MONTHLY PROGRESS REPORT #272
FOR NOVEMBER 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 November to 30 November 2019.

1. SUMMARY OF REMEDIATION ACTIONS

The following is a description of Remediation Actions (RA) underway at Camp Edwards as of November 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 2.691 billion gallons of water treated and re-injected as of 29 November 2019. The following shutdown(s) of the Frank Perkins Road Treatment Facility occurred during November:

- Extraction well EW-658 shut down due to a power supply interruption. EW-658 shut down at 0620 h on 10 November 2019 and was restarted at 0725 h on 12 November 2019.

The Pew Road Mobile Treatment Unit (MTU) continues to operate at a flow rate of 65 GPM, with over 631.8 million gallons of water treated and re-injected as of 29 November 2019. The following shutdown(s) of the Pew Road MTU occurred during November:

- The Pew Road MTU shut down due to a “VFD fault” alarm caused by a power supply interruption. The MTU shut down at 0620 h on 10 November 2019 and was restarted at 0741 h on 12 November 2019.

The Base Boundary MTU continues to operate at a flow rate of 65 gpm, with over 247.9 million gallons of water treated and re-injected as of 29 November 2019. No shutdown(s) of the Base Boundary MTU occurred during November.

The Leading Edge system continues to operate at a flow rate of 100 gpm, with over 173.9 million gallons of water treated and re-injected as of 29 November 2019. No shutdown(s) of the Leading Edge system occurred during November.

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 29 November 2019, over 1.187 billion gallons of water have been treated and re-injected. No shutdown(s) of the Northern Treatment Building occurred in November.

The Northern MTUs E and F continue to operate at a flow rate of 250 gpm. As of 29 November 2019, over 1.637 billion gallons of water have been treated and re-injected. The following shutdown(s) of the J-2 Range Northern system occurred during November:

- MTUs E and F were turned off to replace a broken 3" ball valve on the MTU F effluent pipe. The MTUs were turned off at 0956 h on 21 November 2019 and were restarted at 1030 h on 21 November 2019.
- MTU E shut down due to a "System low flow" alarm caused by a communication error between the extraction well vault PLC and the MTU PLC (likely due to cold temperatures). The MTU shut down at 0549 h on 14 November 2019 and was restarted at 0729 h on 14 November 2019.

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 29 November 2019, over 1.299 billion gallons of water have been treated and re-injected. No shutdown(s) of MTUs H and I occurred during November.

MTU J continues to operate at a flow rate of 120 gpm. As of 29 November 2019, over 593.5 million gallons of water have been treated and re-injected. No shutdown(s) of MTU J occurred during November.

MTU K continues to operate at a flow rate of 125 gpm. As of 29 November 2019, over 710.9 million gallons of water have been treated and re-injected. No shutdown(s) of MTU K occurred during November.

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 29 November 2019, over 1.302 billion gallons of water have been treated and re-injected. The following shutdown(s) of the J-3 Range system occurred during November:

- The System shut down due to a “Treatment Facility Storage Tank High Level” alarm due to an FS-12 shutdown caused by the loss of two phases on the powerline. The System shut down at 0318 h on 01 November 2019 and was restarted at 1007 on 04 November 2019.
- The System shut down due to an FS-12 shutdown. The System shut down at 1003 h on 17 November 2019 and was restarted at 0843 h on 18 November 2019.
- The System was turned off to troubleshoot the alarm programming. The System normally shuts down due to a “High Tank Level” alarm when there is an FS-12 shutdown, but it was not shutting down on its own. The System was turned off at 0617 h on 25 November 2019 and was restarted at 0720 h on 26 November 2019.
- The System was turned off to troubleshoot the alarm programming. The System normally shuts down due to a “High Tank Level” alarm when there is an FS-12 shutdown, but it was not shutting down on its own. Satuit Automation found that the FS-12 PLC was not communicating with the J3 Range PLC. Satuit Automation installed an effluent tank overflow alarm to communicate directly with the J3 Range PLC and tested it. The System was turned off at 1400 h on 26 November 2019 and was restarted at 1140 h on 27 November 2019.
- 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 29 November 2019, over 571.6 million gallons of water have been treated and re-injected. No shutdown(s) of the J-1 Range Southern system occurred during November.

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 29 November 2019, over 772.6 million gallons of water have been treated and re-injected. No shutdown(s) of the J-1 Range Northern MTU occurred during November.

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 29 November 2019, over 1.897 billion gallons of water have been treated and re-injected. No shutdown(s) of the CIA treatment facility occurred during November.

SUMMARY OF ACTIONS TAKEN

CIA
- Performed routine inspections of BEM cover to ensure cover is secure and intact.
- Performed intrusive investigation of P3A2.
- Exchanged bag filters on 26 November 2019.

