



November 16, 2020  
60565355

Mr. Jeff Gill  
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1616 Capitol Avenue  
Omaha, NE 68102

**Subject: Final OU1 Rebound Study Letter Report – Quarter 3 Event  
Remedial Action Operation Groundwater Treatment Facility at OU1  
and Groundwater Monitoring at OU1 and OU3  
Cornhusker Army Ammunition Plant, Grand Island, Nebraska  
Contract W9128F-18-D-0020, Delivery Order Number F0041**

Dear Mr. Gill:

This Operable Unit (OU) 1 Rebound Study Letter Report – Quarter 3 (Q3) Event summarizes the third quarter of field activities completed for the OU1 Rebound Study and 2019 subsurface injections performance monitoring. The Letter Report presents the Q3 analytical results for the OU1 Rebound Study and performance monitoring, evaluations of the OU1 Rebound Study and injection performance, a statistical trend evaluation for OU1 Rebound Study, and presents conclusions and recommendations for upcoming OU1 Rebound Study and subsurface injection activities at Cornhusker Army Ammunition Plant (CHAAP).

## **1.0 INTRODUCTION**

### **1.1 PROJECT WORK AUTHORITY**

Brice Engineering, LLC (Brice) and AECOM Technical Services (AECOM) have prepared this document as the OU1 Rebound Study Letter Report – Quarter 3 Event for CHAAP located at Grand Island, Nebraska (**Figures 1-1 and 1-2**). This work is being conducted under contract W9128F-18-D-0020, Delivery Order Number F0041 to the United States Army Corps of Engineers (USACE), Omaha District.

Conceptual basis for performing the OU1 Rebound Study was provided in the *CHAAP OU1 2018 Groundwater Monitoring Results and Program Recommendations Technical Memorandum* (Program Recommendations Tech Memo [Brice-AECOM 2019a]), the *Final 2018 Annual Groundwater Monitoring Report, Remedial Action Operations (RAO), GWTF at OU1 and Groundwater Monitoring at OU1/OU3* (2018 Annual Groundwater Monitoring Report [Brice-AECOM 2019c]), and presented at several stakeholder meetings (April and November 2019). The approved OU1 Rebound Study work planning details are provided in the *Final Addendum 3, Uniform Federal Policy – Quality Assurance Project Plan (UFP-QAPP) for RAO, GWTF at OU1 and Groundwater Monitoring at OU1/OU3 at CHAAP* (OU1 Rebound Study Work Plan) (Addendum 3, UFP-QAPP [Brice-AECOM 2019b]).

## 1.2 PROJECT PURPOSE AND OBJECTIVE

OU1 consists of explosives-contaminated groundwater plumes (explosives concentrations exceeding regulatory action levels) at CHAAP. Health Advisory Levels (HALs) for explosives compounds hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), 2,4,6-trinitrotoluene (TNT), and octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) were established as regulatory action levels for CHAAP in the OU1 Record of Decision (ROD) (United States Army Environmental Center [USAEC] 1994) and the subsequent OU1 ROD Amendment (URS Greiner Woodward-Clyde Federal Services [URSGWCFS] 2001). The HALs for RDX and TNT are 2 micrograms per liter ( $\mu\text{g/L}$ ) and 400  $\mu\text{g/L}$  for HMX. The primary compounds of concern (i.e., compounds with historic concentrations in groundwater exceeding their corresponding HAL) are RDX and TNT. HMX has not historically exceeded the HAL during any past groundwater monitoring events.

Recent groundwater monitoring and subsequent statistical analysis have shown that concentrations of RDX and TNT near the former facility boundary between extraction well (EW) 6 and EW7 have significantly declined over the past 23 years due to the current on-post RAO (pump and treatment). Numerical groundwater modeling predictions with EW7 not pumping indicate that the on-post plume will not migrate further downgradient (Brice-AECOM 2019c). Based on these results and simulations, an OU1 Rebound Study is being performed to temporarily discontinue pumping at EW7 and monitor groundwater near the former facility boundary. Eight total groundwater sampling events (one baseline and seven quarterly events) will be completed to closely monitor potential migration of the RDX and TNT plumes and to document any increases/decreases in explosives concentrations in groundwater. The objective of the OU1 Rebound Study is to establish a sufficient data set to initiate further identified Decision Points and Contingency Actions as presented in the OU1 Rebound Study Work Plan (i.e., groundwater extraction is no longer needed, groundwater extraction should be resumed, alternative actions) (Brice-AECOM 2019b).

