

**MONTHLY PROGRESS REPORT #249
FOR DECEMBER 2017**

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

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

The following summary of progress is for the period from 1 December to 31 December 2017.

1. SUMMARY OF REMEDIATION ACTIONS

The following is a description of Remediation Actions (RA) underway at Camp Edwards as of December 2017.

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 2.527 billion gallons of water treated and re-injected as of 29 December 2017. The following Frank Perkins Road facility shut downs occurred in December:

- EW-658 shut down at 0940 on 08 December 2017 due to a power interruption and was restarted at 1032 on 08 December 2017.

The Pew Road Mobile Treatment Unit (MTU) continues to operate at a flow rate of 103 gpm with over 553.3 million gallons of water treated and re-injected as of 29 December 2017. The following Pew Road MTU shut downs occurred in December:

- Shut down at 0940 on 08 December 2017 due to a power interruption and was restarted at 1043 on 08 December 2017.

The Base Boundary MTU is operating at a flow rate of 65 gpm with over 185.2 million gallons of water treated and re-injected as of 29 December 2017. No Base Boundary MTU shut downs occurred in December.

The Leading Edge system continues to operate at a flow rate of 100 gpm with over 84.3 million gallons of water treated and re-injected as of 29 December 2017. No Leading Edge system shut downs occurred in December.

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 December 2017, over 453.9 million gallons of water have been treated and re-injected. No J-1 Range Southern system shut downs occurred in December.

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 December 2017, over 523.9 million gallons of water have been treated and re-injected. No J-1 Range Northern MTU shut downs occurred in December.

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 a flow rate of 155 gpm while J3EWIP1 is offline awaiting repair. As of 29 December 2017, over 1.073 billion gallons of water have been treated and re-injected. The following J-3 Range system shut downs occurred in December:

- J3EWIP1 tripped at 0221 on 30 October 2017, during a power outage, and would not restart; alarm is "VFD Fault" "Precharge Error" and will not clear. The VFD needs a new circuit board. Well remains offline awaiting repairs;
- The System was turned off at 0800 on 29 November 2017 to drain GAC Vessels #002A and #002B for the carbon exchange on 30 November 2017. The system was restarted at 0756 on 01 December 2017;
- The system shut down at 1520 on 14 December 2017; alarm was "Treatment Facility Storage Tank High Level" due to FS-12 being off. The system was restarted at 0715 on 15 December 2017;
- Extraction wells 90EW0001 and J3EW0032 shut down at 0112 on 06 December 2017 (no alarm), possibly due to a power interruption, and were restarted at 0718 on 06 December 2017; and
- Extraction well 90EW0001 shut down at 1520 on 29 December 2017 (no alarm) and was restarted at 0724 on 29 December 2017.

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 December 2017, over 957.1 million gallons of water have been treated and re-injected. No Northern Treatment Building shut downs occurred in December.

The Northern MTUs E and F continue to operate at a flow rate of 250 gpm. As of 29 December 2017, over 1.409 billion gallons of water have been treated and re-injected. The following J-2 Range Northern MTU shut down occurred in December:

- MTU F shut down at 1052 on 13 December 2017; alarm was “VFD Fault” due to a power interruption caused by high winds. MTU F was restarted at 1250 on 13 December 2017.

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 December 2017, over 1.027 billion gallons of water have been treated and re-injected. No MTU H and I shut downs occurred in December.

MTU J continues to operate at a flow rate of 120 gpm. As of 29 December 2017, over 475.1 million gallons of water have been treated and re-injected. No shut downs of MTU J occurred in December.

MTU K continues to operate at a flow rate of 125 gpm. As of 29 December 2017, over 587.8 million gallons of water have been treated and re-injected. No shut downs of MTU K occurred in December.

Central Impact Area RA

The Central Impact Area (CIA) Groundwater treatment facility consists of removal and treatment of groundwater to minimize downgradient migration of explosives compounds and perchlorate. The ETR system includes the following components: three extraction wells, an ex-situ treatment process consisting of an ion exchange (IX) resin and granular activated carbon (GAC) media to treat explosives compounds and three infiltration galleries to return treated water to the aquifer. The CIA systems 1, 2, and 3 continue to run at a combined total flow rate of 750 gpm. As of 29 December 2017, over 1.185 billion gallons of

water have been treated and re-injected. The following CIA treatment facility shut downs occurred in December:

- System 2 shut down at 0940 on 08 December 2017 due to a power interruption. The system was restarted at 1101 on 08 December 2017; and
- System 3 shut down at approximately 1130 on 29 December 2017 due to a power supply interruption. On 28 December 2017, a damaged power pole on Canal View Road was reported to EverSource. EverSource noted a switch on the pole caught fire and installed a new pole but has not installed the new switch. System 3 remains off awaiting a new power switch to be installed by EverSource.

SUMMARY OF ACTIONS TAKEN

Samples collected during the reporting period are summarized in Table 1.

Process water samples were collected at Frank Perkins Road, Pew Road, Base Boundary, Leading Edge, J-1 Range Southern, J-1 Range Northern, J-2 Range Northern, J-2 Range Eastern, J-3 Range, and Central Impact Area (CIA).

Environmental and system performance monitoring groundwater samples were collected at J-1 Range Northern, Central Impact Area, and Demolition Area 1.

Performed Vegetation removal on roads and existing well pads for J-2 Range East SPM and Demolition Area 2 LTM.

Performed additional MEC investigation in two Area 6 grids at J-3 Range.

Performed well pad preparation and drilled BH-696 (Profile C) at Demolition Area 1.

Performed daily inspection of BEM cover at the CIA to ensure cover is secure and intact.

JBCC IAGWSP Tech Update Meeting Minutes 7 December 2017

Project and Fieldwork Update

Watermark will be mobing a drill rig to the site next week to install wells at Demolition Area 1. The group was reminded that this effort is a re-drilling of three existing wells to drill deeper in order to investigate the perchlorate recently seen deep in the aquifer. It is anticipated they will be completed by the end of January. Well abandonment work in the Western Boundary is on hold pending the completion of real estate (access). The J-3 system in-plume well is back up and running. Dawson continues to work on UXO surface clearance of the firebreaks. The APC at the end of the KD Range was moved.

In the Small Arms Ranges, crews completed additional lifts at Former B Range, C Range and D Range. Three grids still had detections greater than 200 parts per million. Soil is waiting transportation and disposal; awaiting one waste characterization sample. The soil will most likely be sent as non-hazardous to an in-state facility. A new contract action is required for any additional work. Work was completed at the grids in the J-3 Range in Area 3 and Area 6. No MEC was found in Area 3. In Area 6, there were two grids where one partial rocket (warhead) was found in each; at depths of 2.5' and 3.5'. Both were

cracked so the crews dug the required 5"x 5" x 1" beneath. The results will be written up and provided as an addendum to the draft final report.

Action Items

The action items were discussed and updated.

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 the presentation would cover new work conducted, system performance, annual groundwater sampling results (August 2016 through July 2017) and trends, hydraulic monitoring and capture zone analysis, surface water monitoring, and recommendations.

No new work was conducted during the reporting period. A figure showing the J-3 Range extraction, treatment, reinjection system and plume was displayed and system performance summaries were discussed. It was noted that during this reporting period, the system had an 88.9% up time with 117.4 million gallons of water treated. To date, the system has removed 36.73 pounds of perchlorate and 5.79 pounds of RDX. There were two breakthroughs in 2017; carbon media was exchanged in January and IX in June. A chart displaying the downtime by category was displayed and it was noted that the majority of the downtime as due to power supply interruptions.

Groundwater monitoring results and trends were discussed. In zone 1 (source area to base boundary) the maximum perchlorate concentration was 19.2 µg/L (J3EWIP2) and the maximum RDX Concentration was 11.5 µg/L (MW-198M4). In zone 2 (downgradient of base boundary), the maximum perchlorate concentration was 8.0 µg/L (MW-227M2) and the maximum RDX concentration was 1.3 µg/L (J3EW0032). Figures showing perchlorate and RDX trends in key wells were displayed and discussed.

One aquifer hydraulic event occurred in July 2017. Hydraulic data and gradients were consistent with past reporting periods and the flow direction is generally north to south with convergent flow near the extraction wells.

The model plume vs. observed plume comparison was discussed. It was explained that the groundwater flow model simulated migration of the December 2013 plume shell. Notable observations were that downgradient the measured plumes were slightly smaller than the model predicted plumes and in the source area residual perchlorate and RDX was detected. The observed plumes depict the source area contamination while the model predicted plumes forward migrates the source contamination from 2013. Capture zone analysis was also discussed. It was noted that the capture zones were developed using reverse particle tracking and the existing systems appear to be adequately capturing the contaminant plumes. Figures showing the modeled vs. predicted plumes and the capture zones were displayed.

Surface water monitoring results were reviewed. For Snake Pond, surface water samples were collected from three locations on two sampling events (May and July 2017). Explosives samples were all non-detect and perchlorate results were all below the reporting limit. The results are consistent with past reporting. For the J-3 wetland, data was consistent with previous monitoring events and indicate poor hydraulic connection between the aquifer and the wetland. There is no evidence of any impact from the operation of the J-3 system on the wetland water levels.

Recommendations were discussed. IAGWSP is recommending drilling a groundwater profile boring adjacent to MW-227 to determine if contamination at depth in the vicinity of extraction well J2EWIP2 is bypassing capture there. They also recommend discontinuing surface water sampling at Snake Pond. It

was noted that this recommendation was made with the 2015 report and has been pending approval of the Sandwich Board of Health. IAGWSP will reach out to the town to try and reengage them on the issue. It was noted that a plume shell update will be completed in 2018. It was noted that EPA and MassDEP comments on the annual report are pending.

