

Data are usable as qualified.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

410-19226

Laboratory Report Date:

17 November 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Three field duplicate samples were included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:
20PS-MW06-1029 and field duplicate sample 20PS-MW99-1029
20PS-MW05-1030 and field duplicate sample 20PS-MW99-1030
20PS-MW04-1031 and field duplicate sample 20PS-MW99-1031

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits with the following exception:

The RPDs for perfluorooctane sulfonate, perfluorooctanoic acid, and perfluoroheptanoic acid between the primary (20PS-MW05-1030) and the field duplicate (20PS-MW99-1030) exceed project-specified criteria of RPD (<30%) for water samples. The analyte results for these samples have been qualified with QN, indicating uncertain bias due to lack of precision demonstrated by results of the primary and field duplicate pair.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)
Comments:

Data are usable as qualified.

410-19226

Laboratory Report Date:

17 November 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Two equipment blanks were collected and identified as 20PS-EB-1029 and 20PS-EB-1030.

Three field blanks were collected and identified as 20PS-FBPM-1029, 20PS-FBAM-1030 and 20PS-FBAM-1031.

i. All results less than LOQ and project specified objectives?

Yes☐ No☒ N/A☐ Comments:

Equipment blank sample results and field blank results are non-detect and below ½ LOQ with the following exceptions.

Equipment blank sample 20PS-EB-1030 results are non-detect and below ½ LOQ with the exception of PFOS. Associated sample results that are less than or equal to 10 times the blank value are qualified with B flag and considered high estimated value due to contamination present in the equipment blank. No qualification is necessary for nondetectable sample results.

Field blank sample 20PS-FBAM-1030 results are non-detect and below ½ LOQ with the exception of PFOS. Associated sample results that are less than or equal to 10 times the blank value are qualified with B flag and considered high estimated value due to contamination present in the equipment blank. No qualification is necessary for nondetectable sample results.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

PFOS results for the following samples are considered biased estimated value and flagged with B, due to contamination present in the associated equipment blank: 20PS-MW04-1031 and 20PS-MW99-1031.
PFOS results for samples associated with field 20PS-FBAM-1030 were greater than 10 times the PFOS detected in the field blank. No qualification is necessary for results greater than 10 times the field blank.

iii. Data quality or usability affected?

Comments:

Data are usable as qualified.

410-19226

Laboratory Report Date:

17 November 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

   a. Defined and appropriate?

      Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

30 July 2019

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

EIE02

Laboratory Report Date:

19 June 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

EIE02

Laboratory Report Date:

19 June 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete.

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One sample cooler was received at ELLE with a temperature blank 4.0 degrees Celsius (^{o}C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

EIE02

Laboratory Report Date:

19 June 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

Field duplicate sample 19PS-MW99-0530 was re-extracted due extraction standard outside QC limits. Both sets of results are in agreement. Original results reported.

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

EIE02

Laboratory Report Date:

19 June 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

EIE02

Laboratory Report Date:

19 June 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

EIE02

Laboratory Report Date:

19 June 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist.

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

Comments:

No %R or RPD results are outside QC limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

EIE02

Laboratory Report Date:

19 June 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☐ No☒ N/A☐ Comments:

%Rs are within QC limits for MS/MSD, with the following exceptions:

The MS recovery for perfluoroheptanoic acid (PFHpA) is below QAPP-specified QC criteria. The primary sample 19PS-AP-6078-0530 and field duplicate 19PS-AP-6078 results for PFHpA are qualified as estimated with low bias with the QL flag.

The sample concentration was greater than 4 times the MS spike concentration for the following compounds: perfluorohexanesulfonic acid, perfluorohexanoic acid, perfluorooctanesulfonic acid, perfluorooctanoic acid; therefore, associated results were not qualified.

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

Yes☒ No☐ N/A☐ Comments:

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

Comments:

MS %R result is below QC limits for PFHpA. The primary sample 19PS-AP-6078-0530 PFHpA and field duplicate 19PS-AP-6078 results have been qualified as a low bias result and flagged with QL.

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

Yes☒ No☐ N/A☐ Comments:

EIE02

Laboratory Report Date:

19 June 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

Data are usable as qualified.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required. The extracted and injected internal standards %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extracted standard %R for 13C3-PFBS is above QC limits in samples 19PS-AP-6078-0530, 19PS-MW99-0530 and associated MS/MSD, indicating uncertain bias results. Sample results with detected perfluorobutanesulfonic acid (PFBS) are qualified with QN indicating estimated uncertain bias results.

Extracted standard %R for 13C2-PFTeDA are below QC limits in sample associated matrix spike sample indicating uncertain bias results. Matrix spike samples are not qualified based on extracted standard %R alone.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria.

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

Yes☒ No☐ N/A☐ Comments:

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

EIE02

Laboratory Report Date:

19 June 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

The test method included within this SDG did not include volatile analyses; however, a trip blank was included for PFAS.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

The test method included within this SDG did not include volatile analyses; however, a trip blank was included for PFAS. The trip blank is identified as follows: 19PS-TB-0530.

iii. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Trip blank results are below ½ LOQ.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

No trip blank results are above the LOQs.

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

One field duplicate sample was included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:

- 19PS-AP-6078-0530 and field duplicate sample 19PS-MW99-0530

EIE02

Laboratory Report Date:

19 June 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data are usable as qualified.

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

Yes☒ No☐ N/A☐ Comments:

The results for field blank 19PS-FBPM-0530 are non-detect for PFAS.

i. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Field blank results are below ½ LOQs.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No samples affected.

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

EIE02

Laboratory Report Date:

19 June 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

   a. Defined and appropriate?

      Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

2 August 2019

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

EIE05

Laboratory Report Date:

26 July 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

EIE05

Laboratory Report Date:

26 July 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One sample cooler was received at ELLE with the temperature blank at 7.4 degrees Celsius (°C); however, the temperatures of the cooler were less than 6°C (the range was 3.4°C to 4.0°C) so no qualification of associated sample results has been performed on the basis of sample temperature at receipt.

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

EIE05

Laboratory Report Date:

26 July 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition and no discrepancies were noted, with the exception of the temperature issue discussed above.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

Perfluorooctanesulfonic acid (PFOS) was manually integrated for samples:19-MW-BKG-04-0716, 19PS-MW99-0716, 19-MW-BKG-07-0716, 19-MW-BKG-12-0716, 19-MW-BKG-11-0716, and 19-MW-BKG-01-016, due to internal standard peak areas and extraction standards outside the QC acceptance limits. Samples were re-extracted, the internal standard peak areas were again outside the QC limits; therefore the original extraction results were reported.

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

EIE05

Laboratory Report Date:

26 July 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples were included in this shipment.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

EIE05

Laboratory Report Date:

26 July 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

EIE05

Laboratory Report Date:

26 July 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist.

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

Comments:

No %R results are outside QC limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

MS/MSD samples were prepared with a project sample in preparatory batch 19203019 and 19205018. The following water samples in extraction batch 19203019 were analyzed with project MS/MSD: 19PS-MW99-0716, 19-MW-BKG-12-0716, 19-MW-BKG-11-0716, 19-MW-BKG-01-0716, 19PS-TBGW-0716, and 19PS-FBAM-0716.

For clarity, the following samples were prepared with a project sample MS/MSD in preparatory batch 19205018; however, the project sample and the MS/MSD were reported in SDG EIE06 and not in SDG EIE05: 19-MW-BKG-04-0716, and 19-MW-BKG-07-0716. Data quality and data usability are not affected and project sample MS/MSD criteria were meet for this preparatory batch.

EIE05

Laboratory Report Date:

26 July 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

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

Yes☒ No☐ N/A☐ Comments:

RPDs are within QC limits for MS/MSD.

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

Comments:

No %R results are outside QC limits.

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

Yes☐ No☒ N/A☐ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

EIE05

Laboratory Report Date:

26 July 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

EIE05

Laboratory Report Date:

26 July 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

The %Rs are within the project-specified QC limits for the project samples, with the following exception:

Extracted standard %R for13C3-PFBS is above QC limits in samples 19-MW-BKG-04-0716, 19-MW-BKG-07-0716, 19-MW-BKG-11-0716 and associated MS/MSD, indicating uncertain bias results. Sample results with detected Perfluorobutanesulfonic acid (PFBS) are qualified with QN indicating uncertain bias results.

Extracted standard %R for 13C8-PFOS, 13C6-PFDA, d3-NMeFOSAA, 13C7-PFUnDA, d5-NEtFOSAA, 13C2-PFDoDA, and 13C2-PFTeDA are below QC limits in sample 19PS-MW99-0716 indicating uncertain bias results. Sample result for perfluorooctanesulfonic acid (PFOS) is qualified with QN indicating uncertain bias results. However, sample results for perfluorodecanoic acid (PFDA), N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA), perfluoroundecanoic acid (PFUnA), N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA), and perfluorododecanoic acid (PFDoDA), and 13C2-PFTeDA are non-detect; therefore, results not qualified.

Extract standard %R for d3-NMeFOSAA, 13C7-PFUnDA, d5-NEtFOSAA, 13C2-PFDoDA, and 13C2-PFTeDA are below QC limits in samples 19-MW-BKG-12-0716 and 19-MW-BKG-11-0716 associated MS or MSD indicating uncertain bias results. However, sample results for NMeFOSAA, PFUnDA, NEtFOSAA, PFTeDA, and PFDoDA, are non-detect; therefore, results not qualified.

Injection standard 13C3-PFBA peak areas were below the lower area limits for project samples: 19-MW-BKG-04-0716, 19PS-MW99-0716, and 19-MW-BKG-07-0716, 19-MW-BKG-11-0716. Sample results for associated target analyte PFBS are qualified as QH for positive hits above the LOQ when injection standard peak areas are below the lower limit. Results are not qualified or flagged based on injection standard peak areas below limits when results are non-detect.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria, with the following exceptions:

- The ion ratios for sample 19PS-MW99-0716 are outside criteria for PFOA.
- The ion ratios for sample 19-MW-BKG-07-0716 are outside criteria for PFOA and PFHxA.
- The ion ratios for sample 19-MW-BKG-11-0716 are outside criteria for PFOA.

Results with ion ratio exceeding criteria are qualified as estimated and flagged J, indicating result are estimated due to matrix interference or the presence of isomers in the sample at different ratios than the ratio of isomers present in the calibration standard.

EIE05

Laboratory Report Date:

26 July 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

iv. Data quality or usability affected?

Comments:

Data are usable as qualified.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses, however, a PFAS trip blank 19PS-TBGW-0716 was transported in Cooler ID 003.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

PFAS trip blank 19PS-TBGW-0716 was transported in Cooler ID 003 is clearly identified on COC ID 003.

iii. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Trip blank results are below ½ LOQ.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

No trip blank results are above the LOQs

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected

EIE05

Laboratory Report Date:

26 July 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

One field duplicate sample was included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate sample are identified as follows:

- 19-MW-BKG-04-0716 and field duplicate sample 19PS-MW99-0716

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data are usable as qualified.

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

Yes☒ No☐ N/A☐ Comments:

The results for field blank 19PS-FBAM-0716 are non-detect for PFAS.

i. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Field blank results were all less than the LOQs.

EIE05

Laboratory Report Date:

26 July 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No samples affected.

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

2 August 2019

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

EIE06

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

EIE06

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete with the exception of the field teams relinquish signature. As a corrective action the field team sign and dated the CoC with the time they shipped the cooler and initialed the CoC indicating the correction and confirm they shipped the samples.

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One sample cooler was received at ELLE with the temperature blank at 1.4 degrees Celsius (°C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

EIE06

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

Sample 19-02MW11-0717 and associated MS/MSD were re-extracted due to extraction standards being outside the QC acceptance limits. Samples were re-extracted, the internal standard peak areas were outside the QC limits; therefore the original extraction reported.

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

EIE06

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples were included in this shipment.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

EIE06

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

EIE06

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist.

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

Comments:

No %R results are outside QC limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

EIE06

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

MS/MSD samples were prepared with a project sample in preparatory batch 19205018. The following water samples in extraction batch 19203018 were analyzed with project MS/MSD: 19-02MW11-0717, 19-MW-BKG-10-0717, 19-PS-MW99-0717, 19PS-FBPM-0717, 19-MW-BKG-09-0717, and 19PS-TBGW-0717.

MS/MSD samples were not prepared with a project sample in preparatory batch 19205017. The project requirements documented in the Quality Assurance Project Plan require MS/MSD in each extraction batch. In this case, the following samples were analyzed by drinking water method EPA 537 as requested on CoC and not by project specified EPA 537 modified in QSM Version 5.1 Table B-15, because the North Pole wells are drinking water wells. Enough sample volume to prepare MS/MSDs was not provided; therefore, the following samples in extraction batch 19205017 were analyzed without associated project MS/MSD: 19-NorthPoleWellA-0717 and 19-NorthPoleWellB-0717. No qualification will be performed on the basis of the lack of MS/MSD in this preparatory batch.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☐ No☒ N/A☐ Comments:

%Rs are within QC limits for MS/MSD, with the following exceptions:

The %Rs for perfluorohexanesulfonic acid (PFHxS), and perfluorohexanoic acid (PFHxA) and perfluorooctanoic acid (PFOA) are above QC limits for MSD samples prepared with primary soil sample 19-02MW11-0717. The results for PFHxS, PFHxA and PFOA are greater than 4 times the sample selected for spiking; therefore, no qualification has been performed.

EIE06

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

RPDs are within QC limits for MS/MSD.

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

Comments:

Project sample 19-02MW11-0717results for PFAS listed above have been qualified based on MS/MSD %R.

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

Yes☒ No☐ N/A☐ Comments:

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

Comments:

Data are usable as qualified.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

EIE06

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extracted standard %R for13C3-PFBS is above QC limits in associated MS/MSD for sample 19-02MW11-0717 and below QC in associated MS for 13C2-PFTeDA. MS/MSD sample results are not qualified based on extracted standard recoveries alone.

Extracted standard %R for d3-NMeFOSAA, 13C7-PFUnDA, d5-NEtFOSAA, 13C2-PFDoDA, and 13C2-PFTeDA are below QC limits in sample 19-02MW11-0717 indicating uncertain bias results. However, sample results for NMeFOSAA, PFUnDA, NEtFOSAA, PFDoDA, and PFTeDA are non-detect; therefore, results not qualified.

Extracted standard %R for d5-NEtFOSAA are below QC limits in sample 19-02MW11-0717 indicating uncertain bias results. Sample result for NMeFOSAA has been qualified as bias uncertain and flagged with QN.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria, with the following exception. The ion ratio for sample 19-MW-BKG-09-0717 is outside criteria for PFOA. The PFOA result for sample 19-MW-BKG-09-0717 is qualified as estimated and flagged J, indicating result are estimated due to matrix interference or the presence of isomers in the sample at different ratios than the ratio of isomers present in the calibration standard.

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

Yes☒ No☐ N/A☐ Comments:

Flags and qualifiers are defined above.

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

EIE06

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses, however, a PFAS trip blank 19PS-TBGW-0717 was transported in Cooler ID 004

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

PFAS trip blank 19PS-TBGW-0717 was transported in Cooler ID 004 is clearly identified on CoC ID 004.

iii. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Trip blank results are below ½ LOQ.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

No trip blank results are above the LOQs

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

One field duplicate sample was included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate sample are identified as follows:

- 19-MW-BKG-10-0717 and field duplicate sample 19PS-MW99-0717

EIE06

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)
Comments:

Data are usable as qualified.

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

Yes☒ No☐ N/A☐ Comments:

The results for field blank 19PS-FBPM-0717 are non-detect for PFAS.

i. All results less than LOQ and project specified objectives?

Yes☐ No☒ N/A☐ Comments:

Field blank results were all less than the LOQs.

ii. If above LOQ or project specified objectives, what samples are affected?
Comments:

No samples affected.

iii. Data quality or usability affected?
Comments:

Data quality and data usability are not affected.

EIE06

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

   a. Defined and appropriate?

      Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

2 August 2019

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

EIE07

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

EIE07

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete.

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One sample cooler was received at ELLE with the temperature blank at 3.1 degrees Celsius (°C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

EIE07

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

EIE07

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples were included in this shipment.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

EIE07

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

EIE07

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist.

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

Comments:

No %R results are outside QC limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

MS/MSD samples were prepared with a project sample in preparatory batch 19205025 and 1920518. The following water samples in extraction batch 19203025 were analyzed with project MS/MSD: 19-DSAP-13-0718, 19-DSAP-11-0718, 19-USAP-1-0718, 19PS-FBPM-0718, and 19PS-TBGW-0718.

For clarity, the following samples were prepared with a project sample in preparatory batch 19205018; however, the project sample and the MS/MSD were reported in SDG EIE06 and not in SDG EIE07: 19-DSAP-10-0718 and 19PS-MW99-0718. Data quality and data usability are not affected and project sample MS/MSD criteria meet for preparatory batch.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

EIE07

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☐ No☒ N/A☐ Comments:

%Rs are within QC limits for MS/MSD, with the following exception:

The %R for perfluorooctanesulfonic acid (PFOS) is above QC limits of MS sample prepared with primary soil sample 19-USAP-1-0718. The result for PFOS is greater than 4 times the sample selected for spiking; therefore, no qualification has been performed.

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

Yes☒ No☐ N/A☐ Comments:

RPDs are within QC limits for MS/MSD.

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

Comments:

No %R or RPD results are outside QC limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data are usable as qualified.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

EIE07

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %R for 13C2-PFTeDA is below project-specified QC limits in sample 19-USAP-1-0718 indicating potential uncertain bias. Sample result for associated target analyte perfluorotetradecanoic acid (PFTeDA) is non-detectable for this sample; therefore, result not qualified.

Extracted standards %R for d3-NMeFOSAA, 13C2-PFDoDA, and PFTeDA are below project-specified QC limits in project matrix spike and matrix spike duplicate sample (primary sample 19-USAP-1-0718). Sample results are not qualified based on extracted standard %R for MS/MSD quality control results alone.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria, with the following exceptions:

- The ion ratios for sample 19-DSAP-13-0718 are outside criteria for PFOA.
- The ion ratios for sample 19-DSAP-10-0718 are outside criteria for PFOA and PFHxA.
- The ion ratios for sample 19PS-MW99-0718 are outside criteria for PFOA.

Results with ion ratio exceeding criteria are qualified as estimated and flagged J, indicating result are estimated due to matrix interference or the presence of isomers in the sample at different ratios than the ratio of isomers present in the calibration standard."

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

Yes☒ No☐ N/A☐ Comments:

Potential flags are discussed above.

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

EIE07

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses, however, a PFAS trip blank 19PS-TBGW-0717 was transported in Cooler ID 004

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

PFAS trip blank 19PS-TBGW-0718 was transported in Cooler ID 005 is clearly identified on CoC ID 005.

iii. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Trip blank results are below ½ LOQ.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

No trip blank results are above the LOQs

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

One field duplicate sample was included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate sample are identified as follows:

- 19-USAP-1-0718 and field duplicate sample 19PS-MW99-0718

EIE07

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)
Comments:

Data are usable as qualified.

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

Yes☒ No☐ N/A☐ Comments:

The results for field blank sample 19PS-FBPM-0718 are non-detect for PFAS with the exception of PFOS. As a corrective action the field blank was re-extracted and re-analyzed and reported in SDG EIE08. The re-extracted results were non-detectable for PFAS. Because the associated samples were not re-extracted with this field blank, it could not be determined if the initial result for PFOS was due to a field error or a laboratory error; therefore, sample results for PFOS associated with 19PS-FBPM-0718 have been qualified based on original results. As is, results are qualified B indicating associated analyte results are considered a high biased estimated value due to contamination present in the field blank.

i. All results less than LOQ and project specified objectives?

Yes☐ No☒ N/A☐ Comments:

Field blank results are nondetect and below ½ LOQs, with the exception of PFOS.

ii. If above LOQ or project specified objectives, what samples are affected?
Comments:

Associated samples, 19-DSAP-13-0718, 19-DSAP-11-0718, 19-USAP-1-0718, 19PS-MW99-0718, and 19-DSAP-10-0718, have similar hits for PFOS; therefore, have been qualified as estimated biased high and flagged with a B indicating associated blank contamination.

EIE07

Laboratory Report Date:

16 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

2 August 2019

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

EIE08

Laboratory Report Date:

26 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

EIE08

Laboratory Report Date:

26 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete.

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One sample cooler was received at ELLE with the temperature blank at 3.1 degrees Celsius (°C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

EIE08

Laboratory Report Date:

26 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

This report is the re-extract and re-analyzes for field blank sample 19PS-FBPM-0718. This sample was re-extracted and re-analyzed due to similar associated sample results.

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

Yes☒ No☐ N/A☐ Comments:

No QC failures reported in this SDG.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

No corrective actions needed.

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

Comments:

EIE08

Laboratory Report Date:

26 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples were included in this shipment.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

EIE08

Laboratory Report Date:

26 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

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

Yes☐ No☐ N/A☒ Comments:

Precision for method is based on MS/MSD RPD; however, MS/MSD not performed on re-extraction of field blank.

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

Comments:

No %R results are outside QC limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

This is a re-extraction/re-analysis of 19PS-FBPM-0718; therefore, no project MS/MSD in this SDG.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

EIE08

Laboratory Report Date:

26 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☐ No☐ N/A☒ Comments:

This is a re-extraction/re-analysis of 19PS-FBPM-0718; therefore, no project MS/MSD in this SDG.

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

Yes☐ No☐ N/A☒ Comments:

This is a re-extraction/re-analysis of 19PS-FBPM-0718; therefore, no project MS/MSD RPD in this SDG.

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

Comments:

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

EIE08

Laboratory Report Date:

26 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes☒ No☐ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project sample.

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

Yes☐ No☐ N/A☒ Comments:

No extraction standard %R were outside QC limits.

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses, however, a PFAS trip blank 19PS-TBGW-0718 was transported in Cooler ID 005.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

PFAS trip blank 19PS-TBGW-0718 was transported in Cooler ID 005 is clearly identified on CoC ID 005.

iii. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Trip blank results are below ½ LOQ.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

No trip blank results are above the LOQs

EIE08

Laboratory Report Date:

26 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

This is a re-extraction/re-analysis of 19PS-FBPM-0718; therefore, no field duplicate reported in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality/usability are not affected.

EIE08

Laboratory Report Date:

26 August 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

The re-extracted results, for field blank 19PS-FBPM-0718, were non-detectable for PFAS. Because the associated samples were not re-extracted with this field blank, it could not be determined if the initial result for PFOS was due to a field error or a laboratory error; therefore, sample results for PFOS associated with 19PS-FBPM-0718 have been qualified based on original results. As is, results are qualified B indicating associated analyte results are considered a high biased estimated value due to contamination present in the field blank.

i. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

The re-extracted results, for field blank 19PS-FBPM-0718, were non-detectable for PFAS.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Associated samples, 19-DSAP-13-0718, 19-DSAP-11-0718, 19-USAP-1-0718, 19PS-MW99-0718, and 19-DSAP-10-0718, have similar hits for PFOS; therefore, have been qualified as estimated biased high and flagged with a B indicating associated blank contamination.

iii. Data quality or usability affected?

Comments:

Data are usable as qualified.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

23 November 2019

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

EIE09

Laboratory Report Date:

22 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

EIE09

Laboratory Report Date:

22 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One sample cooler was received at ELLE with the temperature blank at 2.4 degrees Celsius (°C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

EIE09

Laboratory Report Date:

22 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☒ No☐ N/A☐ Comments:

COC sample date for samples 19PS-TW17-1016, 19PS-TW18-1016, and 19PS-FBAM-1016 were corrected and changed from 15 Oct 1029 to 16 Oct 2019. Trip blanks are no longer deemed necessary for testing PFAS; therefore, COC trip blank sample 19PS-TBSW-1017 was cancelled.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

The recovery of extraction standard 13C2-PFTeDA is outside the QC acceptance limits for samples 19PS-TW17-1016 and 19PS-TW06-1016. The samples were re-extracted outside of the method holding time and the recovery of the extraction standards were within the QC acceptance limits. The data are reported from the initial trial and both sets of data are included in the data package.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

EIE09

Laboratory Report Date:

22 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples were included in this shipment.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

EIE09

Laboratory Report Date:

22 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

EIE09

Laboratory Report Date:

22 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist.

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

Comments:

No %R results are outside QC limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

EIE09

Laboratory Report Date:

22 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

MS/MSD samples were prepared with a project sample in preparatory batch 19300001 and 19302003. The following samples in extraction batch 19300001 were analyzed with project MS/MSD: 19PS-TW02-1015, 19PS-TW03-1015, 19PS-TW04-1015, 19PS-TW05-1015, 19PS-TW07-1015, 19PS-TW08-1015, 19PS-TW99-1015, 19PS-FBPM-1015.

MS/MSD samples were not prepared with a project sample in preparatory batch 19302003. The Quality Assurance Project Plan requires that a MS and MSD are included in each extraction batch. In this case, the laboratory separated project samples into multiple extraction batches and only had enough sample volume to prepare MS/MSDs as requested on the chain-of-custody record; therefore, the following samples in extraction batch 19302003 were analyzed without associated project MS/MSD: 19PS-TW06-1016, 19PS-TW09-1016, 19PS-TW13-1016, 19PS-TW14-1016, 19PS-TW15-1016, 19PS-TW17-1016, 19PS-TW18-1016, 19PS-TW98-1016, 19PS-FBAM-1016, 19PS-EB-1016. No qualification will be performed on the basis of the lack of MS/MSD in this preparatory batch.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

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

Yes☒ No☐ N/A☐ Comments:

RPDs are within QC limits for MS/MSD.

EIE09

Laboratory Report Date:

22 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

No %R or RPD results are outside QC limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

EIE09

Laboratory Report Date:

22 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

EIE09

Laboratory Report Date:

22 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Summary of Extracted Standards Outside QC limits.

Field Sample ID	Lab ID	Internal Standard	Percent Recovery	Criteria	Analyte	Sample Result [LOD] (ng/L)	Qualifier
19PS-TW02-1015	1181985	13C3-PFBS	160	50-150	PFBS	0.50 [0.94] J	QN
19PS-TW03-1015	1181986	d5-NEtFOSAA	158	50-150	NEtFOSAA	ND [0.95]	-
		13C3-PFBS	165	50-150	PFBS	0.51 [0.95] J	QN
19PS-TW03-1015MS	1181987	13C3-PFBS	164	50-150	PFBS	0.000020 [0.00000092]	-
19PS-TW03-1015MSD	1181988	13C3-PFBS	165	50-150	PFBS	0.000020 [0.00000092]	-
19PS-TW04-1015	1181989	13C3-PFBS	153	50-150	PFBS	0.55 [0.95] J	QN
19PS-TW06-1016	1181991	13C2-PFTeDA	40	50-150	PFTeDA	ND [0.96]	-
19PS-TW07-1015	1181992	13C3-PFBS	152	50-150	PFBS	ND [0.94]	-
		13C2-PFTeDA	32	50-150	PFTeDA	ND [0.94]	-
19PS-TW17-1016	1181998	13C2-PFTeDA	20	50-150	PFTeDA	ND [0.93]	-
19PS-TW99-1015	1182000	13C3-PFBS	167	50-150	PFBS	0.47 [0.90] J	QN

Notes:
As corrective action, the samples were re-extracted and re-analyzed. Original results reported, re-extraction and re-analysis results reported in raw data
LOD = limit of detection
ng/L= nanogram(s) per liter
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
PFBS = perfluorobutanesulfonic acid
PFTeDA = perfluorotetradecanoic acid
QN = The analyte result is considered an estimated value with uncertain bias due to a QC failure.

Results are qualified as bias uncertain and flagged with QN, for positive hits, when extraction standard % Rs are outside QC limits. Results are not qualified or flagged based on extraction standard %R when associated results are non-detect.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria, with the following exceptions:

- The ion ratios for sample 19PS-TW02-1015 are outside criteria for PFOA.
- The ion ratios for sample 19PS-TW03-1015 are outside criteria for PFHpA.

EIE09

Laboratory Report Date:

22 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

- The ion ratios for sample 19PS-TW04-1015 are outside criteria for PFOA.
- The ion ratios for sample 19PS-TW07-1015 are outside criteria for PFOA.
- The ion ratios for sample 19PS-TW08-1015 are outside criteria for PFOA.
- The ion ratios for sample 19PS-TW09-1016 are outside criteria for PFOA.
- The ion ratios for sample 19PS-TW15-1016 are outside criteria for PFOA.
- The ion ratios for sample 19PS-TW99-1015 are outside criteria for PFOA.

Results with ion ratio exceeding criteria are qualified as estimated and flagged J, indicating result are estimated due to matrix interference or the presence of isomers in the sample at different ratios than the ratio of isomers present in the calibration standard

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

Yes☒ No☐ N/A☐ Comments:

Results are qualified as bias uncertain and flagged with QN, for positive hits, when extraction standard % Rs are outside QC limits. Results are not qualified or flagged based on extraction standard %R when associated results are non-detect.

iv. Data quality or usability affected?

Comments:

Data are usable as qualified.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

This SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

This SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

No volatile analyses.

v. Data quality or usability affected?

Comments:

No volatile analyses.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Two field duplicate samples were included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate sample are identified as follows:

- 19PS-TW13-1016 and field duplicate sample 19PS-TW98-1016
- 19PS-TW03-1015 and field duplicate sample 19PS-TW99-1015

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

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data are usable as qualified.

EIE09

Laboratory Report Date:

22 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

An equipment blank was collected and identified as 19PS-EB-1016.
Field blanks were collected and identified as 19PS-FBPM-1015 and 19PS-FBAM-1016.

i. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No samples affected.

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

16 December 2019

Consultant Firm:

Sundance-EA II, LLC

Laboratory Name:

Eurofins Lancaster Laboratories Environmental

Laboratory Report Number:

EIE10

Laboratory Report Date:

16 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

EIE10

Laboratory Report Date:

16 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to Eurofins in Lancaster, Pennsylvania which is ADEC approved (17-027) and Department of Defense Environmental Laboratory Accreditation Program (A2LA Certificate No. 0001.01) accredited for the scoped methods.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete.

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   Three sample coolers were received at ELLE with the temperature blanks of 4.1, 3.1, and 2.7 degrees Celsius (^{o}C)

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)? 3.1, and

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

EIE10

Laboratory Report Date:

16 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

Injection standards were outside of the QC limits for both the initial extraction and the re-extraction, values were reported from the initial extraction and discussed further in the checklist

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

EIE10

Laboratory Report Date:

16 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

EIE10

Laboratory Report Date:

16 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

EIE10

Laboratory Report Date:

16 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☐ No☒ N/A☐ Comments:

%Rs are within QAPP WS#12 QC limits of 70-130 QC limits for LCS with the following exceptions:

- LCS %Rs for perfluorooctanesulfonic acid (PFOS), perfluoro-n-decanoic acid (PFDA) and perfluoro-n-hexanoic acid (PFHxA) in extraction batch 19305002 are slightly below the project-specified QC acceptance limits of 70-130%. Associated samples 19PS-TW29-1019, 19-TW30-1019, 19PS-TW28-1019, 19PS-TW27-1019, 19PS-TW22-1019, and 19PS-TW25-1019 were re-extracted outside of the method holding time.