Demolition Area 1
- Drive point drilling within Demo 1 AOC.
- Replaced LUC cameras #5, 8, 10, and 15.
- Exchanged bag filters on 01 November 2019.
- Exchanged bag filters on 04 November 2019.
- Resampled Pew Road sample port PR-MID-1 on 21 November 2019.
- Exchanged bag filters on 25 November 2019.

Demolition Area 2
- No activity.

Small Arms Ranges
- No activity.

J-1 Range
- No activity.

J-2 Range
- Exchanged bag filters on 21 November 2019.

J-3 Range
- No activity.

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 J1 Range Northern, J1 Range Southern, J2 Range Eastern, and J2 Range Northern.
- Groundwater samples were collected for PFAS from J2 Range Northern.

JBCC IAGWSP Tech Update Meeting Minutes 14 November 2019

Project and Fieldwork Update
The drive points at the Pocasset Baptist Church will begin November 18th. Long-term monitoring sample crews are in J-1 North. The PFAS sampling was delayed until next week because three weeks of consecutive treatment system operation allowing the capture zone to stabilize are required, and the extraction well went down on October 27th. All other treatment systems are up and running.

In the Small Arms Ranges, all of 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 to April 2020. Contractors will mobilize to the site in January to begin prep work.

UXO work continues in the Central Impact Area. Six teams are continuing with digs and anticipate work to be completed by early December.

Action Items
The action items were discussed and updated.

Central Impact Area Annual Environmental Monitoring Report – Presentation
A presentation was provided on the Central Impact Area Annual Environmental Monitoring Report. It was noted that the presentation would cover new work conducted, system performance, annual groundwater sampling results (July 2018 through June 2019) and trends, hydraulic monitoring and groundwater modeling, a comparison to Decision Document criteria, and recommendations.

No new work was conducted during the reporting period; however, a project note describing the installation of two groundwater profile borings and three water table wells was developed and approved. They have not been installed yet due to ongoing source removal work in the CIA and will be scheduled in 2020.

System performance summaries with statistics for MTUs CIA 1, CIA 2, and CIA 3 were displayed and reviewed. Plots of treatment systems influent trends were displayed and discussed.

Groundwater monitoring results and trends were discussed. Overall, perchlorate ranged from non-detect to 4.2 µg/L (MW-89M2). There were four well locations with concentrations above 2 µg/L. No well locations were above 15 µg/L. RDX concentrations ranged from non-detect to 18.2 µg/L (MW-477M2). There were 30 well locations with concentrations above 0.6 µg/L and 12 well locations that were above 2 µg/L. There were no well locations with RDX concentrations above 20 µg/L. Monitoring well locations, cross-sections and trend plots for perchlorate and RDX were displayed and discussed.

It was noted that one aquifer hydraulic analysis was conducted during this reporting period. In February 2019, water levels ranged from 44.01 ft MSL at MW-616M2 (north) to 66.83 ft MSL at MW-184M1 (south). The horizontal gradient in Zone 1 was approximately 0.00189 ft/ft; in Zone 2, it was 0.00391 ft/ft. Measured and model-predicted concentrations and plume figures were shown and discussed.

Decision Document cleanup timelines were discussed. It was noted that the time to cleanup for two areas of the plumes—the 2,000-meter plume and Zone 1 of the main plume—extended significantly.

No modifications are recommended for plant operations, sampling, wellfield extraction rates, or hydraulic or chemical monitoring programs at this time.

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 November to 30 November 2019. Table 2 summarizes the validated detections of explosives compounds and perchlorate for all groundwater results received from 1 November to 30 November 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. 271 for October 2019	10 November 2019
• Revised Draft 2018 Central Impact Area Source Removal Annual Report	18 November 2019

3. SCHEDULED ACTIONS

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

- Demolition Area 1 Annual Environmental Monitoring Report
- Central Impact Area Environmental Monitoring Report
- Updated 2018 Source Report to include re-digs
- Five Year Review Report
- J-3 Range Annual Environmental Monitoring Report
- J-2 Eastern & Northern Ranges Annual Environmental Monitoring Report

TABLE 1
Sampling Progress: 1 November to 30 November 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-306M2	MW-306M2_F19	N	11/26/2019	Ground Water	164.69	174.69
J1 Range Northern	MW-306M1	MW-306M1_F19	N	11/26/2019	Ground Water	184.88	194.88
J1 Range Northern	MW-306D	MW-306D_F19	N	11/26/2019	Ground Water	291.66	301.66
J1 Range Northern	MW-187M1	MW-187M1_F19	N	11/26/2019	Ground Water	160	170
J1 Range Northern	MW-187D	MW-187D_F19	N	11/26/2019	Ground Water	306	316
Demolition Area 1	PR-MID-1	PR-MID-1-164B	N	11/21/2019	Process Water	0	0
J1 Range Northern	MW-369M1	MW-369M1_F19	N	11/21/2019	Ground Water	254.07	264.07
J2 Range Northern	J2EW0001	J2EW0001_F19	N	11/20/2019	Ground Water	179	234
J2 Range Northern	J2EW0002	J2EW0002_F19	N	11/20/2019	Ground Water	198	233
J2 Range Northern	J2EW0002	J2EW0002_F19D	FD	11/20/2019	Ground Water	198	233
J2 Range Northern	J2EW0001	J2EW0001_PFAS19	N	11/20/2019	Ground Water	179	234
J2 Range Northern	J2EW0002	J2EW0002_PFAS19	N	11/20/2019	Ground Water	198	233
Demolition Area 1	DP-723	DP-723-70-72	N	11/19/2019	Water	70	72
Demolition Area 1	DP-723	DP-723-60-62	N	11/19/2019	Water	60	62
Demolition Area 1	DP-723	DP-723-50-52	N	11/19/2019	Water	50	52
Demolition Area 1	DP-723	DP-723-40-42	N	11/19/2019	Water	40	42
Demolition Area 1	DP-724	DP-724-59-61D	FD	11/18/2019	Water	59	61
Demolition Area 1	DP-724	DP-724-59-61	N	11/18/2019	Water	59	61
J1 Range Northern	MW-286M2	MW-286M2_F19	N	11/18/2019	Ground Water	205	215
Demolition Area 1	DP-724	DP-724-50-52	N	11/18/2019	Water	50	52
J1 Range Northern	MW-286M1	MW-286M1_F19	N	11/18/2019	Ground Water	259	269
Demolition Area 1	DP-724	DP-724-40-42	N	11/18/2019	Water	40	42
J1 Range Northern	MW-349M2	MW-349M2_F19	N	11/18/2019	Ground Water	195	205
J1 Range Northern	MW-349M1	MW-349M1_F19	N	11/18/2019	Ground Water	229	239
J1 Range Northern	MW-563M1	MW-563M1_F19	N	11/14/2019	Ground Water	215	225
J1 Range Northern	MW-164M2	MW-164M2_F19	N	11/14/2019	Ground Water	157	167
J1 Range Northern	MW-164M1	MW-164M1_F19	N	11/14/2019	Ground Water	227	237
J2 Range Eastern	MW-164M1	MW-164M1_F19	N	11/14/2019	Ground Water	227	237
J2 Range Northern	MW-164M1	MW-164M1_F19	N	11/14/2019	Ground Water	227	237
J1 Range Northern	MW-166M3	MW-166M3_F19	N	11/14/2019	Ground Water	125	135
J1 Range Northern	MW-166M3	MW-166M3_F19D	FD	11/14/2019	Ground Water	125	135
J1 Range Northern	MW-166M2	MW-166M2_F19	N	11/14/2019	Ground Water	150	160
J1 Range Northern	MW-166M1	MW-166M1_F19	N	11/14/2019	Ground Water	218	223
J1 Range Northern	MW-245M2	MW-245M2_F19	N	11/13/2019	Ground Water	204	214
J1 Range Northern	MW-245M2	MW-245M2_F19D	FD	11/13/2019	Ground Water	204	214
J1 Range Northern	MW-245M1	MW-245M1_F19	N	11/13/2019	Ground Water	244	254
J1 Range Northern	MW-303M3	MW-303M3_F19	N	11/12/2019	Ground Water	139.74	149.69
J1 Range Northern	MW-303M2	MW-303M2_F19	N	11/12/2019	Ground Water	235.09	245.1
J1 Range Northern	MW-303M2	MW-303M2_F19D	FD	11/12/2019	Ground Water	235.09	245.1
J1 Range Northern	MW-303M1	MW-303M1_F19	N	11/12/2019	Ground Water	299.07	309.07
J1 Range Northern	J1N-INF1B	J1N-INF1B_F19	N	11/12/2019	Process Water	0	0
J1 Range Northern	J1N-INF1A	J1N-INF1A_F19	N	11/12/2019	Process Water	0	0
J1 Range Northern	MW-566M1	MW-566M1_F19	N	11/07/2019	Ground Water	232	242
J1 Range Northern	MW-584M2	MW-584M2_F19	N	11/07/2019	Ground Water	228	238
J1 Range Northern	MW-584M1	MW-584M1_F19	N	11/07/2019	Ground Water	248	258
Central Impact Area	CIA2-EFF	CIA2-EFF-70A	N	11/07/2019	Process Water	0	0
Central Impact Area	CIA2-MID2	CIA2-MID2-70A	N	11/07/2019	Process Water	0	0
Central Impact Area	CIA2-MID1	CIA2-MID1-70A	N	11/07/2019	Process Water	0	0
Central Impact Area	CIA2-INF	CIA2-INF-70A	N	11/07/2019	Process Water	0	0
J1 Range Northern	MW-401M3	MW-401M3_F19	N	11/07/2019	Ground Water	228.5	238.5
Central Impact Area	CIA1-EFF	CIA1-EFF-70A	N	11/07/2019	Process Water	0	0
Central Impact Area	CIA1-MID2	CIA1-MID2-70A	N	11/07/2019	Process Water	0	0
Central Impact Area	CIA1-MID1	CIA1-MID1-70A	N	11/07/2019	Process Water	0	0
Central Impact Area	CIA1-INF	CIA1-INF-70A	N	11/07/2019	Process Water	0	0
J1 Range Northern	MW-401M1	MW-401M1_F19	N	11/07/2019	Ground Water	256.1	266.1
Central Impact Area	CIA3-EFF	CIA3-EFF-41A	N	11/07/2019	Process Water	0	0
Central Impact Area	CIA3-MID2	CIA3-MID2-41A	N	11/07/2019	Process Water	0	0
Central Impact Area	CIA3-MID1	CIA3-MID1-41A	N	11/07/2019	Process Water	0	0

N = Normal Sample
FD = Field Duplicate

TABLE 1
Sampling Progress: 1 November to 30 November 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	CIA3-INF	CIA3-INF-41A	N	11/07/2019	Process Water	0	0
J1 Range Northern	MW-567M1	MW-567M1_F19	N	11/06/2019	Ground Water	215.5	225.5
J1 Range Southern	J1S-EFF	J1S-EFF-144A	N	11/06/2019	Process Water	0	0
J1 Range Southern	J1S-MID	J1S-MID-144A	N	11/06/2019	Process Water	0	0
J1 Range Southern	J1S-INF-2	J1S-INF-2-144A	N	11/06/2019	Process Water	0	0
J1 Range Northern	MW-689M2	MW-689M2_F19	N	11/06/2019	Ground Water	231.4	241.4
J3 Range	J3-EFF	J3-EFF-158A	N	11/06/2019	Process Water	0	0
J3 Range	J3-MID-2	J3-MID-2-158A	N	11/06/2019	Process Water	0	0
J3 Range	J3-MID-1	J3-MID-1-158A	N	11/06/2019	Process Water	0	0
J3 Range	J3-INF	J3-INF-158A	N	11/06/2019	Process Water	0	0
J1 Range Northern	MW-689M1	MW-689M1_F19	N	11/06/2019	Ground Water	253.5	263.5
Demolition Area 1	PR-EFF	PR-EFF-164A	N	11/06/2019	Process Water	0	0
Demolition Area 1	PR-MID-2	PR-MID-2-164A	N	11/06/2019	Process Water	0	0
Demolition Area 1	PR-INF	PR-INF-164A	N	11/06/2019	Process Water	0	0
Demolition Area 1	FPR-2-EFF-A	FPR-2-EFF-A-164A	N	11/06/2019	Process Water	0	0
Demolition Area 1	FPR-2-GAC-MID1A	FPR-2-GAC-MID1A-164A	N	11/06/2019	Process Water	0	0
Demolition Area 1	FPR2-POST-IX-A	FPR2-POST-IX-A-164A	N	11/06/2019	Process Water	0	0
Demolition Area 1	FPR-2-INF	FPR-2-INF-164A	N	11/06/2019	Process Water	0	0
J1 Range Northern	MW-688M2	MW-688M2_F19	N	11/06/2019	Ground Water	227.8	237.8
Demolition Area 1	D1LE-EFF	D1LE-EFF-40A	N	11/06/2019	Process Water	0	0
Demolition Area 1	D1LE-MID2	D1LE-MID2-40A	N	11/06/2019	Process Water	0	0
Demolition Area 1	D1LE-MID1	D1LE-MID1-40A	N	11/06/2019	Process Water	0	0
Demolition Area 1	D1LE-INF	D1LE-INF-40A	N	11/06/2019	Process Water	0	0
J1 Range Northern	MW-688M1	MW-688M1_F19	N	11/06/2019	Ground Water	255.2	265.2
Demolition Area 1	D1-EFF	D1-EFF-112A	N	11/06/2019	Process Water	0	0
Demolition Area 1	D1-MID-2	D1-MID-2-112A	N	11/06/2019	Process Water	0	0
Demolition Area 1	D1-MID-1	D1-MID-1-112A	N	11/06/2019	Process Water	0	0
Demolition Area 1	D1-INF	D1-INF-112A	N	11/06/2019	Process Water	0	0
J1 Range Northern	MW-564M1	MW-564M1_F19	N	11/05/2019	Ground Water	227	237
J1 Range Northern	MW-564M1	MW-564M1_F19D	FD	11/05/2019	Ground Water	227	237
J1 Range Northern	MW-549M2	MW-549M2_F19	N	11/05/2019	Ground Water	187.3	197.3
J1 Range Northern	MW-549M1	MW-549M1_F19	N	11/05/2019	Ground Water	227.4	237.4
J1 Range Northern	MW-606M2	MW-606M2_F19	N	11/05/2019	Ground Water	193.2	203.2
J1 Range Northern	MW-606M1	MW-606M1_F19	N	11/05/2019	Ground Water	233.3	243.3
J1 Range Northern	MW-605M2	MW-605M2_F19	N	11/04/2019	Ground Water	182.2	192.2
J1 Range Northern	MW-605M1	MW-605M1_F19	N	11/04/2019	Ground Water	220.2	230.2
J2 Range Eastern	J2E-EFF-K	J2E-EFF-K-134A	N	11/04/2019	Process Water	0	0
J2 Range Eastern	J2E-MID-2K	J2E-MID-2K-134A	N	11/04/2019	Process Water	0	0
J2 Range Eastern	J2E-MID-1K	J2E-MID-1K-134A	N	11/04/2019	Process Water	0	0
J2 Range Eastern	J2E-INF-K	J2E-INF-K-134A	N	11/04/2019	Process Water	0	0
J2 Range Eastern	J2E-EFF-J	J2E-EFF-J-134A	N	11/04/2019	Process Water	0	0
J2 Range Eastern	J2E-MID-2J	J2E-MID-2J-134A	N	11/04/2019	Process Water	0	0
J2 Range Eastern	J2E-MID-1J	J2E-MID-1J-134A	N	11/04/2019	Process Water	0	0
J2 Range Eastern	J2E-INF-J	J2E-INF-J-134A	N	11/04/2019	Process Water	0	0
J1 Range Southern	MW-526M1	MW-526M1_F19	N	11/04/2019	Ground Water	164	174
J2 Range Eastern	J2E-EFF-IH	J2E-EFF-IH-134A	N	11/04/2019	Process Water	0	0
J2 Range Eastern	J2E-MID-2H	J2E-MID-2H-134A	N	11/04/2019	Process Water	0	0
J2 Range Eastern	J2E-MID-1H	J2E-MID-1H-134A	N	11/04/2019	Process Water	0	0
J2 Range Eastern	J2E-MID-2I	J2E-MID-2I-134A	N	11/04/2019	Process Water	0	0
J2 Range Eastern	J2E-MID-1I	J2E-MID-1I-134A	N	11/04/2019	Process Water	0	0
J2 Range Eastern	J2E-INF-I	J2E-INF-I-134A	N	11/04/2019	Process Water	0	0
J1 Range Southern	MW-525M2	MW-525M2_F19	N	11/04/2019	Ground Water	148	158
J2 Range Northern	J2N-EFF-G	J2N-EFF-G-158A	N	11/04/2019	Process Water	0	0
J2 Range Northern	J2N-MID-2G	J2N-MID-2G-158A	N	11/04/2019	Process Water	0	0
J2 Range Northern	J2N-MID-1G	J2N-MID-1G-158A	N	11/04/2019	Process Water	0	0
J2 Range Northern	J2N-INF-G	J2N-INF-G-158A	N	11/04/2019	Process Water	0	0
J2 Range Northern	J2N-EFF-EF	J2N-EFF-EF-158A	N	11/04/2019	Process Water	0	0
J2 Range Northern	J2N-MID-2F	J2N-MID-2F-158A	N	11/04/2019	Process Water	0	0

N = Normal Sample
FD = Field Duplicate

TABLE 1
Sampling Progress: 1 November to 30 November 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 Southern	MW-525M1	MW-525M1_F19	N	11/04/2019	Ground Water	172	182
J2 Range Northern	J2N-MID-1F	J2N-MID-1F-158A	N	11/04/2019	Process Water	0	0
J2 Range Northern	J2N-INF-EF	J2N-INF-EF-158A	N	11/04/2019	Process Water	0	0
J2 Range Northern	J2N-MID-2E	J2N-MID-2E-158A	N	11/04/2019	Process Water	0	0
J2 Range Northern	J2N-MID-1E	J2N-MID-1E-158A	N	11/04/2019	Process Water	0	0
J1 Range Northern	J1N-EFF	J1N-EFF-73A	N	11/04/2019	Process Water	0	0
J1 Range Northern	J1N-MID2	J1N-MID2-73A	N	11/04/2019	Process Water	0	0
J1 Range Northern	J1N-MID1	J1N-MID1-73A	N	11/04/2019	Process Water	0	0
J1 Range Northern	J1N-INF2	J1N-INF2-73A	N	11/04/2019	Process Water	0	0

N = Normal Sample
FD = Field Duplicate

TABLE 2
VALIDATED EXPLOSIVE AND PERCHLORATE RESULTS
Data Received November 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 Southern	MW-669M2	MW-669M2_F19	201.7	211.7	10/17/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.51		µg/L	0.60		0.036	0.20
J1 Range Southern	MW-669M2	MW-669M2_F19D	201.7	211.7	10/17/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.50		µg/L	0.60		0.036	0.20
J1 Range Southern	MW-669M1	MW-669M1_F19	223.7	233.7	10/17/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1.7		µg/L	0.60	X	0.036	0.20
J1 Range Southern	MW-524M1	MW-524M1_F19	148	158	10/16/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.046	J	µg/L	400		0.025	0.20
J1 Range Southern	MW-524M1	MW-524M1_F19	148	158	10/16/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.32		µg/L	0.60		0.036	0.20
J1 Range Southern	MW-524M1	MW-524M1_F19D	148	158	10/16/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.054	J	µg/L	400		0.025	0.20
J1 Range Southern	MW-524M1	MW-524M1_F19D	148	158	10/16/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.34		µg/L	0.60		0.036	0.20
J1 Range Southern	MW-402M1	MW-402M1_F19	190.14	200.13	10/15/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.28		µg/L	0.60		0.036	0.20
J1 Range Southern	MW-647M1	MW-647M1_F19	211.3	221.3	10/10/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.32		µg/L	0.60		0.036	0.20
J1 Range Southern	MW-647M1	MW-647M1_F19D	211.3	221.3	10/10/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.34		µg/L	0.60		0.036	0.20
J1 Range Southern	MW-592M1	MW-592M1_F19	201	211	10/10/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.073	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	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**

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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**

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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	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**

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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**

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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	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**

PFAS Summary Report – Groundwater

Joint Base Cape Cod, IAGWSP

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**

PFAS Summary Report – Groundwater

Joint Base Cape Cod, IAGWSP

KGS 2019 PFAS MW&INF

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	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**

PFAS Summary Report – Groundwater

Joint Base Cape Cod, IAGWSP

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**

PFAS Summary Report – Groundwater

Joint Base Cape Cod, IAGWSP

KGS 2019 PFAS MW&INF

J2 Range Northern

Location	J2N-INF-E	J2N-INF-F	J2N-INF-F	J2N-INF-G	MW-234M2	MW-313M1
Field Sample ID	J2N-INF-E_PFAS19	J2N-INF-F_PFAS19	J2N-INF-F_PFAS19R	J2N-INF-G_PFAS19	MW-234M2_PFAS19	MW-313M1_PFAS19
Sampling Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	110.00 - 120.00	255.40 - 265.40
Sampling Date	06/18/2019	06/18/2019	07/30/2019	07/30/2019	06/17/2019	06/19/2019
SDG	320514662	320514662	320528231	320528231	320514661	320515981
Sample Type	Normal	Normal	Normal	Normal	Normal	Normal
PFAS	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	19.0 U	19.0 U	18.0 U	20.0 U
8:2 Fluorotelomer sulfonate (8:2 FTS)	9.30 U	9.30 U	9.60 U	9.70 U	8.80 U	9.80 U
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	9.30 U	9.30 U	9.60 U	9.70 U	8.80 U	9.80 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	9.30 U	9.30 U	9.60 U	9.70 U	8.80 U	9.80 U
Perfluoro-1-heptanesulfonate (PFHpS)	0.930 U	**0.400 J**	**0.500 J**	0.970 U	0.880 U	0.980 U
Perfluorobutanesulfonic acid (PFBS)	0.930 U	0.930 U	0.960 U	**1.40 J**	0.880 U	0.980 U
Perfluorobutanoic acid (PFBA)	1.40 U	1.90 U	1.40 U	1.50 U	1.80 U	**0.700 J**
Perfluorodecane sulfonate	1.40 U	1.40 U	1.40 U	1.50 U	1.30 U	1.50 U
Perfluorodecanoic acid (PFDA)	0.930 U	0.930 U	0.960 U	0.970 U	0.880 U	**1.20 J**
Perfluorododecanoic acid (PFDoA)	1.40 U	1.40 U	1.40 U	1.50 U	1.30 U	1.50 U
Perfluoroheptanoic acid (PFHpA)	1.40 U	**0.940 J**	**1.00 J**	1.50 U	1.30 U	1.50 U
Perfluorohexanesulfonic acid (PFHxS)	0.930 U	**9.90**	**9.00**	1.90 U	**0.600 J**	0.980 U
Perfluorohexanoic acid (PFHxA)	0.930 U	**1.20 J**	**1.30 J**	**2.30**	0.880 U	0.980 U
Perfluorononanoic acid (PFNA)	1.40 U	1.40 U	1.40 U	1.50 U	1.30 U	**1.10 J**
Perfluorooctanesulfonamide (FOSA)	2.80 U	2.80 U	2.90 U	2.90 U	2.60 U	2.90 U
Perfluorooctanesulfonic acid (PFOS)	2.80 U	2.80 U	**1.10 J**	2.90 U	**1.90 J**	2.90 U
Perfluorooctanoic acid (PFOA)	1.40 U	**1.70 J**	**1.50 J**	1.50 U	**0.550 J**	1.50 U
Perfluoropentanoic acid (PFPA)	0.930 U	**0.840 J**	**1.00 J**	**1.20 J**	0.880 U	**0.680 J**
Perfluorotetradecanoic acid (PFTA)	2.80 U	2.80 U	2.90 U	2.90 U	2.60 U	2.90 U
Perfluorotridecanoic acid (PFTrDA)	2.80 U	2.80 U	2.90 U	2.90 U	2.60 U	2.90 U
Perfluoroundecanoic acid (PFUnA)	1.40 U	1.40 U	1.40 U	1.50 U	1.30 U	**1.40 J**
†PFOS + PFOA (EPA)	**0.00**	**1.70**	**2.60**	**0.00**	**2.45**	**0.00**
‡PFOS + PFOA + PFDA + PFHpA + PFHxS + PFNA (MassDEP)	**0.00**	**12.5**	**12.6**	**0.00**	**3.05**	**2.30**

PFAS Summary Report – Groundwater

Joint Base Cape Cod, IAGWSP

Location	J2N-INF-E	J2N-INF-F	J2N-INF-F	J2N-INF-G	MW-234M2	MW-313M1
Field Sample ID	J2N-INF-E_PFAS19	J2N-INF-F_PFAS19	J2N-INF-F_PFAS19R	J2N-INF-G_PFAS19	MW-234M2_PFAS19	MW-313M1_PFAS19
Sampling Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	110.00 - 120.00	255.40 - 265.40
Sampling Date	06/18/2019	06/18/2019	07/30/2019	07/30/2019	06/17/2019	06/19/2019
SDG	320514662	320514662	320528231	320528231	320514661	320515981
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	19.0 U	19.0 U	19.0 U	18.0 U	20.0 U
8:2 Fluorotelomer sulfonate (8:2 FTS)	9.30 U	9.30 U	9.60 U	9.70 U	8.80 U	9.80 U
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	9.30 U	9.30 U	9.60 U	9.70 U	8.80 U	9.80 U
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	9.30 U	9.30 U	9.60 U	9.70 U	8.80 U	9.80 U
Perfluoro-1-heptanesulfonate (PFHpS)	0.930 U	**0.400 J**	**0.500 J**	0.970 U	0.880 U	0.980 U
Perfluorobutanesulfonic acid (PFBS)	0.930 U	0.930 U	0.960 U	**1.40 J**	0.880 U	0.980 U
Perfluorobutanoic acid (PFBA)	1.40 U	1.90 U	1.40 U	1.50 U	1.80 U	**0.700 J**
Perfluorodecane sulfonate	1.40 U	1.40 U	1.40 U	1.50 U	1.30 U	1.50 U
Perfluorodecanoic acid (PFDA)	0.930 U	0.930 U	0.960 U	0.970 U	0.880 U	**1.20 J**
Perfluorododecanoic acid (PFDoA)	1.40 U	1.40 U	1.40 U	1.50 U	1.30 U	1.50 U
Perfluoroheptanoic acid (PFHpA)	1.40 U	**0.940 J**	**1.00 J**	1.50 U	1.30 U	1.50 U
Perfluorohexanesulfonic acid (PFHxS)	0.930 U	**9.90**	**9.00**	1.90 U	**0.600 J**	0.980 U
Perfluorohexanoic acid (PFHxA)	0.930 U	**1.20 J**	**1.30 J**	**2.30**	0.880 U	0.980 U
Perfluorononanoic acid (PFNA)	1.40 U	1.40 U	1.40 U	1.50 U	1.30 U	**1.10 J**
Perfluorooctanesulfonamide (FOSA)	2.80 U	2.80 U	2.90 U	2.90 U	2.60 U	2.90 U
Perfluorooctanesulfonic acid (PFOS)	2.80 U	2.80 U	**1.10 J**	2.90 U	**1.90 J**	2.90 U
Perfluorooctanoic acid (PFOA)	1.40 U	**1.70 J**	**1.50 J**	1.50 U	**0.550 J**	1.50 U
Perfluoropentanoic acid (PFPA)	0.930 U	**0.840 J**	**1.00 J**	**1.20 J**	0.880 U	**0.680 J**
Perfluorotetradecanoic acid (PFTA)	2.80 U	2.80 U	2.90 U	2.90 U	2.60 U	2.90 U
Perfluorotridecanoic acid (PFTrDA)	2.80 U	2.80 U	2.90 U	2.90 U	2.60 U	2.90 U
Perfluoroundecanoic acid (PFUnA)	1.40 U	1.40 U	1.40 U	1.50 U	1.30 U	**1.40 J**
†PFOS + PFOA (EPA)	**0.00**	**1.70**	**2.60**	**0.00**	**2.45**	**0.00**
‡PFOS + PFOA + PFDA + PFHpA + PFHxS + PFNA (MassDEP)	**0.00**	**12.5**	**12.6**	**0.00**	**3.05**	**2.30**

PFAS Summary Report – Groundwater

Joint Base Cape Cod, IAGWSP

KGS 2019 PFAS MW&INF

J2 Range Northern

Location	MW-587M2
Field Sample ID	MW-587M2_PFAS19
Sampling Depth	220.00 - 230.00
Sampling Date	06/19/2019
SDG	320515981
Sample Type	Normal
PFAS	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)	1.50 U
Perfluorodecane sulfonate	1.50 U
Perfluorodecanoic acid (PFDA)	0.970 U
Perfluorododecanoic acid (PFDoA)	1.50 U
Perfluoroheptanoic acid (PFHpA)	1.50 U
Perfluorohexanesulfonic acid (PFHxS)	0.970 U
Perfluorohexanoic acid (PFHxA)	0.970 U
Perfluorononanoic acid (PFNA)	1.50 U
Perfluorooctanesulfonamide (FOSA)	2.90 U
Perfluorooctanesulfonic acid (PFOS)	2.90 U
Perfluorooctanoic acid (PFOA)	1.50 U
Perfluoropentanoic acid (PFPA)	0.970 U
Perfluorotetradecanoic acid (PFTA)	2.90 U
Perfluorotridecanoic acid (PFTrDA)	2.90 U
Perfluoroundecanoic acid (PFUnA)	1.50 U
†PFOS + PFOA (EPA)	**0.00**
‡PFOS + PFOA + PFDA + PFHpA + PFHxS + PFNA (MassDEP)	**0.00**

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Joint Base Cape Cod, IAGWSP

Location	MW-587M2
Field Sample ID	MW-587M2_PFAS19
Sampling Depth	220.00 - 230.00
Sampling Date	06/19/2019
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)	1.50 U
Perfluorodecane sulfonate	1.50 U
Perfluorodecanoic acid (PFDA)	0.970 U
Perfluorododecanoic acid (PFDoA)	1.50 U
Perfluoroheptanoic acid (PFHpA)	1.50 U
Perfluorohexanesulfonic acid (PFHxS)	0.970 U
Perfluorohexanoic acid (PFHxA)	0.970 U
Perfluorononanoic acid (PFNA)	1.50 U
Perfluorooctanesulfonamide (FOSA)	2.90 U
Perfluorooctanesulfonic acid (PFOS)	2.90 U
Perfluorooctanoic acid (PFOA)	1.50 U
Perfluoropentanoic acid (PFPA)	0.970 U
Perfluorotetradecanoic acid (PFTA)	2.90 U
Perfluorotridecanoic acid (PFTrDA)	2.90 U
Perfluoroundecanoic acid (PFUnA)	1.50 U
†PFOS + PFOA (EPA)	**0.00**
‡PFOS + PFOA + PFDA + PFHpA + PFHxS + PFNA (MassDEP)	**0.00**

PFAS Summary Report – Groundwater

Joint Base Cape Cod, IAGWSP

KGS 2019 PFAS MW&INF

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	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**

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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**

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KGS 2019 PFAS MW&INF

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	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**

PFAS Summary Report – Groundwater

Joint Base Cape Cod, IAGWSP

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**

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

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

‡ PFAS-Related revisions to the Massachusetts Contingency Plan ("MCP", 310 CMR 40.0000), Massachusetts Department of Environmental Protection, April 19, 2019