Concurrent with the OU1 Rebound Study, subsurface injections (a voluntary action) were completed in 2019 in the area of highest RDX and TNT concentrations near the former facility boundary and are proposed in 2020 for areas with remaining residual RDX and TNT concentrations above HALs to accelerate remedial timeframes. Four total groundwater sampling events (one baseline and three quarterly events) will be completed for each injection event to closely monitor performance of the subsurface injections and remediation of the RDX and TNT plumes and to document any increases/decreases in explosives concentrations in groundwater. The 2019 subsurface injection details and design were included in the Final 2018 Annual Groundwater Monitoring Report (Brice-AECOM 2019c) with the approved procedures outlined in the Final UFP-QAPP (Bay West LLC and URS Group Inc. [BW-URS] 2014). Following the OU1 Rebound Study and the OU1 subsurface injections with associated performance monitoring activities, long-term monitoring (LTM) will continue at OU1.

## 2.0 FIELD ACTIVITIES

This section summarizes the Q3 OU1 Rebound Study and subsurface injection performance monitoring field activities completed at CHAAP. All field activities were completed in accordance with field protocols and standard operating procedures (SOPs) presented in the *Groundwater Recovery and Treatment System Operation and Maintenance (O&M) Manual* (GWTF O&M Manual [Brice 2019]), the Final UFP-QAPP (BW-URS 2014) and its Final Addendum 2 (Brice-

AECOM 2018) and Final Addendum 3 (Brice-AECOM 2019b), and the recommendations provided in the Final 2018 Annual Groundwater Monitoring Report (Brice-AECOM 2019c).

It should be noted that concurrent with OU1 Rebound Study – Q3 sampling activities (i.e., 36 monitoring wells), the annual OU1 LTM groundwater sampling event (i.e., 94 monitoring wells) was completed and is included within this letter report (i.e., DQCRs, weekly reports, plume interpretations, and laboratory data packages and reviews). Only wells pertinent to OU1 Rebound Study and subsurface injections are further discussed and OU1 LTM sampling event data and discussion will be included in a separate deliverable (i.e., 2020 OU1/OU3 Annual Monitoring Report).

## 2.1 OU1 REBOUND STUDY FIELD ACTIVITIES

This section presents the Q3 OU1 Rebound Study field activities. The Q3 field activities were completed in May/June 2020 to compare and evaluate associated data to previous completed events. The most recent OU1 Rebound Study activities (Q2) are summarized in the Final OU1 Rebound Study Letter Report – Quarter 2 Event (Brice-AECOM 2020c). Additionally, the baseline event is summarized in the Final OU1 Rebound Study Letter Report – Baseline Event (Brice-AECOM 2020a).

### 2.1.1 Quarter 3 Direct Push Groundwater Sampling Activities (Off-Post)

A total of three direct push groundwater samples were collected on May 26, 2020 from one off-post location (OS001) as shown on **Figure 2-1**. Off-post direct push groundwater sampling was completed to continue monitoring explosives concentrations only (as screening data) from the select OU1 off-post location where permanent monitoring wells are not present and are not able to be installed due to private land ownership. Direct push groundwater sampling was completed at OS001 at predetermined vertical intervals (shallow – screened approximately 21 to 25 feet below ground surface [bgs], shallow-intermediate – screened approximately 31 to 35 feet bgs, and intermediate – screened approximately 41 to 45 feet bgs) within the unconfined shallow aquifer (Grand Island Formation) to verify the vertical extent of the explosives plume. In accordance with the OU1 Rebound Study Work Plan (Brice-AECOM 2019b), no additional direct push groundwater samples were collected further downgradient of OS001.