- LCS %R for perfluorooctanesulfonic acid (PFOS) in extraction batch 19305003, is slightly below the project-specified QC acceptance limits of 70-130%. Associated samples 19PS-TW31-1020, 19PS-TW32-1020, 19PS-TW33-1020, 19PS-TW99-1020, 19PS-TW34-1020, 19PS-TW35-1020 were re-extracted outside of the method holding time.

The data are reported from the initial extraction due to re-extraction batches hold time exceedances and LCS %R recoveries below project-specified QC limits. The re-extraction batches were used for confirmation purposes. Sample results were qualified as estimated low bias and flagged with QL, due to low LCS %Rs.

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

Yes☐ No☐ N/A☒ Comments:

LCSD not required by method.

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

Comments:

Due to LCS low recovery associated samples, 19PS-TW31-1020,19PS-TW32-1020, 19PS-TW33-1020, 19PS-TW99-1020, 19PS-TW34-1020, 19PS-TW35-1020, 19PS-TW29-1019, 19-TW30-1019, 19PS-TW28-1019, 19PS-TW27-1019, 19PS-TW22-1019, and 19PS-TW25-1019 have been qualified.

EIE10

Laboratory Report Date:

16 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Sample results were qualified as estimated low bias and flagged with QL, due to LCS low recovery.

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

Comments:

Data usable as qualified.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

Project samples in this SDG were reported from multiple preparatory batches: 19305002, 19303002 and 19305003. MS/MSD samples from each of these preparatory batches were prepared with a project sample.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits WS #28 of 70-130 for MS/MSD, with the following exceptions:

The % R for perfluorodecanoic acid (PFDA), perfluorotridecanoic acid (PFTrDA), perfluorohexanesulfonic acid (PFHxS), N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA) are below QC limits for MS and/or MSD samples prepared with primary water sample 19PS-TW33-1020. The results for, PFDA, PFTrDA, PFHxS, and NEtFOSAA have been qualified as biased low and flagged with QL due to MS and/or MSD recovery.

EIE10

Laboratory Report Date:

16 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☒ N/A☐ Comments:

RPDs are within QC limits for MS/MSD, with the following exception:

The MS/MSD % RPD for PFTrDA exceed 30% for water; therefore, PFTrDA results for sample 19PS-TW33-1020 have been qualified as uncertain biased and flagged with QN.

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

Comments:

Project sample 19PS-TW33-1020 has been qualified based on MS/MSD %R and MS/MSD %RPD.

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

Yes☒ No☐ N/A☒ Comments:

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

Comments:

Data are usable as qualified.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected standards were added to the environmental, QC samples, and standards as required.

EIE10

Laboratory Report Date:

16 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

EIE10

Laboratory Report Date:

16 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Summary of Extracted Standards Outside QC Limits.

Field Sample ID	Lab ID	Internal Standard	Percent Recovery	Criteria	Analyte	Sample Result [LOD] (ng/L)	Qualifier
19PS-TW20-1018	1182042	13C2-PFDoDA	47	50-150	PFDoDA	ND [92]	-
		13C3-PFBS	534	50-150	PFBS	ND [92]	-
		13C2-PFTeDA	6	50-150	PFTeDA	ND [92]	-
19PS-TW11-1018	1182028	13C2-PFTeDA	40	50-150	PFTeDA	ND [0.98]	-
19PS-TW31-1020	1182029	13C3-PFBS	157	50-150	PFBS	13 [0.94]	QN
19PS-TW99-1018	1182043	13C3-PFBS	522	50-150	PFBS	ND [0.96]	-
		13C5-PFHxA	48	50-150	PFHxA	ND [0.96]	-
19PS-TW29-1019	1182037	13C3-PFBS	217	50-150	PFBS	ND [0.90]	-
		13C2-PFDoDA	45	50-150	PFDoDA	ND [0.90]	-
		13C2-PFTeDA	5	50-150	PFTeDA	ND [0.90]	-
19PS-TW30-1019	1182038	13C3-PFBS	232	50-150	PFBS	4.9 [1.3]	QN
19PS-TW27-1019	1182040	13C3-PFBS	222	50-150	PFBS	ND [92]	-
		13C2-PFDoDA	27	50-150	PFDoDA	ND [92]	-
		13C2-PFTeDA	1	50-150	PFTeDA	ND [92]	-
19PS-TW25-1019	1182045	13C3-PFBS	153	50-150	PFBS	5.5 [0.89]	QN
19PS-TW35-1020	1182036	13C3-PFBS	159	50-150	PFBS	ND [0.90]	-
19PS-TW34-1020	1182035	13C3-PFBS	171	50-150	PFBS	2.7[0.90]	QN
19PS-TW33-1020	1182031	13C3-PFBS	162	50-150	PFBS	0.99 [0.90]	QN
19PS-TW99-1020	1182034	13C3-PFBS	155	50-150	PFBS	1.0 [0.93]	QN
		13C2-PFTeDA	27	50-150	PFTeDA	ND [0.93]	-
19PS-TW32-1020	1182030	d5-NEtFOSAA	16	50-150	NEtFOSAA	ND [1.1]	-
		d3-NMeFOSAA	8	50-150	NMeFOSAA	ND [0.91]	-
		13C3-PFBS	158	50-150	PFBS	ND [0.91]	-
		13C7-PFUnDA	14	50-150	PFUnDA	ND [0.91]	-
		13C6-PFDA	38	50-150	PFDA	ND [0.91]	-
		13C2-PFDoA	3	50-150	PFDoA	ND [0.91]	-
		13C2-PFTeDA	0	50-150	PFTeDA	0.84 [0.91]	QN

Notes:
As corrective action, the samples were re-extracted and re-analyzed. Original results reported, re-extraction and re-analysis results reported in raw data
LOD = limit of detection
ng/L= nanogram(s) per liter

EIE10

Laboratory Report Date:

16 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

PFBS = perfluorobutanesulfonic acid
PFDoDA = Perfluorododecanoic acid
PFTeDA = perfluorotetradecanoic acid
PFHxA = Perfluorohexanoic acid
QN = The analyte result is considered an estimated value with uncertain bias due to a QC failure.

Results are qualified as bias uncertain and flagged with QN, for positive hits, when extraction standard % R are outside QC limits. Results are not qualified or flagged based on extraction standard %R when associated results are non-detect.

Injection standard 13C3-PFBA peak areas were below the lower area limits for project samples: 19PS-TW29-1019, 19PS-TW30-1019, 19PS-TW27-1019, 19PS-TW20-1018, and 19PS-TW99-1018. Sample results for associated target analyte PFBS are qualified as QH for positive hits above the LOQ when injection standard peak areas are below the lower limit. Results are not qualified or flagged based on injection standard peak areas below limits when results are non-detect.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria, with the following exceptions:

- The ion ratios for sample 19PS-TW29-1019 are outside criteria for PFHxA.
- The ion ratios for sample 19PS-TW30-1019 are outside criteria for PFOA.
- The ion ratios for sample 19PS-TW27-1019 are outside criteria for PFHxA.

Results with ion ratio exceeding criteria are qualified as estimated and flagged J, indicating result are estimated due to matrix interference or the presence of isomers in the sample at different ratios than the ratio of isomers present in the calibration standard.
Professional judgement is used to confirm positive detections when retention times exceed criteria, results were not qualified based on peaks and retention times. Results are not qualified when retention time exceeds criteria and results non-detect.

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

Yes☒ No☐ N/A☐ Comments:

See above for qualifications.

iv. Data quality or usability affected?

Comments:

Data are usable as qualified.

EIE10

Laboratory Report Date:

16 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

This SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

This SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

This SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

No volatile analyses.

v. Data quality or usability affected?

Comments:

No volatile analyses.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Two field duplicate samples were included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:

- 19PS-TW33-1020 and field duplicate sample 19PS-TW99-1020
- 19PS-TW20-1018 and field duplicate sample 19PS-TW99-1018

EIE10

Laboratory Report Date:

16 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)
Comments:

Data quality and data usability are not affected.

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

Yes☒ No☐ N/A☐ Comments:

Three equipment blanks associated with samples reported in this SDG were collected and identified as 19PS-EB-1018 and 19PS-EB-1020. The equipment blanks were reported in SDG EIE11.
Three field blanks associated with samples reported in this SDG were collected and identified as 19PS-FBPM-1018, 19PS-FBAM-1019, and 19PS-FBAM-1020. The field blanks were reported in SDG EIE11.

i. All results less than LOQ and project specified objectives?

Yes☐ No☒ N/A☐ Comments:

Project limits for blank results are less than ½ LOQs, with the following exceptions:
Results for PFOS for the equipment blank 19PS-EB-1020 are greater than ½ LOQ.

EIE10

Laboratory Report Date:

16 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Samples associated with the equipment blank, 19PS-EB-1020, include water samples from 20 October 2019 are reported in SDG EIE11: 19PS-TW31-1020, 19PS-TW32-1020, 19PS-TW33-1020, 19PS-TW99-1020, 19PS-TW34-1020, and 19PS-TW35-1020. Associated sample results for PFOS are greater than 10 times the equipment blank with the exception of 19PS-TW35-1020.

The PFOS results for associated sample 19PS-TW35-1020 was less than 10 times the equipment blank contamination. The PFOS and the aggregate PFOA/PFOS results have been qualified as potential high bias due to possible cross contamination and flagged with a B.

iii. Data quality or usability affected?

Comments:

Data are useable as qualified.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

11 December 2019

Consultant Firm:

Sundance-EA II, LLC

Laboratory Name:

Eurofins Lancaster Laboratories Environmental

Laboratory Report Number:

EIE11

Laboratory Report Date:

17 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

EIE11

Laboratory Report Date:

17 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to Eurofins in Lancaster, Pennsylvania which is ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (certificate number 0001.01) accredited for the scoped methods.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   Three sample coolers were received at ELLE with the temperature blanks at 4.1, 3.1, and 2.7 degrees Celsius (^{o}C)

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

EIE11

Laboratory Report Date:

17 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

EIE11

Laboratory Report Date:

17 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs.

EIE11

Laboratory Report Date:

17 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

EIE11

Laboratory Report Date:

17 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☐ No☒ N/A☐ Comments:

%R are within QAPP WS#12 QC limits of 70-130 with the following exceptions:

The extraction batches 19305002 and 19305003 LCS % R for perfluorooctanesulfonic acid (PFOS) perfluoro-n-decanoic acid (PFDA) and perfluoro-n-hexanoic acid (PFHxA) recovered below laboratory QC acceptance limits. Associated samples 19PS-TW23-1019, 19PS-TW99-1019, 19PS-TW26-1019, 19PS-TW01-1019, 19PS-TW24-1019, 19PS-FMAM-1019, 19PS-FBAM-1020 and 19PS-EB-1020 were re-extracted outside of the method holding time and the recovery of the LCS was within the QC acceptance limits. The data are reported from the initial trial and both sets of data are included in the data package. Sample results for PFOS, PFDA, and PFHxA were qualified as estimated low bias and flagged with QL, due to LCS low recovery.

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist.

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

Comments:

Project samples 19PS-TW23-1019, 19PS-TW99-1019, 19PS-TW26-1019, 19PS-TW01-1019, 19PS-TW24-1019, 19PS-FMAM-1019, 19PS-FBAM-1020 and 19PS-EB-1020 have been qualified based on LCS %R.

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

Yes☒ No☐ N/A☐ Comments:

Results for project samples, listed above, for PFOS, PFDA, and PFHxA were qualified as estimated low bias and flagged with QL, due to LCS low recovery.

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

Comments:

Data usable as qualified.

EIE11

Laboratory Report Date:

17 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

Project samples in this SDG were reported from multiple preparatory batches: 19305002, 19303002 and 19305003. MS/MSD samples from each of these preparatory batches were prepared with a project sample.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☐ No☒ N/A☐ Comments:

%Rs are within QAPP WS#28 QC limits of 70-130 for MS/MSD, with the following exceptions:

The %R for perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA), perfluoroheptanoic acid (PFHpA), perfluorobutanesulfonic acid (PFBS), perfluorohexanoic acid (PFHxA), perfluorodecanoic acid (PFDA), perfluoroundecanoic acid (PFUnA), perfluorododecanoic acid (PFDoDA), perfluorotridecanoic acid (PFTrDA), perfluorotetradecanoic acid (PFTeDA), N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA), N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA) are below QC limits for MS and/or MSD samples prepared with primary water sample 19PS-TW23-1019. The results for PFOA, PFNA, PFHpA, PFBS, PFHxA, PFDA, PFUnA, PFDoDA, PFTrDA, PFTeA, NMeFOSAA, and NEtFOSAA have been qualified as biased low and flagged with QL due to MS and/or MSD recovery.

The %Rs for perfluorohexanesulfonic acid (PFHxS) and perfluorooctanesulfonic acid (PFOS), of the sample selected for spiking, are greater than 4 times the spike amount; therefore, no qualification has been performed on PFHxS and PFOS.

EIE11

Laboratory Report Date:

17 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☒ N/A☐ Comments:

RPDs are within QC limits for MS/MSD, with the following exceptions:

The MS/MSD % RPD for PFOA, PFOS, PFNA, PFHpA, PFBS, PFHxA, PFHxS, PFDA, PFUnA, PFDoDA, PFTrDA, PFTA, NMeFOSAA, and NEtFOSAA results for exceeded 30% for water; therefore, PFOA, PFOS, PFNA, PFHpA, PFBS, PFHxA, PFHxS, PFDA, PFUnA, PFDoDA, PFTrDA, PFTA, NMeFOSAA, and NEtFOSAA results for sample 19PS-TW23-1019 have been qualified as uncertain biased and flagged with QN.

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

Comments:

Results for project sample selected for spiking, 19PS-TW23-1019, have been qualified based on MS/MSD %R and % RPD.

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

Yes☒ No☐ N/A☐ Comments:

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

Comments:

Data are usable as qualified.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected standards were added to the environmental, QC samples, and standards as required.

EIE11

Laboratory Report Date:

17 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %R for 13C2-PFTeDA is below project-specified QC limits in sample 19PS-TW23-1019. Result are not qualified or flagged based on isotope recovery when associated results are non-detect.

Extraction standard %R for 13C3-PFBS, 13C5-PFHxA, 13C3-PFHxS, 13C4-PFHpA, 13C8-PFOA, 13C8-PFOS, 13C9-PFNA, 13C6-PFDA, d3-NMeFOSAA, 13C7-PFUnDA, d5-NEtFOSAA, and 13C2-PFDoDA are above project-specified QC limits for MS sample 19PSTW23-1019MS. MS/MSD results are not qualified based on extraction standard %R; therefore, MS results are not qualified.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria.

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

Yes☐ No☐ N/A☒ Comments:

Sample results were not qualified based on extraction standard %R when results were non-detect and MS results are not qualified based on extraction standard % R alone.

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

This SDG did not include volatile analyses.

EIE11

Laboratory Report Date:

17 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

No volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

No volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

No volatile analyses.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

One field duplicate sample was included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:

- 19PS-TW23-1019 and field duplicate sample 19PS-TW99-1019

EIE11

Laboratory Report Date:

17 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☐ No☒ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits, with the following exceptions:

The RPDs for PFOS, Aggregate PFOA/PFOS, PFHxS, PFBS, and PFHxA results, between 19PS-TW22-1019 and field duplicate sample 19PS-TW99-1019, exceed 30% for water; therefore, results have been qualified as uncertain bias and flagged with QN.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)
Comments:

Data are usable as qualified.

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

Yes☒ No☐ N/A☐ Comments:

Two equipment blanks were collected and identified as 19PS-EB-1018 and 19PS-EB-1020.
Three field blanks were collected and identified as 19PS-FBPM-1018, 19PS-FBAM-1019 and 19PS-FBAM-1020.

i. All results less than LOQ and project specified objectives?

Yes☐ No☒ N/A☐ Comments:

Project limits for blank results are less than ½ LOQs, with the following exceptions:
Results for PFOS for the equipment blank 19PS-EB-1020 are greater than ½ LOQ.

EIE11

Laboratory Report Date:

17 December 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Samples associated with the equipment blank include water samples from 20 October 2019 reported in SDG EIE10: 19PS-TW31-1020, 19PS-TW32-1020, 19PS-TW33-1020, 19PS-TW99-1020, 19PS-TW34-1020, and 19PS-TW35-1020. Associated sample results for PFOS are greater than 10 times the equipment blank with the exception of 19PS-TW35-1020.

The PFOS results for associated sample 19PS-TW35-1020 was less than 10 times the equipment blank contamination. The PFOS and the aggregate PFOA/PFOS results have been qualified as potential high bias due to possible cross contamination and flagged with a B.

iii. Data quality or usability affected?

Comments:

Data are usable as qualified.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

19 December 2019

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

EIE12

Laboratory Report Date:

27 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

EIE12

Laboratory Report Date:

27 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete.

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   Three sample coolers were received at ELLE with the temperature blanks at 4.1, 3.1, and 2.7 degrees Celsius (^{o}C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

EIE12

Laboratory Report Date:

27 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

Injection standards were outside of the QC limits for both the initial extraction and the re-extraction, values were reported from the initial extraction and discussed further in the checklist.

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist. Re-extraction results are presented in hardcopy report and SEDDs. Re-extraction results are for confirmation purposes only, see section 6d ii.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

EIE12

Laboratory Report Date:

27 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☐ No☒ N/A☐ Comments:

Project soil samples 19PS-FFTA-ENT-SB09-1 and 19PS-FFTA-ENT-SB10-7 exceeded 28 project-specified days to analysis by 1 to 3 days. Sample results for samples, 19PS-FFTA-ENT-SB09-1 and 19PS-FFTA-ENT-SB10-7, have been qualified as uncertain bias low and flagged with QL due to hold time exceedances.

c. All soils reported on a dry weight basis?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data are usable as qualified.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

EIE12

Laboratory Report Date:

27 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs.

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

EIE12

Laboratory Report Date:

27 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist.

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

Comments:

No %R or RPD results are outside QC limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

EIE12

Laboratory Report Date:

27 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

MS/MSD samples were prepared with a project sample in preparatory batch 19303002 and 19309023. The following soil samples were analyzed with project MS/MSD: 19PS-FFTA-ENT-SB05-1, 19PS-FFTA-ENT-SB05-7.5, 19PS-FFTA-ENT-SB99-1017, 19PS-FFTA-ENT-SB07-1, 19PS-FFTA-ENT-SB07-7, 19PS-FFTA-ENT-SB08-1, 19PS-FFTA-ENT-SB08-8.5, 19PS-FFTA-ENT-SB09-6, 19PS-FFTA-ENT-SB06-1, 19PS-FFTA-ENT-SB06-7, 19PS-FFTA-ENT-SB10-1, 19PS-FFTA-ENT-SB98-1017. The water samples in extraction batch 19303002 were analyzed with project MS/MSD: 19PS-EB-1017, 19PS-FFTA-FBAM-1017, 19PS-TW16-1017, 19PS-TW19-1017.

MS/MSD samples were not prepared with a project sample in preparatory batch 19315009. The project requirements documented in the Quality Assurance Project Plan require MS/MSD in each extraction batch. In this case, the laboratory separated project samples into multiple extraction batches and only had enough sample volume to prepare MS/MSDs as requested on the chain-of-custody record; therefore, the following samples in extraction batch 19315009 were analyzed without associated project MS/MSD: 19PS-FTA-ENT-SB09-1 and 19PS-FFTA-SB9810-7. No qualification will be performed on the basis of the lack of MS/MSD in this preparatory batch.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☐ No☒ N/A☐ Comments:

%Rs are within QC limits for MS/MSD, with the following exceptions:

The %Rs for perfluorohexanesulfonic acid (PFHxS), and perfluorooctanoic acid (PFOA) are above QC limits for MS/MSD samples prepared with primary soil sample 19PS-FFTA-ENT-SB05-7.5. The results for PFHxS and PFOA are greater than 4 times the sample selected for spiking; therefore, no qualification has been performed.

The %Rs for perfluorobutanesulfonic acid (PFBS) and perfluoroheptanoic acid (PFHpA) are above QC limits for MS samples prepared with primary soil sample 19PS-FFTA-ENT-SB05-7.5. The results for PFBS and PFHpA have been qualified as biased high and flagged with QH.

EIE12

Laboratory Report Date:

27 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☒ N/A☐ Comments:

RPDs are within QC limits for MS/MSD, with the following exceptions:

The MS/MSD % RPD for PFBS, PFHpA, PFHxS, PFOA exceed 50% for soil; therefore, PFBS, PFHpA, PFHxS, and PFOA results for sample 19PS-FFTA-ENT-SB05-7.5 have been qualified as uncertain biased and flagged with QN.

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

Comments:

Project sample 19PS-FFTA-ENT-SB05-7.5 results for PFAS listed above have been qualified based on MS/MSD %R and MS/MSD %RPD.

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

Yes☒ No☐ N/A☐ Comments:

EIE12

Laboratory Report Date:

27 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

Data are usable as qualified.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required. The %Rs are within the project-specified QC limits for the project samples, with the following exception:

Extracted standard %R for 13C3-PFBS is above project-specified QC limits in MSD sample 19PS-TW19-1017 MSD. MS/MSD results are not qualified based on extraction standard % R; therefore, MSD result not qualified.

Injection standard 13C4-PFOS peak areas were below the lower area limits for project samples: 19PS-FFTA-ENT-SB09-6 and 19PS-FFTA-ENT-SB10-1. Sample results for associated target analyte PFOS are qualified as QN for positive hits above the LOQ when injection standard peak areas are below the lower limit. Results are not qualified or flagged based on injection standard peak areas below limits when results are non-detect.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria, with the following exceptions:

- The ion ratios for sample 19PS-FFTA-ENT-SB05-1 are outside criteria for PFHpA.
- The ion ratios for sample 19PS-FFTA-ENT-SB07-1 are outside criteria for PFNA.
- The ion ratios for sample 19PS-FFTA-ENT-SB08-1are outside criteria for PFOA and PFDA.
- The ion ratios for sample 19PS-FFTA-ENT-SB09-1 are outside criteria for PFNA.
- The ion ratios for sample 19PS-FFTA-ENT-SB09-6 are outside criteria for PFDA.
- The ion ratios for sample 19PS-FFTA-ENT-SB10-1 are outside criteria for PFOS, PFOA and PFDA.
- The ion ratios for sample 19PS-FFTA-ENT-SB10-7 are outside criteria for PFUnDA.
- The ion ratios for sample 19PS-FFTA-SB98-1017 are outside criteria for PFOA.

Results with ion ratios exceeding criteria are qualified as estimated and flagged J, indicating result are estimated due to matrix interference or the presence of isomers in the sample at different ratios than the ratio of isomers present in the calibration standard.

EIE12

Laboratory Report Date:

27 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

Extracted standard %R for 13C3-PFBS is above project-specified QC limits in MSD sample 19PS-TW19-1017 MSD.

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

Yes☐ No☒ N/A☐ Comments:

MSD results are not qualified based on extraction standard %R; therefore, no qualification necessary for MSD result.

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

This SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

This SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

No volatile analyses.

EIE12

Laboratory Report Date:

27 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

v. Data quality or usability affected?

Comments:

No volatile analyses.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Two field duplicate samples were included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:

- 19PS-FFTA-ENT-SB05-1 and field duplicate sample 19PS-FFTA-SB99-1017
- 19PS-FFTA-ENT-SB10-1 and field duplicate sample 19PS-FFTA-SB98-1017

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits, with the flowing exceptions:

The RPDs for PFOS results between 19PS-FFTA-ENT-SB10-1 and field duplicate sample 19PS-FFTA-SB98-1017 exceed 50%; therefore, results have been qualified as uncertain bias and flagged with QN.

The RPDs for PFOS, PFNA, and PFDA results between, 19PS-FFTA-ENT-SB05-1 and field duplicate sample 19PS-FFTA-SB99-1017 exceed 50%; therefore, results have been qualified as uncertain bias and flagged with QN.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data are usable as qualified.

EIE12

Laboratory Report Date:

27 November 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

An Equipment blank was collected and identified as 19PS-EB-1017.
Field blanks were collected and identified as 19PS-FFTA-FBAM-1017

i. All results less than LOQ and project specified objectives?

Yes☐ No☒ N/A☐ Comments:

The equipment blank, 19PS-EB-1017, was taken from soil-boring equipment and the results for PFOA, PFOS, and PFHxS are greater than ½ LOQs.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Soil boring samples associated with the equipment blank 19PS-EB-1017 from 17 October 2019 include: 19PS-FFTA-SB98-1017, 19PS-FFTA-ENT-SB05-1, 19PS-FFTA-SB99-1017, 19PS-FFTA-ENT-SB05-7.5, 19PS-FFTA-ENT-SB07-1, 19PS-FFTA-ENT-SB07-7, 19PS-FFTA-ENT-SB08-1, 19PS-FFTA-ENT-SB08-8.5, 19PS-FFTA-ENT-SB09-1, 19PS-FFTA-ENT-SB09-6, 19PS-FFTA-ENT-SB06-1, 19PS-FFTA-ENT-SB06-7, 19PS-FFTA-ENT-SB10-1, 19PS-FFTA-SB98-1017, and 19PS-FFTA-ENT-SB10-7.

Samples with positive results for PFOA, PFOS, and PFHxS that are less than 10 times equipment blank contamination have been qualified as potential high bias due to possible cross contamination and flagged with a B.

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

2 January 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

EIE13

Laboratory Report Date:

20 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

EIE13

Laboratory Report Date:

20 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete.

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   Sample cooler was received at ELLE with the temperature blanks at 0.6 degrees Celsius (°C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

EIE13

Laboratory Report Date:

20 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

EIE13

Laboratory Report Date:

20 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☐ No☒ N/A☐ Comments:

Project soil sample, 19PS-FST1-SB06-7, PFOS result reported at a dilution of 100, exceeded the 28 project-specified days to analysis by 3 days. The PFOS result for sample, 19PS-FST1-SB06-7, has been qualified as uncertain bias low and flagged with QL due to hold time exceedances.

c. All soils reported on a dry weight basis?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data are usable as qualified.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

EIE13

Laboratory Report Date:

20 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs.

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

EIE13

Laboratory Report Date:

20 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☐ No☒ N/A☐ Comments:

%Rs are within QAPP WS#12 QC limits of 70-130 QC limits for LCS with the following exception:

The extraction batch 19305003 LCS % R for perfluorooctanesulfonic acid (PFOS) recovered below laboratory QC acceptance limits. Associated samples 19PS-EB-1021 and 19PS-FBPM-1021 were re-extracted outside of the method holding time and the recovery of the LCS was within the QC acceptance limits. The data are reported from the initial trial and both sets of data are included in the data package. Sample results were qualified as estimated low bias and flagged with QL, due to LCS low recovery.

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist.

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

Comments:

No %R results are outside QC limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

EIE13

Laboratory Report Date:

20 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

MS/MSD samples were prepared with a project samples in preparatory batches 19305003 and 19316006.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD, with the following exceptions:

The %Rs for perfluorooctanesulfonic acid (PFOS) is above QC limits for MS/MSD samples prepared with primary soil sample 19PS-FST1-SB05-8. The result for PFOS is greater than 4 times spike concentration; therefore, no qualification has been performed.

The %Rs for perfluorohexanesulfonic acid (PFHxS), and perfluorooctanoic acid (PFOA) are above QC limits for MS/MSD samples prepared with primary soil sample 19PS-FST1-SB05-8. The result for PFHxS and PFOA have been qualified as biased high and flagged with QH.

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

Yes☐ No☒ N/A☐ Comments:

RPDs are within QC limits for MS/MSD.

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

Comments:

The PFOS result for 19PS-FST1-SB05-8 has been qualified as biased high and flagged with QH.

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

Yes☒ No☐ N/A☐ Comments:

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

Comments:

Data are usable as qualified.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exception:

Extracted standard %R for d3-NMeFOSAA, and d5-NEtFOSAA are above project-specified QC limits in sample 19PS-FST1-SB04-8. As a corrective action, the sample was re-extracted and re-analyzed outside of hold time with similar results. Sample results for N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA) and N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA) are non detectable; therefore, no qualification has been performed. Results reported from initial extraction batch and analytical batch.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria, with the following exception:

- The ion ratios for sample 19PS-FST1-SB04-8 are above criteria for perfluorooctanesulfonic acid (PFOS).

Positive result above the LOQ with ion ratio exceeding criteria are qualified as estimated and flagged QN, indicating result are estimated due to matrix interference or the presence of isomers in the sample at different ratios than the ratio of isomers present in the calibration standard.

EIE13

Laboratory Report Date:

20 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Flags and qualifiers are defined above.

iv. Data quality or usability affected?

Comments:

Data are usable as qualified.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

This SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

This SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

No volatile analyses.

v. Data quality or usability affected?

Comments:

No volatile analyses.

EIE13

Laboratory Report Date:

20 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

One field duplicate sample was included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:

- 19PS-FST1-SB05-01 and field duplicate sample 19PS-FST1-SB99-1021.

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality or usability are not affected.

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

Yes☒ No☐ N/A☐ Comments:

An equipment blank was collected and identified as 19PS-EB-1021.
A field blank was collected and identified as 19PS-FBPM-1021

i. All results less than LOQ and project specified objectives?

Yes☐ No☒ N/A☐ Comments:

The PFOS result for the equipment blank 19PS-EB-1021 was greater than ½ LOQs.

EIE13

Laboratory Report Date:

20 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Project soil samples associated to the equipment blank (19PS-EB-1021) include soil boring samples from 21 October. Samples 19PS-FST1-SB05-1, 19PS-FST1-SB05-8, 19PS-FST1-SB06-1, 19PS-FST1-SB06-7, 19PS-FST1-SB04-1, 19PS-FST1-SB04-8, 19PS-FST1-SB07-1, 19PS-FST1-SB07-8, 19PS-FST1-SB02-1, 19PS-FST1-SB02-7, 19PS-FST1-SB03-1, 19PS-FST1-SB03-6, 19PS-FST1-SB02-1, and 19PS-FST1-SB99-1021 have PFOS results greater than 10 times the PFOS detected in the associated equipment blank; therefore no qualification necessary.
The equipment blank was taken from soil-boring equipment.

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

2 January 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

EIE14

Laboratory Report Date:

13 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

EIE14

Laboratory Report Date:

13 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete.