JBCC Cleanup Team Meeting

The next meeting of the JBCC Cleanup Team (JBCCCT), formerly the MMR Cleanup Team (MMRCT) has not been scheduled. 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 2 summarizes the validated detections of explosives compounds and perchlorate for all groundwater results received from 1 December to 31 December 2017. 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.

There are currently twelve operable units (OU) 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 Areas, 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. 248 for November 2017 12/10/2017
- Demolition Area 1 Optimized Hydraulic and Chemical Monitoring Network – Project Note 12/07/2017
- Final Demolition Area 1 2017 Annual Environmental Monitoring Report 12/15/2017
- Draft J-2 Range Eastern and J-2 Range Northern 2017 Annual Environmental Monitoring Report 12/21/2017

3. SCHEDULED ACTIONS

The following documents are being prepared or revised during January 2018:

- Training Areas Draft Investigation Report;
- Training Areas Remedy Selection Plan;
- Training Areas Draft Decision Document

- 2016 CIA Source Removal Annual Report;
- Technology Evaluation and Attenuation Study Reports;
- J-1 Range Southern Drive Point and Water Table Well Locations Project Note;
- Five Year Review Report;
- Northwest Corner 2017 Annual Environmental Monitoring Report;
- J-3 Range 2017 Annual Environmental Monitoring Report; and
- J-2 Range Eastern and J-2 Range Northern 2017 Annual Environmental Monitoring Report.

TABLE 1
Sampling Progress: 1 December to 30 December 2017

Area Of Concern	Location	Field Sample ID	Sample Type	Date Sampled	Matrix	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)
Demolition Area 1	MW-545M4	MW-545M4_F17	N	12/21/2017	Ground Water	72	82
Demolition Area 1	MW-545M3	MW-545M3_F17	N	12/21/2017	Ground Water	101.5	111.5
Demolition Area 1	MW-545M2	MW-545M2_F17	N	12/21/2017	Ground Water	142	152
Demolition Area 1	MW-545M1	MW-545M1_F17	N	12/21/2017	Ground Water	162	172
Demolition Area 1	MW-544M3	MW-544M3_F17	N	12/21/2017	Ground Water	77.5	87.5
Demolition Area 1	MW-544M2	MW-544M2_F17	N	12/21/2017	Ground Water	112	122
Demolition Area 1	MW-544M1	MW-544M1_F17	N	12/20/2017	Ground Water	162	172
Demolition Area 1	XX9514	XX9514_F17	N	12/20/2017	Ground Water	102	112
Demolition Area 1	MW-73S	MW-73S_F17	N	12/20/2017	Ground Water	52.2	61.7
Demolition Area 1	MW-31S	MW-31S_F17	N	12/19/2017	Ground Water	98	103
Demolition Area 1	MW-31M	MW-31M_F17	N	12/19/2017	Ground Water	113	123
Demolition Area 1	MW-648M1	MW-648M1_F17	N	12/19/2017	Ground Water	112	122
Demolition Area 1	MW-76M2	MW-76M2_F17	N	12/19/2017	Ground Water	105	115
Demolition Area 1	MW-77M2	MW-77M2_F17	N	12/19/2017	Ground Water	120	130
Demolition Area 1	MW-211M1	MW-211M1_F17	N	12/18/2017	Ground Water	200	210
Demolition Area 1	MW-231M1	MW-231M1_F17	N	12/18/2017	Ground Water	210.5	220.5
Demolition Area 1	MW-231M1	MW-231M1_F17D	FD	12/18/2017	Ground Water	210.5	220.5
Demolition Area 1	MW-663D	MW-663D_F17	N	12/18/2017	Ground Water	240.6	250.6
Demolition Area 1	MW-663D	MW-663D_F17D	FD	12/18/2017	Ground Water	240.6	250.6
Demolition Area 1	MW-341M3	MW-341M3_F17	N	12/18/2017	Ground Water	209.5	219.5
Demolition Area 1	MW-341M2	MW-341M2_F17	N	12/18/2017	Ground Water	264.5	269.5
Demolition Area 1	MW-341M2	MW-341M2_F17D	FD	12/18/2017	Ground Water	264.5	269.5
Demolition Area 1	MW-659M1	MW-659M1_F17	N	12/18/2017	Ground Water	120	130
Demolition Area 1	BH-696	D1P-C_221-226	N	12/18/2017	GW Profile	221	226
Demolition Area 1	BH-696	D1P-C_211-216	N	12/15/2017	GW Profile	211	216
Demolition Area 1	BH-696	D1P-C_201-206	N	12/15/2017	GW Profile	201	206
Demolition Area 1	MW-431	MW-431_F17	N	12/13/2017	Ground Water	88	188
Demolition Area 1	BH-696	D1P-C_191-196	N	12/13/2017	GW Profile	191	196
Demolition Area 1	EW-658	EW-658_F17	N	12/13/2017	Ground Water	96	136
Demolition Area 1	MW-19S	MW-19S_F17	N	12/13/2017	Ground Water	52.7	62.7
Demolition Area 1	MW-19S	MW-19S_F17D	FD	12/13/2017	Ground Water	52.7	62.7
Demolition Area 1	BH-696	D1P-C_181-186	N	12/13/2017	GW Profile	181	186
Demolition Area 1	BH-696	D1P-C_181-186D	FD	12/13/2017	GW Profile	181	186
Demolition Area 1	BH-696	D1P-C_171-176	N	12/13/2017	GW Profile	171	176
Demolition Area 1	BH-696	D1P-C_161-166	N	12/13/2017	GW Profile	161	166
Demolition Area 1	BH-696	D1P-C_151-156	N	12/12/2017	GW Profile	151	156
J1 Range Northern	MW-166M3	MW-166M3_F17	N	12/11/2017	Ground Water	125	135
J1 Range Northern	MW-166M2	MW-166M2_F17	N	12/11/2017	Ground Water	150	160
J1 Range Northern	MW-166M1	MW-166M1_F17	N	12/11/2017	Ground Water	218	223
J3 Range	J3-EFF	J3-EFF-135A	N	12/07/2017	Process Water	0	0
J3 Range	J3-MID-2	J3-MID-2-135A	N	12/07/2017	Process Water	0	0
J3 Range	J3-MID-1	J3-MID-1-135A	N	12/07/2017	Process Water	0	0
J3 Range	J3-INF	J3-INF-135A	N	12/07/2017	Process Water	0	0
Demolition Area 1	PR-EFF	PR-EFF-141A	N	12/07/2017	Process Water	0	0
Demolition Area 1	PR-MID-2	PR-MID-2-141A	N	12/07/2017	Process Water	0	0
Demolition Area 1	PR-MID-1	PR-MID-1-141A	N	12/07/2017	Process Water	0	0
J1 Range Northern	MW-303M3	MW-303M3_F17	N	12/07/2017	Ground Water	139.7	149.7
Demolition Area 1	PR-INF	PR-INF-141A	N	12/07/2017	Process Water	0	0
Demolition Area 1	FPR-2-EFF-A	FPR-2-EFF-A-141A	N	12/07/2017	Process Water	0	0
Demolition Area 1	FPR-2-GAC-MID1A	FPR-2-GAC-MID1A-141A	N	12/07/2017	Process Water	0	0
Demolition Area 1	FPR2-POST-IX-A	FPR2-POST-IX-A-141A	N	12/07/2017	Process Water	0	0
Demolition Area 1	FPR-2-INF	FPR-2-INF-141A	N	12/07/2017	Process Water	0	0
J1 Range Northern	MW-303M2	MW-303M2_F17	N	12/07/2017	Ground Water	235.1	245.1
J1 Range Northern	MW-303M2	MW-303M2_F17D	FD	12/07/2017	Ground Water	235.1	245.1
J1 Range Northern	MW-303M1	MW-303M1_F17	N	12/07/2017	Ground Water	299.1	309.1
Demolition Area 1	D1LE-EFF	D1LE-EFF-17A	N	12/07/2017	Process Water	0	0
Demolition Area 1	D1LE-MID2	D1LE-MID2-17A	N	12/07/2017	Process Water	0	0

N = Normal Sample
FD = Field Duplicate

TABLE 1
Sampling Progress: 1 December to 30 December 2017

Area Of Concern	Location	Field Sample ID	Sample Type	Date Sampled	Matrix	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)
Demolition Area 1	D1LE-MID1	D1LE-MID1-17A	N	12/07/2017	Process Water	0	0
Demolition Area 1	D1LE-INF	D1LE-INF-17A	N	12/07/2017	Process Water	0	0
J1 Range Northern	MW-164M2	MW-164M2_F17	N	12/07/2017	Ground Water	157	167
Demolition Area 1	D1-EFF	D1-EFF-89A	N	12/07/2017	Process Water	0	0
Demolition Area 1	D1-MID-2	D1-MID-2-89A	N	12/07/2017	Process Water	0	0
Demolition Area 1	D1-MID-1	D1-MID-1-89A	N	12/07/2017	Process Water	0	0
Demolition Area 1	D1-INF	D1-INF-89A	N	12/07/2017	Process Water	0	0
J1 Range Northern	MW-164M1	MW-164M1_F17	N	12/06/2017	Ground Water	227	237
J1 Range Southern	J1S-EFF	J1S-EFF-121A	N	12/06/2017	Process Water	0	0
J1 Range Southern	J1S-MID-2	J1S-MID-2-121A	N	12/06/2017	Process Water	0	0
J1 Range Southern	J1S-INF-2	J1S-INF-2-121A	N	12/06/2017	Process Water	0	0
J1 Range Northern	MW-590M2	MW-590M2_F17	N	12/06/2017	Ground Water	238	248
J1 Range Northern	MW-590M1	MW-590M1_F17	N	12/06/2017	Ground Water	258	268
J2 Range Northern	J2N-EFF-G	J2N-EFF-G-135A	N	12/06/2017	Process Water	0	0
J2 Range Northern	J2N-MID-2G	J2N-MID-2G-135A	N	12/06/2017	Process Water	0	0
J2 Range Northern	J2N-MID-1G	J2N-MID-1G-135A	N	12/06/2017	Process Water	0	0
J2 Range Northern	J2N-INF-G	J2N-INF-G-135A	N	12/06/2017	Process Water	0	0
J2 Range Northern	J2N-EFF-EF	J2N-EFF-EF-135A	N	12/06/2017	Process Water	0	0
J2 Range Northern	J2N-MID-2F	J2N-MID-2F-135A	N	12/06/2017	Process Water	0	0
J1 Range Northern	MW-584M2	MW-584M2_F17	N	12/06/2017	Ground Water	228	238
J2 Range Northern	J2N-MID-1F	J2N-MID-1F-135A	N	12/06/2017	Process Water	0	0
J2 Range Northern	J2N-INF-EF	J2N-INF-EF-135A	N	12/06/2017	Process Water	0	0
J2 Range Northern	J2N-MID-2E	J2N-MID-2E-135A	N	12/06/2017	Process Water	0	0
J2 Range Northern	J2N-MID-1E	J2N-MID-1E-135A	N	12/06/2017	Process Water	0	0
J1 Range Northern	MW-584M1	MW-584M1_F17	N	12/06/2017	Ground Water	248	258
J1 Range Northern	J1N-EFF	J1N-EFF-50A	N	12/06/2017	Process Water	0	0
J1 Range Northern	J1N-MID2	J1N-MID2-50A	N	12/06/2017	Process Water	0	0
J1 Range Northern	J1N-MID1	J1N-MID1-50A	N	12/06/2017	Process Water	0	0
J1 Range Northern	J1N-INF2	J1N-INF2-50A	N	12/06/2017	Process Water	0	0
J1 Range Northern	MW-401M3	MW-401M3_F17	N	12/05/2017	Ground Water	228.5	238.5
J1 Range Northern	MW-401M1	MW-401M1_F17	N	12/05/2017	Ground Water	256.1	266.1
J1 Range Northern	MW-606M2	MW-606M2_F17	N	12/05/2017	Ground Water	193.2	203.2
Central Impact Area	CIA2-EFF	CIA2-EFF-47A	N	12/05/2017	Process Water	0	0
Central Impact Area	CIA2-MID2	CIA2-MID2-47A	N	12/05/2017	Process Water	0	0
Central Impact Area	CIA2-MID1	CIA2-MID1-47A	N	12/05/2017	Process Water	0	0
J1 Range Northern	MW-606M1	MW-606M1_F17	N	12/05/2017	Ground Water	233.3	243.3
Central Impact Area	CIA2-INF	CIA2-INF-47A	N	12/05/2017	Process Water	0	0
Central Impact Area	CIA1-EFF	CIA1-EFF-47A	N	12/05/2017	Process Water	0	0
Central Impact Area	CIA1-MID2	CIA1-MID2-47A	N	12/05/2017	Process Water	0	0
Central Impact Area	CIA1-MID1	CIA1-MID1-47A	N	12/05/2017	Process Water	0	0
Central Impact Area	CIA1-INF	CIA1-INF-47A	N	12/05/2017	Process Water	0	0
Central Impact Area	MW-695S	MW-695S_R2	N	12/05/2017	Ground Water	130	140
Central Impact Area	CIA3-EFF	CIA3-EFF-18A	N	12/05/2017	Process Water	0	0
Central Impact Area	CIA3-MID2	CIA3-MID2-18A	N	12/05/2017	Process Water	0	0
Central Impact Area	CIA3-MID1	CIA3-MID1-18A	N	12/05/2017	Process Water	0	0
Central Impact Area	CIA3-INF	CIA3-INF-18A	N	12/05/2017	Process Water	0	0
J1 Range Northern	MW-346M4	MW-346M4_F17	N	12/04/2017	Ground Water	140	150
J2 Range Eastern	J2E-EFF-K	J2E-EFF-K-111A	N	12/04/2017	Process Water	0	0
J2 Range Eastern	J2E-MID-2K	J2E-MID-2K-111A	N	12/04/2017	Process Water	0	0
J2 Range Eastern	J2E-MID-1K	J2E-MID-1K-111A	N	12/04/2017	Process Water	0	0
J2 Range Eastern	J2E-INF-K	J2E-INF-K-111A	N	12/04/2017	Process Water	0	0
J1 Range Northern	MW-346M3	MW-346M3_F17	N	12/04/2017	Ground Water	175	185
J2 Range Eastern	J2E-EFF-J	J2E-EFF-J-111A	N	12/04/2017	Process Water	0	0
J2 Range Eastern	J2E-MID-2J	J2E-MID-2J-111A	N	12/04/2017	Process Water	0	0
J2 Range Eastern	J2E-MID-1J	J2E-MID-1J-111A	N	12/04/2017	Process Water	0	0
J2 Range Eastern	J2E-INF-J	J2E-INF-J-111A	N	12/04/2017	Process Water	0	0
J1 Range Northern	MW-346M2	MW-346M2_F17	N	12/04/2017	Ground Water	205.3	215.3

TABLE 1
Sampling Progress: 1 December to 30 December 2017

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-346M2	MW-346M2_F17D	FD	12/04/2017	Ground Water	205.3	215.3
J2 Range Eastern	J2E-EFF-IH	J2E-EFF-IH-111A	N	12/04/2017	Process Water	0	0
J2 Range Eastern	J2E-MID-2H	J2E-MID-2H-111A	N	12/04/2017	Process Water	0	0
J2 Range Eastern	J2E-MID-1H	J2E-MID-1H-111A	N	12/04/2017	Process Water	0	0
J2 Range Eastern	J2E-MID-2I	J2E-MID-2I-111A	N	12/04/2017	Process Water	0	0
J2 Range Eastern	J2E-MID-1I	J2E-MID-1I-111A	N	12/04/2017	Process Water	0	0
J2 Range Eastern	J2E-INF-I	J2E-INF-I-111A	N	12/04/2017	Process Water	0	0
J1 Range Northern	MW-346M1	MW-346M1_F17	N	12/04/2017	Ground Water	245	255
J1 Range Northern	MW-346M1	MW-346M1_F17D	FD	12/04/2017	Ground Water	245	255
J1 Range Northern	J1N-INF1B	J1N-INF1B_F17	N	12/04/2017	Process Water	0	0
J1 Range Northern	J1N-INF1A	J1N-INF1A_F17	N	12/04/2017	Process Water	0	0

TABLE 2
VALIDATED EXPLOSIVE AND PERCHLORATE RESULTS
Data Received December 2017

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-689M2	MW-689M2_F17	231.4	241.4	11/30/2017	SW6850	Perchlorate	0.76		ug/L	2.0		0.012	0.20
J1 Range Northern	MW-689M1	MW-689M1_F17	253.5	263.5	11/30/2017	SW6850	Perchlorate	0.16	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-479M1	MW-479M1_F17	240	250	11/29/2017	SW6850	Perchlorate	0.052	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-349M2	MW-349M2_F17	195	205	11/29/2017	SW6850	Perchlorate	0.087	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-349M1	MW-349M1_F17	229	239	11/29/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.38	J	ug/L	0.60		0.036	0.20
J1 Range Northern	MW-349M1	MW-349M1_F17	229	239	11/29/2017	SW6850	Perchlorate	0.55		ug/L	2.0		0.012	0.20
J1 Range Northern	MW-245M2	MW-245M2_F17	204	214	11/29/2017	SW6850	Perchlorate	24.5		ug/L	2.0	X	0.024	0.40
J1 Range Northern	MW-245M2	MW-245M2_F17	204	214	11/29/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	58.2		ug/L	0.60	X	0.36	2.0
J1 Range Northern	MW-245M2	MW-245M2_F17	204	214	11/29/2017	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	9.2		ug/L	400		0.025	0.20
J1 Range Northern	MW-245M2	MW-245M2_F17D	204	214	11/29/2017	SW6850	Perchlorate	25.6		ug/L	2.0	X	0.024	0.40
J1 Range Northern	MW-245M2	MW-245M2_F17D	204	214	11/29/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	57.3		ug/L	0.60	X	0.36	2.0
J1 Range Northern	MW-245M2	MW-245M2_F17D	204	214	11/29/2017	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	9.0		ug/L	400		0.025	0.20
J1 Range Northern	MW-245M1	MW-245M1_F17	244	254	11/29/2017	SW6850	Perchlorate	0.42		ug/L	2.0		0.012	0.20
J1 Range Northern	MW-326M3	MW-326M3_F17	165.2	175.3	11/28/2017	SW6850	Perchlorate	0.079	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-326M2	MW-326M2_F17	196.3	206.3	11/28/2017	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	10.0		ug/L	400		0.025	0.20
J1 Range Northern	MW-326M2	MW-326M2_F17	196.3	206.3	11/28/2017	SW6850	Perchlorate	22.1		ug/L	2.0	X	0.024	0.40
J1 Range Northern	MW-326M2	MW-326M2_F17	196.3	206.3	11/28/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	46.9		ug/L	0.60	X	0.36	2.0
J1 Range Northern	MW-326M2	MW-326M2_F17D	196.3	206.3	11/28/2017	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	10.0		ug/L	400		0.025	0.20
J1 Range Northern	MW-326M2	MW-326M2_F17D	196.3	206.3	11/28/2017	SW6850	Perchlorate	23.0		ug/L	2.0	X	0.024	0.40
J1 Range Northern	MW-326M2	MW-326M2_F17D	196.3	206.3	11/28/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	40.5		ug/L	0.60	X	0.36	2.0
J1 Range Northern	MW-326M1	MW-326M1_F17	250	260	11/28/2017	SW6850	Perchlorate	0.56		ug/L	2.0		0.012	0.20
J1 Range Northern	MW-541M1	MW-541M1_F17	210	220	11/28/2017	SW6850	Perchlorate	0.091	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-566M1	MW-566M1_F17	232	242	11/27/2017	SW6850	Perchlorate	4.2		ug/L	2.0	X	0.012	0.20
J1 Range Northern	MW-430M2	MW-430M2_F17	188.4	198.4	11/27/2017	SW6850	Perchlorate	0.066	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-430M1	MW-430M1_F17	245.2	255.2	11/27/2017	SW6850	Perchlorate	0.043	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-370M3	MW-370M3_F17	175	185	11/27/2017	SW6850	Perchlorate	0.055	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-370M2	MW-370M2_F17	215.5	225.5	11/27/2017	SW6850	Perchlorate	0.12	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-370M1	MW-370M1_F17	245	255	11/27/2017	SW6850	Perchlorate	8.8		ug/L	2.0	X	0.012	0.20
J1 Range Northern	MW-370M1	MW-370M1_F17D	245	255	11/27/2017	SW6850	Perchlorate	8.9		ug/L	2.0	X	0.012	0.20
J1 Range Northern	MW-549M2	MW-549M2_F17	187.3	197.3	11/21/2017	SW6850	Perchlorate	0.051	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-549M1	MW-549M1_F17	227.4	237.4	11/21/2017	SW6850	Perchlorate	2.4		ug/L	2.0	X	0.012	0.20
J1 Range Northern	MW-547M2	MW-547M2_F17	178	188	11/21/2017	SW6850	Perchlorate	0.067	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-547M1	MW-547M1_F17	237	247	11/21/2017	SW6850	Perchlorate	0.97		ug/L	2.0		0.012	0.20
J1 Range Northern	MW-656M2	MW-656M2_F17	222.1	232.1	11/21/2017	SW6850	Perchlorate	0.49		ug/L	2.0		0.012	0.20
J1 Range Northern	MW-656M1	MW-656M1_F17	244.1	254.1	11/21/2017	SW6850	Perchlorate	0.056	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-564M1	MW-564M1_F17	227	237	11/20/2017	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.41		ug/L	400		0.025	0.20
J1 Range Northern	MW-564M1	MW-564M1_F17	227	237	11/20/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	2.6		ug/L	0.60	X	0.036	0.20
J1 Range Northern	MW-564M1	MW-564M1_F17	227	237	11/20/2017	SW6850	Perchlorate	30.9		ug/L	2.0	X	0.12	2.0
J1 Range Northern	MW-564M1	MW-564M1_F17D	227	237	11/20/2017	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.42		ug/L	400		0.025	0.20

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

TABLE 2
VALIDATED EXPLOSIVE AND PERCHLORATE RESULTS
Data Received December 2017

Area of Concern	Location ID	Field Sample ID	Top Depth (ft bgs)	Bottom Depth (ft bgs)	Date Sampled	Test Method	Analyte	Result Value	Qualifier	Units	MCL/HA	> MCL/HA	MDL	RL
J1 Range Northern	MW-564M1	MW-564M1_F17D	227	237	11/20/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	2.5		ug/L	0.60	X	0.036	0.20
J1 Range Northern	MW-564M1	MW-564M1_F17D	227	237	11/20/2017	SW6850	Perchlorate	31.5		ug/L	2.0	X	0.12	2.0
J1 Range Northern	MW-605M2	MW-605M2_F17	182.2	192.2	11/20/2017	SW6850	Perchlorate	0.073	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-657M2	MW-657M2_F17	208.3	218.3	11/20/2017	SW6850	Perchlorate	0.17	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-567M1	MW-567M1_F17	215.5	225.5	11/16/2017	SW6850	Perchlorate	2.5		ug/L	2.0	X	0.012	0.20
J1 Range Northern	MW-286M2	MW-286M2_F17	205	215	11/16/2017	SW6850	Perchlorate	0.098	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-265M3	MW-265M3_F17	200	210	11/16/2017	SW6850	Perchlorate	0.059	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-265M2	MW-265M2_F17	225	235	11/16/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1.9		ug/L	0.60	X	0.036	0.20
J1 Range Northern	MW-265M2	MW-265M2_F17	225	235	11/16/2017	SW6850	Perchlorate	18.6		ug/L	2.0	X	0.060	1.0
J1 Range Northern	MW-265M2	MW-265M2_F17D	225	235	11/16/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1.9		ug/L	0.60	X	0.036	0.20
J1 Range Northern	MW-265M2	MW-265M2_F17D	225	235	11/16/2017	SW6850	Perchlorate	18.6		ug/L	2.0	X	0.060	1.0
J1 Range Northern	MW-265M1	MW-265M1_F17	265	275	11/16/2017	SW6850	Perchlorate	0.77		ug/L	2.0		0.012	0.20
J1 Range Northern	MW-369M1	MW-369M1_F17	254.1	264.1	11/15/2017	SW8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.21		ug/L	400		0.025	0.20
J1 Range Northern	MW-369M1	MW-369M1_F17	254.1	264.1	11/15/2017	SW6850	Perchlorate	0.48		ug/L	2.0		0.012	0.20
J1 Range Northern	MW-369M1	MW-369M1_F17	254.1	264.1	11/15/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1.2		ug/L	0.60	X	0.036	0.20
J1 Range Northern	MW-220M1	MW-220M1_F17	248	258	11/15/2017	SW6850	Perchlorate	0.051	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-253M1	MW-253M1_F17	265.4	275.4	11/15/2017	SW6850	Perchlorate	0.055	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-315M2	MW-315M2_F17	195.7	205.7	11/15/2017	SW6850	Perchlorate	0.064	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-315M1	MW-315M1_F17	245.5	255.5	11/15/2017	SW6850	Perchlorate	0.069	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-306M2	MW-306M2_F17	164.7	174.7	11/14/2017	SW6850	Perchlorate	0.23		ug/L	2.0		0.012	0.20
J1 Range Northern	MW-306M1	MW-306M1_F17	184.9	194.9	11/14/2017	SW6850	Perchlorate	0.15	J	ug/L	2.0		0.012	0.20
J1 Range Northern	MW-187D	MW-187D_F17	306	316	11/14/2017	SW8260C	m,p-Xylene	0.35	J	ug/L		X	0.35	1.0
J1 Range Northern	MW-187D	MW-187D_F17	306	316	11/14/2017	SW8260C	o-Xylene	0.47	J	ug/L		X	0.23	1.0
J1 Range Northern	MW-187D	MW-187D_F17	306	316	11/14/2017	SW8260C	Xylenes, Total	0.82	J	ug/L		X	0.23	1.0
J1 Range Northern	MW-187D	MW-187D_F17	306	316	11/14/2017	SW8270D	Phenanthrene	0.89	J	ug/L		X	0.81	10.0
J1 Range Northern	MW-187D	MW-187D_F17	306	316	11/14/2017	SW8260C	Ethylbenzene	1.3		ug/L		X	0.33	1.0
J1 Range Northern	MW-187D	MW-187D_F17	306	316	11/14/2017	SW8270D	2-Methylnaphthalene	1.3	J	ug/L		X	0.82	10.0
J1 Range Northern	MW-187D	MW-187D_F17	306	316	11/14/2017	SW8260C	Benzene	11.0		ug/L		X	0.43	1.0
Demolition Area 2	MW-572M1	MW-572M1_F17	164.9	174.9	11/08/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.22		ug/L	0.60		0.036	0.20
Demolition Area 2	MW-161S	MW-161S_F17	145.5	155.5	11/08/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.23		ug/L	0.60		0.036	0.20
J1 Range Southern	MW-669M2	MW-669M2_F17	201.7	211.7	11/07/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.84		ug/L	0.60	X	0.036	0.20
J1 Range Southern	MW-669M1	MW-669M1_F17	223.7	233.7	11/07/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.62		ug/L	0.60	X	0.036	0.20
J1 Range Southern	MW-647M1	MW-647M1_F17	211.3	221.3	11/07/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	5.1		ug/L	0.60	X	0.036	0.20
J1 Range Southern	MW-647M1	MW-647M1_F17D	211.3	221.3	11/07/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	5.0		ug/L	0.60	X	0.036	0.20
J1 Range Southern	MW-645M1	MW-645M1_F17	183.5	193.5	11/02/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.84		ug/L	0.60	X	0.036	0.20
J1 Range Southern	MW-645M1	MW-645M1_F17D	183.5	193.5	11/02/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.84		ug/L	0.60	X	0.036	0.20
J1 Range Southern	MW-482M2	MW-482M2_F17	172.6	182.6	11/02/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1.4		ug/L	0.60	X	0.036	0.20
J1 Range Southern	MW-482M2	MW-482M2_F17D	172.6	182.6	11/02/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1.4		ug/L	0.60	X	0.036	0.20
J1 Range Southern	MW-592M1	MW-592M1_F17	201	211	11/01/2017	SW8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.44		ug/L	0.60		0.036	0.20

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