Brice-AECOM obtained utility clearances prior to the start of intrusive direct push activities. The Nebraska One Call Diggers Hotline was contacted for utility clearances, which were requested a minimum of 48 hours prior to intrusive work. All identified underground utilities were marked with flagging, stakes, and/or paint. Utility locate tasks were documented in field logbooks to aid in subsequent clearance work. No intrusive work was completed within 5 feet of a marked utility.

The direct push location was sited using predetermined horizontal coordinates and a global positioning system (GPS) unit to ensure completion in the planned locations. The final sampling location has been vertically surveyed and referenced to previously surveyed locations (i.e., monitoring wells). The surveyed ground surface elevation and sample interval elevations are provided in **Table 2-1**.

The direct push groundwater samples were collected using a Geoprobe<sup>®</sup> rig (model 7720DT) by Plains Environmental Services (PES) of Salina, Kansas, with full-time oversight by Brice-

AECOM. Nebraska well drilling contractor licenses for PES and Brice-AECOM are provided in **Appendix A**.

Direct push groundwater samples were completed using direct push technology with a Geoprobe™ stainless steel screen point sampler (SP15 with exposed screen) and collected from the screened interval using a Geotech Geopump™ peristaltic pump and a check valve. Prior to groundwater sample collection, approximately 7 liters (3 to 5 rod volumes) were purged typically at rates of 0.5 to 1.0 liter per minute (lpm) for each sampling interval. Direct push groundwater samples were analyzed for explosives only (including mono-nitroso-RDX [MNX]) (United States Environmental Protection Agency [USEPA] Method 8330A). Quality control (QC) samples (field duplicates) and matrix spike/matrix spike duplicate (MS/MSD) samples were collected at a 5-percent rate (i.e., one per 20 samples collected). Direct push groundwater sample locations, sample identification (ID) numbers, sample screened intervals, sample collection dates, QC locations, and sample parameters are provided in **Table 2-1**. Direct push groundwater sample collection field sheets (SCFSs) are provided in **Appendix B**.

### **2.1.2 Quarter 3 OU1 Monitoring Well Sampling Activities (Off-Post and On-Post)**

During the Q3 OU1 Rebound Study sampling event, 18 off-post and 18 on-post monitoring wells were sampled from June 1 through June 16, 2020. A summary of the OU1 off-post and on-post sampling locations is presented in **Table 2-2** and shown on **Figure 2-1**.

The monitoring wells were purged and sampled with stainless steel ProActive Monsoon® submersible pumps. The ProActive Monsoon® pump with new disposable tubing was lowered to the middle of the screened interval prior to purging. Modified low-flow purging techniques were completed at each monitoring well location, maintaining less than (<) 0.3 foot of water level drawdown at a pumping rate of 0.5 lpm or less. Field water quality parameters, including dissolved oxygen (DO), oxidation/reduction potential (ORP), temperature, pH, and conductivity were measured at monitoring wells using a Horiba MPS water quality probe fitted with a flow-through cell. Turbidity was measured with a LaMotte 2020 turbidity meter. Ferrous iron ( $\text{Fe}^{2+}$ ) was measured using a Hach DR820 colorimeter. Purging continued until field water quality parameters stabilized (i.e., three consecutive readings) within criteria ranges.

After purging was completed, sample containers were filled from the discharge line at a rate of 0.5 lpm or less. Samples were collected and analyzed for explosives (including MNX) and laboratory monitored natural attenuation (MNA) parameters: alkalinity by Method 2320B, ammonia by Method 350.1, carbon dioxide ( $\text{CO}_2$ ) back calculated by Method 2320B, nitrate/nitrite by Method 353.2, sulfate by Method 9056A, sulfide by Method 9034, total Kjeldahl nitrogen (TKN) by Method 351.2, dissolved organic carbon (DOC) by Method 9060A, and methane by Method Robert S. Kerr Environmental Research Laboratory 175 (RSK-175). QC samples (field duplicates) and MS/MSDs were collected at a 5-percent rate (i.e., one per 20 samples collected) for all parameters (**Table 2-2**). Off-post and on-post monitoring well SCFSs are provided in **Appendix B**.