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   Sample cooler was received at ELLE with the temperature blanks at 5.8 degrees Celsius (°C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

EIE14

Laboratory Report Date:

13 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

EIE14

Laboratory Report Date:

13 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality and data usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs.

EIE14

Laboratory Report Date:

13 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QAPP WS#12 QC limits of 70-130 for LCS.

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist.

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

Comments:

No %R results are outside QC limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

MS/MSD samples were prepared with a project samples in preparatory batch 19311003.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

EIE14

Laboratory Report Date:

13 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD, with the following exceptions:

The %Rs for perfluorohexanesulfonic acid (PFHxS) and perfluorooctanoic acid (PFOA) are above QC limits for MS/MSD samples prepared with primary soil sample 19PS-FFTA-ENT-SB04-6.5. The results for PFHxS and PFOA are greater than 4 times the sample selected for spiking; therefore, no qualification has been performed.

The %Rs for perfluorooctanesulfonic acid (PFOS) exceed QC limits for MS/MSD samples prepared with primary soil sample 19PS-FFTA-ENT-SB04-6.5. The PFOS MS %R was below limits and MSD %R exceeded limits; therefore, PFOS result for 19PS-FFTA-ENT-SB04-6. has been qualified as estimated with uncertain bias and flagged with QN.

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

Yes☐ No☒ N/A☐ Comments:

RPDs are within QC limits for MS/MSD, with the following exceptions:

The MS/MSD % RPD for PFHxS, PFOS, and PFOA exceed 30%; therefore, PFHxS, PFOS, and PFOA detected results for sample 19PS-FFTA-ENT-SB04-6.5 have been qualified as uncertain bias and flagged with QN.

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

Comments:

The PFOS result for 19PS-FFTA-ENT-SB04-6.5 has been qualified and flagged with QN due to MS/MSD %R. The PFHxS, PFOS, and PFOA detected results for 19PS-FFTA-ENT-SB04-6.5 associated field duplicate sample 19PS-FFTA-SB99-1027 have been qualified as uncertain bias and flagged with QN due to MS/MSD % RPD.

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

Yes☒ No☐ N/A☐ Comments:

EIE14

Laboratory Report Date:

13 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Comments:

Data are usable as qualified.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes☒ No☐ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples.
The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria, with the following exception:

The PFOS retention time, for project sample 19PS-FFTA-SB99-1027, between the EIS retention time and analyte, (when calculated from the expected retention time as presented in the "Retention Time Table" of laboratory report) exceeded criteria. In this case, results were not rejected as prescribed in the QAPP Table 2 General Criteria for Qualifying Sample Data. Using professional judgement, when retention times exceeded criteria, detected results, peaks, data, and reanalysis were reviewed to determine if the result was a detect. PFOS result has been qualified as QN as an estimated value with uncertain basis.

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

Yes☐ No☐ N/A☒ Comments:

Labeled isotope extracted and injected internal standards %R were within project specified QC limits for project samples.

iv. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

EIE14

Laboratory Report Date:

13 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

This SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

This SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

No volatile analyses.

v. Data quality or usability affected?

Comments:

No volatile analyses.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

One field duplicate sample was included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:

- 19PS-FFTA-ENT-SB04-1 and field duplicate sample 19PS-FST1-SB99-1027.

EIE14

Laboratory Report Date:

13 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits, with the following exceptions:

Primary and field duplicate % RPD for PFOS exceeds 50% for soil; therefore, PFOS result for 19PS-FFTA-ENT-SB04-1 and field duplicate sample 19PS-FSTA-SB99-1027 have been qualified as uncertain biased and flagged with QN.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)
Comments:

Data are usable as qualified.

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

Yes☐ No☐ N/A☒ Comments:

Equipment was only used on soil boring SB04 on 27 October 2019; therefore no decontamination blank needed.

i. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

No decontamination blank required for this SDG.

ii. If above LOQ or project specified objectives, what samples are affected?
Comments:

iii. Data quality or usability affected?
Comments:

Data quality and data usability are not affected.

EIE14

Laboratory Report Date:

13 December 2019

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

   a. Defined and appropriate?

      Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Sean Arnold

Title:

Scientist II

Date:

24 June 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

EIE15

Laboratory Report Date:

28 April 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

EIE15

Laboratory Report Date:

28 April 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One cooler was received at ELLE with the temperature blank at 2.2 degrees Celsius (^{o}C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

EIE15

Laboratory Report Date:

28 April 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist

c. Were all corrective actions documented?

Yes☐ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

EIE15

Laboratory Report Date:

28 April 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs.

EIE15

Laboratory Report Date:

28 April 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Method blank results less than LOQ, no samples affected.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganics analysis were included in this SDG.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist

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

Comments:

No samples were affected due to %R or RPD limits.

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

Yes☐ No☐ N/A☒ Comments:

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

Comments:

Data quality or usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

EIE15

Laboratory Report Date:

28 April 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

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

Comments:

%R and RPDs are within QC limits for MS/MSD.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected

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

Comments:

Data quality or usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required. The %Rs are within the project-specified QC limits for the project samples.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria, with the following exceptions:

- The ion ratios for sample 20-DSAP-8S-0416 are outside criteria for PFOA.

Results with ion ratio exceeding criteria are qualified as estimated and flagged J, indicating results are estimated due to matrix interference or the presence of isomers in the sample at different ratios than the ratio of isomers present in the calibration standard

The PFOS retention time for sample 20-DSAP-8S-0416 exceeded criteria. Sample 20-DSAP-8S-0416, result for PFOS is an estimated positive detection.

EIE15

Laboratory Report Date:

28 April 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

Labeled isotope extracted and injected internal standards %R were within project specified QC limits for project samples.

iv. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

EIE15

Laboratory Report Date:

28 April 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

One field duplicate sample was included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:

- 20-DSAP-14-0416 and field duplicate sample 20PS-MW99-0416

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality or usability are not affected.

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

Yes☐ No☐ N/A☒ Comments:

The results for field blank 20PS-FBAM-0416 are non-detect for PFAS.

EIE15

Laboratory Report Date:

28 April 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

i. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Field blank sample 20PS-FBAM-0416 results are non-detect and below ½ LOQ.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Sean Arnold

Title:

Scientist II

Date:

24 June 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

EIE16

Laboratory Report Date:

28 May 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

EIE16

Laboratory Report Date:

28 May 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One cooler was received at ELLE with the temperature blank at 3.8 degrees Celsius (^{o}C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

EIE16

Laboratory Report Date:

28 May 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

EIE16

Laboratory Report Date:

28 May 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs.

EIE16

Laboratory Report Date:

28 May 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Method blank results less than LOQ, no samples affected.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganics analysis were included in this SDG.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

EIE16

Laboratory Report Date:

28 May 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist

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

Comments:

No samples were affected due to %R or RPD limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality or usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

EIE16

Laboratory Report Date:

28 May 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☐ No☒ N/A☐ Comments:

%Rs are within QC limits for MS/MSD, with the following exception:

The %R for perfluorotridecanoic acid (PFTrA) is below QC limits for the MSD sample prepared with primary soil sample 20-USAP-3-0512. Sample result for PFTrA has been qualified as estimated with low bias, QL.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☐ No☒ N/A☐ Comments:

RPDs are within QC limits for MS/MSD, with the following exception:
The RPD for perfluorotridecanoic acid (PFTrA) is above QC limits for the MS/MSD samples prepared with primary soil sample 20-USAP-3-0512. The primary sample result was non-detect; therefore, no qualification is necessary based on the RPD exceedance.

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

Comments:

Sample 20-USAP-3-0512 has been qualified due to MSD %R outside QC limits.

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

Yes☒ No☐ N/A☐ Comments:

The result for PFTrA, sample listed above, is qualified QL indicating associated analyte result is considered a low biased estimated value.

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

Comments:

Data are usable as qualified.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

EIE16

Laboratory Report Date:

28 May 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☒ No☐ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %R for 13C2-PFDoDA is below project-specified QC limits in sample 20-USAP-3-0512, indicating potential uncertain bias. Sample result for associated target analyte, perfluorododecanoic acid (PFDoDA), are non-detectable for this sample, therefore result not qualified.
Extraction standard %Rs for 13C2-PFTeDA are below project-specified QC limits in samples 20-USAP-3-0512 and 20PS-MW99-0512, indicating potential uncertain bias. Sample results for associated target analyte, perfluorotetradecanoic acid (PFTeDA), are non-detectable for these samples, therefore results not qualified.
Extraction standard %R for 13C3-PFBS is above project-specified QC limits in sample 20-USAP-3-0512 indicating potential uncertain bias. The sample result for associated target analyte, perfluorobutanesulfonic acid (PFBS), is qualified as estimated and flagged with QN.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria, with the following exceptions:

- The ion ratios for sample 20-USAP-3-0512 are outside criteria for PFOA.

Results with ion ratio exceeding criteria are qualified as estimated and flagged J, indicating result are estimated due to matrix interference or the presence of isomers in the sample at different ratios than the ratio of isomers present in the calibration standard.

The PFOS retention time for sample 20-USAP-3-0512 exceeded criteria. Sample 20-USAP-3-0512, result for PFOS is an estimated positive detection.

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

Yes☒ No☐ N/A☐ Comments:

Results are qualified as bias uncertain and flagged with QN, for positive hits, when extraction standard %Rs are low. Results are not qualified or flagged based on low extraction standard %Rs when associated results are non-detect.

iv. Data quality or usability affected?

Comments:

Data are usable as qualified.

EIE16

Laboratory Report Date:

28 May 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

One field duplicate sample was included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:

- 20-USAP-3-0512 and field duplicate sample 20PS-MW99-0512

EIE16

Laboratory Report Date:

28 May 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)
Comments:

Data quality or usability are not affected.

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

Yes☒ No☐ N/A☐ Comments:

The results for field blank 20PS-FBAM-0512 are non-detect for PFAS.

i. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Field blank sample 20PS-FBAM-0512 results are non-detect and below ½ LOQ.

ii. If above LOQ or project specified objectives, what samples are affected?
Comments:

iii. Data quality or usability affected?
Comments:

Data quality and data usability are not affected.

EIE16

Laboratory Report Date:

28 May 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

   a. Defined and appropriate?

      Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

8 September 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

EIE17

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

EIE17

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One cooler was received at ELLE with the temperature blank at 0.2 degrees Celsius (^{o}C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

EIE17

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

EIE17

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs.

EIE17

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCSs.

EIE17

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

The RPD between the soil LCS and LCSD was within project-specific requirements

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

Comments:

No %R results are outside QC limits. The soil RPD between the LCS/LCSD was not outside QC limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

This SDG contains IDW samples only; therefore, no project samples in this SDG were selected for spiking

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

EIE17

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☐ No☐ N/A☒ Comments:

No project MS/MSD results are associated this SDG.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☐ No☐ N/A☒ Comments:

.RPDs between MS and MSD are not evaluated when based on non-project samples

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

Comments:

No samples were affected due to %R or RPD.

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

Yes☐ No☐ N/A☒ Comments:

No samples were affected due to %R or RPD.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

EIE17

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria.

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

Yes☐ No☐ N/A☒ Comments:

Extracted and injected internal standards were within project-specified limits.

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

EIE17

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☐ No☒ N/A☐ Comments:

This SDG contains IDW samples only; therefore, no field duplicates were submitted for this SDG

ii. Submitted blind to lab?

Yes☐ No☐ N/A☒ Comments:

No field duplicates were submitted for this SDG

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

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☐ No☐ N/A☒ Comments:

No field duplicates were submitted for this SDG

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality or usability are not affected.

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

Yes☐ No☐ N/A☒ Comments:

No decontamination or equipment blanks were submitted in this SDG.

EIE17

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

i. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

No decontamination or equipment blanks were submitted in this SDG.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

9 September 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

EIE18

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

EIE18

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One cooler was received at ELLE with the temperature blank at 1.6 degrees Celsius (^{o}C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

EIE18

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

EIE18

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs.

EIE18

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCSs.

EIE18

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

The EPA 537.1 mod method for water does not require LCSD; therefore, RPD not reported for water method analysis.
The soil LCS/LCSD RPD was within project-specific requirements.

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

Comments:

No %R results are outside QC limits. The soil RPD between the LCS/LCSD was not outside QC limits.

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

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

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

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

This SDG contains IDW water samples only; therefore, no project samples in this SDG were selected for spiking

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

EIE18

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☐ No☐ N/A☒ Comments:

No project MS/MSD results are associated this SDG.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☐ No☐ N/A☒ Comments:

.RPDs between MS and MSD are not evaluated when based on non-project samples

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

Comments:

No samples were affected due to %R or RPD.

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

Yes☐ No☐ N/A☒ Comments:

No samples were affected due to %R or RPD.

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

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

EIE18

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exception:

The Extracted standard %R for 13C2-PFTeDA is below project -specified QC limits in sample 20PS-IDWW-MW02D indicating uncertain bias. Sample results for associated target analyte perfluorotetradecanoic acid (PFTeDA) are non-detectable for this sample, therefore results are not qualified.

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

Yes☐ No☐ N/A☒ Comments:

Extracted and injected internal standards were within project-specified limits.

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected

e. Trip Blanks

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

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

EIE18

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☐ No☒ N/A☐ Comments:

This SDG contains IDW samples only; therefore, no field duplicates were submitted for this SDG.

ii. Submitted blind to lab?

Yes☐ No☐ N/A☒ Comments:

No field duplicates were submitted for this SDG

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

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☐ No☐ N/A☒ Comments:

No field duplicates were submitted for this SDG

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality or usability are not affected.

EIE18

Laboratory Report Date:

9 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☐ No☐ N/A☒ Comments:

No decontamination or equipment blanks were submitted in this SDG.

i. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

No decontamination or equipment blanks were submitted in this SDG.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

9 September 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

EIE19

Laboratory Report Date:

11 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

EIE19

Laboratory Report Date:

11 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

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

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

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

   Yes☒ No☐ N/A☐ Comments:

   One cooler was received at ELLE with the temperature blank at 2.9 degrees Celsius (°C).

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

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

EIE19

Laboratory Report Date:

11 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

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

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

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

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

EIE19

Laboratory Report Date:

11 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

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

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☒ No☐ N/A☐ Comments:

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs.

EIE19

Laboratory Report Date:

11 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCSs.

EIE19

Laboratory Report Date:

11 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from LCS/LCSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes☐ No☐ N/A☒ Comments:

The RPD between the soil LCS and LCSD was within project-specific requirements.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

No %R results are outside QC limits. The soil RPD between the LCS/LCSD was not outside QC limits.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

This soil IDW sample was selected by the laboratory for MS and MSD analysis. No water project samples in this SDG were selected for spiking

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

EIE19

Laboratory Report Date:

11 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

Soil MS/MSD %R were within project-specified limits.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

.RPDs were within project-specified limits between MS and MSD soil results.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

No samples were affected due to %R or RPD.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

No samples were affected due to %R or RPD.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

EIE19

Laboratory Report Date:

11 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exception:

The extracted standard %Rs for 13C3-PFBS, 13C4-PFHpA, 13C9-PFNA, d5-NEtFOSAA are above project -specified QC limits in sample 20PS-IDWW04 indicating uncertain bias. Sample results for associated target analyte perfluorobutanesulfonic acid (PFBS), perfluoroheptanoic acid (PFHpA), and perfluorononanoic acid (PFNA) have been qualified as uncertain and flagged with QN for positive detects. Sample results for associated target analyte N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA) are non-detectable for this sample, therefore results are not qualified.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria, with the following exceptions:

- The ion ratios for sample 20PS-IDWW04 are outside criteria for PFHpA.

Results with ion ratio exceeding criteria are qualified as estimated and flagged J, indicating result are estimated due to matrix interference or the presence of isomers in the sample at different ratios than the ratio of isomers present in the calibration standard.

iii. Do the sample results with failed surrogate/IDA recoveries have data flags? If so, are the data flags clearly defined?

Yes☒ No☐ N/A☐ Comments:

Results are qualified as bias uncertain and flagged with QN, for positive hits, when extracted standard recoveries are outside project-specified criteria. Results are not qualified or flagged based on extraction standard recoveries outside project-specified criteria when associated results are non-detect.

iv. Data quality or usability affected?

Comments:

Data are usable as qualified.

e. Trip Blanks

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

EIE19

Laboratory Report Date:

11 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☐ No☒ N/A☐ Comments:

This SDG contains IDW samples only; therefore, no field duplicates were submitted for this SDG.

ii. Submitted blind to lab?

Yes☐ No☐ N/A☒ Comments:

No field duplicates were submitted for this SDG

EIE19

Laboratory Report Date:

11 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Precision – All relative percent differences (RPD) less than specified project objectives? (Recommended: 30% water, 50% soil)

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☐ No☐ N/A☒ Comments:

No field duplicates were submitted for this SDG

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality or usability are not affected.

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes☐ No☐ N/A☒ Comments:

No decontamination or equipment blanks were submitted in this SDG.

i. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

No decontamination or equipment blanks were submitted in this SDG.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

EIE19

Laboratory Report Date:

11 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

   a. Defined and appropriate?

      Yes☒ No☐ N/A☐ Comments:

a. Laboratory Data Review Checklist

Completed By:

Sean Arnold

Title:

Scientist II

Date:

25 June 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

EIE20

Laboratory Report Date:

03 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

EIE20

Laboratory Report Date:

03 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

2. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   Yes☒ No☐ N/A☐ Comments:

Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

Samples were not transferred.

3. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   Yes☒ No☐ N/A☐ Comments:

CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

Correct analyses were requested on the CoC.

4. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   Yes☒ No☐ N/A☐ Comments:

One cooler was received at ELLE with the temperature blank at 2.9 degrees Celsius (^{o}C).

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   Yes☒ No☐ N/A☐ Comments:

Samples were received properly preserved.

EIE20

Laboratory Report Date:

03 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

5. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

b. Discrepancies, errors, or QC failures identified by the lab?

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

EIE20

Laboratory Report Date:

03 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

6. Samples Results

a. Correct analyses performed/reported as requested on COC?

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

7. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Project limits for method blank results are less than ½ LOQs.

EIE20

Laboratory Report Date:

03 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the ½ LOQs.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganics analysis were included in this SDG.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

EIE20

Laboratory Report Date:

03 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from LCS/LCSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

No samples were affected due to %R or RPD limits.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality or usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

EIE20

Laboratory Report Date:

03 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

No samples were affected due to %R or RPD limits.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality or usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

EIE20

Laboratory Report Date:

03 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☒ No☐ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %Rs for d5-NEtFOSAA is above project-specified QC limits in samples 20PS-MW02C-0521,20PS-MW99-0521, and 20PS-EB-0522 indicating uncertain bias. The sample result for associated target analyte, N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA), are non-detectable for these samples, therefore results are not qualified.

Extraction standard %Rs for 13C2-PFTeDA is above project-specified QC limits in samples 20PS-MW02D-0524 and 20PS-MW99-0524 indicating uncertain bias. The sample result for associated target analyte, perfluorotetradecanoic acid (PFTeDA), are non-detectable for these samples, therefore results are not qualified.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria.

iii. Do the sample results with failed surrogate/IDA recoveries have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

Labeled isotope extracted and injected internal standards %R were within project specified QC limits or did not require qualification based on project sample results.

iv. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

e. Trip Blanks

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

EIE20

Laboratory Report Date:

03 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Two field duplicate samples were included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:

- 20PS-MW02C-0521 and field duplicate sample 20PS-MW99-0521
- 20PS-MW02D-0524 and field duplicate sample 20PS-MW99-0524

EIE20

Laboratory Report Date:

03 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. Precision – All relative percent differences (RPD) less than specified project objectives? (Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)
Comments:

Data quality or usability are not affected.

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes☒ No☐ N/A☐ Comments:

The results for three field blanks, 20PS-FBPM-0521, 20PS-FBAM-0522 and 20PS-FBPM-0524, and one equipment blank, 20PS-EB-0522, are non-detect for PFAS.

i. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Field blank and equipment blank sample results are non-detect and below ½ LOQ.

ii. If above LOQ or project specified objectives, what samples are affected?
Comments:

iii. Data quality or usability affected?
Comments:

Data quality and data usability are not affected.

EIE20

Laboratory Report Date:

03 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

8. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

   a. Defined and appropriate?

      Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

24 June 2020

Consultant Firm:

Sundance-EA JV II

Laboratory Name:

Eurofins Lancaster Laboratories Environmental (ELLE)

Laboratory Report Number:

EIE21

Laboratory Report Date:

08 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

EIE21

Laboratory Report Date:

08 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to ELLE in Lancaster, Pennsylvania, who holds ADEC Contaminated Sites Laboratory Approval 17-027 and DoD ELAP (A2LA Certificate No. 0001.01) for the scoped methods

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   Yes☒ No☐ N/A☐ Comments:

   CoC information was complete

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

   Correct analyses were requested on the CoC.

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   Yes☒ No☐ N/A☐ Comments:

   One cooler was received at ELLE with the temperature blank at 5.8 degrees Celsius (^{o}C).

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

EIE21

Laboratory Report Date:

08 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

b. Discrepancies, errors, or QC failures identified by the lab?

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist

c. Were all corrective actions documented?

Yes☐ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

EIE21

Laboratory Report Date:

08 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☐ No☒ N/A☐ Comments:

Method Blank batch number 20153002 had detections for perfluorohexanesulfonic acid (PFHxS) less than ½ the LOQ and had detections for perfluorooctane sulfonic acid (PFOS) greater than ½ the LOQ.

EIE21

Laboratory Report Date:

08 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Samples from batch 20153002: 20PS-FBAM-0526, 20PS-FBPM-0527, 20PS-TW99-0527, 20PS-TW46-0526, 20PS-TW47-0526, 20PS-TW48-0526, 20PS-TW58-0526, 20PS-TW50-0527, 20PS-TW53-0527, 20PS-TW57-0527, 20PS-TW56-0527, 20PS-TW51-0527, PFHxS and PFOS results have been qualified due to MB detects.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☒ No☐ N/A☐ Comments:

Results for PFHxS and PFOS, samples listed above, are qualified B indicating associated analyte results are considered a high biased estimated value due to contamination present in the method blank.

v. Data quality or usability affected?

Comments:

Data are usable as qualified.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

EIE21

Laboratory Report Date:

08 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from LCS/LCSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

No %R results are outside QC limits

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

EIE21

Laboratory Report Date:

08 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

RPDs are within QC limits for MS/MSD.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

Labeled isotope extracted and injected internal standards were added to the environmental, QC samples, and standards as required.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project samples, with the following exceptions:

Extraction standard %R for 13C2-PFDoDA and13C2-PFTeDA are below project-specified QC limits in sample 20PS-TW53-0527 indicating potential uncertain bias. Sample result for associated target analyte perfluorododecanoic acid (PFDoDA) and perfluorotetradecanoic acid (PFTeDA) are non-detectable for this sample, therefore result not qualified.

Extraction standard %R for 13C6-PFDA. 13C7-PFUnDA, 13C2-PFDoDA and13C2-PFTeDA are below project-specified QC limits in sample 20PS-TW56-0527 indicating potential uncertain bias. Sample result for associated target analyte perfluorodecanoic acid (PFDA), perfluoroundecanoic acid (PFUnDA), perfluoroundecanoic acid (PFUnA), N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA), PFDoDA, PFTeDA, are non-detectable for this sample, therefore result not qualified.

Extracted standards %R for 13C2-PFDoDA and13C2-PFTeDA are below project-specified QC limits in project matrix spike duplicate (MSD) sample (primary sample 20PS-TW46-0526). Sample results are not qualified based on extracted standard %R for MSD quality control results alone.

The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria, with the following exceptions:

The PFOA ion ratio for samples 20PS-TW50-0527, 20PS-TW99-0527, 20PS-TW56-0527, and 20PS-TW51-0527 exceeds laboratory criteria. Results for PFOA are qualified with a J flag indicating results are estimated positive detections.

The PFOS retention time for samples 20PS-TW99-0527, 20PS-TW48-0526, 20PS-TW49-0526, 20PS-TW50-0527, 20PS-TW57-0527, and 20PS-TW56-0527 exceeds 0.1 minutes. Results for PFOS are qualified with a J flag indicating results are estimated positive detections.

iii. Do the sample results with failed surrogate/IDA recoveries have data flags? If so, are the data flags clearly defined?

Yes☒ No☐ N/A☐ Comments:

EIE21

Laboratory Report Date:

08 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

iv. Data quality or usability affected?

Comments:

Data are usable as qualified.

e. Trip Blanks

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

Methods included within this SDG did not include volatile analyses.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Three field duplicate samples were included in this SDG

EIE21

Laboratory Report Date:

08 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:
20PS-TW46-0526 and field duplicate sample 20PS-TW99-0526
20PS-TW50-0527 and field duplicate sample 20PS-TW99-0527
20PS-TW55-0528 and field duplicate sample 20PS-TW99-0528

iii. Precision – All relative percent differences (RPD) less than specified project objectives? (Recommended: 30% water, 50% soil)

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and data usability are not affected.

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes☒ No☐ N/A☐ Comments:

The results for field blank 20PS-FBAM-0526 are non-detect for PFAS with the exception of perfluorobutanesulfonic acid (PFBS), perfluoroheptanoic acid (PFHpA), perfluorohexanesulfonic acid (PFHxS), perfluorohexanoic acid (PFHxA), perfluorooctane sulfonate (PFOS), and perfluorooctanoic acid (PFOA). Sample results for PFBS, PFHpA, PFHxS, PFHxA, PFOS, and PFOA associated with 20PS-FBAM-0526 are qualified B indicating associated analyte results are considered a high biased estimated value due to contamination present in the field blank.

The results for field blank 20PSFBPM-0527 are non-detect for PFAS with the exception of PFHxS and PFOA. Sample results for PFHxS and PFOA associated with 20PS-FBPM-0527 are qualified B indicating associated analyte results are considered a high biased estimated value due to contamination present in the field blank.

EIE21

Laboratory Report Date:

08 June 2020

CS Site Name:

Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid Site Inspection, Eielson Air Force Base, Alaska

i. All results less than LOQ and project specified objectives?

Yes☐ No☒ N/A☐ Comments:

Field blank sample 20PS-FBAM-0526 results are non-detect and below ½ LOQ, with the exception of PFBS, PFHpA, PFHxS, PFHxA, PFOS, and PFOA.
Field blank sample 20PS-FBPM-0527 results are non-detect and below ½ LOQ, with the exception of PFHxS and PFOA.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Samples associated with field blank sample 20PS-FBAM-0526 with detects < 10 x the FB include: 20PS-TW46-0526, ~~20PS-TW46-0526~~, 20PS-TW47-0526, 20PS-TW48-0526, 20PS-TW49-0526, and 20PS-TW58-0526. Sample results <10X the FB result have been qualified as estimated biased high and flagged with a B indicated associated blank contamination.

Samples associated with field blank sample 20PS-FBPM-0527 with detects <10X the FB ~~inlcude~~ include 20PS-TW50-0527, 20PS-TW99-0527, 20PS-TW51-0527, 20PS-TW53-0527, 20PS-TW56-0526 and 20PS-TW57-0527. Sample results <10X the FB result have been qualified as estimated biased high and flagged with a B indicated associated blank contamination.

iii. Data quality or usability affected?

Comments:

Data are usable as qualified.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

23 November 2019

Consultant Firm:

EA Engineering, Science, and Technology, Inc., PBC

Laboratory Name:

SGS North America Inc. Orlando, Florida

Laboratory Report Number:

FA69540

Laboratory Report Date:

9 November 2019

CS Site Name:

Perfluorooctanoic Acid **(**PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

ADEC File Number:

Hazard Identification Number:

FA69540

Laboratory Report Date:

9 November 2019

CS Site Name:

Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   Yes☒ No☐ N/A☐ Comments:

   Samples were shipped to SGS in Orlando, Florida, which holds DoD ELAP (A2LA Certificate No. L2229) for scoped methods.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred.

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   Yes☒ No☐ N/A☐ Comments:

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   Yes☒ No☐ N/A☐ Comments:

   Sample coolers were received at SGS with the temperature blank at 4.4 degrees Celsius (^{o}C)

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   Yes☒ No☐ N/A☐ Comments:

   Samples were received properly preserved.

FA69540

Laboratory Report Date:

9 November 2019

CS Site Name:

Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

Samples were received in good condition and no discrepancies were noted.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

b. Discrepancies, errors, or QC failures identified by the lab?

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

FA69540

Laboratory Report Date:

9 November 2019

CS Site Name:

Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

FA69540

Laboratory Report Date:

9 November 2019

CS Site Name:

Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the LOQs.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

FA69540

Laboratory Report Date:

9 November 2019

CS Site Name:

Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from LCS/LCSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

No %R or RPD results are outside QC limits.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

FA69540

Laboratory Report Date:

9 November 2019

CS Site Name:

Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

RPDs are within QC limits for MS/MSD.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

No %R or RPD results are outside QC limits.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

FA69540

Laboratory Report Date:

9 November 2019

CS Site Name:

Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes☒ No☐ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project.
The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria.

iii. Do the sample results with failed surrogate/IDA recoveries have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

%R for labeled isotope extracted and injected internal standards were within QC limits.

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

e. Trip Blanks

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes☐ No☐ N/A☒ Comments:

This SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

This SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

No volatile analyses.

FA69540

Laboratory Report Date:

9 November 2019

CS Site Name:

Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

v. Data quality or usability affected?

Comments:

No volatile analyses.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Two field duplicate samples were included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:

- 19PS-MW02A-1026 and field duplicate sample 19PS-MW99-1026.
- 19PS-MW02B-1027 and field duplicate sample 19PS-MW99-1027.

iii. Precision – All relative percent differences (RPD) less than specified project objectives? (Recommended: 30% water, 50% soil)

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and data usability are not affected.

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes☒ No☐ N/A☐ Comments:

Equipment blank was collected and identified as 19PS-EB-1026.
Field blanks were collected and identified as 19PS-FBPM-1026 and 19PS-FBAM-1027.

FA69540

Laboratory Report Date:

9 November 2019

CS Site Name:

Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) Site Inspection, Eielson Air Force Base, Alaska

i. All results less than LOQ and project specified objectives?

Yes☐ No☒ N/A☐ Comments:

Perfluorooctanesulfonic acid (PFOS) is detected above the LOQ in field blank sample 19PS-FBAM-1027 at 0.0126 micrograms per liter.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Associated samples, 19PS-MW02B-1027, 19PS-MW99-1027, and 19PS-IDW01, are non-detect for PFOS; therefore, no impact or qualification to associated samples.

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

Laboratory Data Review Checklist

Completed By:

Eileen Maus

Title:

Chemist III

Date:

23 November 2019

Consultant Firm:

EA Engineering, Science, and Technology, Inc., PBC

Laboratory Name:

SGS North America Inc., Orlando, Florida

Laboratory Report Number:

FA69547

Laboratory Report Date:

18 November 2019

CS Site Name:

Eielson Air Force Base

ADEC File Number:

Hazard Identification Number:

FA69547

Laboratory Report Date:

18 November 2019

CS Site Name:

Eielson Air Force Base

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   Yes☒ No☐ N/A☐ Comments:

Samples were shipped to SGS in Orlando, Florida, which holds DoD ELAP (A2LA Certificate No. L2229) for scoped methods.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

Samples were not transferred.

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   Yes☒ No☐ N/A☐ Comments:

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   Yes☒ No☐ N/A☐ Comments:

Sample coolers were received at SGS with the temperature blank at 4.2 degrees Celsius (^{o}C)

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   Yes☒ No☐ N/A☐ Comments:

Samples were received properly preserved.

FA69547

Laboratory Report Date:

18 November 2019

CS Site Name:

Eielson Air Force Base

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

Yes☒ No☐ N/A☐ Comments:

Samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☒ No☐ N/A☐ Comments:

Sample receipt identified the COC sample ID "19PS-MW01A-1029" and the bottle ID "19PS-MW02B-1029" did not match. The bottle ID was corrected to match the COC, field notes confirmed.

e. Data quality or usability affected?

Comments:

Data quality or usability are not affected.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

b. Discrepancies, errors, or QC failures identified by the lab?

Yes☒ No☐ N/A☐ Comments:

QC failures were identified in the case narrative and are discussed further in this checklist.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

QC issues identified in the case narrative are discussed further in this checklist.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

Issues identified in case narrative and their effect on data usability are discussed further in relevant sections of this checklist.

FA69547

Laboratory Report Date:

18 November 2019

CS Site Name:

Eielson Air Force Base

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

No soil samples reported in this SDG.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

FA69547

Laboratory Report Date:

18 November 2019

CS Site Name:

Eielson Air Force Base

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No blank results were reported above the LOQs.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

No samples are affected.

v. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for LCS.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from LCS/LCSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes☐ No☐ N/A☒ Comments:

RPD are reported based on MS/MSD and discussed further in this checklist.

FA69547

Laboratory Report Date:

18 November 2019

CS Site Name:

Eielson Air Force Base

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

No %R or RPD results are outside QC limits.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

No sample data are affected.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality and data usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

No metals/inorganic analyses were included in this report.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

%Rs are within QC limits for MS/MSD.

FA69547

Laboratory Report Date:

18 November 2019

CS Site Name:

Eielson Air Force Base

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

RPDs are within QC limits for MS/MSD.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

No %R or RPD results are outside QC limits.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

No %R or RPD results are outside QC limits.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality and data usability are not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes☒ No☐ N/A☐ Comments:

The %Rs are within the project-specified QC limits for the project.
The retention times are within the QC limits for project samples and the ion ratios for each detect reported did not exceed criteria.

FA69547

Laboratory Report Date:

18 November 2019

CS Site Name:

Eielson Air Force Base

iii. Do the sample results with failed surrogate/IDA recoveries have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

%R for labeled isotope extracted and injected internal standards were within QC limits.

iv. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

e. Trip Blanks

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes☐ No☐ N/A☒ Comments:

This SDG did not include volatile analyses.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

This SDG did not include volatile analyses.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

No volatile analyses.

v. Data quality or usability affected?

Comments:

No volatile analyses.

FA69547

Laboratory Report Date:

18 November 2019

CS Site Name:

Eielson Air Force Base

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

Two field duplicate samples were included in this SDG.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The original and field duplicate samples are identified as follows:

- 19PS-MW01B-103 and field duplicate sample 19PS-MW99-1030
- 19PS-MW01A-1029 and field duplicate sample 19PS-MW99-1029

iii. Precision – All relative percent differences (RPD) less than specified project objectives? (Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

RPDs for field duplicate and original sample results above the LOQs were within QC limits.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and data usability are not affected.

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes☒ No☐ N/A☐ Comments:

Equipment blank not necessary for last day of sampling deep cluster wells.
Field blanks were collected and identified as 19PS-FBPM-1029 and 19PS-FBPM-1030.

i. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

FA69547

Laboratory Report Date:

18 November 2019

CS Site Name:

Eielson Air Force Base

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

iii. Data quality or usability affected?

Comments:

Data quality and data usability are not affected.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

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Attachment K-2
Sample Summary Table

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Attachment K-2. Sample Summary

LocationID	Sample Ending Depth (ft bgs)	Field Sample ID	Date/Time	Method	Matrix	Container	NPDL Number	QC Type	MS/ MSD	Primary Sample ID	Laboratory Name	SDG	Lab Sample ID	Preservative	Cooler Name	Sampler Initials	Turnaround time
CS01	1	20PS-CS01-0912	09/12/2020 12:15:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	410-13937-1	410-13937-9	None	E-1	NR/TH	10
CS02	1	20PS-CS-02-0912	09/12/2020 11:56:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-13937-1	410-13937-8	None	E-1	NR/TH	10
DSAP-8D	61	20PS-DSAP-8D-0912	09/12/2020 14:51:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-13937-1	410-13937-13	None	E-1	NR/TH	10
DSAP-8S	16.5	20PS-DSAP-8S-0911	09/11/2020 16:55:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-13937-1	410-13937-5	None	E-1	DC	10
Equipment Blank	- -	20PS-EB-0911	09/11/2020 17:11:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Equipment Blank	No	- -	ELLE	410-13937-1	410-13937-6	None	E-1	DC	10
Field Blank	- -	20PS-FBAM-0911	09/11/2020 11:31:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-13937-1	410-13937-1	None	E-1	DC	10
Field Blank	- -	20PS-FBPM-0912	09/12/2020 12:27:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-13937-1	410-13937-12	None	E-1	NR/TH	10
MW02A	51	20PS-MW02A-0911	09/11/2020 12:13:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	410-13937-1	410-13937-2	None	E-1	DC	10
MW02B	108.5	20PS-MW02B-0911	09/11/2020 13:17:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-13937-1	410-13937-4	None	E-1	DC	10
CS01	1	20PS-MW97-0912	09/12/2020 14:27:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-CS-01-0912	ELLE	410-13937-1	410-13937-11	None	E-1	NR/TH	10
USAP-1	24.5	20PS-MW98-0912	09/12/2020 14:13:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-USAP-1-0912	ELLE	410-13937-1	410-13937-10	None	E-1	NR/TH	10
MW02A	51	20PS-MW99-0911	09/11/2020 12:16:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-MW02A-0911	ELLE	410-13937-1	410-13937-3	None	E-1	DC	10
USAP-1	24.5	20PS-USAP-1-0912	09/12/2020 10:02:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-13937-1	410-13937-7	None	E-1	NR/TH	10
Field Blank	- -	20PS-FBAM-0913	09/13/2020 10:02:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-14108-1	410-14108-1	None	E-2	NR/TH	10
Field Blank	- -	20PS-FBPM-0914	09/14/2020 12:57:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-14108-1	410-14108-11	None	E-2	NR/TH	10
MW01A	57	20PS-MW01A-0913	09/13/2020 10:56:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	410-14108-1	410-14108-2	None	E-2	NR/TH	10
MW01B	108	20PS-MW01B-0913	09/13/2020 13:11:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14108-1	410-14108-4	None	E-2	NR/TH	10
MW26	17	20PS-MW26-0914	09/14/2020 18:16:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14108-1	410-14108-9	None	E-2	NR/TH	10
MW27	- -	20PS-MW27-0914	09/14/2020 15:36:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14108-1	410-14108-8	None	E-2	NR/TH	10
MW28	18.5	20PS-MW28-0914	09/14/2020 13:31:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14108-1	410-14108-7	None	E-2	NR/TH	10
MW29	12	20PS-MW29-0913	09/13/2020 16:01:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14108-1	410-14108-5	None	E-2	NR/TH	10
MW30	19	20PS-MW30-0914	09/14/2020 11:40:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14108-1	410-14108-6	None	E-2	NR/TH	10
MW30	19	20PS-MW95-0914	09/14/2020 13:04:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-MW30-0914	ELLE	410-14108-1	410-14108-10	None	E-2	NR/TH	10
MW01A	57	20PS-MW96-0913	09/13/2020 11:16:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-MW01A-0913	ELLE	410-14108-1	410-14108-3	None	E-2	NR/TH	10
Field Blank	- -	20PS-FBAM-0917	09/17/2020 09:17:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-14670-1	410-14670-1	None	E-3	NR/TH	10
Field Blank	- -	20PS-FBPM-0918	09/18/2020 13:01:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-14670-1	410-14670-16	None	E-3	NR/TH	10
HCMW01-15	13.5	20PS-HCMW01-15-0918	09/18/2020 11:18:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14670-1	410-14670-9	None	E-3	NR/TH	10
HCMW01-75	71	20PS-HCMW01-75-0918	09/18/2020 11:33:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14670-1	410-14670-10	None	E-3	NR/TH	10
HCMW02-15	13.5	20PS-HCMW02-15-0918	09/18/2020 15:31:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14670-1	410-14670-13	None	E-3	NR/TH	10
HCMW02-75	70.5	20PS-HCMW02-75-0918	09/18/2020 15:47:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14670-1	410-14670-14	None	E-3	NR/TH	10
HCMW04-15	12	20PS-HCMW04-15-0918	09/18/2020 13:25:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14670-1	410-14670-11	None	E-3	NR/TH	10
HCMW04-75	70.5	20PS-HCMW04-75-0918	09/18/2020 13:39:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14670-1	410-14670-12	None	E-3	NR/TH	10
MW22	19	20PS-MW22-0917	09/17/2020 12:46:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14670-1	410-14670-4	None	E-3	NR/TH	10
MW24	14.5	20PS-MW24-0917	09/17/2020 15:20:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14670-1	410-14670-6	None	E-3	NR/TH	10
MW25	13	20PS-MW25-0917	09/17/2020 16:30:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14670-1	410-14670-7	None	E-3	NR/TH	10
MW31	17	20PS-MW31-0917	09/17/2020 09:59:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	410-14670-1	410-14670-2	None	E-3	NR/TH	10
MW32	18	20PS-MW32-0917	09/17/2020 11:05:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14670-1	410-14670-3	None	E-3	NR/TH	10
MW33	14	20PS-MW33-0917	09/17/2020 14:08:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14670-1	410-14670-5	None	E-3	NR/TH	10
HCMW04-15	12	20PS-MW93-0918	09/18/2020 15:14:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-HCMW04-15-0918	ELLE	410-14670-1	410-14670-15	None	E-3	NR/TH	10
MW31	17	20PS-MW94-0917	09/17/2020 10:14:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-MW31-0917	ELLE	410-14670-1	410-14670-8	None	E-3	NR/TH	10
CS-03	- -	20PS-CS-03-0919	09/19/2020 16:29:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14665-1	410-14665-6	None	E-4	NR/TH	10
Field Blank	- -	20PS-FBAM-0919	09/19/2020 10:01:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-14665-1	410-14665-1	None	E-4	NR/TH	10
HCMW03-15	8	20PS-HCMW03-15-0919	09/19/2020 13:11:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14665-1	410-14665-4	None	E-4	NR/TH	10
HCMW03-75	67	20PS-HCMW03-75-0919	09/19/2020 13:01:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14665-1	410-14665-5	None	E-4	NR/TH	10
HCMW05-15	9	20PS-HCMW05-15-0919	09/19/2020 10:29:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	410-14665-1	410-14665-2	None	E-4	NR/TH	10
HCMW05-75	70	20PS-HCMW05-75-0919	09/19/2020 10:49:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-14665-1	410-14665-3	None	E-4	NR/TH	10
CS03	1	20PS-MW91-0919	09/19/2020 18:14:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-CS-03-0912	ELLE	410-14665-1	410-14665-8	None	E-4	NR/TH	10
TW46	23	20PS-MW92-0919	09/19/2020 08:14:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-HCMW05-75-0919	ELLE	410-14665-1	410-14665-7	None	E-4	NR/TH	10
Equipment Blank	- -	20PS-EB-0921	09/21/2020 16:18:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Equipment Blank	No	- -	ELLE	410-15101-1	410-15101-7	None	E-5	NR/TH	5
Field Blank	- -	20PS-FBAM-0923	09/23/2020 09:14:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-15101-1	410-15101-8	None	E-5	NR/TH	5
Field Blank	- -	20PS-FBPM-0921	09/21/2020 12:47:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-15101-1	410-15101-1	None	E-5	NR/TH	5
MW07	13	20PS-MW07-0921	09/21/2020 10:58:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	410-15101-1	410-15101-2	None	E-5	NR/TH	5
MW08	11.5	20PS-MW08-0921	09/21/2020 12:10:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-15101-1	410-15101-3	None	E-5	NR/TH	5
MW09	15	20PS-MW09-0921	09/21/2020 13:42:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-15101-1	410-15101-4	None	E-5	NR/TH	5
MW10	12	20PS-MW10-0921	09/21/2020 15:03:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-15101-1	410-15101-5	None	E-5	NR/TH	5
MW11	10.5	20PS-MW11-0923	09/23/2020 10:45:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-15101-1	410-15101-10	None	E-5	NR/TH	5
MW12	12	20PS-MW12-0923	09/23/2020 09:44:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-15101-1	410-15101-9	None	E-5	NR/TH	5
MW14	11	20PS-MW14-0923	09/23/2020 15:45:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-15101-1	410-15101-14	None	E-5	NR/TH	5
MW18	13	20PS-MW18-0923	09/23/2020 12:08:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-15101-1	410-15101-11	None	E-5	NR/TH	5
MW19	12	20PS-MW19-0923	09/23/2020 14:08:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-15101-1	410-15101-13	None	E-5	NR/TH	5
MW20	12.5	20PS-MW20-0923	09/23/2020 13:02:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-15101-1	410-15101-12	None	E-5	NR/TH	5
MW12	12	20PS-MW89-0923	09/23/2020 08:00:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-MW12-0923	ELLE	410-15101-1	410-15101-15	None	E-5	NR/TH	5
MW07	13	20PS-MW90-0921	09/21/2020 07:31:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-MW07-0921	ELLE	410-15101-1	410-15101-6	None	E-5	NR/TH	5
Equipment Blank	- -	20PS-EB-0925	09/25/2020 19:22:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Equipment Blank	No	- -	ELLE	410-15361-1	410-15361-12	None	E-6	NR	5
Field Blank	- -	20PS-FBPM-0924	09/24/2020 12:25:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-15361-1	410-15361-1	None	E-6	NR	5
Field Blank	- -	20PS-FBPM-0925	09/25/2020 15:15:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-15361-1	410-15361-10	None	E-6	NR	5
MW01	12	20PS-MW01-0924	09/24/2020 11:43:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	410-15361-1	410-15361-2	None	E-6	NR	5
MW03	11	20PS-MW03-0924	09/24/2020 15:33:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-15361-1	410-15361-4	None	E-6	NR	5
MW13	14	20PS-MW13-0925	09/25/2020 19:16:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-15361-1	410-15361-9	None	E-6	NR	5

LocationID	Sample Ending Depth (ft bgs)	Field Sample ID	Date/Time	Method	Matrix	Container	NPDL Number	QC Type	MS/ MSD	Primary Sample ID	Laboratory Name	SDG	Lab Sample ID	Preservative	Cooler Name	Sampler Initials	Turnaround time
MW15	14	20PS-MW15-0925	09/25/2020 18:08:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-15361-1	410-15361-8	None	E-6	NR	5
MW17	11.5	20PS-MW17-0925	09/25/2020 14:58:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-15361-1	410-15361-7	None	E-6	NR	5
MW-2	7	20PS-MW-2-0924	09/24/2020 12:59:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-15361-1	410-15361-3	None	E-6	NR	5
MW23	8	20PS-MW23-0924	09/24/2020 17:09:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-15361-1	410-15361-5	None	E-6	NR	5
MW17	11.5	20PS-MW87-0925	09/25/2020 11:10:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-MW17-0925	ELLE	410-15361-1	410-15361-11	None	E-6	NR	5
MW01	12	20PS-MW88-0924	09/24/2020 08:40:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-MW01-0924	ELLE	410-15361-1	410-15361-6	None	E-6	NR	5
Equipment Blank	- -	20PS-EB-1029	10/29/2020 11:15:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Equipment Blank	No	- -	ELLE	410-19226-1	410-19226-1	None	E-7	NS	5
Equipment Blank	- -	20PS-EB-1030	10/30/2020 16:50:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Equipment Blank	No	- -	ELLE	410-19226-1	410-19226-10	None	E-7	BRL	5
Field Blank	- -	20PS-FBAM-1030	10/30/2020 10:57:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-19226-1	410-19226-9	None	E-7	BRL	5
Field Blank	- -	20PS-FBAM-1031	10/31/2020 11:00:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-19226-1	410-19226-11	None	E-7	NS/BRL	5
Field Blank	- -	20PS-FBPM-1029	10/29/2020 15:15:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-19226-1	410-19226-4	None	E-7	BRL	5
IDW	- -	20PS-IDWW-1029	10/29/2020 14:15:00	1	Water	x2 250 mL wide mouth HDPE	19-023	IDW	No	- -	ELLE	410-19226-1	410-19226-2	None	E-7	NS	5
MW02	10.76	20PS-MW02-1029	10/29/2020 17:32:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-19226-1	410-19226-5	None	E-7	BRL	5
MW04	10.4	20PS-MW04-1031	10/31/2020 11:13:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-19226-1	410-19226-12	None	E-7	NS/BRL	5
MW05	12.37	20PS-MW05-1030	10/30/2020 10:07:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-19226-1	410-19226-7	None	E-7	BRL	5
MW06	11.03	20PS-MW06-1029	10/29/2020 14:53:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	410-19226-1	410-19226-3	None	E-7	BRL	5
MW06	11	20PS-MW99-1029	10/29/2020 12:00:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-MW06-1029	ELLE	410-19226-1	410-19226-6	None	E-7	BRL	5
MW05	12.37	20PS-MW99-1030	10/30/2020 12:00:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-MW05-1030	ELLE	410-19226-1	410-19226-8	None	E-7	BRL	5
MW04	10.4	20PS-MW99-1031	10/31/2020 11:30:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-MW04-1031	ELLE	410-19226-1	410-19226-13	None	E-7	NS/BRL	5
AP-6078	16.8	19PS-AP-6078-0530	05/30/2019 16:47:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	EIE02	1071735	None	E-2	GM	10
AP-6078	16.8	19PS-MW99-0530	05/30/2019 08:00:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	19PS-AP-6078-0530	ELLE	EIE02	1071740	None	E-2	GM	10
Trip Blank	- -	19PS-TB-0530	05/30/2019 08:00:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Trip Blank	No	- -	ELLE	EIE02	1071739	None	E-2	GM	10
Field Blank	- -	19PS-FBPM-0530	5/30/2019 16:16	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	EIE02	1071738	None	E-2	GM	10
MW-BKG-01	19.2	19-MW-BKG-01-0716	07/16/2019 16:05:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE05	1105022	None	003	GG	5
MW-BKG-04	18	19-MW-BKG-04-0716	07/16/2019 09:30:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE05	1105015	None	003	GG	5
MW-BKG-07	20	19-MW-BKG-07-0716	07/16/2019 12:05:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE05	1105017	None	003	GG	5
MW-BKG-11	15.04	19-MW-BKG-11-0716	07/16/2019 09:55:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	EIE05	1105019	None	003	NS	5
MW-BKG-12	8.84	19-MW-BKG-12-0716	07/16/2019 12:42:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE05	1105018	None	003	NS	5
MW-BKG-04	18	19PS-MW99-0716	07/16/2019 09:35:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	19-MW-BKG-04-0716	ELLE	EIE05	1105016	None	003	GG	5
Trip Blank	- -	19PS-TBGW-0716	07/16/2019 08:00:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Trip Blank	No	- -	ELLE	EIE05	1105023	None	003	NS	5
Field Blank	- -	19PS-FBAM-0716	7/16/2019 8:30	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	EIE05	1105024	None	003	NS	5
02MW11	25	19-02MW11-0717	07/17/2019 11:46:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	EIE06	1105154	None	004	GG	5
MW-BKG-09	14	19-MW-BKG-09-0717	07/17/2019 09:40:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE06	1105160	None	004	GM	5
MW-BKG-10	21	19-MW-BKG-10-0717	07/17/2019 09:35:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE06	1105157	None	004	GG	5
NorthPoleWellA	- -	19-NorthPoleWellA-0717	07/17/2019 09:20:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE06	1105152	None	004	NS	5
NorthPoleWellB	- -	19-NorthPoleWellB-0717	07/17/2019 09:10:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE06	1105153	None	004	NS	5
FFTA-ENT-SB05	1	19-PS-MW99-0717	07/17/2019 09:40:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	19PS-FFTA-ENT-SB05-1	ELLE	EIE06	1105158	None	004	GG	5
Trip Blank	- -	19PS-TBGW-0717	07/17/2019 08:00:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Trip Blank	No	- -	ELLE	EIE06	1105161	None	004	GM	5
Field Blank	- -	19PS-FBPM-0717	7/17/2019 13:30	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	EIE06	1105159	None	004	GM	5
DSAP-10	14.5	19-DSAP-10-0718	07/18/2019 15:52:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE07	1105703	None	005	GG	5
DSAP-11	18	19-DSAP-11-0718	07/18/2019 14:46:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE07	1105699	None	005	GG	5
DSAP-13	10	19-DSAP-13-0718	07/18/2019 16:51:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE07	1105698	None	005	GG	5
USAP-1	25	19PS-MW99-0718	07/18/2019 13:00:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	19-USAP-1-0718	ELLE	EIE07	1105704	None	005	GM	5
Trip Blank	- -	19PS-TBGW-0718	07/18/2019 08:00:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Trip Blank	No	- -	ELLE	EIE07	1105706	None	005	GM	5
USAP-1	25	19-USAP-1-0718	07/18/2019 12:45:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	EIE07	1105700	None	005	GM	5
Field blank	- -	19PS-FBPM-0718	7/18/2019 13:15	1	Water	x2 250 mL wide mouth HDPE	19-023	Field blank	No	- -	ELLE	EIE07	1105705	None	005	GM	5
TW02	24	19PS-TW02-1015	10/15/2019 12:31:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE09	1181985	None	10	BD/RH	10
TW03	24	19PS-TW03-1015	10/15/2019 13:25:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	EIE09	1181986	None	10	BD/RH	10
TW04	24	19PS-TW04-1015	10/15/2019 14:37:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE09	1181989	None	10	BD/RH	10
TW05	24	19PS-TW05-1015	10/15/2019 15:35:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE09	1181990	None	10	BD/RH	10
TW06	24	19PS-TW06-1016	10/16/2019 16:00:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE09	1181991	None	10	BD/RH	10
TW07	24	19PS-TW07-1015	10/15/2019 16:40:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE09	1181992	None	10	BD/RH	10
TW08	24	19PS-TW08-1015	10/15/2019 17:28:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE09	1181993	None	10	BD/RH	10
TW09	24	19PS-TW09-1016	10/16/2019 10:22:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE09	1181994	None	10	BD/RH	10
TW13	24	19PS-TW13-1016	10/16/2019 12:22:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE09	1181995	None	10	BD/RH	10
TW14	24	19PS-TW14-1016	10/16/2019 13:55:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE09	1181996	None	10	BD/RH	10
TW15	24	19PS-TW15-1016	10/16/2019 14:51:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE09	1181997	None	10	BD/RH	10
TW17	24	19PS-TW17-1016	10/16/2019 17:14:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE09	1181998	None	10	BD/RH	10
TW18	24	19PS-TW18-1016	10/16/2019 18:15:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE09	1181999	None	10	BD/RH	10
TW13	24	19PS-TW98-1016	10/16/2019 12:28:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	19PS-TW13-1016	ELLE	EIE09	1182001	None	10	BD/RH	10
TW03	24	19PS-TW99-1015	10/15/2019 13:28:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	19PS-TW03-1015	ELLE	EIE09	1182000	None	10	BD/RH	10
Field Blank	- -	19PS-FBAM-1016	10/16/2019 8:30	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	EIE09	1182002	None	10	BD/RH	10
Field Blank	- -	19PS-FBPM-1015	10/15/2019 17:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	EIE09	1182003	None	10	BD/RH	10
Equipment Blank	- -	19PS-EB-1016	10/16/2019 18:30	1	Water	x2 250 mL wide mouth HDPE	19-023	Equipment Blank	No		ELLE	EIE09	1182004	None	10	BD/RH	10
TW10	24	19PS-TW10-1018	10/18/2019 11:45:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE10	1182041	None	12	BD/RH	10
TW11	24	19PS-TW11-1018	10/18/2019 11:00:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE10	1182028	None	12	BD/RH	10
TW12	24	19PS-TW12-1018	10/18/2019 10:19:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE10	1182046	None	12	BD/RH	10
TW20	24	19PS-TW20-1018	10/18/2019 14:25:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE10	1182042	None	12	BD/RH	10
TW22	24	19PS-TW22-1019	10/19/2019 10:18:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE10	1182044	None	12	BD/RH	10
TW25	24	19PS-TW25-1019	10/19/2019 13:27:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE10	1182045	None	12	BD/RH	10

LocationID	Sample Ending Depth (ft bgs)	Field Sample ID	Date/Time	Method	Matrix	Container	NPDL Number	QC Type	MS/ MSD	Primary Sample ID	Laboratory Name	SDG	Lab Sample ID	Preservative	Cooler Name	Sampler Initials	Turnaround time
TW27	24	19PS-TW27-1019	10/19/2019 15:59:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE10	1182040	None	12	BD/RH	10
TW28	24	19PS-TW28-1019	10/19/2019 16:41:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE10	1182039	None	12	BD/RH	10
TW29	29	19PS-TW29-1019	10/19/2019 18:00:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE10	1182037	None	12	BD/RH	10
TW30	24	19PS-TW30-1019	10/19/2019 17:35:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE10	1182038	None	12	BD/RH	10
TW31	24	19PS-TW31-1020	10/20/2019 13:23:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE10	1182029	None	12	BD/RH	10
TW32	24	19PS-TW32-1020	10/20/2019 12:21:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE10	1182030	None	12	BD/RH	10
TW33	24	19PS-TW33-1020	10/20/2019 11:16:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	EIE10	1182031	None	12	BD/RH	10
TW34	24	19PS-TW34-1020	10/20/2019 10:18:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE10	1182035	None	12	BD/RH	10
TW35	24	19PS-TW35-1020	10/20/2019 09:34:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE10	1182036	None	12	BD/RH	10
TW20	24	19PS-TW99-1018	10/18/2019 14:28:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	19PS-TW20-1018	ELLE	EIE10	1182043	None	12	BD/RH	10
TW33	24	19PS-TW99-1020	10/20/2019 11:18:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	19PS-TW33-1020	ELLE	EIE10	1182034	None	12	BD/RH	10
TW01	24	19PS-TW01-1019	10/19/2019 09:36:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE11	1182620	None	13	BD/RH	10
TW23	24	19PS-TW23-1019	10/19/2019 11:06:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	EIE11	1182627	None	13	BD/RH	10
TW24	24	19PS-TW24-1019	10/19/2019 12:47:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE11	1182621	None	13	BD/RH	10
TW26	24	19PS-TW26-1019	10/19/2019 14:13:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE11	1182619	None	13	BD/RH	10
TW23	24	19PS-TW99-1019	10/19/2019 11:08:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	19PS-TW23-1019	ELLE	EIE11	1182618	None	13	BD/RH	10
Equipment Blank	- -	19PS-EB-1018	10/18/2019 16:58	1	Water	x2 250 mL wide mouth HDPE	19-023	Equipment Blank	No	- -	ELLE	EIE11	1182622	None	13	BD/RH	10
Equipment Blank	- -	19PS-EB-1020	10/20/2019 12:03	1	Water	x2 250 mL wide mouth HDPE	19-023	Equipment Blank	No	- -	ELLE	EIE11	1182625	None	13	BD/RH	10
Field Blank	- -	19PS-FBAM-1019	10/19/2019 12:13	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	EIE11	1182626	None	13	BD/RH	10
Field Blank	- -	19PS-FBAM-1020	10/20/2019 9:15	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	EIE11	1182623	None	13	BD/RH	10
Field Blank	- -	19PS-FBPM-1018	10/18/2019 16:41	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	EIE11	1182624	None	13	BD/RH	10
FFTA-ENT-SB05-1	1	19PS-FFTA-ENT-SB05-1	10/17/2019 09:55:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE12	1183462	None	11	NS/GG	10
FFTA-ENT-SB05-7.5	7.5	19PS-FFTA-ENT-SB05-7.5	10/17/2019 10:00:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	Yes	- -	ELLE	EIE12	1183463	None	11	NS/GG	10
FFTA-ENT-SB06-1	1	19PS-FFTA-ENT-SB06-1	10/17/2019 11:25:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE12	1183473	None	11	NS/GG	10
FFTA-ENT-SB06-7	7	19PS-FFTA-ENT-SB06-7	10/17/2019 11:30:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE12	1183474	None	11	NS/GG	10
FFTA-ENT-SB07-1	1	19PS-FFTA-ENT-SB07-1	10/17/2019 10:35:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE12	1183467	None	11	NS/GG	10
FFTA-ENT-SB07-7	7	19PS-FFTA-ENT-SB07-7	10/17/2019 10:40:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE12	1183468	None	11	NS/GG	10
FFTA-ENT-SB08-1	1	19PS-FFTA-ENT-SB08-1	10/17/2019 10:50:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE12	1183469	None	11	NS/GG	10
FFTA-ENT-SB08-8.5	8.5	19PS-FFTA-ENT-SB08-8.5	10/17/2019 10:55:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE12	1183470	None	11	NS/GG	10
FFTA-ENT-SB09-1	1	19PS-FFTA-ENT-SB09-1	10/17/2019 11:05:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE12	1183471	None	11	NS/GG	10
FFTA-ENT-SB09-6	6	19PS-FFTA-ENT-SB09-6	10/17/2019 11:10:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE12	1183472	None	11	NS/GG	10
FFTA-ENT-SB10-1	1	19PS-FFTA-ENT-SB10-1	10/17/2019 11:50:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE12	1183475	None	11	NS/GG	10
FFTA-ENT-SB10-7	7	19PS-FFTA-ENT-SB10-7	10/17/2019 11:55:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE12	1183476	None	11	NS/GG	10
FFTA-ENT-SB10-1	1	19PS-FFTA-SB98-1017	10/17/2019 12:00:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field Duplicate	No	19PS-FFTA-ENT-SB10-1	ELLE	EIE12	1183477	None	11	NS/GG	10
FFTA-ENT-SB05-1	1	19PS-FFTA-SB99-1017	10/17/2019 10:30:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field Duplicate	No	19PS-FFTA-ENT-SB05-1	ELLE	EIE12	1183466	None	11	NS/GG	10
TW16	24	19PS-TW16-1017	10/17/2019 14:51:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE12	1183480	None	11	NS/GG	10
TW19	24	19PS-TW19-1017	10/17/2019 16:07:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	EIE12	1183481	None	11	NS/GG	10
Equipment Blank	- -	19PS-EB-1017	10/17/2019 11:58	1	Water	x2 250 mL wide mouth HDPE	19-023	Equipment Blank	No	- -	ELLE	EIE12	1183478	None	11	NS/GG	10
FST1-SB02-1	1	19PS-FST1-SB02-1	10/21/2019 15:15:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE13	1185514	None	14	GG/NS	10
FST1-SB02-7	7	19PS-FST1-SB02-7	10/21/2019 15:20:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE13	1185515	None	14	GG/NS	10
FST1-SB03-1	1	19PS-FST1-SB03-1	10/21/2019 15:25:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE13	1185516	None	14	GG/NS	10
FST1-SB03-6	6	19PS-FST1-SB03-6	10/21/2019 15:30:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE13	1185517	None	14	GG/NS	10
FST1-SB04-1	1	19PS-FST1-SB04-1	10/21/2019 14:50:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE13	1185510	None	14	GG/NS	10
FST1-SB04-8	8	19PS-FST1-SB04-8	10/21/2019 15:00:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE13	1185511	None	14	GG/NS	10
FST1-SB05-1	1	19PS-FST1-SB05-1	10/21/2019 13:55:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE13	1185504	None	14	GG/NS	10
FST1-SB05-8	8	19PS-FST1-SB05-8	10/21/2019 14:30:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	Yes	- -	ELLE	EIE13	1185505	None	14	GG/NS	10
FST1-SB06-1	1	19PS-FST1-SB06-1	10/21/2019 14:35:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE13	1185508	None	14	GG/NS	10
FST1-SB06-7	7	19PS-FST1-SB06-7	10/21/2019 14:40:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE13	1185509	None	14	GG/NS	10
FST1-SB07-1	1	19PS-FST1-SB07-1	10/21/2019 15:05:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE13	1185512	None	14	GG/NS	10
FST1-SB07-8	8	19PS-FST1-SB07-8	10/21/2019 15:10:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE13	1185513	None	14	GG/NS	10
FST1-SB05-01	1	19PS-FST1-SB99-1021	10/21/2019 14:00:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field Duplicate	No	19PS-FST1-SB05-01	ELLE	EIE13	1185520	None	14	GG/NS	10
Equipment Blank	- -	19PS-EB-1021	10/21/2019 15:45	1	Water	x2 250 mL wide mouth HDPE	19-023	Equipment Blank	No	- -	ELLE	EIE13	1185518	None	14	GG/NS	10
Field Blank	- -	19PS-FBPM-1021	10/21/2019 14:15	1	Water	x2 4.5 oz HDPE cup w/lid	19-023	Field Blank	No	- -	ELLE	EIE13	1185519	None	14	GG/NS	10
FFTA-ENT-SB04-1	1	19PS-FFTA-ENT-SB04-1	10/27/2019 15:25:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	EIE14	1188774	None	15	NS	10
FFTA-ENT-SB04-6.5	6.5	19PS-FFTA-ENT-SB04-6.5	10/27/2019 15:35:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	Yes	- -	ELLE	EIE14	1188775	None	15	NS	10
FFTA-ENT-SB04-1	1	19PS-FFTA-SB99-1027	10/27/2019 15:30:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field Duplicate	No	19PS-FFTA-ENT-SB04-1	ELLE	EIE14	1188778	None	15	NS	10
IDW	- -	19PS-IDWS-MW01A	10/27/2019 18:30:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	IDW	No	- -	ELLE	EIE14	1188781	None	15	NS	10
IDW	- -	19PS-IDWS-MW01B	10/28/2019 15:00:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	IDW	No	- -	ELLE	EIE14	1188782	None	15	NS	10
IDW	- -	19PS-IDWS-MW02A	10/27/2019 17:30:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	IDW	No	- -	ELLE	EIE14	1188779	None	15	NS	10
IDW	- -	19PS-IDWS-MW02B	10/27/2019 18:00:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	IDW	No	- -	ELLE	EIE14	1188780	None	15	NS	10
Equipment Blank	- -	19PS-EB-1026	10/26/2019 07:40	1	Water	x2 250 mL wide mouth HDPE	19-023	Equipment Blank	No	- -	SGS	FA69540	FA69540-1	None	001	NS/RW	5
IDW	- -	19PS-IDWW01	10/27/2019 17:00	1	Water	x2 250 mL wide mouth HDPE	19-023	IDW	No	- -	SGS	FA69540	FA69540-8	None	001	NS/RW	5
MW02A	54.39	19PS-MW02A-1026	10/26/2019 14:30	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	SGS	FA69540	FA69540-3	None	001	NS/RW	5
MW02B	105.2	19PS-MW02B-1027	10/27/2019 14:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	SGS	FA69540	FA69540-6	None	001	NS/RW	5
MW02A	54.39	19PS-MW99-1026	10/26/2019 14:45	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	19PS-MW02A-1026	SGS	FA69540	FA69540-4	None	001	NS/RW	5
MW02B	105.2	19PS-MW99-1027	10/27/2019 14:30	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	19PS-MW02B-1027	SGS	FA69540	FA69540-7	None	001	NS/RW	5
Field Blank	- -	19PS-FBPM-1026	10/26/2019 13:55	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	SGS	FA69540	FA69540-2	None	001	NS/RW	5
Field Blank	- -	19PS-FBAM-1027	10/27/2019 11:50	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	SGS	FA69540	FA69540-5	None	001	NS/RW	5
IDW	- -	19PS-IDWW03	10/29/2019 15:30	1	Water	x2 250 mL wide mouth HDPE	19-023	IDW	No	- -	SGS	FA69547	FA69547-4	None	002	NS/HP	5
MW01A	56.31	19PS-MW01A-1029	10/29/2019 14:50	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	SGS	FA69547	FA69547-1	None	002	NS/HP	5

LocationID	Sample Ending Depth (ft bgs)	Field Sample ID	Date/Time	Method	Matrix	Container	NPDL Number	QC Type	MS/ MSD	Primary Sample ID	Laboratory Name	SDG	Lab Sample ID	Preservative	Cooler Name	Sampler Initials	Turnaround time
MW01B	104.92	19PS-MW01B-1030	10/30/2019 14:50	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	SGS	FA69547	FA69547-5	None	002	NS/HP	5
MW01A	56.31	19PS-MW99-1029	10/29/2019 15:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	19PS-MW01A-1029	SGS	FA69547	FA69547-3	None	002	NS/HP	5
MW01B	104.92	19PS-MW99-1030	10/30/2019 15:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	19PS-MW01B-1030	SGS	FA69547	FA69547-7	None	002	NS/HP	5
Field Blank	- -	19PS-FBPM-1029	10/29/2019 13:40	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	SGS	FA69547	FA69547-2	None	002	NS/HP	
Field Blank	- -	19PS-FBPM-1030	10/30/2019 13:30	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	SGS	FA69547	FA69547-6	None	002	NS/HP	
DSAP-14	17.6	20-DSAP-14-0416	04/16/2020 10:52:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	EIE15	1301265	None	16	NS	10
DSAP-8S	17.79	20-DSAP-8S-0416	04/16/2020 13:11:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE15	1301264	None	16	NS	10
DSAP-14	17.6	20PS-MW99-0416	04/16/2020 12:00:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20-DSAP-14-0416	ELLE	EIE15	1301269	None	16	NS	10
Field Blank	- -	20PS-FBAM-0416	4/16/2020 10:05	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	EIE15	1301268	None	16	NS	10
USAP-3	- -	20PS-MW99-0512	05/12/2020 12:00:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20-USAP-3-0512	ELLE	EIE16	1314751	None	17	NS	10
USAP-3	- -	20-USAP-3-0512	05/12/2020 11:26:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	EIE16	1314748	None	17	NS	10
Field Blank	- -	20PS-FBAM-0512	5/14/2020 10:10	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	EIE16	1314752	None	17	NS	10
IDW	- -	20PS-IDWS-MW02C	05/17/2020 08:45:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	IDW	No	- -	ELLE	EIE17	1317600	None	18	NS	5
IDW	- -	20PS-IDWW-MW02C	05/17/2020 08:20:00	1	Water	x2 250 mL wide mouth HDPE	19-023	IDW	No	- -	ELLE	EIE17	1317599	None	18	NS	5
IDW	- -	20PS-IDWS-MW02D	05/18/2020 12:53:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	IDW	No	- -	ELLE	EIE18	1317602	None	19	NS	5
IDW	- -	20PS-IDWW-MW02D	05/18/2020 13:05:00	1	Water	x2 250 mL wide mouth HDPE	19-023	IDW	No	- -	ELLE	EIE18	1317601	None	19	NS	5
IDW	- -	20PS-IDWS-MW01D	05/24/2020 08:55:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	IDW	No	- -	ELLE	EIE19	1320818	None	21	NS	5
IDW	- -	20PS-IDWW04	05/22/2020 17:00:00	1	Water	x2 250 mL wide mouth HDPE	19-023	IDW	No	- -	ELLE	EIE19	1320817	None	21	NS	5
IDW	- -	20PS-IDWW-MW01D	05/24/2020 09:10:00	1	Water	x2 250 mL wide mouth HDPE	19-023	IDW	No	- -	ELLE	EIE19	1320819	None	21	NS	5
MW02C	156	20PS-MW02C-0521	05/21/2020 16:41:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	EIE20	1320822	None	20	NS/HP	10
MW02D	206.8	20PS-MW02D-0524	05/24/2020 14:10:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE20	1320827	None	20	NS/HP	10
MW02C	156	20PS-MW99-0521	05/21/2020 16:00:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-MW02C-0521	ELLE	EIE20	1320820	None	20	NS/HP	10
MW02D	206.8	20PS-MW99-0524	05/24/2020 14:00:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-MW02D-0524	ELLE	EIE20	1320828	None	20	NS/HP	10
Field Blank	- -	20PS-FBPM-0521	5/21/2020 16:25	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	EIE20	1320821	None	20	NS/HP	10
Equipment Blank	- -	20PS-EB-0522	5/22/2020 9:15	1	Water	x2 250 mL wide mouth HDPE	19-023	Equipment Blank	No		ELLE	EIE20	1320825	None	20	NS/HP	10
Field Blank	- -	20PS-FBAM-0522	5/22/2020 9:10	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	EIE20	1320826	None	20	NS/HP	10
Field Blank	- -	20PS-FBPM-0524	5/24/2020 12:15	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	EIE20	1320829	None	20	NS/HP	10
TW46	23	20PS-TW46-0526	05/26/2020 11:25:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	EIE21	1321915	None	1	KC	5
TW47	15	20PS-TW47-0526	05/26/2020 13:10:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE21	1321918	None	1	KC	5
TW48	17	20PS-TW48-0526	05/26/2020 14:20:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE21	1321919	None	1	KC	5
TW49	13.5	20PS-TW49-0526	05/26/2020 16:43:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE21	1321920	None	1	KC	5
TW50	13	20PS-TW50-0527	05/27/2020 08:50:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE21	1321922	None	1	KC	5
TW51	11	20PS-TW51-0527	05/27/2020 13:47:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE21	1321926	None	1	KC	5
TW53	5.5	20PS-TW53-0527	05/27/2020 09:53:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE21	1321923	None	1	KC	5
TW56	11	20PS-TW56-0527	05/27/2020 12:36:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE21	1321925	None	1	KC	5
TW57	6	20PS-TW57-0527	05/27/2020 10:55:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE21	1321924	None	1	KC	5
TW58	10.5	20PS-TW58-0526	05/26/2020 15:35:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	EIE21	1321921	None	1	KC	5
TW46	23	20PS-TW99-0526	05/26/2020 11:30:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-TW46-0526	ELLE	EIE21	1321914	None	1	KC	5
TW50	13	20PS-TW99-0527	05/27/2020 08:56:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-TW50-0527	ELLE	EIE21	1321913	None	1	KC	5
Field Blank	- -	20PS-FBAM-0526	5/26/2020 10:07	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	EIE21	1321911	None	1	KC	5
Field Blank	- -	20PS-FBPM-0527	5/27/2020 13:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	EIE21	1321912	None	1	KC	5
Equipment Blank	- -	20PS-EB-0530	05/30/2020 10:32:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Equipment Blank	No	- -	ELLE	410-3082-1	410-3082-15	None	22	NS/KC	10
Field Blank	- -	20PS-FBAM-0530	05/30/2020 08:53:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-3082-1	410-3082-1	None	22	NS/KC	10
Field Blank	- -	20PS-FBPM-0531	05/31/2020 16:00:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-3082-1	410-3082-19	None	22	NS/KC	10
FFTA-ENT-SB11	1	20PS-FFTA-ENT-SB11-1	05/30/2020 08:59:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	Yes	- -	ELLE	410-3082-1	410-3082-2	None	22	NS/KC	10
FFTA-ENT-SB11	7.5	20PS-FFTA-ENT-SB11-7.5	05/30/2020 09:09:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3082-1	410-3082-3	None	22	NS/KC	10
FFTA-ENT-SB12	1	20PS-FFTA-ENT-SB12-1	05/30/2020 09:14:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	Yes	- -	ELLE	410-3082-1	410-3082-5	None	22	NS/KC	10
FFTA-ENT-SB12	7	20PS-FFTA-ENT-SB12-7	05/30/2020 09:22:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3082-1	410-3082-6	None	22	NS/KC	10
FFTA-ENT-SB13	1	20PS-FFTA-ENT-SB13-1	05/30/2020 09:37:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3082-1	410-3082-7	None	22	NS/KC	10
FFTA-ENT-SB13	6	20PS-FFTA-ENT-SB13-6.5	05/30/2020 09:43:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3082-1	410-3082-8	None	22	NS/KC	10
FFTA-ENT-SB14	1	20PS-FFTA-ENT-SB14-1	05/30/2020 09:52:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3082-1	410-3082-9	None	22	NS/KC	10
FFTA-ENT-SB14	7.5	20PS-FFTA-ENT-SB14-7.5	05/30/2020 09:57:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3082-1	410-3082-10	None	22	NS/KC	10
FFTA-ENT-SB15	1	20PS-FFTA-ENT-SB15-1	05/30/2020 10:05:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3082-1	410-3082-11	None	22	NS/KC	10
FFTA-ENT-SB15	7	20PS-FFTA-ENT-SB15-7	05/30/2020 10:10:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3082-1	410-3082-12	None	22	NS/KC	10
FFTA-ENT-SB16	1	20PS-FFTA-ENT-SB16-1	05/30/2020 10:22:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3082-1	410-3082-13	None	22	NS/KC	10
FFTA-ENT-SB16	7	20PS-FFTA-ENT-SB16-7	05/30/2020 10:25:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3082-1	410-3082-14	None	22	NS/KC	10
FFTA-ENT-SB11	7.5	20PS-FFTA-SB99-0530	05/30/2020 09:00:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field Duplicate	No	20PS-FFTA-ENT-SB11-1	ELLE	410-3082-1	410-3082-4	None	22	NS/KC	10
MW01C	155.3	20PS-MW01C-0531	05/31/2020 16:35:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3082-1	410-3082-17	None	22	NS/KC	10
MW01D	204	20PS-MW01D-0531	05/31/2020 10:50:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	410-3082-1	410-3082-16	None	22	NS/KC	10
MW01D	204	20PS-MW99-0531	05/31/2020 12:00:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-MW01D-0531	ELLE	410-3082-1	410-3082-18	None	22	NS/KC	10
IDW	- -	20PS-IDWS-MW01C	05/31/2020 08:38:00	1	GW	x2 250 mL wide mouth HDPE	19-023	IDW	No	- -	ELLE	410-3081-1	410-3081-2	None	23	NS	5
IDW	- -	20PS-IDWW05	05/31/2020 11:10:00	1	Water	x2 250 mL wide mouth HDPE	19-023	IDW	No	- -	ELLE	410-3081-1	410-3081-1	None	23	NS	5
IDW	- -	20PS-IDWW-MW01C	05/31/2020 09:15:00	1	Water	x2 250 mL wide mouth HDPE	19-023	IDW	No	- -	ELLE	410-3081-1	410-3081-3	None	23	NS	5
Equipment Blank	- -	20PS-EB-0603	06/03/2020 09:50:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Equipment Blank	No	- -	ELLE	410-3415-1	410-3415-16	None	24	NS/JP	10
FST1-SB08	1	20PS-FST1-SB08-1	06/03/2020 08:19:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3415-1	410-3415-2	None	24	NS/JP	10
FST1-SB08	7.5	20PS-FST1-SB08-7.5	06/03/2020 08:25:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3415-1	410-3415-3	None	24	NS/JP	10
FST1-SB09	1	20PS-FST1-SB09-1	06/03/2020 08:29:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3415-1	410-3415-4	None	24	NS/JP	10
FST1-SB09	7.5	20PS-FST1-SB09-7.5	06/03/2020 08:34:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3415-1	410-3415-5	None	24	NS/JP	10
FST1-SB10	1	20PS-FST1-SB10-1	06/03/2020 08:40:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3415-1	410-3415-6	None	24	NS/JP	10
FST1-SB10	6	20PS-FST1-SB10-6	06/03/2020 08:44:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3415-1	410-3415-7	None	24	NS/JP	10

LocationID	Sample Ending Depth (ft bgs)	Field Sample ID	Date/Time	Method	Matrix	Container	NPDL Number	QC Type	MS/ MSD	Primary Sample ID	Laboratory Name	SDG	Lab Sample ID	Preservative	Cooler Name	Sampler Initials	Turnaround time
FST1-SB11	1	20PS-FST1-SB11-1	06/03/2020 08:47:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3415-1	410-3415-8	None	24	NS/JP	10
FST1-SB11	6	20PS-FST1-SB11-6	06/03/2020 08:52:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3415-1	410-3415-9	None	24	NS/JP	10
FST1-SB12	1	20PS-FST1-SB12-1	06/03/2020 08:58:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3415-1	410-3415-10	None	24	NS/JP	10
FST1-SB12	8	20PS-FST1-SB12-8	06/03/2020 09:00:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3415-1	410-3415-11	None	24	NS/JP	10
FST1-SB13	1	20PS-FST1-SB13-1	06/03/2020 09:07:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3415-1	410-3415-12	None	24	NS/JP	10
FST1-SB13	7.5	20PS-FST1-SB13-7.5	06/03/2020 09:15:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3415-1	410-3415-13	None	24	NS/JP	10
FST1-SB14	1	20PS-FST1-SB14-1	06/03/2020 09:20:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3415-1	410-3415-14	None	24	NS/JP	10
FST1-SB14	8	20PS-FST1-SB14-8	06/03/2020 09:28:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3415-1	410-3415-15	None	24	NS/JP	10
FST1-SB09	7.5	20PS-FST1-SB99-0603	06/03/2020 08:45:00	1	Soil	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3415-1	410-3415-1	None	24	NS/JP	10
IDW	- -	20PS-IDWW06	05/31/2020 10:30:00	1	Water	x2 250 mL wide mouth HDPE	19-023	IDW	No	- -	ELLE	410-3412-1	410-3412-1	None	25	NS	5
IDW	- -	20PS-IDWW07	06/03/2020 10:30:00	1	Water	x2 250 mL wide mouth HDPE	19-023	IDW	No	- -	ELLE	410-3412-1	410-3412-2	None	25	NS	5
Field Blank	- -	20PS-FBAM-0528	05/28/2020 09:30:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-3098-1	410-3098-1	None	1	JP	5
Field Blank	- -	20PS-FBPM-0529	05/29/2020 13:15:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-3098-1	410-3098-2	None	1	JP	5
TW37	16	20PS-TW37-0529	05/29/2020 08:44:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3098-1	410-3098-10	None	1	JP	5
TW38	16	20PS-TW38-0529	05/29/2020 09:38:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3098-1	410-3098-11	None	1	JP	5
TW39	15.6	20PS-TW39-0529	05/29/2020 14:03:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3098-1	410-3098-13	None	1	JP	5
TW40	11	20PS-TW40-0529	05/29/2020 11:55:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3098-1	410-3098-12	None	1	JP	5
TW41	16	20PS-TW41-0528	05/28/2020 17:20:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3098-1	410-3098-9	None	1	JP	5
TW52	11	20PS-TW52-0528	05/28/2020 14:00:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3098-1	410-3098-8	None	1	JP	5
TW55	10	20PS-TW55-0528	05/28/2020 09:09:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	410-3098-1	410-3098-5	None	1	JP	5
TW59	11	20PS-TW59-0528	05/28/2020 10:46:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3098-1	410-3098-6	None	1	JP	5
TW60	11	20PS-TW60-0528	05/28/2020 12:50:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3098-1	410-3098-7	None	1	JP	5
TW55	10	20PS-TW99-0528	05/28/2020 09:15:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-TW55-0528	ELLE	410-3098-1	410-3098-3	None	1	JP	5
TW37	16	20PS-TW99-0529	05/29/2020 08:49:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-TW37-0529	ELLE	410-3098-1	410-3098-4	None	1	JP	5
Field Blank	- -	20PS-FBPM-0610	06/10/2020 12:01:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-4213-1	410-4213-10	None	E5	LK/JP	10
GL01	1	20PS-GL01-SW-1	06/10/2020 09:55:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-4213-1	410-4213-6	None	E5	LK/JP	10
GL02	1	20PS-GL02-SW-1	06/10/2020 10:23:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-4213-1	410-4213-7	None	E5	LK/JP	10
GL02	5	20PS-GL02-SW-5	06/10/2020 10:30:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-4213-1	410-4213-8	None	E5	LK/JP	10
GL02	1	20PS-GL99-SW-0610	06/10/2020 10:27:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-GL02-SW-1	ELLE	410-4213-1	410-4213-9	None	E5	LK/JP	10
IDW	- -	20PS-IDW-08	06/10/2020 12:05:00	1	Water	x2 250 mL wide mouth HDPE	19-023	IDW	No	- -	ELLE	410-4213-1	410-4213-2	None	E5	LK/JP	10
PS03	1	20PS-PS03-SW-1	06/08/2020 11:56:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	410-4213-1	410-4213-1	None	E5	LK/JP	10
PS03	1	20PS-PS99-SW-0608	06/08/2020 12:00:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-PS03-SW-1	ELLE	410-4213-1	410-4213-11	None	E5	LK/JP	10
SC01	1	20PS-SC01-SW-1	06/10/2020 08:18:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-4213-1	410-4213-5	None	E5	LK/JP	10
SC02	1	20PS-SC02-SW-1	06/10/2020 09:03:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-4213-1	410-4213-3	None	E5	LK/JP	10
SC02	4	20PS-SC02-SW-4	06/10/2020 09:05:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-4213-1	410-4213-4	None	E5	LK/JP	10
BR01	1	20PS-BR01-SW-1	06/06/2020 11:55:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3855-1	410-3855-12	None	E2	LK	10
BR02	1	20PS-BR02-SW-1	06/06/2020 10:23:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	410-3855-1	410-3855-14	None	E2	LK	10
BR02	5	20PS-BR02-SW-5	06/06/2020 10:30:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3855-1	410-3855-16	None	E2	LK	10
BR02	1	20PS-BR99-SW-0606	06/06/2020 10:28:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-BR02-SW-1	ELLE	410-3855-1	410-3855-15	None	E2	LK	10
Equipment Blank	- -	20PS-EB-0606	06/06/2020 18:15:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Equipment Blank	No	- -	ELLE	410-3855-1	410-3855-10	None	E2	LK	10
FC01	1	20PS-FC01-SW-1	06/04/2020 15:42:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3855-1	410-3855-13	None	E2	LK	10
FC03	1	20PS-FC03-SW-1	06/04/2020 13:50:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3855-1	410-3855-11	None	E2	LK	10
ML01	1	20PS-ML01-SW-1	06/03/2020 17:00:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3855-1	410-3855-1	None	E2	LK	10
ML02	1	20PS-ML02-SW-1	06/03/2020 16:03:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3855-1	410-3855-2	None	E2	LK	10
ML02	5	20PS-ML02-SW-5	06/03/2020 16:05:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3855-1	410-3855-3	None	E2	LK	10
MP01	1	20PS-MP01-SW-1	06/03/2020 13:40:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3855-1	410-3855-7	None	E2	LK	10
MP02	2	20PS-MP02-SW-2	06/03/2020 12:55:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3855-1	410-3855-9	None	E2	LK	10
MP01	1	20PS-MP99-SW-0603	06/03/2020 13:45:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-MP01-SW-1	ELLE	410-3855-1	410-3855-8	None	E2	LK	10
SP01	1	20PS-SP01-SW-1	06/03/2020 14:29:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3855-1	410-3855-4	None	E2	LK	10
SP01	5	20PS-SP01-SW-5	06/03/2020 14:32:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3855-1	410-3855-5	None	E2	LK	10
SP02	1	20PS-SP02-SW-1	06/03/2020 15:09:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3855-1	410-3855-6	None	E2	LK	10
FC02	1	20PS-FC02-SW-1	06/04/2020 14:50:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	410-3854-1	410-3854-1	None	E1	LK	10
FC02	1	20PS-FC99-SW-0604	06/04/2020 14:53:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-FC02-SW-1	ELLE	410-3854-1	410-3854-18	None	E1	LK	10
MC02	1	20PS-MC01-SW-1	06/06/2020 14:24:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3854-1	410-3854-3	None	E1	LK	10
MC02	1	20PS-MC02-SW-1	06/06/2020 12:55:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3854-1	410-3854-2	None	E1	LK	10
MLP01	1	20PS-MLP01-SW-1	06/06/2020 17:35:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3854-1	410-3854-7	None	E1	LK	10
MLP01	5	20PS-MLP01-SW-5	06/06/2020 17:40:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3854-1	410-3854-8	None	E1	LK	10
MLP02	1	20PS-MLP02-SW-1	06/06/2020 18:53:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3854-1	410-3854-9	None	E1	LK	10
MLP02	5	20PS-MLP02-SW-5	06/06/2020 18:55:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3854-1	410-3854-10	None	E1	LK	10
SH01	1	20PS-SH01-SW-1	06/07/2020 12:43:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3854-1	410-3854-15	None	E1	LK	10
SH02	1	20PS-SH02-SW-1	06/07/2020 13:33:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3854-1	410-3854-16	None	E1	LK	10
SH02	4	20PS-SH02-SW-4	06/07/2020 13:36:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3854-1	410-3854-17	None	E1	LK	10
TK01	1	20PS-TK01-SW-1	06/07/2020 10:32:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3854-1	410-3854-11	None	E1	LK	10
TK02	1	20PS-TK02-SW-1	06/07/2020 11:27:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3854-1	410-3854-13	None	E1	LK	10
TK02	5	20PS-TK02-SW-5	06/07/2020 11:32:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3854-1	410-3854-14	None	E1	LK	10
TK01	1	20PS-TK99-SW-0607	06/07/2020 10:37:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-TK01-SW-1	ELLE	410-3854-1	410-3854-12	None	E1	LK	10
ZP01	1	20PS-ZP01-SW-1	06/06/2020 16:05:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3854-1	410-3854-4	None	E1	LK	10
ZP01	3	20PS-ZP01-SW-3	06/06/2020 16:12:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-3854-1	410-3854-6	None	E1	LK	10
ZP01	1	20PS-ZP99-SW-0606	06/06/2020 16:10:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-ZP01-SW-1	ELLE	410-3854-1	410-3854-5	None	E1	LK	10
BR02	0	20PS-BR02-SD-0	06/06/2020 10:45:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	Yes	- -	ELLE	410-3856-1	410-3856-7	None	E3	LK	10

LocationID	Sample Ending Depth (ft bgs)	Field Sample ID	Date/Time	Method	Matrix	Container	NPDL Number	QC Type	MS/ MSD	Primary Sample ID	Laboratory Name	SDG	Lab Sample ID	Preservative	Cooler Name	Sampler Initials	Turnaround time
BR02	0	20PS-BR99-SD-0606	06/06/2020 10:50:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field Duplicate	No	20PS-BR02-SD-0	ELLE	410-3856-1	410-3856-8	None	E3	LK	10
Equipment Blank	- -	20PS-EB-AU-0604	06/04/2020 10:01:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Equipment Blank	No	- -	ELLE	410-3856-1	410-3856-19	None	E3	LK	10
Equipment Blank	- -	20PS-EB-BL-0604	06/04/2020 11:10:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Equipment Blank	No	- -	ELLE	410-3856-1	410-3856-18	None	E3	LK	10
Field Blank	- -	20PS-FBAM-0604	06/04/2020 10:09:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-3856-1	410-3856-21	None	E3	LK	10
Field Blank	- -	20PS-FBAM-0607	06/07/2020 09:56:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-3856-1	410-3856-23	None	E3	LK	10
Field Blank	- -	20PS-FBPM-0603	06/03/2020 13:00:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-3856-1	410-3856-20	None	E3	LK	10
Field Blank	- -	20PS-FBPM-0606	06/06/2020 14:38:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-3856-1	410-3856-22	None	E3	LK	10
FCO1	0	20PS-FC01-SD-0	06/04/2020 15:47:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3856-1	410-3856-6	None	E3	LK	10
FC02	0	20PS-FC02-SD-0	06/04/2020 14:55:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	Yes	- -	ELLE	410-3856-1	410-3856-5	None	E3	LK	10
FC03	0	20PS-FC03-SD-0	06/04/2020 13:55:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3856-1	410-3856-4	None	E3	LK	10
MC01	0	20PS-MC01-SD-0	06/06/2020 14:25:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3856-1	410-3856-10	None	E3	LK	10
MC02	0	20PS-MC02-SD-0	06/06/2020 12:56:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3856-1	410-3856-9	None	E3	LK	10
MC01	0	20PS-MC99-SD-0606	06/06/2020 16:43:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field Duplicate	No	20PS-MC01-SD-0	ELLE	410-3856-1	410-3856-11	None	E3	LK	10
MP02	0	20PS-ML02-SD-0	06/04/2020 13:10:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3856-1	410-3856-1	None	E3	LK	10
MLP01	0	20PS-MLP01-SD-0	06/06/2020 17:48:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3856-1	410-3856-12	None	E3	LK	10
MLP02	0	20PS-MLP02-SD-0	06/06/2020 18:48:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3856-1	410-3856-13	None	E3	LK	10
MP01	0	20PS-MP01-SD-0	06/04/2020 11:34:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3856-1	410-3856-17	None	E3	LK	10
MP02	0	20PS-MP02-SD-0	06/04/2020 10:15:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3856-1	410-3856-2	None	E3	LK	10
MP02	0	20PS-MP99-SD-0604	06/04/2020 10:25:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field Duplicate	No	20PS-MP02-SD-0	ELLE	410-3856-1	410-3856-3	None	E3	LK	10
SH02	0	20PS-SH02-SD-0	06/07/2020 13:40:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3856-1	410-3856-15	None	E3	LK	10
SH02	0	20PS-SH99-SD-0607	06/07/2020 13:45:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field Duplicate	No	20PS-SH02-SD-0	ELLE	410-3856-1	410-3856-16	None	E3	LK	10
TK02	0	20PS-TK02-SD-0	06/07/2020 11:43:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-3856-1	410-3856-14	None	E3	LK	10
BB01	1	20PS-BB01-SW-1	06/09/2020 13:35:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-4215-1	410-4215-14	None	E4	JP/LK	10
BB02	0	20PS-BB02-SD-0	06/09/2020 12:56:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-4215-1	410-4215-11	None	E4	JP/LK	10
BB02	1	20PS-BB02-SW-1	06/09/2020 13:06:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-4215-1	410-4215-12	None	E4	JP/LK	10
BB02	5	20PS-BB02-SW-5	06/09/2020 13:10:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-4215-1	410-4215-13	None	E4	JP/LK	10
Field Blank	- -	20PS-FBAM-0609	06/09/2020 06:49:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-4215-1	410-4215-19	None	E4	JP/LK	10
Field Blank	- -	20PS-FBPM-0608	06/08/2020 14:20:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-4215-1	410-4215-5	None	E4	JP/LK	10
GL02	0	20PS-GL02-SD-0	06/10/2020 10:35:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-4215-1	410-4215-3	None	E4	JP/LK	10
GL02	0	20PS-GL99-SD-0610	06/10/2020 10:40:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field Duplicate	No	20PS-GL02-SD-0	ELLE	410-4215-1	410-4215-10	None	E4	JP/LK	10
HL01	1	20PS-HL01-SW-1	06/09/2020 15:10:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-4215-1	410-4215-18	None	E4	JP/LK	10
HL02	0	20PS-HL02-SD-0	06/09/2020 14:14:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-4215-1	410-4215-15	None	E4	JP/LK	10
HL02	1	20PS-HL02-SW-1	06/09/2020 14:32:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-4215-1	410-4215-16	None	E4	JP/LK	10
HL02	5	20PS-HL02-SW-5	06/09/2020 14:34:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-4215-1	410-4215-17	None	E4	JP/LK	10
PS01	0	20PS-PS01-SD-0	06/09/2020 07:29:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-4215-1	410-4215-7	None	E4	JP/LK	10
PS01	1	20PS-PS01-SW-1	06/09/2020 07:36:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-4215-1	410-4215-9	None	E4	JP/LK	10
PS02	0	20PS-PS02-SD-0	06/08/2020 14:01:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-4215-1	410-4215-6	None	E4	JP/LK	10
PS02	1	20PS-PS02-SW-1	06/08/2020 13:40:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	410-4215-1	410-4215-4	None	E4	JP/LK	10
PS03	0	20PS-PS03-SD-0	06/08/2020 11:32:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	Yes	- -	ELLE	410-4215-1	410-4215-1	None	E4	JP/LK	10
PS03	0	20PS-PS99-SD-0608	06/08/2020 11:49:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field Duplicate	No	20PS-PS03-SD-0	ELLE	410-4215-1	410-4215-2	None	E4	JP/LK	10
PS01	0	20PS-PS99-SD-0609	06/09/2020 07:34:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field Duplicate	No	20PS-PS01-SD-0	ELLE	410-4215-1	410-4215-21	None	E4	JP/LK	10
PS03	1	20PS-PS99-SW-0609	06/09/2020 07:40:00	1	SW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-PS03-SW-1	ELLE	410-4215-1	410-4215-8	None	E4	JP/LK	10
SC02	0	20PS-SC02-SD-0	06/10/2020 08:40:00	1	SD	x2 4.5 oz HDPE cup w/lid	19-023	Field_Sample	No	- -	ELLE	410-4215-1	410-4215-20	None	E4	JP/LK	10
USAP-2	20.91	20PS-MW99-0608	06/08/2020 12:00:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20-USAP-2-0608	ELLE	410-3851-1	410-3851-2	None	26	BL/NS	10
USAP-2	20.91	20-USAP-2-0608	06/08/2020 11:13:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	410-3851-1	410-3851-1	None	26	BL/NS	10
Field Blank	- -	20PS-FBAM-0627	6/27/2020 11:00	1	Water	x2 250 mL wide mouth HDPE	19-023	Field Blank	No	- -	ELLE	410-6332-1	410-6332-4	None	1	GG/JP	5
TW36	15	20PS-TW36-0627	06/27/2020 10:40:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	Yes	- -	ELLE	410-6332-1	410-6332-1	None	1	GG/JP	5
TW42	15.5	20PS-TW42-0627	06/27/2020 12:22:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field_Sample	No	- -	ELLE	410-6332-1	410-6332-2	None	1	GG/JP	5
TW36	15	20PS-TW99-0627	06/27/2020 08:00:00	1	GW	x2 250 mL wide mouth HDPE	19-023	Field Duplicate	No	20PS-TW36-0627	ELLE	410-6332-1	410-6332-3	None	1	GG/JP	5
Equipment Blank	- -	20PS-BL-EB-0601	06/01/2020 13:10:00	1	Water	x2 250 mL wide mouth HDPE	20-023	Equipment Blank	No	- -	ELLE	410-3323-1	410-3323-25	None	B1	LK	10
Field Blank	- -	20PS-BL-FBAM-0602	06/02/2020 08:44:00	1	Water	x2 250 mL wide mouth HDPE	20-023	Field Blank	No	- -	ELLE	410-3323-1	410-3323-26	None	B1	LK	10
Field Blank	- -	20PS-BL-FBPM-0601	06/01/2020 14:54:00	1	Water	x2 250 mL wide mouth HDPE	20-023	Field Blank	No	- -	ELLE	410-3323-1	410-3323-27	None	B1	LK	10
BL-SB01	1	20PS-BL-SB01-1	06/02/2020 09:42:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-3323-1	410-3323-1	None	B1	LK	10
BL-SB01	2	20PS-BL-SB01-2	06/02/2020 09:49:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	Yes	- -	ELLE	410-3323-1	410-3323-2	None	B1	LK	10
BL-SB02	0.5	20PS-BL-SB02-0.5	06/02/2020 09:00:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	Yes	- -	ELLE	410-3323-1	410-3323-3	None	B1	LK	10
BL-SB02	2	20PS-BL-SB02-2	06/02/2020 09:02:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	Yes	- -	ELLE	410-3323-1	410-3323-4	None	B1	LK	10
BL-SB03	1	20PS-BL-SB03-1	06/01/2020 11:36:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-3323-1	410-3323-5	None	B1	LK	10
BL-SB03	5.75	20PS-BL-SB03-5.75	06/01/2020 11:39:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-3323-1	410-3323-6	None	B1	LK	10
BL-SB04	0.25	20PS-BL-SB04-0.25	06/01/2020 14:30:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-3323-1	410-3323-7	None	B1	LK	10
BL-SB04	1	20PS-BL-SB04-1	06/01/2020 14:32:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-3323-1	410-3323-8	None	B1	LK	10
BL-SB05	1	20PS-BL-SB05-1	06/01/2020 14:51:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-3323-1	410-3323-9	None	B1	LK	10
BL-SB05	2	20PS-BL-SB05-2	06/01/2020 14:53:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-3323-1	410-3323-10	None	B1	LK	10
BL-SB06	1	20PS-BL-SB06-1	06/01/2020 15:31:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-3323-1	410-3323-11	None	B1	LK	10
BL-SB06	6	20PS-BL-SB06-6	06/01/2020 15:39:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-3323-1	410-3323-12	None	B1	LK	10
BL-SB07	1	20PS-BL-SB07-1	06/01/2020 13:39:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-3323-1	410-3323-13	None	B1	LK	10
BL-SB07	2.4	20PS-BL-SB07-2.4	06/01/2020 13:49:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-3323-1	410-3323-14	None	B1	LK	10
BL-SB08	0.33	20PS-BL-SB08-0.33	06/01/2020 15:22:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-3323-1	410-3323-15	None	B1	LK	10
BL-SB08	0.75	20PS-BL-SB08-0.75	06/01/2020 15:46:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-3323-1	410-3323-16	None	B1	LK	10
SB-BL09	1	20PS-BL-SB09-1	06/01/2020 12:09:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-3323-1	410-3323-17	None	B1	LK	10
BL-SB09	5	20PS-BL-SB09-5	06/01/2020 12:27:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-3323-1	410-3323-18	None	B1	LK	10

LocationID	Sample Ending Depth (ft bgs)	Field Sample ID	Date/Time	Method	Matrix	Container	NPDL Number	QC Type	MS/ MSD	Primary Sample ID	Laboratory Name	SDG	Lab Sample ID	Preservative	Cooler Name	Sampler Initials	Turnaround time
BL-SB10	1	20PS-BL-SB10-1	06/01/2020 12:45:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-3323-1	410-3323-19	None	B1	LK	10
BL-SB10	5.5	20PS-BL-SB10-5.5	06/01/2020 12:53:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-3323-1	410-3323-20	None	B1	LK	10
BL-SB06	1	20PS-BL-SB99-0601-1	06/01/2020 15:33:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field Duplicate	No	20PS-BL-SB06-1	ELLE	410-3323-1	410-3323-21	None	B1	LK	10
BL-SB06	6	20PS-BL-SB99-0601-6	06/01/2020 15:41:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field Duplicate	No	20PS-BL-SB06-6	ELLE	410-3323-1	410-3323-22	None	B1	LK	10
BL-SB01	1	20PS-BL-SB99-0602-1	06/02/2020 09:47:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field Duplicate	No	20PS-BL-SB01-1	ELLE	410-3323-1	410-3323-23	None	B1	LK	10
BL-SB01	2	20PS-BL-SB99-0602-2	06/02/2020 09:54:00	1	Soil	x2 4.5 oz HDPE cup w/lid	20-023	Field Duplicate	No	20PS-BL-SB01-2	ELLE	410-3323-1	410-3323-24	None	B1	LK	10
BL01	0	20PS-BL01-SD-0	06/05/2020 13:15:00	1	SD	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-4116-1	410-4116-4	None	B2	LK	10
BL-01	1	20PS-BL01-SW-0.5	06/05/2020 13:07:00	1	SW	x2 250 mL wide mouth HDPE	20-023	Field_Sample	No	- -	ELLE	410-4116-1	410-4116-1	None	B2	LK	10
BL01	1	20PS-BL01-SW-4	06/05/2020 13:05:00	1	SW	x2 250 mL wide mouth HDPE	20-023	Field_Sample	No	- -	ELLE	410-4116-1	410-4116-2	None	B2	LK	10
BL01	1	20PS-BL01-SW-8	06/05/2020 12:45:00	1	SW	x2 250 mL wide mouth HDPE	20-023	Field_Sample	Yes	- -	ELLE	410-4116-1	410-4116-3	None	B2	LK	10
BL02	0	20PS-BL02-SD-0	06/05/2020 15:30:00	1	SD	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	No	- -	ELLE	410-4116-1	410-4116-8	None	B2	LK	10
BL02	1	20PS-BL02-SW-0.5	06/05/2020 18:02:00	1	SW	x2 250 mL wide mouth HDPE	20-023	Field_Sample	No	- -	ELLE	410-4116-1	410-4116-5	None	B2	LK	10
BL02	1	20PS-BL02-SW-4	06/05/2020 17:59:00	1	SW	x2 250 mL wide mouth HDPE	20-023	Field_Sample	No	- -	ELLE	410-4116-1	410-4116-6	None	B2	LK	10
BL02	1	20PS-BL02-SW-8	06/05/2020 17:54:00	1	SW	x2 250 mL wide mouth HDPE	20-023	Field_Sample	No	- -	ELLE	410-4116-1	410-4116-7	None	B2	LK	10
BL03	0	20PS-BL03-SD-0	06/05/2020 16:15:00	1	SD	x2 4.5 oz HDPE cup w/lid	20-023	Field_Sample	Yes	- -	ELLE	410-4116-1	410-4116-12	None	B2	LK	10
BL03	1	20PS-BL03-SW-0.5	06/05/2020 17:07:00	1	SW	x2 250 mL wide mouth HDPE	20-023	Field_Sample	No	- -	ELLE	410-4116-1	410-4116-9	None	B2	LK	10
BL03	1	20PS-BL03-SW-4	06/05/2020 17:04:00	1	SW	x2 250 mL wide mouth HDPE	20-023	Field_Sample	No	- -	ELLE	410-4116-1	410-4116-10	None	B2	LK	10
BL03	1	20PS-BL03-SW-8	06/05/2020 17:00:00	1	SW	x2 250 mL wide mouth HDPE	20-023	Field_Sample	No	- -	ELLE	410-4116-1	410-4116-11	None	B2	LK	10
BL02	0	20PS-BL99-SD-0605	06/05/2020 15:40:00	1	SD	x2 4.5 oz HDPE cup w/lid	20-023	Field Duplicate	No	20PS-BL02-SD-0	ELLE	410-4116-1	410-4116-13	None	B2	LK	10
BL01	1	20PS-BL99-SW-0605	06/05/2020 12:49:00	1	SW	x2 250 mL wide mouth HDPE	20-023	Field Duplicate	No	20PS-BL01-SW-4	ELLE	410-4116-1	410-4116-17	None	B2	LK	10
Equipment Blank	- -	20PS-BL-EB-BOWL-0605	06/05/2020 14:41:00	1	Water	x2 250 mL wide mouth HDPE	20-023	Equipment Blank	No	- -	ELLE	410-4116-1	410-4116-14	None	B2	LK	10
Equipment Blank	- -	20PS-BL-EB-PON-0605	06/05/2020 14:44:00	1	Water	x2 250 mL wide mouth HDPE	20-023	Equipment Blank	No	- -	ELLE	410-4116-1	410-4116-15	None	B2	LK	10
Field Blank	- -	20PS-BL-FBAM-0605	06/05/2020 10:52:00	1	Water	x2 250 mL wide mouth HDPE	20-023	Field Blank	No	- -	ELLE	410-4116-1	410-4116-16	None	B2	LK	10

Notes:
1. PFAS were analyzed by isotope dilution liquid chromatography-tandem mass spectroscopy, compliant with Department of Defense Quality Systems Manual Version 5.1, Table B-15 (2017).
ELLE = Eurofins Lancaster Laboratories Environmental, LLC
ft bgs = feet below ground surface
GW = ground water
HDPE = high density polyethylene
SD = sediment
SGS = SGS North America, Inc., Orlando, FL.
SW = surface water

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EXPANDED PFOS, PFOA, AND PFBS SITE INSPECTION REPORT EIELSON AFB AND MOOSE CREEK, ALASKA

APPENDIX L – RESPONSE TO COMMENTS

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 155
Seattle, WA 98101-3123

SUPERFUND &
EMERGENCY
MANAGEMENT DIVISION

August 5, 2022

Kristina Smith
Installation Restoration Program
AFCEC CZOP
2310 Central Avenue, Suite 213
Eielson AFB, AK 99702

RE: EPA and DEC Joint Approval of the *Final Expanded Perfluorooctane Sulfonate (PFOS), Perfluorooctanoic Acid (PFOA), and Perfluorobutane Sulfonate (PFBS) Site Inspection (SI) Report for Eielson Air Force Base and Moose Creek, Alaska (July 2022)*

Dear Ms. Smith:

The U.S. Environmental Protection Agency (EPA) and Alaska Department of Environmental Conservation (DEC) have completed review of the ***Final Expanded Perfluorooctane Sulfonate (PFOS), Perfluorooctanoic Acid (PFOA), and Perfluorobutane Sulfonate (PFBS) Site Inspection (SI) Report for Eielson Air Force Base and Moose Creek, Alaska (July 2022).*** The final version of this report was received by the regulators on August 5, 2022. The goal of the Expanded SI was to further delineate known PFOS, PFOA, and PFBS groundwater contamination migrating off Eielson AFB to the community of Moose Creek, Alaska. The Expanded SI Report describes the results of sampling activities performed and recommends future remedial investigation activities at Eielson AFB, and the adjacent community of Moose Creek.

Review comments submitted by both DEC and EPA have been appropriately addressed in the final report. EPA and DEC jointly approve this document. If you have any questions, please do not hesitate to contact EPA at (206) 553-5502 or by email at Bott.Dustan@epa.gov or DEC at (907) 451-2180 or by email at dennis.shepard@alaska.gov. Please include this letter and final comment tables in the final document and contact either of us if you have any questions.

Sincerely,

Digitally signed by
DUSTAN BOTT
Date: 2022.08.05
17:20:24 -07'00'

Dustan Bott
Remedial Project Manager

Digitally signed by
Dennis Shepard
Date: 2022.08.08
13:20:03 -08'00'

Dennis Shepard
Remedial Project Manager

Cc: (via email)
Roy Willis, AFCEC
Mike Boese, AFCEC
Joe Price, AFCEC
Nicole Drenning, AFCEC
Will Mangini, AFCEC

Erin Gleason, EPA
Axl Levan, DEC

EPA Review of the Draft Expanded Perfluorooctane Sulfonate (PFOS), Perfluorooctanoic Acid (PFOA), and Perfluorobutane Sulfonate (PFBS) Site Inspection (SI) Report for Eielson Air Force Base and Moose Creek, Alaska, July 2021

Number	Page	Section	Comment	
GENERAL COMMENTS				
1.	-	General Comment	Given the aggregate nature of the occurrence of per- and polyfluoroalkyl substances (PFAS), it is unclear why the target hazard quotient (THQ) of 1.0 was used to determine the PALs, rather than 0.1. Sites with multiple contaminants of concern are screened at a THQ of 0.1 to account for the potential total hazard index of all contaminants to exceed 1.0. The use of a THQ of 0.1 is recommended to account for the presence of multiple contaminants that may have similar mechanisms of toxicity, which is the case with PFAS. Revise the workplan to use a THQ of 0.1, or alternately, follow the OLEM recommendation of using 40 ppt for PFOA and PFOS (https://www.epa.gov/sites/default/files/2019-12/text_version_epas_interim_recommendations_for_addressing_groundwater_contaminated_with_pfoa_and_pfos_dec_2019.txt).	It should be noted that due to the length of time to review and respond to comments for this report that the PFOS, PFOA, and PFBS cleanup levels have been held at the time of the submission of the draft version of this report (July 2021); PFAS analytes were screened at a THQ of 0.1 except for PFOS and PFOA in groundwater and surface water. This report delineates the contaminant plume in groundwater using ½ of the Lifetime Health Advisory level (0.035 ug/L) that is approximate to the THQ of 0.1 (0.04 ug/L) for PFOS and PFOA. The US Air Force understands that all subsequent documents and groundwater monitoring reports will report PFOS, PFOA, and PFBS cleanup levels to the Regional Screening Levels (RSLs) calculated with a Hazard Quotient of 0.1. ***EPA: The response addresses the comment.***
2.	-	General Comment	The potential for exposure of ecological receptors to PFAS in site media has not been adequately addressed. Neither the conceptual site model (CSM) shown in Appendix B nor the text of the Draft SI (in particular, Section 4.4.4, Ecological Pathways and Targets) consider potential ecological risks except as they relate to human health (e.g., human receptors ingesting contaminated plant and animal tissue, etc.). While it is acknowledged that the current understanding of PFAS toxicology and the development of appropriate screening levels for ecological receptors has lagged behind that of human health, site impacts of PFAS exposure by plants and animals should at least be addressed qualitatively. (Note that ecological screening values are available in *Approach for Assessing PFAS Risk to Threatened and Endangered Species* SERDP Project ER18-1653, March 2020.) In addition, a threatened and endangered (T&E) species survey, as proscribed by U.S. Fish and Wildlife Service (FWS), should be performed at this stage of the investigation, and included in the Draft SI. Therefore, please revise the Draft SI to include ecological receptors/exposure pathways on the CSM and in text and provide a T&E survey.	The following has been added to Section 4.4.4, "While PFOS and PFOA contaminant concerns exclusive to ecological receptors are not currently part of the response actions, these may be considered in the future. For future evaluations, the data indicates that given the available habitat and ecosystems, potential ecological exposure pathways would (at least) include: • Potential direct exposure of aquatic resources (e.g., fish, benthic macroinvertebrates, and epibenthic organisms) to chemicals present in sediment, • Potential direct exposure (e.g., incidental ingestion during foraging or burrowing activities) of wildlife to chemicals in surface soil and/or sediment, and • Bioconcentration or bioaccumulation through ingestion of food items by avian

Number	Page	Section	Comment	
				wildlife (for example, piscivorous birds) and aquatic organisms (e.g., marine fish) using ponded and near-shore lagoon or ocean areas." The CSM was updated to include evaluation of ecological risk pathways. There are no Threatened and Endangered Species identified by the USFWS that are known to live within the study area. ***EPA: The response addresses the comment.***
3.	-	General Comment	The fate and transport considerations of PFAS, as described in Section 4.2 of the Draft SI, do not take into account air transport of soil particulates. This may be an important mechanism for PFAS to move between environmental compartments and should be included in this section. Please revise the Draft SI accordingly.	The following text was added to Section 4.2, "An additional transport mechanism is the fugitive dust from surface soil impacts." The inhalation of fugitive dust was indicated as a completed pathway for current and future receptors in the CSM as described in Section 4.4.3. ***EPA: The response addresses the comment.***
4.	-	General Comment	Section 5.7 (Deviations, pages 5-10 to 5-13) and Table 5-1 (Deviations) identify several deviations that occurred during field activities; however, the Draft SI does discuss whether there are data gaps associated with the deviations. Examples include, but are not limited to, the following: 1) existing well USAP-2 could not be sampled due to accessibility issues, 2) well 20PS-MW19 was installed 342 feet from the planned location due to accessibility issues, and 3) changes were made in the field to the procedures for collecting sediment samples. Based on these deviations and whether they resulted in data gaps, it is unclear if project data quality objectives (DQOs) were met. For example, Section 8.4 (Completeness) of Appendix K (Chemical Data Quality Report) indicates that project completeness is 100 percent (%), but completeness is calculated by comparing the amount of usable data obtained to the total possible amount of planned data; therefore, it is unclear how 100% completeness was achieved given the number of samples that were not collected. Please revise the Draft SI to include a detailed discussion of data gaps resulting from the deviations discussed in Section 5.7 and Table 5-1. In addition, please revise the Draft SI, including Appendix K, to ensure a complete data usability assessment was performed considering all deviations and associated data gaps and their effect on the project DQOs.	Additional discussion of data gaps was added to the respective Section 7 subsections where data gaps exist due to deviations. Generally, the DQOs were met in all cases. However, where the deviations did occur, the alternative sample collected were adequate to satisfy the DQOs. ***EPA: The response addresses the comment.***
5.	-	General Comment	The screening level for PFBS needs to be revised. This report uses the old RSL of 400 µg/L, it was updated in spring 2021 based on the new PPRTV for PFBS. It's now 6 µg/L using a HQ of 1, or 0.6 using 0.1. Revise accordingly. This revision may also change the change the recommendation for no further evaluation in Section 7.2.	The RSL was updated throughout to 0.6 µg/L for PFBS. ***EPA: The response addresses the comment.***
6.	-	General Comment	The RSLs are the product of an EPA workgroup that includes representatives from certain HQ offices and each region and are presented in the tables. The Calculator is provided to assist users to calculate values using non-standard inputs, and it includes chemicals for which the group has determined not to include in the RSL table for various reasons. This includes PFOA and PFOS, and values calculated by other parties should are not approved RSLs and should not be referred to as such.	All references to RSLs have been addressed in the Executive Summary, Section 1.3 Regulatory Setting, and Section 7 Summary and Conclusions. All references to RSLs throughout the document have been changed from RSLs to PALs, except for Section 3 Previous Investigations, where

Number	Page	Section	Comment	
				historical reports referenced the established EPA RSLs. ***EPA: The response addresses the comment.***
SPECIFIC COMMENTS				
1.	ES-1	Executive Summary	Line 23-29 are incorrect. Those PFAS compounds are considered by EPA to be CERCLA pollutants or contaminants, so the statement needs to be modified accordingly like the following statement from the Moose Creek ROD: PFOS and PFOA are not CERCLA listed hazardous substances, but in some circumstances could be responded to as CERCLA pollutants or contaminants; therefore, the U.S. Air Force (USAF) is following the CERCLA process to address potential risks from exposure to these PFASs (USAF, 2016). In addition, PFOS and PFOA are considered hazardous substances under state of Alaska regulations.	Text was changed to the following: "PFOS and PFOA are not Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) listed hazardous substances, but in some circumstances could be responded to as CERCLA pollutants or contaminants; therefore, the USAF is following the CERCLA process to address potential risks from exposure to these PFASs (USAF, 2016)." ***EPA: The response addresses the comment.***
2.	ES-3	Executive Summary	The first paragraph on Page ES-3 (lines 8 through 13) is one long, run-on sentence. Please consider revising this paragraph to clarify the information (e.g., with a bulleted list).	The paragraph was made into a bulleted list. ***EPA: The response addresses the comment.***
3.	1-2	1.1, Background, Lines 11-12	A reference should be provided to substantiate the statement that U.S. Air Force (USAF) use of aqueous film forming foam (AFFF) at Eielson AFB began in the early 1970s. A similar statement in Section 4.1 cites, "Schultz, et al. 2003; Place and Field, 2012," but it is unclear if these references also apply to the statement in Section 1.1. Please provide a reference for this information.	Text adjusted and reference added: "In the 1970s, the USAF began using AFFF containing PFAS associated with historical activities at fire-training sites and other facilities at Eielson AFB (CH2MHill, 2018)" ***EPA: The response addresses the comment.***
4.	-	3 Previous Investigations & Throughout Report	According to the Executive Summary, the goal of the Expanded SI was to further delineate known PFOS, PFOA, and PFBS groundwater contamination migrating off Eielson AFB to the community of Moose Creek, impacting the groundwater that the community of Moose Creek uses as its domestic water source. There has been other PFAS sampling data that need to be incorporated here. Historical analytical results relevant to this Expanded SI Report include all validated sampling data conducted prior to October 2020. The Expanded SI must present / summarize the validated data and use the data in the conclusions, figures and recommendations.	The data set has been updated to include pertinent data from previous reports. Much of the previous data has been superseded by newer data to establish the horizontal and vertical extent of PFOS, PFOA, and PFBS groundwater contamination. ***EPA: The response addresses the comment.***
5.	3-3	3.1.2, Moose Creek PFOS and PFOA Contamination, Lines 19-20	It appears that this phrase has a typographic error: "three of the monitoring wells sampled contained **PFOS** and/or **PFOS.**" It is assumed that this sentence should be, "PFOA and/or PFOS." Please revise this sentence to include the correct PFAS constituents.	Text was corrected to "For the Chena River Flood Control Project, three of the monitoring wells sampled contained PFOS and/or PFOA but were below cleanup levels." ***EPA: The response addresses the comment.***
6.	4-5	4.4.4, Ecological	Despite the section heading, the paragraph in this section does not discuss ecological pathways and targets. The information contained herein pertains to human health pathways as they relate to ecological receptors (e.g., for example, human ingestion of	The following was added to the Section 4.4.4, "While PFOS and PFOA contaminant concerns

Number	Page	Section	Comment	
		Pathways and Targets, Lines 26-29	impacted plant and animal tissue). Given that Section 4.4, Potential Receptors and Exposure Pathways, focuses on human health, please revise Section 4.4.4 to discuss ecological receptors/pathways.	exclusive to ecological receptors are not currently part of the response actions, these may be considered in the future. For future evaluations, the data indicates that given the available habitat and ecosystems, potential ecological exposure pathways would (at least) include: • Potential direct exposure of aquatic resources (e.g., fish, benthic macroinvertebrates, and epibenthic organisms) to chemicals present in sediment, • Potential direct exposure (e.g., incidental ingestion during foraging or burrowing activities) of wildlife to chemicals in surface soil and/or sediment, and • Bioconcentration or bioaccumulation through ingestion of food items by avian wildlife (for example, piscivorous birds) and aquatic organisms (e.g., marine fish) using ponded and near-shore lagoon or ocean areas." The CSM was updated to include evaluation of ecological risk pathways. There are no Threatened and Endangered Species identified by the USFWS that are known to live within the study area. ***EPA: The response addresses the comment.***
7.	5-4	5.3.1, Temporary Monitoring Well Installation	There is no discussion provided in Section 5.3.1 as to how the groundwater sampling device was treated after samples were collected. The section states that groundwater samples were collected using a "groundwater sampling device consisting of a 0.010-inch-slotted polyvinylchloride (PVC) disposable screen installed in a 1.6 inch-outer diameter screen sheath (Geoprobe®, 2020)." This tool has a disposable screen, but the rest of the tool should be decontaminated, which is not discussed in the text; the text should therefore explain how the tool was decontaminated and how the disposable screen was disposed. Please revise Section 5.3.1 to provide this information.	The following text was added to Section 5.3.1," The probe rod and extension rod were decontaminated between temporary monitoring well installations and the single-use well screens and tubing were disposed of according to procedures outlined in the approved Work Plan and Addenda (USAF, 2019a; USAF, 2019b; and USAF, 2020b)." ***EPA: The response addresses the comment.***
8.	6-10 and 6-11	6.4.1, Fire Station #1 (IRP Site SS306P); Figure 6-7,	The extent of contamination at Fire Station #1 has not be fully characterized, which is necessary to support the recommendations for future work in Section 7.2, Conclusions and Recommendations. Surface soils to the south and southeast of 20PS-FST1-SB13 have not been fully delineated, as shown on Figure 6-7, where there are no samples to bound the 8.9 milligrams per kilogram (mg/kg) detection of PFOS, and Figure 6-8, where there were subsurface detections at 7.5 (feet below ground surface (ft bgs) of	The following text was added to Section 6.4.1: "Surface soil contamination remains unbounded to the south and southeast of 20PS-FST1-SB13 and to the north and northeast of 20PS-FST1-

Number	Page	Section	Comment	
		Surface Soil Results at Fire Station #1; and Figure 6-8, Subsurface Soil Results at Fire Station #1	PFOS and PFOA at 2.3 mg/kg and 2.0 mg/kg, respectively. Similarly, on Figure 6-8, the extent of PFOS contamination associated with 20PS-FST1-SB12 (8 ft) has not been delineated to the north or northeast. Therefore, please revise Section 6.4.1 to acknowledge data gaps associated with the extent of PFAS contamination at Fire Station #1.	SB12. Subsurface soil contamination remains unbounded to the south and southeast of 20PS-FST1-SB13-1." ***EPA: The response addresses the comment.***
9.	6-11	6.4.2, Southern Burn Area FFTA by the Current Entomology Building (IRP Site FT092); Figure 6-9, Surface Soil Results at the Former Fire Training Area Near Entomology Building; and Figure 6-10, Subsurface Soil Results at Former Fire Training Area Near Entomology Building	The extent of soil contamination has not been delineated at the former fire training area (FFTA) near the Entomology Building. On Figure 6-9, the extent of PFOS in surface soil has not been delineated to the northeast of 9PS-FFTA-ENT-SB10-1, north and northeast of 0PS-FFTA-ENT-SB11-1, or north, northwest, and west of 20PS-FFTA-ENT-SB12-1. Based on Figure 6-10, the extent of PFOS in subsurface soil has not been delineated northwest and west of 20PS-FFTA-ENT-SB15 (7 ft) or west, southwest, and south of 19PS-FFTA-ENT-SB09 (6 ft.). Also, there is probably PFAS-contaminated soil beneath the roughly square soil stockpile. Please revise Section 6.4.2 to discuss data gaps associated with the extent of PFAS contamination at the FFTA near the Entomology Building.	The following additional text was added to Section 6.4.2: "Surface soil contamination remains unbounded to the north and west of 20PS-FFTA-ENT-SB11 and 20PS-FFTA-ENT-SB12-1. Additionally, surface contamination likely extends below the existing soil stockpiles within the possible release area identified in Figures 6-9 and 6-10. Subsurface soil contamination remains unbounded to the south and west of boring locations 20PS-FFTA-ENT-SB15 and 20PS-FFTA-ENT-SB16." ***EPA: The response addresses the comment.***
10.	7-3	7.1.1, Groundwater and Surface Water, and Figure 6-1, Site Vicinity Map with PFOA+PFOS Results through October 2020	Based on Figure 6-1, the extent of PFAS in groundwater has not been delineated south, southeast, or east of MW14/MW27 or south of Moose Creek cluster #2 and 19PS-TW16, which contradicts the text stating, "The southern edge is well defined with a semicircle of monitoring wells < 10% of the PAL." Also, on figures, "isoconcentration" contour lines should be dashed near wells where the extent has not been delineated. Also, to support the text, wells that could not be installed should be identified on the figure (e.g., shaded grey or black) to support the statements in the first bullet point on page 7-3. Please revise Section 7.1.1 to discuss data gaps associated with the delineation of the extent of PFAS in groundwater, and revise Figure 6-1 accordingly, as described above.	The last bullet was moved to the new surface water section. The remaining section has been revised as follows: "As limited by the scope of this Expanded SI, the estimated horizontal extent of the PFOA+PFOS contaminant plume is bounded by a combination of groundwater sample results and natural boundaries as detailed in the following examples and exceptions. • Northern and eastern edges of the central contaminant plume are bound by permafrost and the Birch Creek Schist as the Tanana Basin Aquifer thins approaching the

Number	Page	Section	Comment	
				foothills. Several attempts to retrieve groundwater samples to the east were unsuccessful due to dry monitoring wells in the permafrost. Stakeholder scoping decisions were made that no further delineation was necessary. • The southern edge and area west of the main Eielson AFB are well defined with a series of monitoring wells < 10% of the PAL. • The northwestern edge along the Chena River Flood Control levee has a line of low detections that bound the contaminant plume in that direction including the north side of Moose Creek Bluff. The westernmost portion (west of the town of Moose Creek) of the contaminant plume as it approaches the Tanana River via Piledriver Slough, and the Chena River Flood Control area is relatively undefined as the area is marshy or inaccessible during the summer months. However, it is likely the westward migration of the contaminant plume is dependent on the local and seasonal Tanana River hydrological influence on the regional groundwater gradient. " ***EPA: The response addresses the comment.***
11.	Table K-2	Appendix K, Chemical Data Quality Report, Table K-2, Summary of Analytical Results, Project Screening Level Comparison, and Field Duplicate Relative Percent Difference for Temporary Wells	Several of the results in Table K-2 in Appendix K of the Draft SI are bolded and highlighted red indicating that the result shown exceeded the screening level; however, many of these results are "ND" (nondetectable), and therefore, it is unclear why they are bolded and highlighted red (e.g., samples 19PS-TW06-1016 and 19PS-TW07-1015 on page 2 of 16; samples 19PS-TW08-1016, 19PS-TW10-1018, and 19PS-TW11-1018 on page 3 of 16; samples 19PS-TW12-1018, 19PS-TW13-1016, and 19PS-TW98-1016 on page 4 of 16; etc.). Please revise Table K-2 to remove the bolding and red highlight from ND results. Alternatively, please revise the Notes sections of Table K-2 to include an explanation for ND results that are bolded and highlighted red.	Table K-2 has been updated to correct bolding and highlighting. ***EPA: The response addresses the comment.***

Number	Page	Section	Comment	
12.	Figure 6-1	Site Vicinity Map with PFOA + PFOS Results through October 2020	In the northern portion of the site, the distance between isoconcentration contour lines diminishes to unrealistic distances. Consider using areas where sufficient data exists to space the contour lines for the PFOA + PFOS isoconcentration lines (0.007 µg/L (10% of LHA) from 0.035 µg/L (50% of LHA) from 0.07 µg/L (EPA LHA)) to inform the distance between the isoconcentration lines in areas where insufficient data has been collected and dash the lines in these areas to infer that the location of the isoconcentration lines is inferred.	Figure 6-1 was revised, and dashed lines were utilized in the northern portion of the site for isoconcentration contours where data are limited. ***EPA: The response addresses the comment.***
Additional Comment on Draft Final May 20, 2022				
13.	General Comment	-	This PFAS Expanded SI will need to be updated to reflect the most recent PFAS RSLs that were published on May 18, 2022. EPA added 5 PFAS chemicals to the RSL tables. Here is a link for the details. https://www.epa.gov/risk/regional-screening-levels-rsls-whats-new	Per the OSD Memo dated 6July2022, AF will incorporate the May 18, 2022 RSLs. The Expanded SI data will be reevaluated against the May 2022 RSLs as part of the RI effort. ***EPA: The response partially addresses the comment. The statement that the USAF will use the new RSLs in the RI effort needs to be stated in the Executive Summary in the Conclusions/Recommendations section. Also reference the May 18, 2022 date of new RSLs and the OSD memo.*** The following text has been added after the 1st sentence in the 4th paragraph of the Executive Summary in the Conclusions/Recommendations section, "Per the OSD Memo dated 6 July 2022, AF will incorporate the 18 May 2022 RSLs as part of the RI effort. Additionally, SI data will also be screened against the new RSLs." ***EPA: The response addresses the comment.***

DEC Comments on Draft Expanded Perfluorooctane Sulfonate (PFOS), Perfluorooctanoic Acid (PFOA), and Perfluorobutane Sulfonate (PFBS) Site Inspection (SI) Report for Eielson Air Force Base and Moose Creek, Alaska, July 2021

September 15, 2021
Reviewer: Alaska Department of Environmental Conservation

Comment No.	Page	Section	Comment / Recommendation	Response
1.	ES-1	Executive Summary	Lines 23-29. Text states "Although PFAS compounds, including PFOS, PFOA, and PFBS, are not federally regulated compounds under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or the Resource Conservation and Recovery Act of 1976 (RCRA), these compounds may present potential, non-carcinogenic risks to human health and the environment (Chang et al., 2014; Porter, 2011; Rak et al., 2009). In 2014, PFOS and PFOA contamination was identified in environmental media (e.g., groundwater and surface water) at Eielson AFB by the USAF." However, this statement seems to contradict a previous statement from the Moose Creek IROD concerning CERCLA: *PFOS and PFOA are not CERCLA listed hazardous substances, but in some circumstances could be responded to as CERCLA pollutants or contaminants; therefore, the U.S. Air Force (USAF) is following the CERCLA process to address potential risks from exposure to these PFASs (USAF, 2016).* Please revise for consistency. Please add: On 6 November 2016, DEC promulgated soil and groundwater cleanup levels for PFOS & PFOA. PFOS and PFOA are considered hazardous substances under state of Alaska regulations.	Accepted – We agree to use the language from the Moose Creek IROD. Text was changed to "PFOS and PFOA are not Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) listed hazardous substances, but in some circumstances could be responded to as CERCLA pollutants or contaminants; therefore, the USAF is the CERCLA process to address potential risks from exposure to these PFASs (USAF, 2016)." The recommended text was added, "On 6 November 2016, Alaska Department of Environmental Conservation (ADEC) promulgated soil and groundwater cleanup levels for PFOS and PFOA. PFOS and PFOA are considered hazardous substances under state of Alaska regulations." **DEC Accepts Response 4/14/2022**
2.	ES-2	Executive Summary	Lines 7-8, 13-14. Text states: "Initially, the PALs for soil included the ADEC Human Health (HH) Cleanup Levels (CLs) for soil, but ADEC has subsequently deferred to the RSLs in lieu of HH CLs." and "Initially, soil exceedances were also compared to the ADEC HH CLs for soil, but ADEC has subsequently deferred to the RSLs in lieu of HH CLs." The approved work plan also included DEC Method Two migration to groundwater (MTG) Soil Cleanup levels as project action levels. The Air Force response was "The objective of soil sampling as part of this Expanded SI is to delineate contamination above human health levels. A Remedial investigation will be conducted afterwards. During the RI, the migration to groundwater cleanup levels will be an ARAR." DEC agrees that comparison to the resident soil and tapwater RSLs are more stringent than comparison to DEC's HH CLs. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) dictates in 40 CFR 300.420(c)(5)(iii) that, "Upon completion of a remedial SI [site inspection], the lead agency shall prepare a report that includes the following: A description of pathways of migration of contaminants." The USAF must therefore gather adequate sampling information	Noted – Expanded SI text was not revised. The National Contingency Plan (NCP), as stated in 40 CFR 300.420, assigns responsibility for the SI to the lead agency. The Air Force, as the lead agency, selected the EPA RSLs as PALs for soil and sediment consistent with the 2021 Assistant Secretary of Defense Memorandum, Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense (DoD) Cleanup Program. **4/14/2022 DEC does not accept: DEC does not agree that use of the EPA residential soil screening levels is the appropriate screening level for use in site investigations (SIs). DEC also disagrees that the objective of the SI is delineation of contamination above human health levels. It is DECs understanding that the objective of a site investigation is to evaluate the presence or absence of contamination at a site, and the extent to which a site presents a threat to human health or the environment, by determining whether hazardous substances are present at the site and are migrating to the surrounding environment. Appropriate screening levels to achieve the objective during the SI should include the most stringent of EPA's RSLs for resident soil and tapwater, and EPA's protection of groundwater Soil SL. DEC is open to the Air Force using DEC's Table B1 Method Two migration to groundwater cleanup levels, which are analogous to EPA RSLs but modified to adjust for Alaska conditions. At Eielson the contamination has already reached**

<table>
<tr><th>Comment No.</th><th>Page</th><th>Section</th><th>Comment / Recommendation</th><th>Response</th></tr>
<tr><td></td><td></td><td></td><td>and compare it against screening levels, whether EPA's protection of groundwater soil screening level or DEC's MTG soil cleanup level, to determine if there is a complete or potentially complete soil migration to groundwater pathway. Without this information, the requirements of the NCP have not been fulfilled. Additionally, the identified project screening levels do not address possible ecological impacts, though the conceptual site mode indicates receptors should be considered for at some of the locations investigated.</td><td>groundwater so we know the pathway is complete. The extent of soil contamination that has potential for continued migration to groundwater is unknown, requires further investigation, and needs be clearly delineated during the remedial investigation. The remedial investigation needs to further investigate the potential exposure pathways. During the RI DEC will recommend potential ARARs.

Delineation during the RI would not be considered complete if the extent of soil with potential to impact groundwater is not identified.

Response noted.</td></tr>
<tr><td>3.</td><td>ES-2, 6-2, 6-3</td><td>Executive Summary 6.1.1 and 6.1.2</td><td>Lines 21-23, 11-12, and 9-10. Text states in the Executive Summary “PFBS was detected in most groundwater and surface water samples submitted but all concentrations were well below the PFBS PAL of 400 µg/L.” and in Sections 6.1.1 and 6.1.2 “No groundwater samples had concentrations that exceeded ½ PAL or the PFBS PAL of 400 µg/L.”

However, the EPA PFBS RfD dropped by two orders of magnitude in the most recent toxicity evaluation. The current 2021 RSL table will reflect the new values. It is DEC and EPA’s expectation that investigations will utilize the most recent RSLs, including PFBS. The RSL for PFBS should be reevaluated and the PAL should be updated to current levels to compare with the site results data. DEC used the EPA RSL calculator and derived a RSL of 6.01 ug/L for PFBS at an HQ = 1. However, the screening level value should be at a HQ of 0.1 since cumulative risk is evaluated for all compounds at or above 1/10th Human Health levels. Please revise the PAL for PFBS throughout the document and tables.</td><td>Accepted - The PALs for PFOA, PFOS, and PFBS have been updated throughout the report (to include text, figures, and tables) to reflect the new PALs, as follows:

<table>
<tr><th>Sample Collection Date</th><th>PFOA Results (µg/L)</th><th>Q</th><th>PFOS Results (µg/L)</th><th>Q</th><th>Aggregate PFOA/PFOS Results (µg/L)</th><th>Q</th><th>PFBS Results (µg/L)</th><th>Q</th></tr>
<tr><td>Screening Levels</td><td>0.070 µg/L [1]</td><td></td><td>0.070 µg/L [1]</td><td></td><td>0.070 µg/L [1]</td><td></td><td>0.601 µg/L [2]</td><td></td></tr>
</table>
1. EPA November 2016 Lifetime Health Advisory Levels. If both PFOA and PFOS are present, the combined concentration is compared to the health advisory Level (0.070 µg/L).

2. EPA Regional Screening Level (RSL) values for PFBS calculated by the EPA RSL calculator using (TR=1E-06, HQ=0.1) for tapwater. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

<table>
<tr><th>Sample Collection Date</th><th>PFOA Results (mg/kg)</th><th>Q</th><th>PFOS Results (mg/kg)</th><th>Q</th><th>PFBS Results (mg/kg)</th><th>Q</th></tr>
<tr><td>Screening Levels</td><td>0.126 mg/kg [1]</td><td></td><td>0.126 mg/kg [1]</td><td></td><td>1.9 mg/kg [1]</td><td></td></tr>
</table>
1. EPA Regional Screening Level (RSL) values for PFOS, PFOA, and PFBS are calculated by the EPA RSL calculator using EPA Resident, RfDs, HQ of 0.1, and residential exposure assumptions. Output generated 31 March 2022. Accessed online at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search

DEC Accepts Response 4/13/2022 with note: DEC maintains that PALs based on migration to groundwater are appropriate for this work.

Response noted.</td></tr>
<tr><td>4.</td><td>ES-2, 4-4</td><td>Executive Summary and 4.4</td><td>Lines 25-26 and 7-10. Text states in Executive Summary “Eielson AFB and Moose Creek are currently using water from water treatment systems that remove PFOS, PFOA, and PFBS.” and in Section 4-4 “Eielson AFB and the community of Moose Creek use the local groundwater for drinking water and daily operations, although both are currently using water from water treatment systems that effectively remove PFOS, PFOA, and PFBS.” Please add “or delivered water.” Not all water is from water treatment systems. E.g., Pioneer wells deliveries.</td><td>Text in the ES was revised to, “Eielson AFB and Moose Creek are currently using either water from water treatment systems that remove PFOS, PFOA, and PFBS or water delivered to them.”

And text in Section 4.4 was revised to, “Eielson AFB and the community of Moose Creek use the local groundwater for drinking water and daily operations, although both are currently using either water from water treatment systems that effectively remove PFOS, PFOA, and PFBS or water delivered to them.”

DEC Accepts Response 4/25/2022</td></tr>
</table>

Comment No.	Page	Section	Comment / Recommendation	Response
5.	ES-2	Executive Summary	Line 40. The CSM graphic form in Appendix B indicates Incidental soil ingestion pathway is considered potentially complete for current residential. Please add.	Text was adjusted to, "the incidental soil ingestion pathway is considered potentially complete for both current and future users in commercial, industrial, and residential land use scenarios." **DEC Accepts Response 4/25/2022**
6.	ES-3, 7-5	Executive Summary and 7.2	Lines 32-33 and 36-37. Text states in Executive Summary "**Fire Station #1 (IRP Site SS306P) and FFTA soils:** Vertical soil delineation was determined by collecting soils at 1-to-2-foot intervals." This statement implies soil samples were collected on 1-to-2-foot intervals. Text states in Section 7.2 "**Fire Station #1 (IRP Site SS306P) and FFTA soils:** Vertical soil delineation determined by collecting soils at 1-to-2-foot intervals." Please clarify the recommendation for soil delineation for IRP Site SS306P. Please develop detailed conclusions and recommendations to inform the ongoing PFAS RI.	Text in the ES and Section 7.2 was revised to, "Additional vertical soil delineation within identified contaminated areas is recommended by collecting soils at 1-to-2-foot intervals from the surface to below the groundwater interface." **DEC Accepts Response 4/25/2022**
7.	1-1	1	Lines 12-16, text states: "This Expanded SI Report was prepared under Contract Number (No.) W911KB-17-D-0018, Task Order No. W911KB18F0173, the *Expanded Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) Site Inspection at Eielson Air Force Base and Moose Creek Uniform Federal Policy-Quality Assurance Project Plan Work Plan*, dated September 2019 (Work Plan; U.S. Air Force [USAF], 2019a), and following two separate Work Plan Addenda" There were three Work Plan Addenda. Please add: Birch Lake Surface Water, Sediment, and Soil Sampling Final Addendum to the Work Plan for Expanded Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) Site Investigation, Eielson Air Force Base (AFB), Alaska. The reporting for the Birch Lake investigation is being submitted separately. Please provide a reference to the Birch Lake Addendum.	The reference was added to Section 1 with a note indicating that the Birch Lake investigation and report are discussed in a separate document. The following text was added," Birch Lake Surface Water, Sediment, and Soil Sampling, Final Addendum to the Work Plan for Expanded Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) Site Investigation, Eielson Air Force Base (AFB), Alaska. Dated 6 April 2020. The investigation at Birch Lake is discussed in a separate report." **DEC Accepts Response 4/14/2022**
8.	1-1	1.1	Lines 33-38. Text states "Although PFAS compounds, including PFOS, PFOA, and PFBS, are not federally regulated compounds under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or the Resource Conservation and Recovery Act of 1976 (RCRA), these compounds may present potential, non-carcinogenic risks to human health and the environment (Chang et al., 2014; Porter, 2011; Rak et al., 2009)." Please revise per comment 1. At the end of Section 1.1 (on page 1-2 after Line 23), please add: On 6 November 2016, DEC promulgated soil and groundwater cleanup levels for PFOS & PFOA. PFOS and PFOA are considered hazardous substances under state of Alaska regulations.	Accepted – We agree to use the language from the Moose Creek IROD. Text in Section 1.3 was changed to "PFOS and PFOA are not CERCLA listed hazardous substances, but in some circumstances could be responded to as CERCLA pollutants or contaminants; therefore, the USAF is following the CERCLA process to address potential risks from exposure to these PFASs (USAF, 2016)." The recommended text was added, "On 6 November 2016, ADEC promulgated soil and groundwater cleanup levels for PFOS and PFOA. PFOS and PFOA are considered hazardous substances under state of Alaska regulations." **DEC Accepts Response 4/14/2022**

Comment No.	Page	Section	Comment / Recommendation	Response
9.	1-3	1.3	Lines 22-25. Text states: "For the Expanded SI field activities, as agreed upon by all stakeholders, analytical results for PFOS, PFOA, and PFBS in groundwater, surface water, sediment, and soil samples were compared to the applicable screening levels designated as PALs." The applicable ADEC Soil Cleanup levels are listed in Table 15-2 of the Final Work Plan for Expanded Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate	The noted text was changed to, "For the Expanded SI field activities analytical results for PFOS, PFOA, and PFBS in groundwater, surface water, sediment, and soil samples were compared to the applicable screening levels designated as PALs. The National Contingency Plan (NCP), as stated in 40 CFR 300.420, assigns responsibility for an SI to the lead agency. The USAF, as the lead agency, selected the EPA RSLs as PSLs for soil and sediment consistent with the 2021 Assistant Secretary of Defense Memorandum, Investigating Per- and Polyfluoroalkyl Substances within the DoD Cleanup Program (DoD, 2021)."
			(PFOS) Site Investigation, September 2020, and were not compared against in this document. Please add to this section: However, the USAF has acknowledged that the DoD and the State of Alaska are currently holding discussions regarding the use of Alaska screening levels, including migration to groundwater (a protection of groundwater screening level) in the CERCLA process in an effort to arrive at a consensus for moving forward on this issue. Based on the outcome of those discussions, the data associated with this SI will be re-evaluated to determine a path forward for completing the soil delineation in areas that may require further investigation.	**4/14/2022 Noted: DEC continues to disagree with the PALs. (see comment 2 above). Delineation during the RI would not be considered complete if the extent of soil with potential to impact groundwater is not identified.** **Response noted.**
10.	1-3	1.3	Line 37-38. Text states: "The PAL for PFBS (target HQ of 1) is based upon the EPA RSL of 1,300 mg/kg in residential soil (EPA, 2020a)." The EPA PFBS RfD has dropped by two orders of magnitude in the most recent toxicity evaluation. The current 2021 RSL table will reflect the new values. It is DEC and EPA's expectation that investigations will utilize the most recent RSLs, including PFBS. The RSL for PFBS should be reevaluated and the PAL should be updated to current levels to compare with the site results data. Please revise the PAL for PFBS throughout the document and tables. DEC used the EPA RSL calculator and derived a RSL of 19 mg/kg for PFBS at an HQ = 1. However, the screening level value should be at a HQ of 0.1 since cumulative risk is evaluated for all compounds at or above $1/10^{th}$ Human Health levels. Please revise the PAL for PFBS throughout the document and tables.	The PAL for PFBS in sediment and soil has been revised to 1.9 mg/kg throughout the document. **DEC Accepts Response 4/14/2022**
11.	1-4	1.3.1	Lines 29-30. Bullet states "the previously installed water tanks, and granular activated carbon (GAC) 30 systems will be removed, and tanker and bottled water delivery will stop." Are there any exceptions?	The noted statement is one of the components of the selected remedy. It is not known at this point whether exceptions will be requested or allowed. **DEC Accepts Response 4/14/2022**

Comment No.	Page	Section	Comment / Recommendation	Response
12.	1-4	1.3.2	Lines 35-36. Text states "On 26 November 2019, the USAF requested that the Alaska Department of Natural Resources (ADNR) establish a CWMA for the water within Moose Creek, Alaska." Please revise the text to reflect the current status of the CWMA. Please Add: The CWMA order and decision was signed by the Commissioner of DNR on May 24, 2021. As of June 31, 2021, the CWMA was no longer appealable, and is considered in effect by DNR.	The recommended text was added to section 1.3.2. "The CWMA order and decision was signed by the Commissioner of DNR on 24 May 2021. As of 31 June 2021, the CWMA was no longer appealable, and is considered in effect by DNR." **DEC Accepts Response 4/14/2022**
13.	1-7	1.5	Line 5. Text in section refers to a qualified environmental sampler (QES). Please identify the QES. Please identify personnel that collected the samples.	All field personnel that collected samples were QES. Samplers for each individual sample can be found on field forms in Appendices E and F. **DEC Accepts Response 4/14/2022**: found in Appendix F.4.
14.	2-2	2.4	Line 14. Text states "stands of evergreen and deciduous trees include black and white spruce." Please add Birch and Aspen	Birch and aspen were added to the list. **DEC Accepts Response 4/14/2022**
15.	2-2	2.5	Line 20. Text states: "French Creek and Piledriver Slough support arctic grayling, salmon, and other fish (USAF, 2017b)." Please add: Moose Creek.	Moose Creek was added to the list. **DEC Accepts Response 4/14/2022** **Additionally, is there a reference for the no threatened and endangered species.** **Reference added (USFWS, 2022).** **DEC Accepts Response 8/01/2022**
16.	2-3	2.8	Line 35-37. The text states "and drains to the wetlands north of Eielson AFB". Garrison Slough joins Moose Creek near the northwestern boundary of Eielson AFB. Please clarify.	Text revised to, "Garrison Slough flows from south to north through the main area of Eielson AFB, east of the flight line, and drains into Moose Creek north of the Eielson AFB, which ultimately drains to the Tanana River." **DEC Accepts Response 4/14/2022**

Comment No.	Page	Section	Comment / Recommendation	Response
17.	3-1	3 & Figure 6-1	Historical analytical results relevant to this Expanded SI Report include all validated sampling data conducted prior to October 2020. The Expanded SI must present / summarize the validated data and use the data in the conclusions, figures and recommendations. Page 3-1, lines 40-41 and Page 3-2, lines 1-10: The plume depiction in Figure 6-1 from the Supplemental SI does not include all the groundwater data from the 2015 and 2016 additional site inspections. The plume boundaries are incorrect. The Figure 3-4 Overall PFOA and PFOS Groundwater and Surface Water Results from the Site Inspection Report for Aqueous Film Forming Foam Areas, May 2018 Eielson Air Force Base, Alaska identified extensive groundwater contamination above the LHA and the DEC Table C groundwater cleanup level in the south loop. The historical sampling results from the 2018 Site Inspection need to be incorporated in this report and in the plume depiction, or the Figure 6-1 of this report will not be approved. 2020 Results (PFOS = 0.076 ug/L, PFOA + PFOS = 0.105 ug/L) from the sampling at 20-PS01-SW-1 (9 June 2020) on Piledriver Slough are not shown and the Figure 6-1 is not capturing the exceedance. Given the statement: "On and around Eielson AFB, the groundwater and surface water are generally in direct contact and are generally connected vertically and horizontally. Therefore, the groundwater and surface water are presented together." It is unclear how the Figure 6-1 can be considered correct. The exceedances at Piledriver Slough 20-PS01-SW-1 and the Moose Creek landing (20PS-TW55, MW14, MW27) indicate the plume is above LHA in those locations. The plume is continuous and above LHA at the distal end of the plume as far Moose Creek landing.	Additional data has been added to the figure and the plume boundary has been revised in Figure 6-1. **DEC Accepts Response 4/25/2022**
			The plume depiction in the southeast portion of Figure 6-1 should be encompassing all of spruce lake which has been shown to be above the DEC Table C cleanup level (20PS-SP02-SW-1). Currently the contour is drawn through the middle of the lake. Please revise the Figure 6-1 plume to depict the known exceedances.	
18.	3-1	3.1.1	Line 29. Where are the eight drinking water wells located? Please show wells locations on a support figure.	Figure 2-1 showing six of the currently used drinking water wells, the WWTP well, and the Dog Kennel supply well has been included. **DEC Accepts Response 4/14/2022**
19.	3-1	3.1.1	Line 40. Text states "In 2015 and 2016, additional site inspections were completed for 15 additional AFFF areas". Please remove first use of "additional".	Text was adjusted to "In 2015 and 2016, site inspections were completed for 15 additional AFFF areas, …" **DEC Accepts Response 4/14/2022**

Comment No.	Page	Section	Comment / Recommendation	Response
20.	3-2	3.1.1	Line 11. Text states: "Two areas where soil PFOS and PFOA soil contamination exceeding" Please remove first use of "soil"	Text was adjusted to, "Two areas where PFOS and PFOA soil contamination exceeding…" **DEC Accepts Response 4/14/2022**
21.	3-2	3.1.1	Lines 18-20. A 2,000-gallon AFFF UST has been closed in place along the northern side of the building. Please show / label the approximate location of the UST on Figures 3-1, 5-4, 6-7, and 6-8.	The approximate location of the former UST has been added on Figures 3-1, 5-4, 6-7, and 6-8. **DEC Accepts Response 4/14/2022 with note: Please add identifying information. I.E. Former AFFF UST. Rather than "former AFFF".** **Identifying information added to figures.** **DEC Accepts Response 8/01/2022** Former UST identified.
22.	3-2	3.1.1	Lines 32-34. Text states "During the 2016 SI for AFFF areas, the concentration of PFOS in one soil boring exceeded the EPA RSL and the concentration of PFOS in another soil boring exceeded the EPA RSL at Fire Station #1 as shown on Figure 3-1." Figure 3-1 shows a PFOS concentration in one soil boring exceeding the ADEC HH Cleanup Level (CL). Please clarify text.	Text was revised to, "During the 2016 SI for AFFF areas, the PFOS concentration in one soil boring sample at Fire Station #1 exceeded the ADEC HH CLs for soil as shown on Figure 3-1." **DEC Accepts Response 4/14/2022 with note: If both EPA RSL and the ADEC HH CL are exceeded, both should be referenced similar to the comment below.** **Text adjusted to, "During the 2016 SI for AFFF areas, the PFOS concentration in one soil boring sample at Fire Station #1 exceeded the EPA RSL and the ADEC HH CLs for soil as shown on Figure 3-1."** **DEC Accepts Response 8/01/2022**
23.	3-3	3.1.1	Line 7. Please clarify in text that the two soil borings contained PFOS exceeding the ADEC HH CL.	Text was revised to, "two soil boring samples at the FFTAs by the current Entomology Building contained PFOS exceeding the EPA RSL and the ADEC HH CL, as shown on Figure 3-2." **DEC Accepts Response 4/14/2022**
24.	3-3	3.1.2	Line 19. Text states: "monitoring wells sampled contained PFOS and/or PFOS but were below cleanup levels" Please clarify whether PFOA was contained in the sampled wells.	Text was corrected to, "monitoring wells sampled contained PFOS and/or PFOA but were below cleanup levels." **DEC Accepts Response 4/14/2022**
25.	3-3	3.1.2	Lines 21-22. Text states "PFOS results and PFOA+PFOS results through December 2015 from a model are presented in Figure 3-3 and Figure 3-4, respectively (USAF, 2016)." Please add historical figures 3-2 and 3-4 from the Final Site Inspection for AFFF Areas, Eielson Air Force Base, Alaska (May 2018). These depict sampling results through November 2016 that need to be incorporated into this report.	The Final Site Inspection for AFFF Areas, Eielson Air Force Base, Alaska (AFCEC, 2018) is referenced in the text and historical Figure 3-2 and 3-4 have been added unaltered. Figure 3-5. Overall PFOA and PFOS Soil, Sediment, and Sludge Results (AFCEC, 2018; Figure 3-2) Figure 3-6. Overall PFOA and PFOS Groundwater and Surface Water Results (AFCEC, 2018; Figure 3-4) **DEC Accepts Response 4/14/2022**

Comment No.	Page	Section	Comment / Recommendation	Response
26.	3-3	3.1.2	Lines 23-28. The last paragraph on the page refers to the Eielson AFB water system. The section header concerns Moose Creek PFOS and PFOA Contamination. This paragraph seems like it belongs in a separate section concerning Eielson WTP. In addition, the text references two temporary GAC vessels were made part of the permanent system. Per Section 3.1.1, six GAC vessels are part of the system. Please clarify.	The noted paragraph in Section 3.1.2 was removed. A similar description of the Eielson water treatment system is included in Section 3.1.1. **DEC Accepts Response 4/14/2022 with note: Comment was not fully addressed. Is the system an eight GAC vessel system including the two temporary GAC vessels or are only six GAC vessels used since 2017?** **The text was clarified to "In December 2017, the water treatment system was upgraded to six GAC vessels and quarterly sampling shows that the WWTP is maintaining the PFOS and PFOA levels below the EPA HA (USAF, 2020c)."** **DEC Accepts Response 8/01/2022**
27.	4-1	4	Lines 12-13. Site Inspection Photographs are provided in Appendix C. Please clarify.	The reference was corrected to Appendix B. **DEC Accepts Response 4/14/2022**
28.	4-2	4.2	Line 42. PFOS concentrations in sediment exceed the soil DEC MTG CUL; while MTG CULs are for soil, this comparison gives a qualitative indication that sediment is impacted, and additional consideration is needed. Sediment impacted with PFOS and PFOA should be addressed in the Fate and Transport Considerations. Please add text to discuss that although the resident soil PALs were not exceeded, evaluation of sediment concentrations against ecological screening levels will be completed once ecological screening levels for PFAS are established. DEC is aware of final ecological levels that will be available for the PFAS investigations in progress.	Noted – Expanded SI text was not revised. The National Contingency Plan (NCP), as stated in 40 CFR 300.420, assigns responsibility for an SI to the lead agency. The USAF, as the lead agency, selected the EPA RSLs as PALs for soil and sediment consistent with the 2021 Assistant Secretary of Defense Memorandum, Investigating Per- and Polyfluoroalkyl Substances within the DoD Cleanup Program. The following text was added to section 4.4.3, "However, five sediment samples exceeded the ADEC Method Two Clean-up levels for PFOS of 0.0030 mg/kg with concentrations ranging from 0.0033 to 0.0055 mg/kg. Additional consideration of ecological screening levels may be warranted in the RI." **DEC Accepts Response to the inclusion of ecological levels.** **However, DEC does not concur with the first paragraph of the response. DEC disagrees that use of only the EPA residential soil and tapwater regional screening levels (RSLs) is appropriate as screening levels for site investigations (SIs). Per the Executive Summary of EPA's Guidance for Performing Site Inspection Under CERCLA, a site investigation, "evaluates the extent to which a site presents a threat to human health or the environment by, among other things, collecting and analyzing wastes and environmental media samples to determine whether hazardous substances are present at the site and are migrating to the surrounding environment." The National Contingency Plan states in 40 CFR §300.420(c)(5)(iii) that, "[u]pon completion of a remedial SI [site inspection], the lead agency shall prepare a report that includes the following: A description of pathways of migration of contaminants." The USAF, as the lead agency, is not following federal law or EPA's CERCLA guidance if it does not gather adequate sampling information and compare it against appropriate screening levels, including EPA's protection of groundwater soil screening level (SSL), to determine if there is a complete or potentially complete soil migration to groundwater pathway. Appropriate screening levels during the SI should include EPA's RSLs for resident soil and tapwater, as well as EPA's protection of groundwater SSL. (Also see comment responses at Comment 2).**

Comment No.	Page	Section	Comment / Recommendation	Response
29.	5-2, 5-3	5.1	Line 35, Lines 1-4. Figure 5-1 shows the land owned by State DNR, State MHTA, Federal, and University of Alaska. Areas where access permission was secured from Alyeska Pipeline Service Company, JJAL, Inc., and Chena River Flood Control Project (USACE-AK) is not indicated on Figure 5-1. Please clarify.	Noted – Expanded SI text was not revised. Access along and within the Alyeska Pipeline Corridor was required for all locations along the pipeline or accessed via the pipeline ROW. Permission was also secured from AK DNR as listed in Section 5.1. The federal category on the figure includes, USACE, BLM, USAF, and any other federally managed lands including the Chena River Flood Control Project and Eielson AFB. **DEC Accepts Response 4/25/2022**
30.	5-6	5.3.4	Lines 6-9. Use of only turbidity to determine if development of permanent monitoring wells does not follow the well development procedures outlined in the Standard Operating Procedure No. 019. Please clarify is the SOP was followed and, if not, please indicated variance from the work plan.	The SOP and Work Plan were followed. Text was changed to, "Direct water quality parameters, including potential hydrogen (pH), specific conductance, oxidation reduction potential (ORP), dissolved oxygen (DO), and turbidity were monitored during development to determine if well stabilization was achieved. Turbidity was measured using a portable turbidity meter after each monitoring well volume was removed. Monitoring wells were considered developed when stabilization of parameters was achieved, and turbidity of the development water was less than 10 nephelometric turbidity units (NTU) for three to six consecutive readings. In instances where stabilization or turbidity of less than 10 NTU was unattainable, development was stopped when ten times the casing volume in the monitoring well had been purged." **DEC Accepts Response 4/14/2022**
31.	5-11	5.7.1	Lines 17-19. Due to this variance, the groundwater sample analytical results for TW01 through TW35 should be flagged in the results tables with a potential low bias (QL). Please add the qualifier QL for all the applicable results?	Noted – Expanded SI text, table, figures, and laboratory results were revised. It is not appropriate to qualify the results based upon sample depth. The discussion in the deviations Section 5.7.1 is appropriate. **DEC Accepts Response 4/25/2022**
32.	5-12	5.7.2	Lines 15-17. Were the five permanent shallow monitoring wells replaced with wells installed at the correct depth and/or location or does a data gap remain? Please provide information regarding the data gap.	The listed five initial monitoring wells listed were replaced with permanent monitoring wells at the planned locations and depths. The five initial wells were sampled prior to decommissioning to provide a higher sample data density in the area than anticipated. **DEC Clarification 4/25/2022:** **The response indicates that samples were collected. What are the current well designations? Please clarify in the text. Also add the results data to the report and provide a reference to the location (whether Table 5-1 or other).** **Response 7/19/2022:** **The wells (MW26, MW28, MW31, MW32, and MW33) were sampled and decommissioned as described in the text. The results are included in data tables and locations on applicable figures.** **DEC Clarification 08/01/2022** **The comment was trying to identify the designations for the replacement wells? I.e. Was MW26 replaced with a well called MW26 or something different. What are the replacement well designations? Please specify in the text of the document for clarity on this point.**

				Response 8/3/2022 **The following text was added to the end of the last bullet in Section 5.7.2,** **"These wells were replaced with subsequent wells as follows:** ○ **MW-13 replaced MW-26** ○ **MW-15 replaced MW-28** ○ **MW-18 replaced MW-31** ○ **MW-19 replaced MW-32** ○ **MW-23 replaced MW-33"** **DEC Accepts Response 08/5/2022**
33.	5-12	5.7.3	Line 33. Please verify/change 19PS-MW21 to 19PS-TW21.	Text was corrected to 19PS-TW21. **DEC Accepts Response 05/11/2022**

Comment No.	Page	Section	Comment / Recommendation	Response
34.	5-12	5.7.3	Lines 42-43. Text states "During sampling, all monitoring wells were stabilized or purged until six wellbore volumes were removed." Is this a deviation?	This is not a deviation. The UFP-QAPP only requires a minimum of three well volumes to be removed before sampling if parameters do not stabilize. **DEC Accepts Response 05/11/2022**
35.	5-12	5.7.4	Table 5-1 lists multiple surface water and sediment samples that were collected from locations that deviated from the work plan. Please provide text that indicates these variances.	The text has been revised to discuss the SW deviations and refers to Table 5-1 for details of the deviations. **DEC Accepts Response 05/11/2022**
36.	5-13	5.7.4	Lines 1-2. Surface water sample CS-03 was collected to replace permanent shallow monitoring well 20PS-MW-21 per Table 5-1. Please verify and add "and replaced permanent shallow monitoring well 20PS-MW21."	The text has been revised to state, "The proposed location for 20PS-MW21 was not accessible for a drill rig. Surface water sample, CS-03, was substituted to provide data at this location and CS-03 replaced permanent shallow monitoring well 20PS-MW21." **DEC Accepts Response 05/11/2022**
37.	6-1	6	Lines 6-8. Text states "Figure 6-1 shows the lateral extent of PFOA+PFOS concentrations exceeding the PAL in shallow groundwater samples from the Expanded SI field activities from existing, temporary, and permanent monitoring wells." Historical analytical results relevant to this Expanded SI Report include all validated sampling data conducted prior to October 2020. The Expanded SI must present / summarize all the validated data and use the data in the conclusions, figures and recommendations, not just data collected in this investigation in order to meet project objective 1. See comment 17.	Agree. The text has been revised to, "Figure 6-1 shows the lateral extent of PFOA+PFOS concentrations exceeding the PAL in shallow groundwater samples from previous investigations and the Expanded SI field activities from existing, temporary, and permanent monitoring wells." **DEC Accepts Response 05/11/2022**

38.	6-1	6.1.1	Lines 23-25. Text states "including six co-located nested monitoring well clusters with both a shallow and a deep sample and two monitoring wells (USAP-1 and DSAP-8S) that were sampled twice (USAP-1 in both 2019 and 2020, and DSAP-8S twice in 2020)." This is the first time existing nested well clusters are mentioned in the Expanded SI report. Are USAP-1 and DSAP-8S nested monitoring wells? What are the six co-located nested monitoring well clusters? The Sample Summary Sheet in Appendix K indicates the groundwater samples collected from USAP-1 were from a depth of 24.5 or 25 feet bgs. Is this part of a cluster or representative of a "deeper" sampling location? The Sample Summary Sheet indicates groundwater samples were collected from DSAP-8S (16.5 feet bgs) and from DSAP-8D (61 feet bgs) in September 2020. Please clarify / provide a discussion regarding the sampling and results of existing nested well clusters.	The following text was added, "The six co-located nested monitoring well clusters were HCMW01, HCMW02, HCMW03, HCMW04, HCMW05, and DSAP-8. The 15 feet bgs well and the 75 feet bgs monitoring well were sampled from the HCMW series and both shallow (16.5 feet bgs) and deep (61 feet bgs) monitoring wells were sampled in well DSAP-8." USAP-1 is a singular well and was sampled from 24.5-25 feet bgs. **DEC Accepts Response 05/11/2022**
39.	6-9	6.3	Line 41. Text states "Sediment samples were collected from approximately the top 1 foot of sediment." Table K-2 indicates the sediment sample ending depths are 0 feet below the ground surface. Table 6-5 indicates the sediment sample depths are 0 feet. Please clarify the sediment sampling depths.	The text in Section 6.3 was revised to state, "Sediment samples were collected from the uppermost sediment of the lake or river bottom." **DEC Accepts Response 05/11/2022**

Comment No.	Page	Section	Comment / Recommendation	Response
40.	6-10	6.3	Lines 15-16. Text states "None of the sediment samples exceeded the PFOS PAL of 1.26 mg/kg." However, five sediment samples exceed the DEC MTG CUL for PFOS of 0.0030 with concentrations ranging from 0.0033 to 0.0055 mg/kg. See Table 6-5. Please add this information to the text. Additional consideration of ecological screening levels is warranted.	The following text was added to Section 6.3, "However, five sediment samples exceeded the ADEC Method Two Clean-up levels for PFOS of 0.0030 mg/kg with concentrations ranging from 0.0033 to 0.0055 mg/kg (see Table 6-5). Additional consideration of ecological screening levels may be warranted in the RI." **DEC Accepts Response 05/11/2022**
41.	7-1	7	Lines 9-10. However, the PAL for PFBS is not the current EPA RSL value. Also see comment no. 10.	The PAL for PFBS in sediment and soil has been revised to 1.9 mg/kg throughout the document. **DEC Accepts Response 05/11/2022**
42.	7-1	7, 7.1.1	Lines 13-15. Text states "Project objectives were 1) to laterally and vertically delineate PFOS, PFOA, and PFBS contamination in groundwater, 2) to determine the concentrations PFOS, PFOA, and PFBS in surface water and sediment in surface water bodies on Eielson AFB and off-Base".	A surface water subsection (new Section 7.1.2) has been added to provide a summary and conclusions regarding the concentrations of PFOS, PFOA, and PFBS in surface water bodies on Eielson AFB and off-Base. "**7.1.2 Surface Water** **DEC Accepts Response 8/01/2022**

			Lines 22-24. Text states "On and around Eielson AFB, the groundwater and surface water are generally in direct contact and are generally connected vertically and horizontally. Therefore, the groundwater and surface water are presented together." ADEC understands surface water sample results are considered in the lateral and vertical delineation of PFOS, PFOA, and PFBS contamination in groundwater (Project Objective 1) and these results are discussed in Section 7.1.1. However, Project Objective 2 has not been adequately addressed in Section 7. Please provide a summary and conclusions regarding the concentrations of PFOS, PFOA, and PFBS in surface water bodies on Eielson AFB and off-Base.	On and around Eielson AFB, the groundwater and surface water are generally in direct contact and are generally connected vertically and horizontally. Laboratory analysis identified impacts exceeding PALs in surface water samples that exceeded the PFOS and PFOA+PFOS PAL of 0.070 µg/L (EPA, 2016). PFOS, PFOA, and PFBS results from surface water samples are detailed in Table 6-4 and shown on Figures 6-2, 6-3, 6-4, 6-5, and 6-6. PFOS and PFOA+PFOS concentrations exceeding the PALs were found in surface water samples from Bear Lake (Figure 6-2), Moose Creek (Figure 6-3), Moose Lake (Figure 6-5), Piledriver Slough (Figure 6-3), and Spruce Lake (Figure 6-6). Moose Creek Landing (Figure 6-4) had samples with PFOS and PFOA+PFOS concentrations exceeding ½ of the PALs. All surface water exceedances of PALs are summarized in Table 7-4. Surface water bodies to the south and west of Eielson AFB have not been significantly impacted by PFOS, PFOA, and PFOA+PFOS. Multiple surface water bodies to the east, north, and northeast of Eielson AFB and the community of Moose Creek have been impacted through contact with impacted groundwater or overland flow." **DEC Accepts Response 05/11/2022**
43.	7-1	7.1.1	Lines 30 and 36. Text indicates 19PS-TW01 is "to the northwest of the community of Moose Creek: and "on the north end of the community of Moose Creek". Suggest the location of 19PS-TW01 be presented consistently.	Both instances have been revised to "northwest of the community of Moose Creek" **DEC Accepts Response 05/11/2022**

Comment No.	Page	Section	Comment / Recommendation	Response
44.	7-1, 7-2	7.1.1	Lines 39 and 1. Text states "In addition, all PFBS detections were below 0.02 µg/L except in a groundwater sample from temporary monitoring well 20PS-TW37". The groundwater sample from temporary monitoring well 19PS-TW24 had 0.024 µg/L. Please clarify.	The objective of the sentence is point out the significance of the variance of the sample from 20PS-TW37 from the remainder of the data. Text revised to, "In addition, all PFBS detections were below 0.025 µg/L except in a groundwater sample from temporary monitoring well 20PS-TW37 on Eielson AFB south of the runway with a concentration of 0.14 (QN, QH) µg/L." **DEC Accepts Response 05/11/2022**

45.	7-2	7.1.1	Lines 14-16. Text states "The estimated lateral extent of PFOA+PFOS results for groundwater and surface water from existing, temporary, permanent shallow monitoring wells, and surface water samples through October 2020 are shown on Figure 6-1." It is understood that the surface water sample results are considered for interpreting the lateral extent of contamination. Note the surface water samples collected from Moose Creek Landing Pond (MLP01 and MLP02 on Figure 5-3) do not exceed the LHA; however, Figure 6-1 shows these sampling locations within the lateral extent of the PFOA+PFOS>EPA HA and/or>50% EPA HA. Also, surface water samples PS01, MC01, SP01, and SP02 have concentrations exceeding the LHA (Figure 5-3) but are not located within the lateral extent of concentrations exceeding the LHA on Figure 6-1. Please verify / clarify that the surface water results have been included in the interpretation. Please include the surface sample locations on Figure 6-1.	Noted – Expanded SI text was not revised. Figure 6-1 has been revised. The "estimated lateral extent" is an interpretation of the data that has been collected to date. Although surface water and groundwater likely influence each other, due to the variation in sample collection, it is presumptuous to assume that surface water samples provide the same repeatability as samples collected from a monitoring well. Given that reality, the surface water sample results are considered as a line of evidence, but not as definitive as a groundwater sample in determining the lateral extent of impacts in groundwater. **DEC Accepts Response 05/11/2022**
46.	7-2	7.1.1	Line 35. As shown on Figures 5-3 and 6-1, the lateral extent of groundwater contamination is generally contained to the east of Eielson AFB by French Creek. Please verify / change Moose Creek to French Creek.	Concur. The text has been changed to "French Creek." **DEC Accepts Response 05/11/2022**
47.	7-3	7.1.1	Lines 4-5. The northern-most reach of the groundwater contaminant plume seems to terminate as it approaches the Tanana River and along Moose Creek Dam. Please show / label Moose Creek Dam on Figure 6-1.	Moose Creek Dam is 3 miles north of the limit of Figure 6-1. Expanding the boundaries of the figure to that scale would make the locations and data difficult to see. There is a label pointing to the extension of the dam that separates the flood control area from the city of North Pole in Figure 6-1. **DEC Accepts Response 05/11/2022**

Comment No.	Page	Section	Comment / Recommendation	Response
48.	7-3	7.1.1	Lines 13-31. Text states "The estimated horizontal extent of the PFOA+PFOS contaminant plume is bounded by groundwater samples except as detailed in the following, as limited by the scope of this Expanded SI." Based on this introductory sentence, the following five bullets are expected to detail where the groundwater plume has not been defined. Two of the five bullets present information regarding where the contaminant plume has been defined (Bullets 2 and 3) and one of the bullets (Bullet 5) summarizes surface water sample results. Please clarify where data gaps remain with respect to defining the lateral extent of the groundwater plume.	The last bullet was moved to the new surface water section. The remaining section has been revised as follows: "As limited by the scope of this Expanded SI, the estimated horizontal extent of the PFOA+PFOS contaminant plume is bounded by a combination of groundwater sample results and natural boundaries as detailed in the following examples and exceptions. • Northern and eastern edges of the central contaminant plume are bound by permafrost and the Birch Creek Schist as the Tanana Basin Aquifer thins approaching the foothills. Several attempts to retrieve groundwater samples to the east were unsuccessful due to dry monitoring wells in the permafrost. Stakeholder scoping decisions were made that no further delineation was necessary. • The southern edge and area west of the main Eielson AFB are well defined with a series of monitoring wells < 10% of the PAL. • The northwestern edge along the Chena River Flood Control levee has a line of low detections that bound the contaminant plume in that direction including the north side of Moose Creek Bluff. • The westernmost portion (west of the town of Moose Creek) of the contaminant plume as it approaches the Tanana River via Piledriver Slough, and the Chena River Flood Control area is relatively undefined as the area is marshy or inaccessible during the summer months. However, it is likely the westward migration of the contaminant plume is dependent on the local and seasonal Tanana River hydrological influence on the regional groundwater gradient. " **DEC Accepts Response 05/11/2022**
49.	7-4	7.1.3	Lines 30-32. Text states "The extent of PFOS and PFOA contamination was not delineated laterally or vertically, as limited by the scope of this Expanded SI. The extent of PFOS and PFOA is further described below." The following discussion for the IRP Sites SS306P and FT092 does not further describe the lateral or vertical extent of contamination with the exception of the statement, "Surface soil detection levels do not align with subsurface detection levels." Please provide a discussion of the lateral and vertical extent of soil contamination and remaining data gaps.	The noted sentence has been revised to, "The limited scope of this Expanded SI was to further investigate the PFOS and PFOA contamination in soil in the vicinity of the two buildings. The investigation further assessed the vertical and lateral extents of contamination but did not fully delineate in either dimension. The assessment of the extents of contamination of PFOS and PFOA in soil is further described below." **DEC Accepts Response 05/11/2022**
50.	7-5	7.2	Lines 17-18. Text states "PFBS concentrations in groundwater, surface water, and soil were well below the PALs and is therefore not recommend for the RI activities." DEC disagrees. The PFAS RI needs to continue to evaluate PFBS. As mentioned, the screening level has decreased and may make a difference in interpreting risks for the sites.	The sentence has been revised to, "PFBS concentrations in groundwater, surface water, and soil were well below the PALs and is therefore not recommend as a primary contaminant for the RI activities; however, PFBS should continue to be evaluated as part of the analytical suite to account for cumulative risks." **DEC Accepts Response 05/11/2022**

Comment No.	Page	Section	Comment / Recommendation	Response
51.	7-5	7.2	Lines 21-22. Text states "Further, based on the data from this investigation, it is recommended that sediment is eliminated as a medium of concern for future PFOS, PFOA, and PFBS investigations." However, DEC disagrees with eliminating the evaluation of sediment as a media of concern. Ecological screening levels for PFOS, PFOA and PFBS are being developed and will be required to be incorporated into the remedial investigations at Garrison Slough and the overall Site investigation at Eielson AFB. This recommendation is not accepted.	The sentence has been revised to, "Further, based on the data from this investigation, it is recommended that the determination of horizontal vertical extent of sediment is eliminated for future PFOS, PFOA, and PFBS investigations; however, further assessment to support risk assessments maybe necessary." **DEC Accepts Response 05/11/2022**
52.	7-6	7.3	Information presented in Section 7.3 should be used / presented in the discussions regarding the delineation of the lateral and vertical extent of groundwater and soil contamination, not just in the Limitations section.	Information from the 4th bullet (deep nested monitoring well locations) was incorporated into the 7.2 discussions. The remainder of the bullets were already addressed or are properly addressed in the limitations section. **DEC Accepts Response 05/11/2022**
53.	7-6	7.3	Line 29. Please verify / edit referenced Section 6.3.	The reference was changed to 6.4. **DEC Accepts Response 05/11/2022**
54.	8-1	8	Line 3. Please update the 18 AAC 75 reference date to the current version accessed with the provided https link.	The reference was updated in Section 8 and throughout the document. **DEC Accepts Response 05/11/2022**
55.		Fig. 1-1	ADEC recognizes that Figure 1-1 is an unaltered figure from the original source reference; however, the figure does not have a north arrow. Please include a north arrow on figure.	A north arrow was added to Figure 1-1. **DEC Accepts Response 05/11/2022**
56.		Fig. 2-1	Suggest including the blue arrow and "Regional Groundwater Flow" in the legend (similar to Figure 5-2).	The recommended changes were implemented. **DEC Accepts Response 05/11/2022**
57.		Fig. 2-5	As stated on Section 2.8 (Line 21), Moose Creek discharges to Piledriver Slough northwest of Eielson AFB. Figure 2-5 shows Moose Creek terminating prior to reaching Piledriver Slough with a historical creek channel connecting the two water bodies. Please edit Figure 2-5 to show Moose Creek and Piledriver Slough are currently connected as stated in text.	The recommended changes were implemented. **DEC Accepts Response 05/11/2022**
58.		Fig 6-1	Suggest the symbols and descriptions in the Legend for Location Results be presented in order of highest to lowest concentrations: red to orange to yellow to green. Suggest the colors in the inset box match the colors in the Legend for Location Results. Suggest including the blue arrow and "Regional Groundwater Flow" in the legend (similar to Figure 5-2).	The recommended changes were implemented. Symbols colors were ordered as requested, red to orange to yellow to green. Noted. Added regional flow and added note in bottom left corner. Legend box was full. **DEC Accepts Response 05/11/2022**

Comment No.	Page	Section	Comment / Recommendation	Response
59.		Fig 6-2	Sediment Sample 20PS-BR02-SD-0. Please verify / present the higher duplicate concentration of PFOS – 0.0034 mg/kg.	The higher duplicate value is verified and was added to the figure. **Sediment** **20PS-BR99-SD-0606 Duplicate Result** PFOA- ND QL PFOS- 0.0034 QL, QN mg/kg PFBS- ND QL **DEC Accepts Response 05/11/2022**
60.		Fig 6-3 Fig 6-5	Table 6-5 indicates Sediment Sample 20PS-MC01-SD-0 has 0.0055 mg/kg PFOS. Please verify / correct Figure 6-3. Surface Water Sample 20PS-PS03-SW-1. Please verify / present the higher duplicate concentrations of PFOS and PFOA+PFOS (0.00078 µg/L).	The recommended changes were implemented. **Surface Water – Figure 6-3** **20PS-PS99-SW-0608 Duplicate Result** PFOA- ND PFOS- 0.00078 J µg/L PFOA + PFOS- 0.00078 J µg/L PFBS- ND **Sediment – Figure 6-5** **20PS-ML02-SD-0** PFOA- ND QL PFOS- 0.0018 QL mg/kg PFBS- ND QL **DEC Accepts Response 05/11/2022**
61.		Fig 6-7	Surface Soil Sample 19PS-FST1-SB05-1. Please verify / present the higher duplicate concentrations of PFOA (0.015 mg/kg) and PFOS (1.9 mg/kg).	The higher duplicate value is verified and was added to the figure. **19PS-FST1-SB99-1021 Duplicate** PFOA- 0.015 m g/k g PFOS- 1.9 m g /k g PFBS – ND **DEC Accepts Response 05/11/2022**
62.		Fig 6-8	Soil Sample 20PS-FST1-SB09-7.5. Please verify / present the higher duplicate concentrations of PFOS (0.20 mg/kg) and PFBS (0.00058 mg/kg).	The higher duplicate value is verified and was added to the figure. **20PS-FST1-SB99-0603 (7.5 ft.) Duplicate** PFOA- 0.012 m g/k g PFOS - 0.20 QN m g/k g
				PFBS - 0.00058 J m g/k g **DEC Accepts Response 05/11/2022**
63.		Fig 6-9	Surface Soil Sample 19PS-FFTA-ENT-SB04-1. Please verify / present the higher duplicate concentrations of PFOA (0.00025 mg/kg) and PFOS (0.027 mg/kg). Surface Soil Sample 19PS-FFTA-ENT-SB05-1. Please verify / present the higher duplicate concentration of PFOA (0.0029 mg/kg).	The higher duplicate values are verified and was added to the figure. **19PS-FFTA-SB99-1027 Duplicate** PFOA- 0.00025 J m g/kg PFOS - 0.027 QN m g/kg PFBS – ND **19PS-FFTA-SB99-1017 Duplicate**

Comment No.	Page	Section	Comment / Recommendation	Response
			Surface Soil Sample 20PS-FFTA-ENT-SB11-1. Please verify / present the higher duplicate concentration of PFOS (16 mg/kg).	PFOA- 0.0029 B m g/kg PFOS- 0.15 QN mg/kg PFBS – ND **19PS-FFTA-SB98-1017 Duplicate** PFOA- 0.040 QN m g/kg PFOS- 16 QN mg/kg PFBS - 0.062 QN m g/kg **DEC Accepts Response 05/11/2022**
64.	Page 1 of 4	Table 5-1	For the 19PS-TW21 deviation, please indicate which Spring 2020 step-out temporary monitoring well closed the potential data gap. For the Flush Mount Wells deviation, the text states "Monitoring well completions will be completed in spring 2021." Were they? Please provide information regarding the current well completion status.	For the 19PS-TW21 deviation, the text was revised to, "Team reviewed findings from the remaining Fall 2019 temporary monitoring wells and attempted to close the potential data gap with a Spring 2020 step-out temporary monitoring well. However, proposed temporary well location 20PS-TW43 and 20PS-TW44 encountered frozen soils (permafrost zones) between Moose Creek and 19PS-TW21. Based on these wells and the permafrost model available for the area, it is assumed that shallow groundwater doesn't flow toward 19PS-TW21 due to the extent of permafrost. The Flush Mount Wells deviation text was revised to "were completed in Spring 2021." **DEC Accepts Response 05/12/2022**
65.		Table 6-6	Sample 20PS-FST1-SB09-1. Please verify / change sample depth to 1.	The data was verified in Table 6-6, and the table was updated. **DEC Accepts Response 05/12/2022**
66.		Table 6-7	Sample 19PS-FFTA-ENT-SB08-8.5. Please verify / change sample depth to 8.5.	The data was verified in Table 6-7, and the table was updated. **DEC Accepts Response 05/12/2022**
67.	Appendix J	ANALYTICAL LABORATORY REPORTS: Please provide the laboratory reports.	Level IV laboratory reports were provided electronically and on CD. **DEC Accepts Response 05/12/2022**	
68.	K-4	4	Table 5-1 indicates a COC deviation – three sample coolers were shipped with only one COC. Please add discussion regarding COC deviation.	Table 5-1 was revised to, "Three sample coolers were shipped with only one Sample Receipt covering the contents of all three coolers (COC-11, COC-12, COC-13). However, all coolers were received within temperature range and in good condition. Therefore, there was no impact to the sample data quality." **DEC Accepts Response 05/12/2022**

Comment No.	Page	Section	Comment / Recommendation	Response
69.	K-5	4	Lines 14-19. Results for the referenced qualified samples are not presented in the Appendix K summary tables. Based on the sample identification, it is assumed these samples were collected from Birch Lake. Please provide an explanation for the absence of the analytical data for these samples from the Expanded SI report.	The following text was added, "Sample results from the Birch Lake investigation are discussed in a separate document, the Birch Lake Technical Memo (USAF, 2021b)." **DEC Accepts Response 05/12/2022**
70.	K-6	6.1	Lines 9-10. Please add deviation to Table 5-1 of the Expanded SI report.	The field blank sampling protocol deviation from the 2019 QAPP were added to Table 5-1, as stated in lines 9–10-page K-6. **DEC Accepts Response 05/12/2022**
71.	K-6	6.2	Lines 32-33. Please add deviation to Table 5-1 of the Expanded SI report.	The trip blank sampling protocol deviation from the 2019 QAPP were added to Table 5-1, as stated in lines 32–33-page K-6. **DEC Accepts Response 05/12/2022**
72.	K-7	6.4	Lines 31-32. Please add deviation to Table 5-1 for the groundwater duplicate sampling deviation on 17 October 2019. Lines 37-38. Per Table 5-1, surface water field duplicates were not collected on June 3 and 4, 2020. Please clarify.	The sampling deviation on 17 October was added to Table 5-1, as stated in lines 31–32-page K-7. Field duplicate surface water samples were sampled on June 3 and 4. As stated in lines 37–38-page K-7 a field duplicate was collected everyday of surface water sampling. Removed mention of the deviation on 03 June 2020 and 04 June 2020. **DEC Accepts Response 05/12/2022**
73.	K-8	7.3	Line 34. Sample 19-TW30-1019 has not been qualified as estimated low bias and flagged with QL in Table K-2. Please verify/clarify.	The Table K-2 Sample 19PS-TW30-1019 results were qualified with a QL flag for PFOS, PFDA, PFHxA, and aggregate PFOA/PFOS. **DEC Accepts Response 05/12/2022**