MONTHLY PROGRESS REPORT #273
FOR DECEMBER 2019

EPA REGION I ADMINISTRATIVE ORDERS SDWA 1-97-1019 and 1-2000-0014

JOINT BASE CAPE COD (JBCC)
TRAINING RANGE AND IMPACT AREA

The following summary of progress is for the period from 1 December to 31 December 2019.

1. SUMMARY OF REMEDIATION ACTIONS

The following is a description of Remediation Actions (RA) underway at Camp Edwards as of December 2019.

Demolition Area 1 Comprehensive Groundwater RA

The Demolition Area 1 Comprehensive Groundwater RA consists of the removal and treatment of contaminated groundwater to control further migration of explosives compounds and perchlorate. Extraction, treatment, and recharge (ETR) systems at Frank Perkins Road, Pew Road, Base Boundary, and the Leading Edge include extraction wells, ex-situ treatment processes to remove explosives compounds and perchlorate from the groundwater, and injection wells to return treated water to the aquifer.

The Frank Perkins Road Treatment Facility has been optimized as part of the Environmental and System Performance Monitoring (ESPM) program at Demolition Area 1. The treatment facility continues to operate at a flow rate of 175 gpm, with over 2.698 billion gallons of water treated and re-injected as of 27 December 2019. No shutdown(s) of the Frank Perkins Road Treatment Facility occurred during December.

The Pew Road Mobile Treatment Unit (MTU) continues to operate at a flow rate of 65 GPM, with over 634.4 million gallons of water treated and re-injected as of 27 December 2019. No shutdown(s) of the Pew Road MTU occurred during December.

The Base Boundary MTU continues to operate at a flow rate of 65 gpm, with over 250.5 million gallons of water treated and re-injected as of 27 December 2019. The following shutdown(s) of the Base Boundary MTU occurred during December:

- The Base Boundary MTU was turned off to replace a broken camlock fitting on the effluent pipe. The MTU was turned off at 0925 h on 05 December 2019 and was restarted at 1040 h on 05 December 2019.

The Leading Edge system continues to operate at a flow rate of 100 gpm, with over 177.9 million gallons of water treated and re-injected as of 27 December 2019. No shutdown(s) of the Leading Edge system occurred during December.

J-2 Range Groundwater RA

Northern Plant

The J-2 Range Northern Treatment facility consists of removal and treatment of contaminated groundwater to control further migration of explosives compounds and perchlorate. The Extraction,

Treatment, and Re-infiltration system includes three extraction wells, ex-situ treatment process to remove explosives compounds and perchlorate from the groundwater, and an infiltration basin to return treated water to the aquifer.

The Northern Treatment Building continues to operate at a flow rate of 225 gpm. As of 27 December 2019, over 1.196 billion gallons of water have been treated and re-injected. No shutdown(s) of the Northern Treatment Building occurred in December.

The Northern MTUs E and F continue to operate at a flow rate of 250 gpm. As of 27 December 2019, over 1.647 billion gallons of water have been treated and re-injected. No shutdown(s) of the J-2 Range Northern system occurred during December.

Eastern Plant

The J-2 Range Eastern Treatment facility consists of removal and treatment of groundwater to minimize downgradient migration of explosives compounds and perchlorate. The ETI system includes the following components: three extraction wells in an axial array, an ex-situ treatment process consisting of an ion exchange (IX) resin and granular activated carbon (GAC) media to treat perchlorate and explosives compounds, and three infiltration trenches located along the lateral boundaries of the plume where treated water will enter the vadose zone and infiltrate into the aquifer. The J-2 Range Eastern system is running at a combined total flow rate of 495 gpm.

The MTUs H and I continue to operate at a flow rate of 250 gpm. As of 27 December 2019, over 1.307 billion gallons of water have been treated and re-injected. The following shutdown(s) of MTUs H and I occurred during December:

- MTUs H and I shut down due to a power outage. Eversource restored power and Boston Electric and Telephone (BETCo) replaced the motor starter. The MTUs shut down at 0930 h on 02 December 2019 and were restarted at 0815 h on 06 December 2019.

MTU J continues to operate at a flow rate of 120 gpm. As of 27 December 2019, over 597.9 million gallons of water have been treated and re-injected. The following shutdown(s) of MTU J occurred during December:

- MTU J shut down due to a power outage. Eversource restored power. The MTU shut down at 0930 h on 02 December 2019 and was restarted at 1445 h on 03 December 2019.

MTU K continues to operate at a flow rate of 125 gpm. As of 27 December 2019, over 715.5 million gallons of water have been treated and re-injected. The following shutdown(s) of MTU K occurred during December:

- MTU K shut down due to a power outage. Eversource restored power. The MTU shut down at 0930 h on 02 December 2019 and was restarted at 1355 h on 03 December 2019.

J-3 Range Groundwater RA

The J-3 Range Groundwater RA consists of removal and treatment of contaminated groundwater to control further migration of explosives compounds and perchlorate. The ETR system includes four extraction wells, ex-situ treatment process to remove explosives compounds and perchlorate from the groundwater, and use of the existing Fuel Spill-12 (FS-12) infiltration gallery to return treated water to the aquifer.

The J-3 system is currently operating at 255 gpm. As of 27 December 2019, over 1.311 billion gallons of water have been treated and re-injected. The following shutdown(s) of the J-3 Range system occurred during December:

- The System shut down due to an “Effluent Tank Overflow” alarm due to an FS-12 shutdown. The System shut down at 1653 h on 27 November 2019 and was restarted at 0931 h on 02 December 2019.

J-1 Range Groundwater RA

Southern Plant

The J-1 Range Southern Groundwater RA consists of removal and treatment of contaminated groundwater to control further migration of explosives compounds. The ETR system includes two extraction wells, ex-situ treatment process to remove explosives compounds from the groundwater, and an infiltration trench to return treated water to the aquifer.

The Southern MTU continues to operate at a flow rate of 125 gpm. As of 27 December 2019, over 576.2 million gallons of water have been treated and re-injected. The following shutdown(s) of the J-1 Range Southern system occurred during December:

- The MTU shut down due to a power outage. The MTU shut down at 0930 h on 02 December 2019 and was restarted at 1415 h on 03 December 2019.

Northern Plant

The J-1 Range Northern Groundwater RA consists of removal and treatment of contaminated groundwater to control further migration of explosives compounds and perchlorate. The ETR system includes two extraction wells, ex-situ treatment process to remove explosives compounds and perchlorate from the groundwater, and an infiltration trench to return treated water to the aquifer.

The Northern MTU continues to operate at a total system flow rate of 250 gpm. As of 27 December 2019, over 782.7 million gallons of water have been treated and re-injected. No shutdown(s) of the J-1 Range Northern MTU occurred during December.

Central Impact Area RA

The Central Impact Area (CIA) Groundwater treatment facility consists of removal and treatment of groundwater to minimize downgradient migration of explosives compounds and perchlorate. The ETR system includes the following components: three extraction wells, an ex-situ treatment process consisting of an ion exchange (IX) resin and granular activated carbon (GAC) media to treat explosives compounds, and three infiltration galleries to return treated water to the aquifer. The CIA systems 1, 2, and 3 continue to run at a combined total flow rate of 750 gpm. As of 27 December 2019, over 1.927 billion gallons of water have been treated and re-injected. No shutdown(s) of the CIA treatment facility occurred during December.

SUMMARY OF ACTIONS TAKEN

CIA
- Performed routine inspections of BEM cover to ensure cover is secure and intact.
- Performed intrusive investigation of P3A2.
- Performed year-end demolition operations.
- Exchanged bag filters on 24 December 2019.

Demolition Area 1
- Exchanged bag filters on 12 December 2019.
- Exchanged bag filters on 18 December 2019.
- Exchanged bag filters on 30 December 2019.

Demolition Area 2
- No activity.

Small Arms Ranges
- No activity.

J-1 Range
- Exchanged bag filters on 20 December 2019.

J-2 Range
- Exchanged bag filters on 04 December 2019.
- Exchanged bag filters on 17 December 2019.

J-3 Range
- Exchanged bag filters on 17 December 2019.

L Range
- No activity.

Training Areas
- No activity.

Other
- Process water samples were collected from Central Impact Area, Demolition Area 1, J1 Range Northern, J1 Range Southern, J2 Range Eastern, J2 Range Northern, and J3 Range.
- Groundwater samples were collected from Demolition Area 1, Demolition Area 2, and J1 Range Northern.