## **2.2 OU1 SUBSURFACE INJECTION FIELD ACTIVITIES**

This section presents the Q3 performance monitoring activities completed in May/June 2020 to monitor the results of the 2019 OU1 subsurface injections in the area between EW6 and EW7. The

2019 OU1 subsurface injection activities and baseline performance monitoring groundwater sampling event conducted prior to the subsurface injections are summarized in the Final OU1 Rebound Study Letter Report – Baseline Event (Brice-AECOM 2020a) and subsequent Q2 activities summarized in the Final OU1 Rebound Study Letter Report – Quarter 2 Event (Brice-AECOM 2020c).

## 2.2.1 Quarter 3 Subsurface Injection Performance Monitoring

In the area between EW6 and EW7, 20 performance monitoring locations (two LTM monitoring wells and 18 temporary wells) were sampled in May/June 2020, as shown on **Figure 2-2**. The Q3 event is the third of four quarterly performance monitoring events planned at these performance monitoring wells to gauge the effectiveness of the 2019 subsurface injection activities completed in October/November 2019. The Q3 performance monitoring included:

- Eighteen new temporary wells (EW7-PM21A/B through EW7-PM29A/B) at nine locations (one shallow depth, one shallow-intermediate depth at each location)
- Two existing monitoring wells (piezometers PZ017R and PZ018)

As completed during the baseline and Q2 events, temporary monitoring wells were used to provide a higher quality groundwater sample that has lower turbidity (compared to direct push screen point samples) and is representative of the aquifer. Temporary monitoring wells were installed using direct push technology. The temporary monitoring wells were screened at select vertical intervals based on past direct push vertical profile sampling results. At each location, one shallow temporary well (screened 20 to 30 feet bgs) and one shallow-intermediate temporary well (screened 30 to 40 feet bgs) were installed within the interpreted groundwater explosives plume. Temporary well construction details are provided in **Table 2-3**. Surveyed ground surface elevations are provided in **Tables 2-3** and **2-4**. PZ017R and PZ018 were selected as performance monitoring locations based on current concentrations and proximity to completed 2019 injection activities (**Figure 2-2**).

### 2.2.1.1 Groundwater Sampling from Temporary Wells

The 18 temporary monitoring wells (at nine locations) were installed, developed, purged, sampled, and abandoned from May 27 through June 2, 2020. Temporary performance monitoring well development, purging, and sampling were completed using a Geotech Geopump<sup>TM</sup> peristaltic pump. Temporary wells were developed by purging approximately 10 well volumes (purge rates between 0.5 and 1.0 lpm) and samples were collected after all field water quality parameters had stabilized. Groundwater samples collected from the temporary monitoring wells were analyzed for explosives (including MNX) and laboratory water quality parameters: alkalinity, ammonia, nitrate/nitrite, sulfate, sulfide, TKN, DOC, and methane. QC samples (field duplicates) and MS/MSDs were collected at a 5-percent rate (i.e., one per 20 samples collected) for all parameters. Performance monitoring groundwater sampling locations and parameters are listed in **Table 2-4**. Performance monitoring SCFSs are provided in **Appendix B**.

Per Nebraska Administrative Code (NAC) Title 178, Chapter 12 (NAC 2014), temporary wells (i.e., test holes) can be used in conjunction with groundwater investigations but may be retained for no more than 10 days unless a surface seal is used and a pre-notification document is submitted to Nebraska Department of Health and Human Services within 30 days prior to construction, then a temporary well may be retained for up to 90 days. However, upon completion of sample

collection, all temporary monitoring wells were abandoned within 10 days of installation by a Nebraska-licensed well driller. Temporary monitoring wells were abandoned by removing the temporary well casing 3 feet bgs and grouting from the bottom of the well up to ground surface following the procedures outlined in SOP 4, Boring and Monitoring Well Abandonment in the Final UFP-QAPP (BW-URS 2014).

### **2.2.1.2 Groundwater Sampling from OU1 Monitoring Wells**

Two existing monitoring wells (piezometers PZ017R and PZ018) were purged and sampled on June 16, 2020. These wells were purged and sampled in accordance with **Section 2.1.2**. Performance monitoring groundwater sampling locations and parameters are listed in **Table 2-4**. Performance monitoring SCFSs are provided in **Appendix B**.

## **2.3 INVESTIGATION-DERIVED WASTE DISPOSAL PROCEDURES**

Investigation-derived waste (IDW) from the Q3 sampling events consisted of purge, decontamination, and development water. IDW disposal was completed in accordance with NDEE IDW procedures as outlined in the Final UFP-QAPP (BW-URS 2014), as follows:

- A visual inspection of the IDW was conducted for evidence of potential contamination (i.e., discoloration, sheen, etc.).
- All IDW water was containerized in an IDW-labeled poly tank located at the GWTF and sampled for site waste characterization analysis (Explosives [including MNX] only [Method 8330A]). All IDW analyses were nondetect, as summarized in **Table 2-5** (included in **Appendix D**) and discharged to ground surface.

## **2.4 FIELD DOCUMENTATION, SAMPLE IDENTIFICATION, SAMPLE HANDLING, AND SHIPPING**

Observations and data collected during the Q3 field activities were documented to provide a permanent record of all completed activities. The observations and data collected during field activities were recorded with waterproof ink in a permanently bound, waterproof logbook with consecutively numbered pages, and/or on field sheets (provided in **Appendix B**), if applicable. A photographic record of site activities and progress was maintained throughout the course of the OU1 Rebound Study and subsurface injection activities and is provided in **Appendix C**.

Samples were collected in laboratory-provided containers. Samples collected during the Q3 OU1 Rebound Study and subsurface injection groundwater sampling activities were given discrete ID codes. Each ID code included the sample location number (sample depth for direct push groundwater samples), and collection date. Sample ID labels were attached to each sample container and completed using waterproof, permanent ink. The labels were completed with the sampler's name, sample ID number, date and time of sample collection, preservation type, analyses requested, and sampling matrix. Sample containers were placed into coolers, packed with wet ice (to achieve a temperature of approximately 6 degrees Celsius [ $^{\circ}\text{C}$ ] or less), and made ready for shipment. The chain-of-custody (CoC) forms were included in each cooler. A copy of each CoC was maintained to document sample handling between the field and the laboratory. Sample coolers

were shipped to TestAmerica Laboratories, Inc. (TAL) in Arvada, Colorado during each sampling event. All samples were shipped via FedEx Priority Overnight.

## **2.5 FIELD REPORTING**

### **2.5.1 Daily Quality Control Reports**

Daily Quality Control Reports (DQCRs) were completed for each day of fieldwork associated with the OU1 Rebound Study. DQCRs include a summary of daily field activities, safety activities, quality assurance/QC activities pertaining to all features of work, problems encountered in the field, and any corrective actions that were taken to correct these problems. Copies of the completed DQCRs are provided in **Appendix B**.

### **2.5.2 Weekly Progress Reports**

Weekly progress reports were completed and submitted to the USACE Project Manager throughout the duration of the field activities. The weekly reports included a summary of the work performed in a particular week including mobilization, site preparation, site access, surveying, groundwater sampling, injection, and demobilization actions. The reports also included a summary of the problems encountered, deviations from the scope of work, percentage of work performed, and records of conversations or other correspondence among CHAAP team members. Copies of the weekly progress reports are provided in **Appendix B**.

## **3.0 SUMMARY OF QUARTER 3 RESULTS AND DATA QUALITY REVIEW**

### **3.1 QUARTER 3 ANALYTICAL RESULTS**

Groundwater samples for the Q3 OU1 Rebound Study and subsurface injection performance monitoring activities were analyzed in accordance with the Final Addendum 2, UFP-QAPP (Brice-AECOM 2018) for various compounds depending on sample location. Groundwater samples for the OU1 Rebound Study off-post direct push locations were analyzed for explosives (including MNX) only (see **Table 2-1**). Groundwater samples for the OU1 Rebound Study off-post and on-post monitoring wells and the subsurface injection performance monitoring activities were analyzed for explosives (including MNX) and laboratory MNA/water quality parameters: alkalinity, ammonia, nitrate/nitrite, sulfate, sulfide, TKN, DOC, and methane (see **Tables 2-2 and 2-4**). All laboratory analyses were completed by TAL. A summary of all Q3 analytical results is presented below.

**Tables 3-1** (off-post direct push samples), **3-2** (off-post and on-post monitoring wells), and **3-3** (performance monitoring wells) summarize the explosives compounds detected in groundwater during the Q3 OU1 Rebound Study and subsurface injection performance monitoring sampling activities. The primary explosives compounds detected in groundwater were RDX, HMX, and TNT (only compounds having HALs). Additionally, the explosives breakdown products 1,3,5-trinitrobenzene, 1,3-dinitrobenzene, 2,4-dinitrotoluene, 2-amino-4,6-dinitrotoluene (2-Am-DNT), 4-amino-2,6-dinitrotoluene (4-Am-DNT), 4-nitrotoluene, MNX, and nitrobenzene were detected. All of the previously listed explosives compounds were detected at on-post performance monitoring wells. Seven of the on-post performance monitoring wells had concentrations of RDX

above the HAL (2 µg/L) and two of the on-post performance monitoring wells had a concentration of TNT above the HAL (2 µg/L). The off-post and on-post monitoring wells had all the detected explosives compounds above except 1,3-dinitrobenzene, 2,4-dinitrotoluene, MNX, and nitrobenzene and only had four wells above the TNT HAL (all on-post). The off-post direct push samples only had detections of 1,3,5-trinitrobenzene, TNT, and RDX with all three samples having TNT above the HAL (further discussed in **Section 5**). The data collected during the Q3 OU1 Rebound Study and subsurface injection performance monitoring were used to update the explosives plume in these areas. Data for the Q3 off-post direct push groundwater sample locations and off-post and on-post monitoring wells are shown on **Figure 2-1** and data for the Q3 OU1 subsurface injection performance monitoring are shown on **Figure 2-2**.

**Tables 3-2** and **3-3** also summarizes the laboratory MNA/water quality parameters detected in groundwater at off-post and on-post monitoring wells and performance monitoring wells, respectively. Field duplicate sample pairs were collected to assess both field and laboratory precision. Four field duplicate samples were collected and submitted to the laboratory for analysis. Analytical results for the Q3 OU1 Rebound Study and subsurface injection performance monitoring field duplicate sample pairs are presented in **Table 3-4**.

## 3.2 FIELD WATER QUALITY PARAMETERS

Field water quality parameter measurements were determined at the time of sample collection in Q3 OU1 Rebound Study (off-post and on-post monitoring wells) and subsurface injection performance monitoring sampling activities. Field water quality parameter measurements included ORP, DO, pH, conductivity, temperature, turbidity, and Fe<sup>2+</sup>. Due to an uncertain DO measurement at one off-post well (NW060), the well was repurged for field water quality parameters using a new instrument less than a week later. All field results were recorded on the SCFSs (included in **Appendix B**). OU1 on-post and off-post monitoring well and subsurface injection performance monitoring well field water quality parameter measurements are presented in **Tables 3-5** and **3-6**, respectively.

## 3.3 DATA QUALITY REVIEW/VALIDATION PROCESS

Analytical data were reviewed and verified in accordance with the Final Addendum 2, UFP-QAPP (Brice-AECOM 2018). The data review process included evaluations of the following elements, as required, including validation of raw data by an AECOM chemist. The validation software ADR.NET was used to supplement the manual validation.

- Laboratory case narrative/cooler receipt form
- Sample documentation
- Sample preservation and holding time compliance
- Instrument performance check (tuning)
- Initial calibration
- Initial calibration verification second source
- Continuing calibration verification (CCV)

- Internal standards
- Blank samples
- Laboratory control samples (LCS)
- Surrogate compounds
- MS/MSDs
- Field duplicates
- Sensitivity
- Additional qualifications, including professional judgment
- Completeness

### 3.3.1 Analytical Results Verification

The laboratory data reports, complete ADR.NET, and data verification reports are provided in **Appendix D**. Qualifications applied to the analytical results based on the data review findings are included in **Table D-1 (Appendix D)**. As previously indicated, below trends only include discussion regarding the Q3 OU1 Rebound Study and subsurface injection performance monitoring activities.

General trends regarding the data validation are as follows:

- The methane results for the duplicate pairs EW7-PM23A-3-25 / EW7-PM523A-3-25 were qualified as estimated (**J**) due to field duplicate relative percent differences outside of evaluation criteria.
- The methane result for samples EW7-PM23A-3-25 and EW7-PM27B-3-35 were qualified as **J** due to the presence of headspace greater than (>) 6 millimeters in the associated sample containers.
- The nitrate-nitrite results for samples EW7-PM24A-3-25 and EW7-PM27A-3-25 were qualified as **J** due to LCS/LCSD recovery above evaluation criteria.
- The methane results for samples EW7-PM21A-3-25, the sulfate result for sample G0079-20A, the RDX result for sample EW7-PM29B-3-35, and the 2,4,6-trinitrotoluene and 1,3,5-trinitrobenzene results for sample OS001-DP03-25 were qualified as **J** due to MS/MSD recoveries above evaluation criteria.
- The detected explosives results for nine samples were qualified as estimated due to surrogate recoveries above evaluation criteria.
- The 4-nitrotoluene, 2-amino-4,6-dinitrotoluene, 2-nitrotoluene, 3-nitrotoluene, and 4-amino-2,6-dinitrotoluene results for eleven samples were qualified as estimated/estimated nondetect (**J/UJ**) due to LCS/LCSD recoveries below evaluation criteria.
- The sulfate result for sample EW7-PM22B-3-35 was qualified as **J** due to MS/MSD recoveries below evaluation criteria.
- The nitrate-nitrite results for five samples were qualified as **J/UJ** due to MS/MSD recoveries below evaluation criteria.

- Some explosives results for five samples were qualified as **J/UJ** due to MS/MSD recoveries below evaluation criteria.
- The TKN results for six samples were qualified as **J/UJ** due to MS/MSD recoveries below evaluation criteria.
- The explosives results for four samples were all qualified as **J/UJ** due to surrogate recoveries below evaluation criteria.
- Some explosives results were qualified as **J** due to relative percent differences >40% between the primary and confirmation columns.

### **3.3.2 Conclusions of Data and Quality Review**

The analytical data were found to be acceptable for the intended use based on the data validation and the automated data review. Completeness, defined to be the percentage of analytical results judged to be valid, including estimated data, was 100 percent for the sampling events. No analytical data were rejected during the data validation. Generally, good precision was noted in the field duplicate samples for analytes reported above the laboratory limits of quantitation.

## **4.0 OU1 STATISTICAL TREND EVALUATION (OU1 REBOUND STUDY WELLS)**

As part of the OU1 Rebound Study, statistical trend evaluation of TNT and RDX concentrations will be performed. Once a total of four quarterly groundwater sampling events have been completed, statistical trend evaluations will be performed for all locations sampled as part of the OU1 Rebound Study where sufficient data are available (i.e., locations with a minimum of four data points and less than 50% non-detect results). While trend evaluation will be performed for all locations, only locations with detections will be included in quarterly report figures (e.g, **Figures 4-1** and **4-2**). Until sufficient OU1 Rebound Study data are obtained, quarterly sampling results will be qualitatively evaluated on a well by well basis to assess if explosives concentrations in groundwater are increasing.

### **4.1 STATISTICAL TREND EVALUATION PROCESS**

Once sufficient analytical data are obtained, analytical results will be evaluated using Monitoring and Remediation Optimization System (MAROS) Version 3.0., a groundwater data trend analysis and LTM optimization tool developed by the Technology Transfer Division of the Air Force Civil Engineer Center (AFCEC) (AFCEC 2012). MAROS applies statistical techniques to site data to determine plume trends. The following site data are analyzed by the program:

- Historic and current site analytical data
- Hydrogeologic factors
- Locations of potential receptors

Statistical trends will be assessed using the Mann-Kendall analysis. Using the three statistical metrics for Mann-Kendall analysis (Mann-Kendall statistic [S], Confidence in Trend [CT], and Coefficient of Variation [COV], the Mann-Kendall analyzes the trend in the data over time and is utilized in the analysis of groundwater plume stability. A concentration trend category is then

determined following the Mann-Kendall Analysis Decision Matrix. Generally, positive S values indicate an increase in analyte concentrations over time and negative S values indicate a decrease in analyte concentrations over time. The CT provides a percentage value of confidence for the S validity, and the COV provides a general indicator of the degree of variability. Mann-Kendall analysis will be applied to RDX and TNT results to assess the potential for future RDX and TNT concentration increases.

Individual monitoring well concentration trends are categorized into one of seven categories based on the decision matrix:

#### MANN-KENDALL ANALYSIS DECISION MATRIX

Mann-Kendall Statistic (S)	Confidence in Trend (CT)	Concentration Trend
$S > 0$	$> 95\%$	Increasing (I)
$S > 0$	90% to 95%	Probably Increasing (PI)
$S > 0$	$< 90\%$	No Trend (NT)
$S \text{ less than or equal } (\leq) 0$	$< 90\%$ and COV greater than or equal ( $\geq$ ) 1	No Trend (NT)
$S \leq 0$	$< 90\%$ and COV $< 1$	Stable (S)
$S < 0$	90% to 95%	Probably Decreasing (PD)
$S < 0$	$> 95\%$	Decreasing (D)
Dataset where all values are nondetect		Nondetect (ND)

**Notes:**

No Trend – No statistically significant trend with more variability in concentrations over time (COV)

Stable – No statistically significant trend with less variability in concentrations over time (COV)

The OU1 Rebound Study statistical trend evaluation and Mann-Kendall analysis will be completed following similar procedures as in the annual OU1 LTM statistical trend evaluations, most recently the Final 2019 Annual Groundwater Report (Brice-AECOM 2020b). See Section 5.5 of the Final 2019 Annual Groundwater Report for additional Program Input details (e.g., Data Management, Site Details).

## 4.2 STATISTICAL RESULTS SUMMARY

Once sufficient analytical data are obtained from monitoring wells (minimum of four sampling results with less than 50% non-detect results), Mann-Kendall analysis will be performed. A qualitative evaluation of the Q3 data indicated that RDX and TNT concentrations were similar to concentrations detected during the previous annual OU1 LTM event (June 2019), the OU1 Rebound Study baseline event (October 2019), and the Q2 event (February/March 2020), with only minimal fluctuations (increases and decreases) observed. Additionally, all monitoring wells sampled during the Q3 OU1 Rebound Study have previously showed RDX and TNT concentration trends were decreasing or had a stable/no trend, as documented in the 2019 statistical trend evaluation (Brice-AECOM 2020b). The OU1 Rebound Study (baseline, Q2, and Q3) and June 2019 RDX and TNT results are shown on **Figure 4-1** (wells near the former facility boundary) and on **Figure 4-2** (upgradient wells). The tabulated groundwater monitoring data set for each well are included in **Appendix E**.

## 5.0 OU1 REBOUND STUDY AND INJECTION PERFORMANCE EVALUATION

This section presents an evaluation of the Q3 data compared to Q2 and baseline data for the OU1 Rebound Study and the 2019 subsurface injection performance monitoring for the OU1 groundwater explosives plume. This evaluation will compare RDX and TNT concentrations and key MNA/water quality parameters in groundwater and will qualitatively discuss any concentration trends observed.

### 5.1 OU1 REBOUND STUDY EVALUATION

#### 5.1.1 RDX and TNT Concentrations

RDX and TNT concentrations for all OU1 Rebound Study locations are presented in **Table 5-1**. Of the 18 on-post wells sampled during the Q3 event, four wells (G0077, G0086, PZ017R, and PZ020) have TNT concentrations  $>2$   $\mu\text{g/L}$ ; a decrease from 5 wells during Q2 event. For these four wells, TNT increased slightly at G0077; but decreased at G0086, PZ017R, and PZ020 when compared to baseline/Q2 event results (**Figures 4-1 and 4-2**). All 18 off-post wells continue to be nondetect for TNT during Q3 event, with exception to NW020, which has had minor TNT detections below the HAL, and OS001, which is discussed in the paragraph below. All on-post and off-post OU1 Rebound Study wells continued to have RDX concentrations below the HAL.

At OS001, a comparison of TNT concentrations detected during the baseline, