MONTHLY PROGRESS REPORT #274
FOR JANUARY 2020

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 January to 31 January 2020.

1. SUMMARY OF REMEDIATION ACTIONS

The following is a description of Remediation Actions (RA) underway at Camp Edwards as of January 2020.

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 2.706 billion gallons of water treated and re-injected as of 31 January 2020. The following shutdown(s) of the Frank Perkins Road Treatment Facility occurred during January.

- The Facility shut down at 1125 on 12 January 2020 due to a power outage, and was restarted at 0805 on 14 January 2020.
- The Facility shut down at 1608 on 30 January 2020 due to a JBCC power outage, and was restarted at 0725 on 31 January 2020.

The Pew Road Mobile Treatment Unit (MTU) continues to operate at a flow rate of 65 GPM, with over 637.4 million gallons of water treated and re-injected as of 31 January 2020. The following shutdown(s) of the Frank Perkins Road Treatment Facility occurred during January. The following shutdown(s) of the Pew Road MTU occurred during January.

- The MTU shut down due to a power outage at 1125 on 12 January 2020, and was restarted at 0947 on 14 January 2020
- The MTU shut down at 1608 on 30 January 2020, and was restarted at 0750 on 31 January 2020.

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 31 January 2020. No shutdown(s) of the Base Boundary MTU occurred during January.

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 31 January 2020. The following shutdown(s) of the Leading Edge system occurred during January:

- The Leading Edge MTU was turned off at 0800 on 09 January 2020 to install a packer. The packer could not be installed on 09 January 2020 due to rust build-up within the extraction well D1-EW-5. D1-EW-5 was brushed, developed to remove rust and fines, and a downhole inspection was performed on 14 January 2020. The MTU was restarted at 1010 on 15 January 2020.

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 31 January 2020, over 1.208 billion gallons of water have been treated and re-injected. No shutdown(s) of the Northern Treatment Building occurred in January.

The Northern MTUs E and F continue to operate at a flow rate of 250 gpm. As of 31 January 2020, over 1.659 billion gallons of water have been treated and re-injected. The following shutdown(s) of the J-2 Range Northern system occurred during January:

- MTU E shut down at 1827 on 11 January 2020 due to a power outage, and was restarted at 0751 on 13 January 2020.
- • MTU F shut down at 0541 on 12 January 2020 due to a power outage, and was restarted at 0748 on 13 January 2020.

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 31 January 2020, over 1.317 billion gallons of water have been treated and re-injected. The following shutdown(s) of MTUs H and I occurred during January:

- MTUs H and I shut down at 0925 on 06 January 2020 due to a power outage. BETCo replaced a broken insulator, contactor, and a blown fuse on the Wood Road power line on 10 January 2020. MTUs H and I were restarted at 1105 on 10 January 2020.

- MTUs H and I shut down at 2343 on 12 January 2020 due to a blown fuse on the Route 130, Sandwich power line. Eversource replaced the fuse and the MTUs were restarted at 1243 on 13 January 2020.

MTU J continues to operate at a flow rate of 120 gpm. As of 31 January 2020, over 603.7 million gallons of water have been treated and re-injected. The following shutdown(s) of MTU J occurred during January:

- MTU J was turned off at 0933 on 10 January 2020 to complete the power line repairs, and was restarted at 1035 on 10 January 2020, resulting in 1.03 hours of downtime.
- MTU J shut down at 0636 on 12 January 2020 due to a power outage, and was restarted at 1255 on 13 January 2020.

MTU K continues to operate at a flow rate of 125 gpm. As of 31 January 2020, over 721.5 million gallons of water have been treated and re-injected. The following shutdown(s) of MTU K occurred during January:

- MTU K was turned off at 0945 on 10 January 2020 to complete the power line repairs, and was restarted at 1027 on 10 January 2020.
- MTU K shut down at 827 on 11 January 2020 due to a power outage, and was restarted at 0816 on 13 January 2020.
- MTU K was turned off at 0900 on 13 January 2020 due to a lost phase on the power line, and was restarted at 1235 on 13 January 2020.

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 31 January 2020, over 1.323 billion gallons of water have been treated and re-injected. The following shutdown(s) of the J-3 Range system occurred during January:

- The System shut down at 1031 on 12 January, was restarted at 0940 on 13 January 2020.

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 31 January 2020, over 582.2 million gallons of water have been treated and re-injected. The following shutdown(s) of the J-1 Range Southern system occurred during January:

- The system was turned off at 0735 on 10 January 2020 to replace the J1SEW0002 pump and motor and associated wiring, overload heaters, and breaker. The system was restarted at 1340 on 10 January 2020.
- The MTU shut down due to a power outage at 0300 on 12 January 2020, and was restarted at 1215 on 13 January 2020.

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 31 January 2020, over 795.3 million gallons of water have been treated and re-injected. No shutdown(s) of the J-1 Range Northern MTU occurred during January.

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 31 January 2020, over 1.916 billion gallons of water have been treated and re-injected. The following shutdown(s) of the CIA treatment facility occurred during January.

- System 1 shut down at 1125 on 12 January 2020 due to a power outage, and was restarted at 0900 on 14 January 2020.
- System 1 was turned off at 0745 on 15 January 2020 to upgrade and program the VFD and replace the broken influent pressure transmitter. System 1 was restarted at 1020 on 15 January 2020.
- System 1 was turned off at 0810 on 23 January 2020 to upgrade the pump and motor to 30 horsepower and install a pressure gauge at the wellhead. The system was restarted at 1025 on 24 January 2020.
- System 1 was turned off to repair the buried, leaking influent pipe joint at 0825 on 27 January 2020. It was restarted at 1215 on 31 January 2020, once Cavossa Excavating electro-fused a coupling.
- System 2 shut down at 1125 on 12 January 2020 due to a power outage, and was restarted at 0845 on 14 January 2020.
- System 2 was turned off at 1030 on 15 January 2020to replace the bad wires on the line reactor in the VFD, and was restarted at 1125 on 15 January 2020.
- System 2 shut down due to a JBCC power outage at 0804 on 29 January 2020, and was restarted at 1345 on 29 January 2020.
- System 2 shut down due to a JBCC power outage at 0952 on 30 January 2020, and was restarted at 0815 on 31 January 2020.

- System 3 was turned off at 0800 on 07 January 2020 to perform a carbon exchange, and was restarted at 0858 on 09 January 2020.

SUMMARY OF ACTIONS TAKEN

CIA
- Performed routine inspections of BEM cover to ensure cover is secure and intact.
- Commenced well pad clearance to detection depth.
- Hydraulic monitoring and groundwater sampling within the CIA SPM program.

Demolition Area 1
- Groundwater sampling within the Demo 1 SPM program.
- The Leading Edge MTU bag filters were exchanged on 30 December 2019.
- The third, focused, post-packer hydraulic event for Base Boundary was completed on 02 January 2020.
- Exchanged Pew Road MTU bag filters on 23 January 2020.

Demolition Area 2
- No activity.

J-1 Range
- No activity.

J-2 Range
- Hydraulic monitoring and groundwater sampling within the J2 East SPM program.
- Groundwater sampling within the J2 North SPM program.

J-3 Range
- Groundwater sampling within the J3 Range SPM program.
- Satuit Automation installed and tested a float switch in the sump and a “High Sump” alarm that will send directly to the J3 Range PLC.
- Cut vegetation re-growth and installed blind seeds at Barrage Rocket Investigation Area.

L Range
- Groundwater sampling within the L Range LTM program.

Small Arms Ranges
- Groundwater sampling within the Small Arms Ranges LTM program.

Training Areas
- Cut vegetation re-growth and installed blind seeds at Former E Investigation Area.

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 B Range, Central Impact Area, CS-10 (ARNG), Demolition Area 1, G/GA/GB Ranges, J1 Range Northern, J2 Range Eastern, J2 Range Northern, J3 Range, and L Range.

JBCC IAGWSP Tech Update Meeting Minutes 09 January 2020

Project and Fieldwork Update

The Demolition Area 1 leading edge extraction well packer is being installed today. The new pump for the J-1 Southern extraction system is being installed tomorrow. The VFD for CIA 1 is being stalled on 23 January. Long term monitoring sampling is underway in the J-3 Range and will be moving to J-2 North next. All treatment systems are up and running. However, J-2 East MTUs H&I went down on January 6th with a broken insulator. It is being repaired tomorrow. There was be a media change out at CIA 3 on January 8th. The drill rig will mobilize in March for the wells in the CIA.

In the Training Areas, Dawson will be mobilizing to the site in late January. They plan to begin by clearing well pads in the CIA. They will move to Former E Range and J-3 Range to perform vegetation clearance, which should continue into early February. Then they will excavate the 35'x 35' grid around the primary target at the KD Range. They will perform geophysical surveys at the Former E and J-3 Ranges. Finally, they will finish with anomaly investigation at targets. There is no fieldwork associated with the Small Arms Ranges; a completion of work report is being prepared.

The UXO crews in the Central Impact Area left the site just before the holidays. They still have fifteen digs to complete. They were unable to complete because the digs were in close proximity to BIP locations and they could not perform BIP operations because of the weather. They have 15 digs, 12 BIPS and 36 items to be destroyed in the BEM when they return. In addition, they will perform some scrap removal. They will return to the site sometime in mid-March/early April.

Action Items

The action items were discussed and updated.

J-2 Range Eastern Annual Environmental Monitoring Report Presentation

A presentation was provided on the J-2 Range Eastern Annual Environmental Monitoring Report. It was noted that during the reporting period (November 2018 to October 2019), new work included installing MW-706S, MW-707S, MW-708S and MW-709S adjacent to contaminated soil and/or burial/burn pit areas, samples were collected for PFAS analyses from three wells and monitoring wells within the capture zone for the CO-OP's supply well WS-1 were sampled for perchlorate and RDX. The PFAS sampling locations were displayed and results were discussed. The J-2 Range Eastern groundwater treatment system performance statistics were reviewed and discussed. During the reporting period, at MTU J, 62 million gallons of groundwater was treated, 0.29 pounds of perchlorate and 0.05 pounds of RDX were removed. At MTUs H and I, 119.2 million gallons of water were treated; 1.31 pounds of perchlorate and 0.24 pounds of RDX were removed. At MTU K, 64.7 million gallons of water were treated; 0.06 pounds of perchlorate and 0.15 pounds of RDX were removed.

Sampling locations, groundwater monitoring results, and trends were reviewed and discussed. Perchlorate concentrations ranged from non-detect to 38.2 µg/L (MW-368M1) and there were six wells with concentrations above 2 µg/L and 2 wells with concentrations above 15 µg/L. RDX concentrations ranged from non-detect to 4.6 µg/L (MW-368M2) and there were five wells with concentrations above 0.6 µg/L, three wells with concentrations above 2 µg/L, and no wells greater than 20 µg/L. Trend plots and cross-sections were reviewed. An overview of the hydraulic analyses completed in January 2019 was presented. It was noted that the numerical model indicates that the perchlorate and RDX plumes are being captured and that stagnation points downgradient of each extraction well are creating a disjointed plume.

Decision Document cleanup timelines were discussed. Perchlorate and RDX measurements indicate that the plumes are reasonably well predicted but the expected overall cleanup time is 15 years longer than the Decision Document timeline, likely the result of the mapping of contamination to lower K units that may not be realistic.

IAGWSP recommends making no modifications to plant operations, sampling or extraction rates. Groundwater modeling will be conducted to evaluate the efficacy of packering a portion of the extraction well screen at J2EW0006 in order to determine if the capture zone can be extended to a sufficient depth to capture contamination observed in MW-667M1. This area of contamination is likely is under-flowing the extraction well. IAGWSP recommends no changes to either the hydraulic or the groundwater monitoring programs.

J-2 Range Northern Annual Environmental Monitoring Report Presentation

A presentation was provided on the J-2 Range Northern Annual Environmental Monitoring Report. It was noted that during the reporting period (November 2018 to October 2019), new work included samples collected for PFAS analyses from three monitoring wells. Additional perchlorate and explosives samples were collected from 27 monitoring wells screens with most concentrations being non-detect. The PFAS sampling locations were displayed and results were discussed. Northern groundwater treatment system performance statistics were reviewed and discussed. During the reporting period, at MTUs E and F (Wood Road) 115.6 million gallons of groundwater were treated, 2.36 pounds of perchlorate and 0.07 pounds of RDX were removed.

At MTU G (Jefferson Road), 121.7 million gallons of water were treated, 0.38 pounds of perchlorate and 0.01 pounds of RDX were removed.

Sampling locations, groundwater monitoring results, and trends were reviewed and discussed. Perchlorate concentrations ranged from non-detect to 43.4 µg/L (MW-587M2) and there were ten wells with concentrations above 2 µg/L and 1 well with concentrations above 15 µg/L. RDX concentrations ranged from non-detect to 4.8 µg/L (MW-289M2) and there were two wells with concentrations above 0.6 µg/L, two wells with concentrations above 2 µg/L and no wells with concentrations above 20 µg/L. An overview of the hydraulic analysis completed in July 2019 was presented. It was noted that the numerical model indicates that the perchlorate plume is being captured and that the smaller plumelets are expected to diminish based on long-term modeling. In addition, stagnation points downgradient of each extraction well are creating a disjointed plume.

Decision Document cleanup timelines were discussed. Perchlorate measurements indicate that the plume is reasonably well predicted but expected overall cleanup time is 18 years longer than the Decision Document timeline, likely the result of the mapping of contamination to lower K units that may not be realistic. IAGWSP recommends making no modifications to plant operations, sampling or extraction rates. IAGWSP noted that groundwater modeling will be conducted to evaluate the efficacy of packering a portion of the extraction well screen at J2EW0003 in order to determine if the capture zone can be extended to capture contamination observed in J2EW3-MW-1-C. This contamination is likely under-flowing the extraction well.

J-3 Range Annual Environmental Monitoring Report Presentation

A presentation was provided on the J-3 Range Annual Environmental Monitoring Report. It was noted that during the reporting period (September 2018 to August 2019), new work included PFAS analyses from three monitoring wells and the treatment plant influent. The J-3 Range treatment system performance statistics were reviewed and discussed. During the reporting period, 122.1 million gallons of groundwater were treated; 0.93 pounds of perchlorate and 0.29 pounds of RDX were removed.

Sampling locations, groundwater monitoring results, and trends were reviewed and discussed. The maximum perchlorate concentration in Zone 1 (Source Area to Base Boundary) was 3.4 µg/L (MW-163S) and the maximum RDX concentration was 1.2 µg/L (MW-163S). In Zone 2 (Downgradient of Base Boundary) the maximum perchlorate concentration was 3.3 µg/L (MW-637M2) and the maximum RDX concentration was 0.5 µg/L (MW-250M3). An overview of the hydraulic analysis completed in August 2019 was presented. It was noted that the hydraulic data /hydraulic gradients were consistent with past reporting periods and that the flow direction is generally north to south with convergent flow near the extraction wells.

The modeled vs. observed plume comparison was discussed. The groundwater flow model plume shell was updated in August of 2018 using the Drift Function. Notable observations were that in the downgradient area, the measured plumes were consistent with the model predicted plumes. In the source area, the observed plumes depict the source area contamination where the model predicted plume forward migrates it. The capture zone analysis was developed using reverse particle tracking and shows that the existing system appears to be adequately capturing the plumes.

Surface water monitoring of Snake Pond and the J-3 Wetland were discussed. For Snake Pond, there were two sampling events (May and July 2019) and explosives were all non-detect, perchlorate samples were below the reporting limit. The results were consistent with past reporting periods. The J-3 wetland data was also consistent with previous monitoring and there is no evidence of impact from the operation of the J-3 system on wetland water levels.

IAGWSP recommends performing an evaluation of optimizing the pumping rates of the two in-plume extraction wells J3EWIP1 and J3EWIP2 to determine if the time to cleanup can be significantly reduced by increasing pumping at J3EWIP2. Any recommendations for modifying the wellfield flow rates would be proposed in a separate project note. A proposal remains to discontinue Snake Pond surface water sampling pending Sandwich Board of Health review. Surface water sampling will continue according to the currently approved schedule pending a final decision is made. There are no recommendations for the fate and transport modeling, as a plume shell update completed August 2018.

JBCC IAGWSP Tech Update Meeting Minutes 30 January 2020

Project and Fieldwork Update

Long term monitoring sampling is underway in the Central Impact Area. All treatment systems are up and running. There was a larger power outage a couple of weeks ago due to a windstorm that took out all of the treatment systems. All were brought back online right away with the exception of J-1 south and J-2 east because Eversource needed to make a repair on Route 130. The CIA-1 influent line has a leak at a weakened seam. It was detected after a pump change-out on January 24th. It will be fixed tomorrow. The drill rig will mobilize in March for the wells in the CIA.

In the Training Areas, Dawson has been cutting vegetation regrowth at the Former E Range and J-3 Range investigation areas in advance of their upcoming EM-61 work. They will clear well pads in the CIA

next week. The second week in February they will excavate the 35'x 35' grid around the primary target at the KD Range. There is no fieldwork associated with the Small Arms Ranges; a completion of work report is being prepared.

Currently, there is no UXO fieldwork in the Central Impact Area. Crews will return to the site sometime in mid-March/early April.

Central Impact Area 100% Verification Grid Presentation

A presentation was provided on the results of the CIA Phase 3 Area 2 100% dig validation. A figure showing the validation grids (35_36 and 57_41) was displayed and discussed. The group was reminded of the goals set in the Decision Document (remove 75-95% of UXO while maximizing removal of net explosive weight) as well as the goals of the classification (to correctly classify 95% of the targets of interest (TOI) while reducing clutter digs by greater than 70%).

A figure showing the Metal Mapper data collected for all EM61 anomalies for the two grids was displayed. For grid 35_36, there were 300 EM61 anomaly locations with Metal Mapper cued data collection. Of those, 103 met the dig criteria resulting in a recommended dig rate of 34.3%. The remaining 198 anomalies were dug for QA. Seventeen TOI (UXO or UXO-like items) were recovered. No UXO was recovered. For the classification results, 197 clutter items were correctly classified, 30.63% of the clutter was incorrectly classified as "likely- TOI" therefore not meeting the goal of reduction of clutter digs by 70%. The incorrect classification was due to larger frag and/or larger quantities of frag recovered. They were classified as digs because they are large objects or because the number of sources overwhelmed the model.

Two TOI were missed during excavation in grid 35_36. Two munitions debris items were within 1m of AGC classified dig locations. A 75mm recovered at 50cm below ground surface was within 40cm of a classified dig and another 75mm was recovered at 40cm within 90cm of a classified dig. Both misses attributed to operator complacency. Holes were dug to standard depth (90cm), and items were found at shallower depths. It was assumed spoils were not checked well enough, and items were re-buried.

For grid 57_41, there were 279 EM61 anomaly locations with Metal Mapper cued data collection. Of those, 82 met the dig criteria resulting in a recommended dig rate of 29.4%. The remaining 204 anomalies were dug for QA. Twelve TOI (UXO or UXO-like items) were recovered. For the classification results, 202 clutter items were correctly classified, 26.28% of the clutter was incorrectly classified as "likely- TOI" therefore meeting the goal of reduction of clutter digs by 70%.

Phase 3 Area 2 results to date were discussed. Currently, results are just under the AGC detection goal of 95%. The five missed items were two 81mm mortars and three 75 mms. The goal of clutter rejection of 70% is being met. The 91.7% of TOI correctly classified /recovered with inclusion of the two TOI missed by the intrusive team in 35_36 is meeting DD goal of 75-95% removal.

The status and path forward was reviewed. In Phase III Area 1, the re-digs are complete through USACE QA. The Phase 3 Area 2 Metal Mapper data collection and classification is complete. Data and target lists have been approved by USACE and all QC/QA seeds were within 1m of a dig location. Intrusive investigation and demolition activities are mostly complete. There are nine remaining BIPs that were not completed due to end of year weather; twelve remaining digs adjacent to BIP items and three QC re-checks based on intrusive results review. These remaining demo and intrusive activities will be completed upon remobilization. The Phase 3 Area 2 digs are complete and through USACE QA. The annual report has been submitted and is in USACE review. A status map as of December 18, 2019 was displayed.

Action Items

The action items were discussed and updated.

JBCC Cleanup Team Meeting

The next meeting of the JBCC Cleanup Team (JBCCCT) is scheduled for 11 March 2020 (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 January to 31 January 2020. Table 2 summarizes the validated detections of explosives compounds and perchlorate for all groundwater results received from 1 January to 31 January 2020. 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. 273 for December 2019 — 10 December 2019

3. SCHEDULED ACTIONS

The following documents are being prepared or revised during January 2020:

- Central Impact Area Environmental Monitoring Report
- Demonstration of Compliance Report for Northwest Corner
- Five-Year Review Report
- J-2 Eastern and Northern 2019 Annual Environmental Monitoring Reports
- J-3 Range 2019 Annual Environmental Monitoring Report
- Updated 2018 Source Report to include re-digs

TABLE 1
Sampling Progress: 1 January to 31 January 2020

Area Of Concern	Location	Field Sample ID	Sample Type	Date Sampled	Matrix	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)
J2 Range Eastern	MW-324M2	MW-324M2_S20	N	01/30/2020	Ground Water	203.74	214.74
J2 Range Northern	MW-324M2	MW-324M2_S20	N	01/30/2020	Ground Water	203.74	214.74
J2 Range Eastern	MW-324M1	MW-324M1_S20	N	01/30/2020	Ground Water	234.85	244.85
J2 Range Eastern	MW-393D	MW-393D_S20	N	01/30/2020	Ground Water	313.56	323.56
J2 Range Eastern	MW-339M1	MW-339M1_S20	N	01/29/2020	Ground Water	233	243
J2 Range Eastern	MW-368M2	MW-368M2_S20	N	01/29/2020	Ground Water	202.73	212.73
J2 Range Eastern	MW-368M2	MW-368M2_S20D	FD	01/29/2020	Ground Water	202.73	212.73
J2 Range Eastern	J2MW-04M2	J2MW-04M2_S20	N	01/29/2020	Ground Water	210	220
J2 Range Eastern	J2MW-04M1	J2MW-04M1_S20	N	01/29/2020	Ground Water	257	267
B Range	MW-455S	MW-455S_S20	N	01/29/2020	Ground Water	117.57	127.57
Central Impact Area	MW-455S	MW-455S_S20	N	01/29/2020	Ground Water	117.57	127.57
Central Impact Area	MW-37M2	MW-37M2_S20	N	01/27/2020	Ground Water	145	155
Central Impact Area	MW-235M1	MW-235M1_S20	N	01/27/2020	Ground Water	154	164
Central Impact Area	MW-106M1	MW-106M1_S20	N	01/27/2020	Ground Water	170.5	180.5
Central Impact Area	MW-487M2	MW-487M2_S20	N	01/27/2020	Ground Water	195.84	205.84
J1 Range Northern	MW-487M2	MW-487M2_S20	N	01/27/2020	Ground Water	195.84	205.84
Central Impact Area	MW-487M1	MW-487M1_S20	N	01/27/2020	Ground Water	240.29	250.29
J1 Range Northern	MW-487M1	MW-487M1_S20	N	01/27/2020	Ground Water	240.29	250.29
Central Impact Area	MW-123S	MW-123S_S20	N	01/23/2020	Ground Water	139	149
Demolition Area 1	MW-35S	MW-35S_S20	N	01/23/2020	Ground Water	84	94
G Range	MW-470S	MW-470S_S20	N	01/23/2020	Ground Water	76.32	86.32
Demolition Area 1	MW-36S	MW-36S_S20	N	01/23/2020	Ground Water	73	83
GA Range	MW-690S	MW-690S_S20	N	01/23/2020	Ground Water	99.2	109.2
GB Range	03MW0122A	03MW0122A_S20	N	01/22/2020	Ground Water	83.44	93.44
CS-10 (ARNG)	03MW0709	03MW0709_S20	N	01/22/2020	Ground Water	82.12	87.12
GA Range	03MW0710	03MW0710_S20	N	01/22/2020	Ground Water	73.6	83.3
C Range	MW-456S	MW-456S_S20	N	01/16/2020	Ground Water	150.34	160.34
C Range	MW-456S	MW-456S_S20D	FD	01/16/2020	Ground Water	150.34	160.34
C Range	MW-491S	MW-491S_S20	N	01/16/2020	Ground Water	146.93	156.93
B Range	MW-538M1	MW-538M1_S20	N	01/16/2020	Ground Water	107	117
B Range	MW-72S	MW-72S_S20	N	01/16/2020	Ground Water	106	116
B Range	MW-72S	MW-72S_S20D	FD	01/16/2020	Ground Water	106	116
Central Impact Area	MW-72S	MW-72S_S20	N	01/16/2020	Ground Water	106	116
Central Impact Area	MW-72S	MW-72S_S20D	FD	01/16/2020	Ground Water	106	116
J2 Range Eastern	J2E-EFF-IH	J2E-EFF-IH-136A	N	01/16/2020	Process Water	0	0
J2 Range Eastern	J2E-MID-2H	J2E-MID-2H-136A	N	01/16/2020	Process Water	0	0
J2 Range Eastern	J2E-MID-1H	J2E-MID-1H-136A	N	01/16/2020	Process Water	0	0
J2 Range Eastern	J2E-MID-2I	J2E-MID-2I-136A	N	01/16/2020	Process Water	0	0
J2 Range Eastern	J2E-MID-1I	J2E-MID-1I-136A	N	01/16/2020	Process Water	0	0
J2 Range Eastern	J2E-INF-I	J2E-INF-I-136A	N	01/16/2020	Process Water	0	0
B Range	MW-539M1	MW-539M1_S20	N	01/15/2020	Ground Water	113	123
B Range	MW-490S	MW-490S_S20	N	01/15/2020	Ground Water	108.08	118.08
B Range	MW-537M1	MW-537M1_S20	N	01/15/2020	Ground Water	106	116
J2 Range Northern	J2EW0003	J2EW0003_S20	N	01/14/2020	Ground Water	202	232
J2 Range Northern	J2EW0002	J2EW0002_S20	N	01/14/2020	Ground Water	198	233
Central Impact Area	CIA3-EFF	CIA3-EFF-43A	N	01/14/2020	Process Water	0	0
J2 Range Northern	J2EW0001	J2EW0001_S20	N	01/14/2020	Ground Water	179	234
Central Impact Area	CIA3-MID2	CIA3-MID2-43A	N	01/14/2020	Process Water	0	0
Central Impact Area	CIA3-MID1	CIA3-MID1-43A	N	01/14/2020	Process Water	0	0
Central Impact Area	CIA3-INF	CIA3-INF-43A	N	01/14/2020	Process Water	0	0
L Range	MW-153M1	MW-153M1_S20	N	01/14/2020	Ground Water	199	209
L Range	MW-242M1	MW-242M1_S20	N	01/13/2020	Ground Water	235	245
L Range	MW-288M1	MW-288M1_S20	N	01/13/2020	Ground Water	190	200
L Range	MW-650M1	MW-650M1_S20	N	01/13/2020	Ground Water	260	270
L Range	MW-596M1	MW-596M1_S20	N	01/13/2020	Ground Water	231.1	241.1
L Range	90MW0031	90MW0031_S20	N	01/13/2020	Ground Water	195.32	200.22
L Range	MW-651M1	MW-651M1_S20	N	01/09/2020	Ground Water	242.3	252.3
L Range	MW-595M2	MW-595M2_S20	N	01/09/2020	Ground Water	205.3	215.3
L Range	MW-595M1	MW-595M1_S20	N	01/09/2020	Ground Water	255.3	265.3

N = Normal Sample
FD = Field Duplicate

TABLE 1
Sampling Progress: 1 January to 31 January 2020

Area Of Concern	Location	Field Sample ID	Sample Type	Date Sampled	Matrix	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)
L Range	MW-595M1	MW-595M1_S20D	FD	01/09/2020	Ground Water	255.3	265.3
L Range	MW-530S	MW-530S_S20	N	01/09/2020	Ground Water	97	107
J2 Range Eastern	J2E-EFF-K	J2E-EFF-K-136A	N	01/09/2020	Process Water	0	0
J2 Range Eastern	J2E-MID-2K	J2E-MID-2K-136A	N	01/09/2020	Process Water	0	0
J2 Range Eastern	J2E-MID-1K	J2E-MID-1K-136A	N	01/09/2020	Process Water	0	0
J2 Range Eastern	J2E-INF-K	J2E-INF-K-136A	N	01/09/2020	Process Water	0	0
J2 Range Eastern	J2E-EFF-J	J2E-EFF-J-136A	N	01/09/2020	Process Water	0	0
J2 Range Eastern	J2E-MID-2J	J2E-MID-2J-136A	N	01/09/2020	Process Water	0	0
J2 Range Eastern	J2E-MID-1J	J2E-MID-1J-136A	N	01/09/2020	Process Water	0	0
L Range	MW-529M1	MW-529M1_S20	N	01/09/2020	Ground Water	107	117
J2 Range Eastern	J2E-INF-J	J2E-INF-J-136A	N	01/09/2020	Process Water	0	0
J3 Range	J3-EFF	J3-EFF-160A	N	01/08/2020	Process Water	0	0
L Range	90MW0034	90MW0034_S20	N	01/08/2020	Ground Water	94	99
J3 Range	J3-MID-2	J3-MID-2-160A	N	01/08/2020	Process Water	0	0
J3 Range	J3-MID-1	J3-MID-1-160A	N	01/08/2020	Process Water	0	0
J3 Range	J3-INF	J3-INF-160A	N	01/08/2020	Process Water	0	0
Central Impact Area	CIA2-EFF	CIA2-EFF-72A	N	01/08/2020	Process Water	0	0
Central Impact Area	CIA2-MID2	CIA2-MID2-72A	N	01/08/2020	Process Water	0	0
Central Impact Area	CIA2-MID1	CIA2-MID1-72A	N	01/08/2020	Process Water	0	0
J3 Range	MW-637M3	MW-637M3_S20	N	01/08/2020	Ground Water	174.1	184.1
Central Impact Area	CIA2-INF	CIA2-INF-72A	N	01/08/2020	Process Water	0	0
J3 Range	MW-637M2	MW-637M2_S20	N	01/08/2020	Ground Water	214.1	224.1
J3 Range	MW-637M2	MW-637M2_S20D	FD	01/08/2020	Ground Water	214.1	224.1
J3 Range	MW-637M1	MW-637M1_S20	N	01/08/2020	Ground Water	236.1	246.1
Central Impact Area	CIA1-EFF	CIA1-EFF-72A	N	01/08/2020	Process Water	0	0
Central Impact Area	CIA1-MID2	CIA1-MID2-72A	N	01/08/2020	Process Water	0	0
Central Impact Area	CIA1-MID1	CIA1-MID1-72A	N	01/08/2020	Process Water	0	0
Central Impact Area	CIA1-INF	CIA1-INF-72A	N	01/08/2020	Process Water	0	0
J3 Range	90PLT01006	90PLT01006_S20	N	01/08/2020	Process Water	0	0
Demolition Area 1	PR-EFF	PR-EFF-166A	N	01/07/2020	Process Water	0	0
Demolition Area 1	PR-MID-2	PR-MID-2-166A	N	01/07/2020	Process Water	0	0
Demolition Area 1	PR-MID-1	PR-MID-1-166A	N	01/07/2020	Process Water	0	0
Demolition Area 1	PR-INF	PR-INF-166A	N	01/07/2020	Process Water	0	0
J3 Range	J3EW0032	J3EW0032_S20	N	01/07/2020	Ground Water	102	152
J3 Range	J3EW0032	J3EW0032_S20D	FD	01/07/2020	Ground Water	102	152
J3 Range	90EW0001	90EW0001_S20	N	01/07/2020	Ground Water	83.1	143.83
Demolition Area 1	FPR-2-EFF-A	FPR-2-EFF-A-166A	N	01/07/2020	Process Water	0	0
Demolition Area 1	FPR-2-GAC-MID1A	FPR-2-GAC-MID1A-166A	N	01/07/2020	Process Water	0	0
Demolition Area 1	FPR2-POST-IX-A	FPR2-POST-IX-A-166A	N	01/07/2020	Process Water	0	0
Demolition Area 1	FPR-2-INF	FPR-2-INF-166A	N	01/07/2020	Process Water	0	0
Demolition Area 1	D1LE-EFF	D1LE-EFF-42A	N	01/07/2020	Process Water	0	0
Demolition Area 1	D1LE-MID2	D1LE-MID2-42A	N	01/07/2020	Process Water	0	0
Demolition Area 1	D1LE-MID1	D1LE-MID1-42A	N	01/07/2020	Process Water	0	0
Demolition Area 1	D1LE-INF	D1LE-INF-42A	N	01/07/2020	Process Water	0	0
Demolition Area 1	D1-EFF	D1-EFF-114A	N	01/07/2020	Process Water	0	0
Demolition Area 1	D1-MID-2	D1-MID-2-114A	N	01/07/2020	Process Water	0	0
Demolition Area 1	D1-MID-1	D1-MID-1-114A	N	01/07/2020	Process Water	0	0
Demolition Area 1	D1-INF	D1-INF-114A	N	01/07/2020	Process Water	0	0
J3 Range	J3EWIP2	J3EWIP2_S20	N	01/07/2020	Ground Water	149.5	169.5
J3 Range	J3EWIP1	J3EWIP1_S20	N	01/07/2020	Ground Water	153	193
J3 Range	MW-636M2	MW-636M2_S20	N	01/06/2020	Ground Water	110.5	120.5
J3 Range	MW-636M1	MW-636M1_S20	N	01/06/2020	Ground Water	141.6	151.6
J1 Range Southern	J1S-EFF	J1S-EFF-146A	N	01/06/2020	Process Water	0	0
J1 Range Southern	J1S-MID	J1S-MID-146A	N	01/06/2020	Process Water	0	0
J1 Range Southern	J1S-INF-2	J1S-INF-2-146A	N	01/06/2020	Process Water	0	0
J3 Range	MW-653M2	MW-653M2_S20	N	01/06/2020	Ground Water	59.3	69.3
J2 Range Northern	J2N-EFF-G	J2N-EFF-G-160A	N	01/06/2020	Process Water	0	0
J3 Range	MW-653M1	MW-653M1_S20	N	01/06/2020	Ground Water	147.5	157.5
J2 Range Northern	J2N-MID-2G	J2N-MID-2G-160A	N	01/06/2020	Process Water	0	0

N = Normal Sample
FD = Field Duplicate

TABLE 1
Sampling Progress: 1 January to 31 January 2020

Area Of Concern	Location	Field Sample ID	Sample Type	Date Sampled	Matrix	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)
J2 Range Northern	J2N-MID-1G	J2N-MID-1G-160A	N	01/06/2020	Process Water	0	0
J2 Range Northern	J2N-INF-G	J2N-INF-G-160A	N	01/06/2020	Process Water	0	0
J2 Range Northern	J2N-EFF-EF	J2N-EFF-EF-160A	N	01/06/2020	Process Water	0	0
J2 Range Northern	J2N-MID-2F	J2N-MID-2F-160A	N	01/06/2020	Process Water	0	0
J2 Range Northern	J2N-MID-1F	J2N-MID-1F-160A	N	01/06/2020	Process Water	0	0
J2 Range Northern	J2N-INF-EF	J2N-INF-EF-160A	N	01/06/2020	Process Water	0	0
J2 Range Northern	J2N-MID-2E	J2N-MID-2E-160A	N	01/06/2020	Process Water	0	0
J2 Range Northern	J2N-MID-1E	J2N-MID-1E-160A	N	01/06/2020	Process Water	0	0
J1 Range Northern	J1N-EFF	J1N-EFF-75A	N	01/06/2020	Process Water	0	0
J1 Range Northern	J1N-MID2	J1N-MID2-75A	N	01/06/2020	Process Water	0	0
J1 Range Northern	J1N-MID1	J1N-MID1-75A	N	01/06/2020	Process Water	0	0
J1 Range Northern	J1N-INF2	J1N-INF2-75A	N	01/06/2020	Process Water	0	0

N = Normal Sample
FD = Field Duplicate

TABLE 2
VALIDATED EXPLOSIVE AND PERCHLORATE RESULTS
Data Received January 2020

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
Demolition Area 1	MW-545M4	MW-545M4_F19	72	82	12/19/2019	SW6850	Perchlorate	0.57		µg/L	2.0		0.027	0.20
Demolition Area 1	MW-545M3	MW-545M3_F19	101.5	111.5	12/19/2019	SW6850	Perchlorate	0.79		µg/L	2.0		0.027	0.20
Demolition Area 1	MW-545M2	MW-545M2_F19	142	152	12/19/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.10	J	µg/L	0.60		0.034	0.20
Demolition Area 1	MW-545M2	MW-545M2_F19	142	152	12/19/2019	SW6850	Perchlorate	2.9		µg/L	2.0	X	0.027	0.20
Demolition Area 1	MW-545M1	MW-545M1_F19	162	172	12/19/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.065	J	µg/L	0.60		0.034	0.20
Demolition Area 1	MW-545M1	MW-545M1_F19	162	172	12/19/2019	SW6850	Perchlorate	1.8		µg/L	2.0		0.027	0.20
Demolition Area 1	EW-658	EW-658_F19	96	136	12/18/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.085	J	µg/L	400		0.036	0.20
Demolition Area 1	EW-658	EW-658_F19	96	136	12/18/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.12	J	µg/L	0.60		0.034	0.20
Demolition Area 1	MW-431	MW-431_F19	88	188	12/18/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.10	J	µg/L	400		0.036	0.20
Demolition Area 1	MW-431	MW-431_F19	88	188	12/18/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.11	J	µg/L	0.60		0.034	0.20
Demolition Area 1	XX9514	XX9514_F19	102	112	12/18/2019	SW6850	Perchlorate	3.8		µg/L	2.0	X	0.027	0.20
J1 Range Northern	MW-370M3	MW-370M3_F19	174.96	184.96	12/12/2019	SW6850	Perchlorate	0.076	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-370M2	MW-370M2_F19	215.54	225.54	12/12/2019	SW6850	Perchlorate	0.092	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-370M1	MW-370M1_F19	245	255	12/12/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.52		µg/L	0.60		0.034	0.20
J1 Range Northern	MW-370M1	MW-370M1_F19	245	255	12/12/2019	SW6850	Perchlorate	8.4		µg/L	2.0	X	0.027	0.20
J1 Range Northern	MW-370M1	MW-370M1_F19D	245	255	12/12/2019	SW6850	Perchlorate	8.3		µg/L	2.0	X	0.027	0.20
J1 Range Northern	MW-590M2	MW-590M2_F19	238	248	12/11/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.24		µg/L	0.60		0.034	0.20
J1 Range Northern	MW-590M2	MW-590M2_F19	238	248	12/11/2019	SW6850	Perchlorate	5.1		µg/L	2.0	X	0.027	0.20
J1 Range Northern	MW-590M2	MW-590M2_F19D	238	248	12/11/2019	SW6850	Perchlorate	5.2		µg/L	2.0	X	0.027	0.20
J1 Range Northern	MW-590M1	MW-590M1_F19	258	268	12/11/2019	SW6850	Perchlorate	0.062	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-326M3	MW-326M3_F19	165.24	175.26	12/11/2019	SW6850	Perchlorate	0.043	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-326M3	MW-326M3_F19	165.24	175.26	12/11/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.22		µg/L	400		0.036	0.20
J1 Range Northern	MW-326M3	MW-326M3_F19	165.24	175.26	12/11/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.38		µg/L	0.60		0.034	0.20
J1 Range Northern	MW-326M2	MW-326M2_F19	196.27	206.28	12/11/2019	SW6850	Perchlorate	0.79		µg/L	2.0		0.027	0.20
J1 Range Northern	MW-326M2	MW-326M2_F19	196.27	206.28	12/11/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	3.9		µg/L	400		0.036	0.20
J1 Range Northern	MW-326M2	MW-326M2_F19	196.27	206.28	12/11/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	5.4		µg/L	0.60	X	0.034	0.20
J1 Range Northern	MW-326M2	MW-326M2_F19D	196.27	206.28	12/11/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	4.0		µg/L	400		0.036	0.20
J1 Range Northern	MW-326M2	MW-326M2_F19D	196.27	206.28	12/11/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	5.6		µg/L	0.60	X	0.034	0.20
J1 Range Northern	MW-326M1	MW-326M1_F19	250.01	260.01	12/11/2019	SW6850	Perchlorate	1.4		µg/L	2.0		0.027	0.20
J1 Range Northern	MW-315M2	MW-315M2_F19	195.72	205.72	12/10/2019	SW6850	Perchlorate	0.065	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-315M2	MW-315M2_F19	195.72	205.72	12/10/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.075	J	µg/L	0.60		0.034	0.20
J1 Range Northern	MW-315M1	MW-315M1_F19	245.49	255.49	12/10/2019	SW6850	Perchlorate	0.33		µg/L	2.0		0.027	0.20
J1 Range Northern	MW-265M3	MW-265M3_F19	200	210	12/10/2019	SW6850	Perchlorate	0.079	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-265M2	MW-265M2_F19	225	235	12/10/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.081	J	µg/L	400		0.036	0.20
J1 Range Northern	MW-265M2	MW-265M2_F19	225	235	12/10/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.71		µg/L	0.60	X	0.034	0.20
J1 Range Northern	MW-265M2	MW-265M2_F19	225	235	12/10/2019	SW6850	Perchlorate	9.0		µg/L	2.0	X	0.027	0.20
J1 Range Northern	MW-265M2	MW-265M2_F19D	225	235	12/10/2019	SW6850	Perchlorate	9.2		µg/L	2.0	X	0.027	0.20
J1 Range Northern	MW-265M1	MW-265M1_F19	265	275	12/10/2019	SW6850	Perchlorate	1.4		µg/L	2.0		0.027	0.20
J1 Range Northern	MW-346M4	MW-346M4_F19	140	150	12/09/2019	SW6850	Perchlorate	0.044	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-346M3	MW-346M3_F19	175	185	12/09/2019	SW6850	Perchlorate	0.079	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-346M2	MW-346M2_F19	205.28	215.28	12/09/2019	SW6850	Perchlorate	0.13	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-346M2	MW-346M2_F19	205.28	215.28	12/09/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.33		µg/L	400		0.036	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 January 2020

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-346M2	MW-346M2_F19	205.28	215.28	12/09/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	2.6		µg/L	0.60	X	0.034	0.20
J1 Range Northern	MW-346M2	MW-346M2_F19D	205.28	215.28	12/09/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.35		µg/L	400		0.036	0.20
J1 Range Northern	MW-346M2	MW-346M2_F19D	205.28	215.28	12/09/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	2.8		µg/L	0.60	X	0.034	0.20
J1 Range Northern	MW-346M1	MW-346M1_F19	245	255	12/09/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.12	J	µg/L	400		0.036	0.20
J1 Range Northern	MW-346M1	MW-346M1_F19	245	255	12/09/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	11.6		µg/L	0.60	X	0.034	0.20
J1 Range Northern	MW-346M1	MW-346M1_F19	245	255	12/09/2019	SW6850	Perchlorate	19.0		µg/L	2.0	X	0.054	0.40
J1 Range Northern	MW-346M1	MW-346M1_F19D	245	255	12/09/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.13	J	µg/L	400		0.036	0.20
J1 Range Northern	MW-346M1	MW-346M1_F19D	245	255	12/09/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	11.2		µg/L	0.60	X	0.034	0.20
J1 Range Northern	MW-346M1	MW-346M1_F19D	245	255	12/09/2019	SW6850	Perchlorate	19.7		µg/L	2.0	X	0.054	0.40
Demolition Area 2	MW-161S	MW-161S_F19	145.5	155.5	12/05/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.13	J	µg/L	400		0.036	0.20
Demolition Area 2	MW-161S	MW-161S_F19	145.5	155.5	12/05/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.91		µg/L	0.60	X	0.034	0.20
Demolition Area 2	MW-160S	MW-160S_F19	137.5	147.5	12/05/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.13	J	µg/L	0.60		0.034	0.20
Demolition Area 2	MW-573M2	MW-573M2_F19	155.4	165.4	12/05/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.28		µg/L	0.60		0.034	0.20
Demolition Area 2	MW-573M2	MW-573M2_F19D	155.4	165.4	12/05/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.29		µg/L	0.60		0.034	0.20
Demolition Area 2	MW-572M1	MW-572M1_F19	164.9	174.9	12/05/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.039	J	µg/L	0.60		0.034	0.20
Demolition Area 2	MW-655M1	MW-655M1_F19	178	188	12/04/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.042	J	µg/L	0.60		0.034	0.20
J1 Range Northern	MW-657M2	MW-657M2_F19	208.3	218.3	12/02/2019	SW6850	Perchlorate	0.11	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-547M2	MW-547M2_F19	178	188	12/02/2019	SW6850	Perchlorate	0.092	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-547M1	MW-547M1_F19	237	247	12/02/2019	SW6850	Perchlorate	2.2		µg/L	2.0	X	0.027	0.20
J1 Range Northern	MW-306M2	MW-306M2_F19	164.69	174.69	11/26/2019	SW6850	Perchlorate	0.061	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-306M1	MW-306M1_F19	184.88	194.88	11/26/2019	SW6850	Perchlorate	0.084	J	µg/L	2.0		0.027	0.20
J1 Range Northern	MW-369M1	MW-369M1_F19	254.07	264.07	11/21/2019	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.11	J	µg/L	400		0.025	0.20
J1 Range Northern	MW-369M1	MW-369M1_F19	254.07	264.07	11/21/2019	SW6850	Perchlorate	0.29		µg/L	2.0		0.027	0.20
J1 Range Northern	MW-369M1	MW-369M1_F19	254.07	264.07	11/21/2019	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.52		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
February 09, 2020

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**

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 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**

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

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

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 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**

PFAS Summary Report – Groundwater
Joint Base Cape Cod, IAGWSP
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 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**

PFAS Summary Report – Groundwater
Joint Base Cape Cod, IAGWSP

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