JBCC IAGWSP Tech Update Meeting Minutes 12 December 2019

Project and Fieldwork Update
The groundwater sampling team is finishing up at the J-1 Range and moving to Demolition Area 1. All treatment systems are up and running. The leading edge packer installation to optimize the capture zone is being scheduled. Crews are going to replace a couple of well pumps (J-1S and CIA) as they have become less efficient over time. The PFAS sampling results from the two extraction wells at J-2 North are expected in about a week. The results from the drive points at the Pocasset Baptist Church are in review; and it was noted that drilling did not go well. The deepest the rig was able to go was 80 feet.

In the Small Arms Ranges, all of the work was completed. In the Training Areas, the upcoming soil excavation at KD Range is scheduled for early February. The geophysical and EM-61 surveys at Former E Range and the J-3 Range are scheduled for February. Contractors will mobilize to the site in January to begin prep work.

UXO work continues in the Central Impact Area. Digs in transect 5A are wrapping up; currently they are 80% complete. BEM operations have started, but the weather has been hindering the number of shots that have been performed. The UXO team thinks they will be able to complete remaining shots by the end of next week. The BIP of the three 500 pound bombs is scheduled for Monday.

Action Items
The action items were discussed and updated.

JBCC Cleanup Team Meeting

The next meeting of the JBCC Cleanup Team (JBCCCT) has yet to be scheduled (previous meeting was 9 October 2019). The Cleanup Team meeting discusses late breaking news and responses to action items, as well as updates from the IAGWSP and the Installation Restoration Program (IRP). The JBCCCT meetings provide a forum for community input regarding issues related to both the IRP and the IAGWSP.

SUMMARY OF DATA RECEIVED

Table 1 summarizes sampling for all media from 1 December to 31 December 2019. Table 2 summarizes the validated detections of explosives compounds and perchlorate for all groundwater results received from 1 December to 31 December 2019. These results are compared to the Maximum Contaminant Levels/Health Advisory (MCL/HA) values for respective analytes. Explosives and perchlorate are the primary contaminants of concern (COC) at Camp Edwards. Table 3 summarizes sampling of influent and groundwater samples for per- and polyfluoroalkyl substances (PFAS) from 16 June 2019 to present.

Twelve operable units (OU) are under investigation and cleanup at Camp Edwards. The OUs include: Central Impact Area, Demolition Area 1, Demolition Area 2, Former A Range, J-1 Range, J-2 Range, J-3 Range, L Range, Northwest Corner, Small Arms Ranges, Training Area, and Western Boundary. Environmental monitoring reports for each OU are generated each year to evaluate the current year groundwater results. These reports are available on the site Environmental Data Management System (EDMS) and at the project document repositories (IAGWSP office and Jonathan Bourne Library).

2. DELIVERABLES SUBMITTED

Deliverables submitted during the reporting period include the following:

• Monthly Progress Report No. 272 for November 2019	10 December 2019
• Revised Draft Five Year Report 2012-2016 Impact Area Groundwater Study Program	04 December 2019
• Demolition Area 1 2019 Annual Environmental Monitoring Report	09 December 2019
• Draft J-3 Range 2019 Annual Environmental Monitoring Report	20 December 2019
	27 December 2019

- Draft J-2 Range Eastern and J-2 Range Northern 2019 Environmental Monitoring Report

3. SCHEDULED ACTIONS

The following documents are being prepared or revised during December 2019:

- Central Impact Area Environmental Monitoring Report
- Updated 2018 Source Report to include re-digs
- Five Year Review Report

TABLE 1
Sampling Progress: 1 December to 31 December 2019

Area Of Concern	Location	Field Sample ID	Sample Type	Date Sampled	Matrix	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)
Demolition Area 1	MW-659M1	MW-659M1_F19	N	12/30/2019	Ground Water	120	130
Demolition Area 1	MW-73S	MW-73S_F19	N	12/30/2019	Ground Water	52.2	61.7
Demolition Area 1	MW-19S	MW-19S_F19	N	12/23/2019	Ground Water	52.7	62.7
Demolition Area 1	MW-19S	MW-19S_F19D	FD	12/23/2019	Ground Water	52.7	62.7
Demolition Area 1	MW-544M3	MW-544M3_F19	N	12/23/2019	Ground Water	77.5	87.5
Demolition Area 1	MW-544M2	MW-544M2_F19	N	12/23/2019	Ground Water	112	122
Demolition Area 1	MW-544M1	MW-544M1_F19	N	12/23/2019	Ground Water	162	172
Demolition Area 1	MW-545M4	MW-545M4_F19	N	12/19/2019	Ground Water	72	82
Demolition Area 1	MW-545M3	MW-545M3_F19	N	12/19/2019	Ground Water	101.5	111.5
Demolition Area 1	MW-545M2	MW-545M2_F19	N	12/19/2019	Ground Water	142	152
Demolition Area 1	MW-545M1	MW-545M1_F19	N	12/19/2019	Ground Water	162	172
Demolition Area 1	MW-648M1	MW-648M1_F19	N	12/18/2019	Ground Water	112	122
Demolition Area 1	EW-658	EW-658_F19	N	12/18/2019	Ground Water	96	136
Demolition Area 1	MW-431	MW-431_F19	N	12/18/2019	Ground Water	88	188
Demolition Area 1	XX9514	XX9514_F19	N	12/18/2019	Ground Water	102	112
Demolition Area 1	MW-31S	MW-31S_F19	N	12/17/2019	Ground Water	98	103
Demolition Area 1	MW-31M	MW-31M_F19	N	12/17/2019	Ground Water	113	123
Demolition Area 1	MW-76M2	MW-76M2_F19	N	12/17/2019	Ground Water	105	115
Demolition Area 1	MW-77M2	MW-77M2_F19	N	12/17/2019	Ground Water	120	130
Demolition Area 1	MW-77M2	MW-77M2_F19D	FD	12/17/2019	Ground Water	120	130
Demolition Area 1	MW-663D	MW-663D_F19	N	12/16/2019	Ground Water	240.6	250.6
Demolition Area 1	MW-663D	MW-663D_F19D	FD	12/16/2019	Ground Water	240.6	250.6
Demolition Area 1	MW-231M1	MW-231M1_F19	N	12/16/2019	Ground Water	210.5	220.5
Demolition Area 1	MW-341M3	MW-341M3_F19	N	12/16/2019	Ground Water	209.5	219.5
Demolition Area 1	MW-341M2	MW-341M2_F19	N	12/16/2019	Ground Water	264.5	269.5
J1 Range Northern	MW-370M3	MW-370M3_F19	N	12/12/2019	Ground Water	174.96	184.96
J1 Range Northern	MW-370M2	MW-370M2_F19	N	12/12/2019	Ground Water	215.54	225.54
J1 Range Northern	MW-370M1	MW-370M1_F19	N	12/12/2019	Ground Water	245	255
J1 Range Northern	MW-370M1	MW-370M1_F19D	FD	12/12/2019	Ground Water	245	255
J1 Range Northern	MW-590M2	MW-590M2_F19	N	12/11/2019	Ground Water	238	248
J1 Range Northern	MW-590M2	MW-590M2_F19D	FD	12/11/2019	Ground Water	238	248
J1 Range Northern	MW-590M1	MW-590M1_F19	N	12/11/2019	Ground Water	258	268
J1 Range Northern	MW-326M3	MW-326M3_F19	N	12/11/2019	Ground Water	165.24	175.26
J1 Range Northern	MW-326M2	MW-326M2_F19	N	12/11/2019	Ground Water	196.27	206.28
J1 Range Northern	MW-326M2	MW-326M2_F19D	FD	12/11/2019	Ground Water	196.27	206.28
J1 Range Northern	MW-326M1	MW-326M1_F19	N	12/11/2019	Ground Water	250.01	260.01
J1 Range Northern	MW-315M2	MW-315M2_F19	N	12/10/2019	Ground Water	195.72	205.72
J1 Range Northern	MW-315M1	MW-315M1_F19	N	12/10/2019	Ground Water	245.49	255.49
J1 Range Northern	MW-265M3	MW-265M3_F19	N	12/10/2019	Ground Water	200	210
J1 Range Northern	MW-265M2	MW-265M2_F19	N	12/10/2019	Ground Water	225	235
J1 Range Northern	MW-265M2	MW-265M2_F19D	FD	12/10/2019	Ground Water	225	235
J1 Range Northern	MW-265M1	MW-265M1_F19	N	12/10/2019	Ground Water	265	275
J1 Range Northern	MW-479M1	MW-479M1_F19	N	12/09/2019	Ground Water	240	250
J1 Range Northern	MW-346M4	MW-346M4_F19	N	12/09/2019	Ground Water	140	150
Demolition Area 1	D1-EFF	D1-EFF-113A	N	12/09/2019	Process Water	0	0
Demolition Area 1	D1-MID-2	D1-MID-2-113A	N	12/09/2019	Process Water	0	0
J1 Range Northern	MW-346M3	MW-346M3_F19	N	12/09/2019	Ground Water	175	185
Demolition Area 1	D1-MID-1	D1-MID-1-113A	N	12/09/2019	Process Water	0	0
Demolition Area 1	D1-INF	D1-INF-113A	N	12/09/2019	Process Water	0	0
J1 Range Northern	MW-346M2	MW-346M2_F19	N	12/09/2019	Ground Water	205.28	215.28
J1 Range Northern	MW-346M2	MW-346M2_F19D	FD	12/09/2019	Ground Water	205.28	215.28
J2 Range Eastern	J2E-EFF-K	J2E-EFF-K-135A	N	12/09/2019	Process Water	0	0
J2 Range Eastern	J2E-MID-2K	J2E-MID-2K-135A	N	12/09/2019	Process Water	0	0
J2 Range Eastern	J2E-MID-1K	J2E-MID-1K-135A	N	12/09/2019	Process Water	0	0
J2 Range Eastern	J2E-INF-K	J2E-INF-K-135A	N	12/09/2019	Process Water	0	0
J2 Range Eastern	J2E-EFF-J	J2E-EFF-J-135A	N	12/09/2019	Process Water	0	0
J2 Range Eastern	J2E-MID-2J	J2E-MID-2J-135A	N	12/09/2019	Process Water	0	0
J2 Range Eastern	J2E-MID-1J	J2E-MID-1J-135A	N	12/09/2019	Process Water	0	0

N = Normal Sample
FD = Field Duplicate

TABLE 1
Sampling Progress: 1 December to 31 December 2019

Area Of Concern	Location	Field Sample ID	Sample Type	Date Sampled	Matrix	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)
J1 Range Northern	MW-346M1	MW-346M1_F19	N	12/09/2019	Ground Water	245	255
J1 Range Northern	MW-346M1	MW-346M1_F19D	FD	12/09/2019	Ground Water	245	255
J2 Range Eastern	J2E-INF-J	J2E-INF-J-135A	N	12/09/2019	Process Water	0	0
J2 Range Eastern	J2E-EFF-IH	J2E-EFF-IH-135A	N	12/09/2019	Process Water	0	0
J2 Range Eastern	J2E-MID-2H	J2E-MID-2H-135A	N	12/09/2019	Process Water	0	0
J2 Range Eastern	J2E-MID-1H	J2E-MID-1H-135A	N	12/09/2019	Process Water	0	0
J2 Range Eastern	J2E-MID-2I	J2E-MID-2I-135A	N	12/09/2019	Process Water	0	0
J2 Range Eastern	J2E-MID-1I	J2E-MID-1I-135A	N	12/09/2019	Process Water	0	0
J2 Range Eastern	J2E-INF-I	J2E-INF-I-135A	N	12/09/2019	Process Water	0	0
Demolition Area 2	MW-161S	MW-161S_F19	N	12/05/2019	Ground Water	145.5	155.5
Demolition Area 1	FPR-2-EFF-A	FPR-2-EFF-A-165A	N	12/05/2019	Process Water	0	0
Demolition Area 1	FPR-2-GAC-MID1A	FPR-2-GAC-MID1A-165A	N	12/05/2019	Process Water	0	0
Demolition Area 1	FPR2-POST-IX-A	FPR2-POST-IX-A-165A	N	12/05/2019	Process Water	0	0
Demolition Area 1	FPR-2-INF	FPR-2-INF-165A	N	12/05/2019	Process Water	0	0
Demolition Area 2	MW-160S	MW-160S_F19	N	12/05/2019	Ground Water	137.5	147.5
Demolition Area 1	PR-EFF	PR-EFF-165A	N	12/05/2019	Process Water	0	0
Demolition Area 1	PR-MID-2	PR-MID-2-165A	N	12/05/2019	Process Water	0	0
Demolition Area 1	PR-MID-1	PR-MID-1-165A	N	12/05/2019	Process Water	0	0
Demolition Area 1	PR-INF	PR-INF-165A	N	12/05/2019	Process Water	0	0
Demolition Area 2	MW-573M2	MW-573M2_F19	N	12/05/2019	Ground Water	155.4	165.4
Demolition Area 2	MW-573M2	MW-573M2_F19D	FD	12/05/2019	Ground Water	155.4	165.4
Demolition Area 1	D1LE-EFF	D1LE-EFF-41A	N	12/05/2019	Process Water	0	0
Demolition Area 1	D1LE-MID2	D1LE-MID2-41A	N	12/05/2019	Process Water	0	0
Demolition Area 1	D1LE-MID1	D1LE-MID1-41A	N	12/05/2019	Process Water	0	0
Demolition Area 1	D1LE-INF	D1LE-INF-41A	N	12/05/2019	Process Water	0	0
Demolition Area 2	MW-573M1	MW-573M1_F19	N	12/05/2019	Ground Water	176.4	186.4
Demolition Area 2	MW-572M1	MW-572M1_F19	N	12/05/2019	Ground Water	164.9	174.9
Demolition Area 2	MW-435M2	MW-435M2_F19	N	12/04/2019	Ground Water	149.57	159.93
J1 Range Southern	J1S-EFF	J1S-EFF-145A	N	12/04/2019	Process Water	0	0
J1 Range Southern	J1S-MID	J1S-MID-145A	N	12/04/2019	Process Water	0	0
J1 Range Southern	J1S-INF-2	J1S-INF-2-145A	N	12/04/2019	Process Water	0	0
Demolition Area 2	MW-435M1	MW-435M1_F19	N	12/04/2019	Ground Water	169.94	179.95
J3 Range	J3-EFF	J3-EFF-159A	N	12/04/2019	Process Water	0	0
J3 Range	J3-MID-2	J3-MID-2-159A	N	12/04/2019	Process Water	0	0
Demolition Area 2	MW-654M1	MW-654M1_F19	N	12/04/2019	Ground Water	154	164
J3 Range	J3-MID-1	J3-MID-1-159A	N	12/04/2019	Process Water	0	0
J3 Range	J3-INF	J3-INF-159A	N	12/04/2019	Process Water	0	0
Demolition Area 2	MW-655M2	MW-655M2_F19	N	12/04/2019	Ground Water	156	166
J2 Range Northern	J2N-EFF-G	J2N-EFF-G-159A	N	12/04/2019	Process Water	0	0
J2 Range Northern	J2N-MID-2G	J2N-MID-2G-159A	N	12/04/2019	Process Water	0	0
J2 Range Northern	J2N-MID-1G	J2N-MID-1G-159A	N	12/04/2019	Process Water	0	0
J2 Range Northern	J2N-INF-G	J2N-INF-G-159A	N	12/04/2019	Process Water	0	0
J2 Range Northern	J2N-EFF-EF	J2N-EFF-EF-159A	N	12/04/2019	Process Water	0	0
Demolition Area 2	MW-655M1	MW-655M1_F19	N	12/04/2019	Ground Water	178	188
J2 Range Northern	J2N-MID-2F	J2N-MID-2F-159A	N	12/04/2019	Process Water	0	0
J2 Range Northern	J2N-MID-1F	J2N-MID-1F-159A	N	12/04/2019	Process Water	0	0
J2 Range Northern	J2N-INF-EF	J2N-INF-EF-159A	N	12/04/2019	Process Water	0	0
J2 Range Northern	J2N-MID-2E	J2N-MID-2E-159A	N	12/04/2019	Process Water	0	0
J2 Range Northern	J2N-MID-1E	J2N-MID-1E-159A	N	12/04/2019	Process Water	0	0
J1 Range Northern	MW-656M2	MW-656M2_F19	N	12/03/2019	Ground Water	222.1	232.1
Central Impact Area	CIA2-EFF	CIA2-EFF-71A	N	12/03/2019	Process Water	0	0
Central Impact Area	CIA2-MID2	CIA2-MID2-71A	N	12/03/2019	Process Water	0	0
J1 Range Northern	MW-656M1	MW-656M1_F19	N	12/03/2019	Ground Water	244.1	254.1
Central Impact Area	CIA2-MID1	CIA2-MID1-71A	N	12/03/2019	Process Water	0	0
Central Impact Area	CIA2-INF	CIA2-INF-71A	N	12/03/2019	Process Water	0	0
Central Impact Area	CIA1-EFF	CIA1-EFF-71A	N	12/03/2019	Process Water	0	0
Central Impact Area	CIA1-MID2	CIA1-MID2-71A	N	12/03/2019	Process Water	0	0
Central Impact Area	CIA1-MID1	CIA1-MID1-71A	N	12/03/2019	Process Water	0	0

N = Normal Sample
FD = Field Duplicate

TABLE 1
Sampling Progress: 1 December to 31 December 2019

Area Of Concern	Location	Field Sample ID	Sample Type	Date Sampled	Matrix	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)
Central Impact Area	CIA1-INF	CIA1-INF-71A	N	12/03/2019	Process Water	0	0
J1 Range Northern	MW-220M1	MW-220M1_F19	N	12/03/2019	Ground Water	248	258
Central Impact Area	CIA3-EFF	CIA3-EFF-42A	N	12/03/2019	Process Water	0	0
Central Impact Area	CIA3-MID2	CIA3-MID2-42A	N	12/03/2019	Process Water	0	0
Central Impact Area	CIA3-MID1	CIA3-MID1-42A	N	12/03/2019	Process Water	0	0
Central Impact Area	CIA3-INF	CIA3-INF-42A	N	12/03/2019	Process Water	0	0
J1 Range Northern	MW-253M1	MW-253M1_F19	N	12/02/2019	Ground Water	265.4	275.4
J1 Range Northern	MW-657M2	MW-657M2_F19	N	12/02/2019	Ground Water	208.3	218.3
J1 Range Northern	MW-657M1	MW-657M1_F19	N	12/02/2019	Ground Water	240.3	250.3
J1 Range Northern	MW-547M2	MW-547M2_F19	N	12/02/2019	Ground Water	178	188
J1 Range Northern	J1N-EFF	J1N-EFF-74A	N	12/02/2019	Process Water	0	0
J1 Range Northern	J1N-MID2	J1N-MID2-74A	N	12/02/2019	Process Water	0	0
J1 Range Northern	J1N-MID1	J1N-MID1-74A	N	12/02/2019	Process Water	0	0
J1 Range Northern	J1N-INF2	J1N-INF2-74A	N	12/02/2019	Process Water	0	0
J1 Range Northern	MW-547M1	MW-547M1_F19	N	12/02/2019	Ground Water	237	247

N = Normal Sample
FD = Field Duplicate

TABLE 2
VALIDATED EXPLOSIVE AND PERCHLORATE RESULTS
Data Received December 2019

Area of Concern	Location ID	Field Sample ID	Top Depth (ft bgs)	Bottom Depth (ft bgs)	Date Sampled	Test Method	Analyte	Result Value	Qualifier	Units	MCL/HA	> MCL/HA	MDL	RL
J2 Range Northern	J2EW0001	J2EW0001_F19	179	234	11/20/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.064	J	µg/L	0.60		0.036	0.20
J2 Range Northern	J2EW0001	J2EW0001_F19	179	234	11/20/2019	SW6850	Perchlorate	0.91		µg/L	2.0		0.027	0.20
J2 Range Northern	J2EW0002	J2EW0002_F19	198	233	11/20/2019	SW6850	Perchlorate	4.5		µg/L	2.0	X	0.027	0.20
J2 Range Northern	J2EW0002	J2EW0002_F19D	198	233	11/20/2019	SW6850	Perchlorate	4.6		µg/L	2.0	X	0.027	0.20
J1 Range Northern	MW-286M2	MW-286M2_F19	205	215	11/18/2019	SW6850	Perchlorate	0.10	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-349M2	MW-349M2_F19	195	205	11/18/2019	SW6850	Perchlorate	0.055	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-349M1	MW-349M1_F19	229	239	11/18/2019	SW6850	Perchlorate	0.44		µg/L	2.0		0.027	0.20
J1 Range Northern	MW-349M1	MW-349M1_F19	229	239	11/18/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.67		µg/L	0.60	X	0.036	0.20
J1 Range Northern	MW-164M2	MW-164M2_F19	157	167	11/14/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.10	J	µg/L	0.60		0.036	0.20
J1 Range Northern	MW-164M2	MW-164M2_F19	157	167	11/14/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.19	J	µg/L	400		0.025	0.20
J1 Range Northern	MW-166M3	MW-166M3_F19	125	135	11/14/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.22		µg/L	400		0.025	0.20
J1 Range Northern	MW-166M3	MW-166M3_F19	125	135	11/14/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.32		µg/L	0.60		0.036	0.20
J1 Range Northern	MW-166M3	MW-166M3_F19	125	135	11/14/2019	SW8330	4-Amino-2,6-dinitrotoluene	0.34		µg/L	7.3		0.015	0.20
J1 Range Northern	MW-166M3	MW-166M3_F19D	125	135	11/14/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.23		µg/L	400		0.025	0.20
J1 Range Northern	MW-166M3	MW-166M3_F19D	125	135	11/14/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.34		µg/L	0.60		0.036	0.20
J1 Range Northern	MW-166M3	MW-166M3_F19D	125	135	11/14/2019	SW8330	4-Amino-2,6-dinitrotoluene	0.35		µg/L	7.3		0.015	0.20
J1 Range Northern	MW-245M2	MW-245M2_F19	204	214	11/13/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	19.1		µg/L	0.60	X	0.036	0.20
J1 Range Northern	MW-245M2	MW-245M2_F19	204	214	11/13/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	3.9		µg/L	400		0.025	0.20
J1 Range Northern	MW-245M2	MW-245M2_F19	204	214	11/13/2019	SW6850	Perchlorate	4.3		µg/L	2.0	X	0.027	0.20
J1 Range Northern	MW-245M2	MW-245M2_F19D	204	214	11/13/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	19.1		µg/L	0.60	X	0.036	0.20
J1 Range Northern	MW-245M2	MW-245M2_F19D	204	214	11/13/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	3.9		µg/L	400		0.025	0.20
J1 Range Northern	MW-245M2	MW-245M2_F19D	204	214	11/13/2019	SW6850	Perchlorate	4.2		µg/L	2.0	X	0.027	0.20
J1 Range Northern	MW-245M1	MW-245M1_F19	244	254	11/13/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.17	J	µg/L	0.60		0.036	0.20
J1 Range Northern	MW-245M1	MW-245M1_F19	244	254	11/13/2019	SW6850	Perchlorate	0.76		µg/L	2.0		0.027	0.20
J1 Range Northern	MW-303M3	MW-303M3_F19	139.74	149.69	11/12/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.038	J	µg/L	400		0.025	0.20
J1 Range Northern	MW-303M3	MW-303M3_F19	139.74	149.69	11/12/2019	SW8330	4-Amino-2,6-dinitrotoluene	0.11	J	µg/L	7.3		0.015	0.20
J1 Range Northern	MW-303M3	MW-303M3_F19	139.74	149.69	11/12/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.46		µg/L	0.60		0.036	0.20
J1 Range Northern	MW-303M2	MW-303M2_F19	235.09	245.1	11/12/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	4.3		µg/L	400		0.025	0.20
J1 Range Northern	MW-303M2	MW-303M2_F19	235.09	245.1	11/12/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	5.6		µg/L	0.60	X	0.036	0.20
J1 Range Northern	MW-303M2	MW-303M2_F19D	235.09	245.1	11/12/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	4.2		µg/L	400		0.025	0.20
J1 Range Northern	MW-303M2	MW-303M2_F19D	235.09	245.1	11/12/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	5.6		µg/L	0.60	X	0.036	0.20
J1 Range Northern	MW-566M1	MW-566M1_F19	232	242	11/07/2019	SW6850	Perchlorate	2.3		µg/L	2.0	X	0.027	0.20
J1 Range Northern	MW-584M2	MW-584M2_F19	228	238	11/07/2019	SW6850	Perchlorate	0.046	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-584M1	MW-584M1_F19	248	258	11/07/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.069	J	µg/L	0.60		0.036	0.20
J1 Range Northern	MW-584M1	MW-584M1_F19	248	258	11/07/2019	SW6850	Perchlorate	2.5		µg/L	2.0	X	0.027	0.20
J1 Range Northern	MW-401M3	MW-401M3_F19	228.5	238.5	11/07/2019	SW6850	Perchlorate	0.11	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-401M1	MW-401M1_F19	256.1	266.1	11/07/2019	SW6850	Perchlorate	0.058	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-567M1	MW-567M1_F19	215.5	225.5	11/06/2019	SW6850	Perchlorate	2.0		µg/L	2.0	X	0.027	0.20
J1 Range Northern	MW-689M1	MW-689M1_F19	253.5	263.5	11/06/2019	SW6850	Perchlorate	0.24	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-564M1	MW-564M1_F19	227	237	11/05/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.46		µg/L	400		0.025	0.20
J1 Range Northern	MW-564M1	MW-564M1_F19	227	237	11/05/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	2.0		µg/L	0.60	X	0.036	0.20
J1 Range Northern	MW-564M1	MW-564M1_F19	227	237	11/05/2019	SW6850	Perchlorate	7.3		µg/L	2.0	X	0.027	0.20

J = Estimated Result
MDL = Method Detection Limit
RL = Reporting Limit

MCL/HA= Either the MCL or Lowest Health Advisory Limit

TABLE 2
VALIDATED EXPLOSIVE AND PERCHLORATE RESULTS
Data Received December 2019

Area of Concern	Location ID	Field Sample ID	Top Depth (ft bgs)	Bottom Depth (ft bgs)	Date Sampled	Test Method	Analyte	Result Value	Qualifier	Units	MCL/HA	> MCL/HA	MDL	RL
J1 Range Northern	MW-564M1	MW-564M1_F19D	227	237	11/05/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.48		µg/L	400		0.025	0.20
J1 Range Northern	MW-564M1	MW-564M1_F19D	227	237	11/05/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	2.0		µg/L	0.60	X	0.036	0.20
J1 Range Northern	MW-564M1	MW-564M1_F19D	227	237	11/05/2019	SW6850	Perchlorate	7.4		µg/L	2.0	X	0.027	0.20
J1 Range Northern	MW-549M1	MW-549M1_F19	227.4	237.4	11/05/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.066	J	µg/L	0.60		0.036	0.20
J1 Range Northern	MW-549M1	MW-549M1_F19	227.4	237.4	11/05/2019	SW6850	Perchlorate	3.0		µg/L	2.0	X	0.027	0.20
J1 Range Northern	MW-606M1	MW-606M1_F19	233.3	243.3	11/05/2019	SW6850	Perchlorate	1.2		µg/L	2.0		0.027	0.20
J1 Range Northern	MW-605M2	MW-605M2_F19	182.2	192.2	11/04/2019	SW6850	Perchlorate	0.067	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-541M1	MW-541M1_F19	210	220	10/31/2019	SW6850	Perchlorate	0.14	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-430M1	MW-430M1_F19	245.23	255.23	10/31/2019	SW6850	Perchlorate	0.046	J	µg/L	2.0		0.027	0.20
J1 Range Southern	MW-482M2	MW-482M2_F19	172.64	182.64	10/29/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.059	J	µg/L	400		0.025	0.20
J1 Range Southern	MW-482M2	MW-482M2_F19	172.64	182.64	10/29/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.38		µg/L	0.60		0.036	0.20
J1 Range Southern	MW-482M2	MW-482M2_F19D	172.64	182.64	10/29/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.056	J	µg/L	400		0.025	0.20
J1 Range Southern	MW-482M2	MW-482M2_F19D	172.64	182.64	10/29/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.40		µg/L	0.60		0.036	0.20
J1 Range Southern	MW-645M1	MW-645M1_F19	183.5	193.5	10/23/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.46		µg/L	0.60		0.036	0.20
J1 Range Southern	MW-645M1	MW-645M1_F19D	183.5	193.5	10/23/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.42		µg/L	0.60		0.036	0.20
J1 Range Southern	DP-379	DP-379_F19	184.3	189.3	10/22/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.054	J	µg/L	0.60		0.036	0.20

J = Estimated Result
MDL = Method Detection Limit
RL = Reporting Limit

MCL/HA= Either the MCL or Lowest Health Advisory Limit

PFAS Summary Report – Groundwater
Joint Base Cape Cod, IAGWSP
KGS 2019 PFAS MW&INF
Demolition Area 1

Location	D1-INF	FPR-2-INF	MW-258M1	MW-663D	PR-INF
Field Sample ID	D1-INF_PFAS19	FPR-2-INF_PFAS19	MW-258M1_PFAS19	MW-663D_PFAS19	PR-INF_PFAS19
Sampling Depth	0.00 - 0.00	0.00 - 0.00	109.00 - 119.00	240.60 - 250.60	0.00 - 0.00
Sampling Date	06/24/2019	06/25/2019	06/19/2019	06/24/2019	06/25/2019
SDG	320517141	320517141	320515981	320517141	320517141
Sample Type	**Normal**	**Normal**	**Normal**	**Normal**	**Normal**
PFAS 21 Cmps	Results (ng/L)	Results (ng/L)	Results (ng/L)	Results (ng/L)	Results (ng/L)
6:2 Fluorotelomer sulfonate (6:2 FTS)	18.0 U	19.0 U	20.0 U	20.0 U	20.0 U
8:2 Fluorotelomer sulfonate (8:2 FTS)	9.10 U	9.50 U	9.80 U	9.80 U	9.80 U
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	9.10 U	9.50 U	9.80 U	9.80 U	9.80 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	9.10 U	9.50 U	9.80 U	9.80 U	9.80 U
Perfluoro-1-heptanesulfonate (PFHpS)	0.910 U	0.950 U	0.980 U	0.980 U	0.980 U
Perfluorobutanesulfonic acid (PFBS)	0.910 U	0.950 U	0.980 U	0.980 U	0.980 U
Perfluorobutanoic acid (PFBA)	1.40 U	1.40 U	1.50 U	1.50 U	1.50 U
Perfluorodecane sulfonate	1.40 U	1.40 U	1.50 U	1.50 U	1.50 U
Perfluorodecanoic acid (PFDA)	0.910 U	0.950 U	0.980 U	**2.20**	0.980 U
Perfluorododecanoic acid (PFDoA)	1.40 U	1.40 U	1.50 U	1.50 U	1.50 U
Perfluoroheptanoic acid (PFHpA)	1.40 U	1.40 U	1.50 U	1.50 U	1.50 U
Perfluorohexanesulfonic acid (PFHxS)	0.910 U	0.950 U	0.980 U	0.980 U	2.00 U
Perfluorohexanoic acid (PFHxA)	0.910 U	0.950 U	0.980 U	0.980 U	0.980 U
Perfluorononanoic acid (PFNA)	1.40 U	1.40 U	1.50 U	**1.00 J**	1.50 U
Perfluorooctanesulfonamide (FOSA)	2.70 U	2.80 U	2.90 U	3.00 U	2.90 U
Perfluorooctanesulfonic acid (PFOS)	2.70 U	2.80 U	2.90 U	3.00 U	2.90 U
Perfluorooctanoic acid (PFOA)	1.40 U	1.40 U	1.50 U	1.50 U	1.50 U
Perfluoropentanoic acid (PFPA)	0.910 U	0.950 U	0.980 U	**0.460 J**	0.980 U
Perfluorotetradecanoic acid (PFTA)	2.70 U	2.80 U	2.90 U	3.00 U	2.90 U
Perfluorotridecanoic acid (PFTrDA)	2.70 U	2.80 U	2.90 U	3.00 U	2.90 U
Perfluoroundecanoic acid (PFUnA)	1.40 U	1.40 U	1.50 U	**1.20 J**	1.50 U
†PFOS + PFOA (EPA)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
‡PFOS + PFOA + PFDA + PFHpA + PFHxS + PFNA (MassDEP)	**0.00**	**0.00**	**0.00**	**3.20**	**0.00**
§PFOS + PFOA + PFHpA + PFHxS + PFNA (Mass ORSG)	**0.00**	**0.00**	**0.00**	**1.00**	**0.00**

PFAS Summary Report – Groundwater
Joint Base Cape Cod, IAGWSP
KGS 2019 PFAS MW&INF
J1 Range Northern

Location	J1N-INF2	J1N-INF2	MW-136S	MW-564M1	MW-590M2
Field Sample ID	J1N-INF2_PFAS19	J1N-INF2_PFAS19R	MW-136S_PFAS19	MW-564M1_PFAS19	MW-590M2_PFAS19
Sampling Depth	0.00 - 0.00	0.00 - 0.00	107.00 - 117.00	227.00 - 237.00	238.00 - 248.00
Sampling Date	06/17/2019	07/30/2019	06/24/2019	06/24/2019	06/24/2019
SDG	320514661	320528231	320517141	320517141	320517141
Sample Type	**Normal**	**Normal**	**Normal**	**Normal**	**Normal**
PFAS 21 Cmps	Results (ng/L)	Results (ng/L)	Results (ng/L)	Results (ng/L)	Results (ng/L)
6:2 Fluorotelomer sulfonate (6:2 FTS)	19.0 U	19.0 U	20.0 U	18.0 U	19.0 U
8:2 Fluorotelomer sulfonate (8:2 FTS)	9.30 U	9.60 U	9.80 U	9.20 U	9.60 U
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	9.30 U	9.60 U	9.80 U	9.20 U	9.60 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	9.30 U	9.60 U	9.80 U	9.20 U	9.60 U
Perfluoro-1-heptanesulfonate (PFHpS)	0.930 U	0.960 U	0.980 U	0.920 U	0.960 U
Perfluorobutanesulfonic acid (PFBS)	0.930 U	0.960 U	0.980 U	0.920 U	0.960 U
Perfluorobutanoic acid (PFBA)	1.90 U	1.40 U	**0.990 J**	1.40 U	1.40 U
Perfluorodecane sulfonate	1.40 U	1.40 U	1.50 U	1.40 U	1.40 U
Perfluorodecanoic acid (PFDA)	0.930 U	0.960 U	0.980 U	0.920 U	0.960 U
Perfluorododecanoic acid (PFDoA)	1.40 U	1.40 U	1.50 U	1.40 U	1.40 U
Perfluoroheptanoic acid (PFHpA)	1.40 U	1.40 U	1.50 U	1.40 U	1.40 U
Perfluorohexanesulfonic acid (PFHxS)	0.930 U	1.90 U	2.00 U	1.80 U	0.960 U
Perfluorohexanoic acid (PFHxA)	0.930 U	0.960 U	0.980 U	0.920 U	0.960 U
Perfluorononanoic acid (PFNA)	1.40 U	1.40 U	1.50 U	1.40 U	1.40 U
Perfluorooctanesulfonamide (FOSA)	**1.80 J**	2.90 U	2.90 U	2.80 U	2.90 U
Perfluorooctanesulfonic acid (PFOS)	**4.90**	2.90 U	**1.40 J**	2.80 U	2.90 U
Perfluorooctanoic acid (PFOA)	1.40 U	1.40 U	**2.40**	1.40 U	1.40 U
Perfluoropentanoic acid (PFPA)	0.930 U	0.960 U	0.980 U	0.920 U	0.960 U
Perfluorotetradecanoic acid (PFTA)	2.80 U	2.90 U	2.90 U	2.80 U	2.90 U
Perfluorotridecanoic acid (PFTrDA)	2.80 U	2.90 U	2.90 U	2.80 U	2.90 U
Perfluoroundecanoic acid (PFUnA)	1.40 U	1.40 U	1.50 U	1.40 U	1.40 U
†PFOS + PFOA (EPA)	**4.90**	**0.00**	**3.80**	**0.00**	**0.00**
‡PFOS + PFOA + PFDA + PFHpA + PFHxS + PFNA (MassDEP)	**4.90**	**0.00**	**3.80**	**0.00**	**0.00**
§PFOS + PFOA + PFHpA + PFHxS + PFNA (Mass ORSG)	**4.90**	**0.00**	**3.80**	**0.00**	**0.00**

PFAS Summary Report – Groundwater
Joint Base Cape Cod, IAGWSP
KGS 2019 PFAS MW&INF
J2 Range Eastern

Location	J2E-INF-I	J2E-INF-J	J2E-INF-K	MW-307M3	MW-307M3	MW-368M1
Field Sample ID	J2E-INF-I_PFAS19	J2E-INF-J_PFAS19	J2E-INF-K_PFAS19	MW-307M3_PFAS19	MW-307M3_PFAS19D	MW-368M1_PFAS19
Sampling Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	125.80 - 135.82	125.80 - 135.82	237.35 - 247.35
Sampling Date	06/20/2019	06/20/2019	06/20/2019	06/18/2019	06/18/2019	06/18/2019
SDG	320515981	320515981	320515981	320514662	320514662	320514662
Sample Type	**Normal**	**Normal**	**Normal**	**Normal**	**Field Duplicate**	**Normal**
PFAS 21 Cmps	Results (ng/L)	Results (ng/L)	Results (ng/L)	Results (ng/L)	Results (ng/L)	Results (ng/L)
6:2 Fluorotelomer sulfonate (6:2 FTS)	19.0 U	19.0 U	20.0 U	18.0 U	19.0 U	17.0 U
8:2 Fluorotelomer sulfonate (8:2 FTS)	9.70 U	9.30 U	9.80 U	9.00 U	9.60 U	8.50 U
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	9.70 U	9.30 U	9.80 U	9.00 U	9.60 U	8.50 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	9.70 U	9.30 U	9.80 U	9.00 U	9.60 U	8.50 U
Perfluoro-1-heptanesulfonate (PFHpS)	0.970 U	0.930 U	0.980 U	0.900 U	0.960 U	0.850 U
Perfluorobutanesulfonic acid (PFBS)	0.970 U	0.930 U	0.980 U	0.900 U	0.960 U	0.850 U
Perfluorobutanoic acid (PFBA)	1.50 U	1.40 U	1.50 U	1.80 U	1.90 U	1.70 U
Perfluorodecane sulfonate	1.50 U	1.40 U	1.50 U	1.30 U	1.40 U	1.30 U
Perfluorodecanoic acid (PFDA)	0.970 U	0.930 U	0.980 U	0.900 U	0.960 U	**1.40 J**
Perfluorododecanoic acid (PFDoA)	1.50 U	1.40 U	1.50 U	1.30 U	1.40 U	**0.450 J**
Perfluoroheptanoic acid (PFHpA)	1.50 U	1.40 U	1.50 U	1.30 U	1.40 U	1.30 U
Perfluorohexanesulfonic acid (PFHxS)	0.970 U	0.930 U	0.980 U	0.900 U	0.960 U	0.850 U
Perfluorohexanoic acid (PFHxA)	0.970 U	0.930 U	0.980 U	0.900 U	0.960 U	0.850 U
Perfluorononanoic acid (PFNA)	1.50 U	1.40 U	1.50 U	**0.880 J**	**0.730 J**	**0.650 J**
Perfluorooctanesulfonamide (FOSA)	2.90 U	2.80 U	2.90 U	2.70 U	2.90 U	2.60 U
Perfluorooctanesulfonic acid (PFOS)	2.90 U	2.80 U	2.90 U	2.70 U	2.90 U	2.60 U
Perfluorooctanoic acid (PFOA)	1.50 U	1.40 U	1.50 U	1.30 U	1.40 U	1.30 U
Perfluoropentanoic acid (PFPA)	0.970 U	0.930 U	0.980 U	0.900 U	0.960 U	0.850 U
Perfluorotetradecanoic acid (PFTA)	2.90 U	2.80 U	2.90 U	2.70 U	2.90 U	2.60 U
Perfluorotridecanoic acid (PFTrDA)	2.90 U	2.80 U	2.90 U	2.70 U	2.90 U	2.60 U
Perfluoroundecanoic acid (PFUnA)	1.50 U	1.40 U	1.50 U	1.30 U	1.40 U	**4.90**
†PFOS + PFOA (EPA)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
‡PFOS + PFOA + PFDA + PFHpA + PFHxS + PFNA (MassDEP)	**0.00**	**0.00**	**0.00**	**0.880**	**0.730**	**2.05**
§PFOS + PFOA + PFHpA + PFHxS + PFNA (Mass ORSG)	**0.00**	**0.00**	**0.00**	**0.880**	**0.730**	**0.650**

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J2 Range Eastern

Location	MW-368M2	MW-667M1
Field Sample ID	MW-368M2_PFAS19	MW-667M1_PFAS19
Sampling Depth	202.73 - 212.73	302.30 - 312.30
Sampling Date	06/18/2019	06/17/2019
SDG	320514662	320514661
Sample Type	**Normal**	**Normal**
PFAS 21 Cmps	Results (ng/L)	Results (ng/L)
6:2 Fluorotelomer sulfonate (6:2 FTS)	18.0 U	18.0 U
8:2 Fluorotelomer sulfonate (8:2 FTS)	8.80 U	9.00 U
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	8.80 U	9.00 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	8.80 U	9.00 U
Perfluoro-1-heptanesulfonate (PFHpS)	0.880 U	0.900 U
Perfluorobutanesulfonic acid (PFBS)	0.880 U	0.900 U
Perfluorobutanoic acid (PFBA)	1.30 U	1.80 U
Perfluorodecane sulfonate	1.30 U	1.40 U
Perfluorodecanoic acid (PFDA)	**0.800 J**	**4.30**
Perfluorododecanoic acid (PFDoA)	1.30 U	1.40 U
Perfluoroheptanoic acid (PFHpA)	1.30 U	1.40 U
Perfluorohexanesulfonic acid (PFHxS)	0.880 U	0.900 U
Perfluorohexanoic acid (PFHxA)	0.880 U	0.900 U
Perfluorononanoic acid (PFNA)	1.30 U	**2.80**
Perfluorooctanesulfonamide (FOSA)	2.60 U	2.70 U
Perfluorooctanesulfonic acid (PFOS)	2.60 U	2.70 U
Perfluorooctanoic acid (PFOA)	1.30 U	1.40 U
Perfluoropentanoic acid (PFPA)	0.880 U	0.900 U
Perfluorotetradecanoic acid (PFTA)	2.60 U	2.70 U
Perfluorotridecanoic acid (PFTrDA)	2.60 U	2.70 U
Perfluoroundecanoic acid (PFUnA)	**2.40**	**1.60 J**
†PFOS + PFOA (EPA)	**0.00**	**0.00**
‡PFOS + PFOA + PFDA + PFHpA + PFHxS + PFNA (MassDEP)	**0.800**	**7.10**
§PFOS + PFOA + PFHpA + PFHxS + PFNA (Mass ORSG)	**0.00**	**2.80**

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J2 Range Northern

Location	J2EW0001	J2EW0002	J2N-INF-E	J2N-INF-F	J2N-INF-F	J2N-INF-G
Field Sample ID	J2EW0001_PFAS19	J2EW0002_PFAS19	J2N-INF-E_PFAS19	J2N-INF-F_PFAS19	J2N-INF-F_PFAS19R	J2N-INF-G_PFAS19
Sampling Depth	179.00 - 234.00	198.00 - 233.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Sampling Date	11/20/2019	11/20/2019	06/18/2019	06/18/2019	07/30/2019	07/30/2019
SDG	320565491	320565491	320514662	320514662	320528231	320528231
Sample Type	**Normal**	**Normal**	**Normal**	**Normal**	**Normal**	**Normal**
PFAS 21 Cmps	Results (ng/L)	Results (ng/L)	Results (ng/L)	Results (ng/L)	Results (ng/L)	Results (ng/L)
6:2 Fluorotelomer sulfonate (6:2 FTS)	19.0 U	40.0 U	19.0 U	19.0 U	19.0 U	19.0 U
8:2 Fluorotelomer sulfonate (8:2 FTS)	19.0 U	20.0 U	9.30 U	9.30 U	9.60 U	9.70 U
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	9.60 U	10.0 U	9.30 U	9.30 U	9.60 U	9.70 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	9.60 U	10.0 U	9.30 U	9.30 U	9.60 U	9.70 U
Perfluoro-1-heptanesulfonate (PFHpS)	0.960 U	**0.370 J**	0.930 U	**0.400 J**	**0.500 J**	0.970 U
Perfluorobutanesulfonic acid (PFBS)	0.960 U	1.00 U	0.930 U	0.930 U	0.960 U	**1.40 J**
Perfluorobutanoic acid (PFBA)	1.40 U	1.50 U	1.40 U	1.90 U	1.40 U	1.50 U
Perfluorodecane sulfonate	1.40 U	1.50 U	1.40 U	1.40 U	1.40 U	1.50 U
Perfluorodecanoic acid (PFDA)	0.960 U	1.00 U	0.930 U	0.930 U	0.960 U	0.970 U
Perfluorododecanoic acid (PFDoA)	1.40 U	1.50 U	1.40 U	1.40 U	1.40 U	1.50 U
Perfluoroheptanoic acid (PFHpA)	1.40 U	**1.00 J**	1.40 U	**0.940 J**	**1.00 J**	1.50 U
Perfluorohexanesulfonic acid (PFHxS)	0.960 U	**11.0**	0.930 U	**9.90**	**9.00**	1.90 U
Perfluorohexanoic acid (PFHxA)	0.960 U	**1.30 J**	0.930 U	**1.20 J**	**1.30 J**	**2.30**
Perfluorononanoic acid (PFNA)	1.40 U	1.50 U	1.40 U	1.40 U	1.40 U	1.50 U
Perfluorooctanesulfonamide (FOSA)	2.90 U	3.00 U	2.80 U	2.80 U	2.90 U	2.90 U
Perfluorooctanesulfonic acid (PFOS)	2.90 U	**1.30 J**	2.80 U	2.80 U	**1.10 J**	2.90 U
Perfluorooctanoic acid (PFOA)	1.40 U	**1.50 J**	1.40 U	**1.70 J**	**1.50 J**	1.50 U
Perfluoropentanoic acid (PFPA)	0.960 U	**0.910 J**	0.930 U	**0.840 J**	**1.00 J**	**1.20 J**
Perfluorotetradecanoic acid (PFTA)	2.90 U	3.00 U	2.80 U	2.80 U	2.90 U	2.90 U
Perfluorotridecanoic acid (PFTrDA)	2.90 U	3.00 U	2.80 U	2.80 U	2.90 U	2.90 U
Perfluoroundecanoic acid (PFUnA)	1.40 U	1.50 U	1.40 U	1.40 U	1.40 U	1.50 U
†PFOS + PFOA (EPA)	**0.00**	**2.80**	**0.00**	**1.70**	**2.60**	**0.00**
‡PFOS + PFOA + PFDA + PFHpA + PFHxS + PFNA (MassDEP)	**0.00**	**14.8**	**0.00**	**12.5**	**12.6**	**0.00**
§PFOS + PFOA + PFHpA + PFHxS + PFNA (Mass ORSG)	**0.00**	**14.8**	**0.00**	**12.5**	**12.6**	**0.00**

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J2 Range Northern

Location	MW-234M2	MW-313M1	MW-587M2
Field Sample ID	MW-234M2_PFAS19	MW-313M1_PFAS19	MW-587M2_PFAS19
Sampling Depth	110.00 - 120.00	255.40 - 265.40	220.00 - 230.00
Sampling Date	06/17/2019	06/19/2019	06/19/2019
SDG	320514661	320515981	320515981
Sample Type	**Normal**	**Normal**	**Normal**
PFAS 21 Cmps	Results (ng/L)	Results (ng/L)	Results (ng/L)
6:2 Fluorotelomer sulfonate (6:2 FTS)	18.0 U	20.0 U	19.0 U
8:2 Fluorotelomer sulfonate (8:2 FTS)	8.80 U	9.80 U	9.70 U
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	8.80 U	9.80 U	9.70 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	8.80 U	9.80 U	9.70 U
Perfluoro-1-heptanesulfonate (PFHpS)	0.880 U	0.980 U	0.970 U
Perfluorobutanesulfonic acid (PFBS)	0.880 U	0.980 U	0.970 U
Perfluorobutanoic acid (PFBA)	1.80 U	**0.700 J**	1.50 U
Perfluorodecane sulfonate	1.30 U	1.50 U	1.50 U
Perfluorodecanoic acid (PFDA)	0.880 U	**1.20 J**	0.970 U
Perfluorododecanoic acid (PFDoA)	1.30 U	1.50 U	1.50 U
Perfluoroheptanoic acid (PFHpA)	1.30 U	1.50 U	1.50 U
Perfluorohexanesulfonic acid (PFHxS)	**0.600 J**	0.980 U	0.970 U
Perfluorohexanoic acid (PFHxA)	0.880 U	0.980 U	0.970 U
Perfluorononanoic acid (PFNA)	1.30 U	**1.10 J**	1.50 U
Perfluorooctanesulfonamide (FOSA)	2.60 U	2.90 U	2.90 U
Perfluorooctanesulfonic acid (PFOS)	**1.90 J**	2.90 U	2.90 U
Perfluorooctanoic acid (PFOA)	**0.550 J**	1.50 U	1.50 U
Perfluoropentanoic acid (PFPA)	0.880 U	**0.680 J**	0.970 U
Perfluorotetradecanoic acid (PFTA)	2.60 U	2.90 U	2.90 U
Perfluorotridecanoic acid (PFTrDA)	2.60 U	2.90 U	2.90 U
Perfluoroundecanoic acid (PFUnA)	1.30 U	**1.40 J**	1.50 U
†PFOS + PFOA (EPA)	**2.45**	**0.00**	**0.00**
‡PFOS + PFOA + PFDA + PFHpA + PFHxS + PFNA (MassDEP)	**3.05**	**2.30**	**0.00**
§PFOS + PFOA + PFHpA + PFHxS + PFNA (Mass ORSG)	**3.05**	**1.10**	**0.00**

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J3 Range

Location	J3-INF	J3-INF	MW-163S	MW-163S	MW-163S	MW-227M2
Field Sample ID	J3-INF_PFAS19	J3-INF_PFAS19D	MW-163S_PFAS19	MW-163S_PFAS19D	MW-163S_PFAS19R	MW-227M2_PFAS19
Sampling Depth	0.00 - 0.00	0.00 - 0.00	38.00 - 48.00	38.00 - 48.00	38.00 - 48.00	110.00 - 120.00
Sampling Date	06/17/2019	06/17/2019	06/18/2019	06/18/2019	07/30/2019	06/19/2019
SDG	320514661	320514661	320514662	320514662	320528231	320515981
Sample Type	**Normal**	**Field Duplicate**	**Normal**	**Field Duplicate**	**Normal**	**Normal**
PFAS 21 Cmps	Results (ng/L)	Results (ng/L)	Results (ng/L)	Results (ng/L)	Results (ng/L)	Results (ng/L)
6:2 Fluorotelomer sulfonate (6:2 FTS)	19.0 U	18.0 U	17.0 U	17.0 U	19.0 U	19.0 U
8:2 Fluorotelomer sulfonate (8:2 FTS)	9.40 U	9.20 U	8.60 U	8.60 U	9.30 U	9.60 U
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	9.40 U	9.20 U	8.60 U	8.60 U	9.30 U	9.60 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	9.40 U	9.20 U	8.60 U	8.60 U	9.30 U	9.60 U
Perfluoro-1-heptanesulfonate (PFHpS)	0.940 U	0.920 U	0.860 U	0.860 U	0.930 U	0.960 U
Perfluorobutanesulfonic acid (PFBS)	0.940 U	0.920 U	0.860 U	0.860 U	0.930 U	0.960 U
Perfluorobutanoic acid (PFBA)	1.90 U	1.80 U	1.70 U	1.70 U	**0.560 J**	1.40 U
Perfluorodecane sulfonate	1.40 U	1.40 U	1.30 U	1.30 U	1.40 U	1.40 U
Perfluorodecanoic acid (PFDA)	0.940 U	0.920 U	0.860 U	0.860 U	0.930 U	0.960 U
Perfluorododecanoic acid (PFDoA)	**1.70 J**	1.40 U	1.30 U	1.30 U	1.40 U	1.40 U
Perfluoroheptanoic acid (PFHpA)	1.40 U	1.40 U	1.30 U	1.30 U	1.40 U	1.40 U
Perfluorohexanesulfonic acid (PFHxS)	**1.50 J**	**1.50 J**	**0.690 J**	**0.610 J**	1.90 U	**0.540 J**
Perfluorohexanoic acid (PFHxA)	0.940 U	0.920 U	**0.410 J**	0.860 U	0.930 U	0.960 U
Perfluorononanoic acid (PFNA)	1.40 U	1.40 U	1.30 U	1.30 U	1.40 U	1.40 U
Perfluorooctanesulfonamide (FOSA)	2.80 U	2.80 U	2.60 U	2.60 U	2.80 U	2.90 U
Perfluorooctanesulfonic acid (PFOS)	2.80 U	2.80 U	**12.0**	**12.0**	**12.0**	2.90 U
Perfluorooctanoic acid (PFOA)	**0.520 J**	1.40 U	**1.70**	**1.60 J**	**1.30 J**	1.40 U
Perfluoropentanoic acid (PFPA)	0.940 U	0.920 U	0.860 U	0.860 U	0.930 U	0.960 U
Perfluorotetradecanoic acid (PFTA)	2.80 U	2.80 U	2.60 U	2.60 U	2.80 U	2.90 U
Perfluorotridecanoic acid (PFTrDA)	**1.40 J**	2.80 U	2.60 U	2.60 U	2.80 U	2.90 U
Perfluoroundecanoic acid (PFUnA)	1.40 U	1.40 U	1.30 U	1.30 U	1.40 U	1.40 U
†PFOS + PFOA (EPA)	**0.520**	**0.00**	**13.7**	**13.6**	**13.3**	**0.00**
‡PFOS + PFOA + PFDA + PFHpA + PFHxS + PFNA (MassDEP)	**2.02**	**1.50**	**14.4**	**14.2**	**13.3**	**0.540**
§PFOS + PFOA + PFHpA + PFHxS + PFNA (Mass ORSG)	**2.02**	**1.50**	**14.4**	**14.2**	**13.3**	**0.540**

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J3 Range

Location	MW-250M2
Field Sample ID	MW-250M2_PFAS19
Sampling Depth	145.00 - 155.00
Sampling Date	06/20/2019
SDG	320515981
Sample Type	**Normal**
PFAS 21 Cmps	Results (ng/L)
6:2 Fluorotelomer sulfonate (6:2 FTS)	19.0 U
8:2 Fluorotelomer sulfonate (8:2 FTS)	9.70 U
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	9.70 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	9.70 U
Perfluoro-1-heptanesulfonate (PFHpS)	0.970 U
Perfluorobutanesulfonic acid (PFBS)	0.970 U
Perfluorobutanoic acid (PFBA)	**0.710 J**
Perfluorodecane sulfonate	1.40 U
Perfluorodecanoic acid (PFDA)	0.970 U
Perfluorododecanoic acid (PFDoA)	1.40 U
Perfluoroheptanoic acid (PFHpA)	1.40 U
Perfluorohexanesulfonic acid (PFHxS)	0.970 U
Perfluorohexanoic acid (PFHxA)	0.970 U
Perfluorononanoic acid (PFNA)	1.40 U
Perfluorooctanesulfonamide (FOSA)	2.90 U
Perfluorooctanesulfonic acid (PFOS)	2.90 U
Perfluorooctanoic acid (PFOA)	1.40 U
Perfluoropentanoic acid (PFPA)	0.970 U
Perfluorotetradecanoic acid (PFTA)	2.90 U
Perfluorotridecanoic acid (PFTrDA)	2.90 U
Perfluoroundecanoic acid (PFUnA)	1.40 U
†PFOS + PFOA (EPA)	**0.00**
‡PFOS + PFOA + PFDA + PFHpA + PFHxS + PFNA (MassDEP)	**0.00**
§PFOS + PFOA + PFHpA + PFHxS + PFNA (Mass ORSG)	**0.00**

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Notes:

ng/L = nanograms per liter; ug/kg = micrograms per kilogram; U = not detected; J = estimated; UJ = estimated non detect

The LOQ value will be used to report non-detects when blank contamination occurs

Bolded results indicate detections of PFAS

Bolded and highlighted results indicate detection of PFAS above the EPA Lifetime Health Advisory: PFOS + PFOA > 70 ng/L.

Bolded and highlighted results indicate detection of PFAS above the MassDEP: PFOS + PFOA + PFDA + PFHpA + PFHxS + PFNA > 20 ng/L

Bolded and highlighted results indicate detection of PFAS above the MassDEP Office of Research and Standards Guideline (ORSG): PFOS + PFOA + PFHpA + PFHxS + PFNA > 70 ng/L

† Lifetime Health Advisory, US Environmental Protection Agency, May 2016

‡ Final PFAS-Related Revisions to the Massachusetts Contingency Plan ("MCP", 310 CMR 40.0000), Massachusetts Department of Environmental Protection, December 27, 2019

‡ PFAS Maximum Contaminant Level (MCL) Proposed Amendment & Public Comment ("MCL", 310 CMR 22.00 PFAS MCL Amendments), Massachusetts Department of Environmental Protection, December 27, 2019

§ MassDEP Office of Research and Standards Final Recommendations for Interim Toxicity and Drinking Water Guidance Values, Massachusetts Department of Environmental Protection, June 8, 2018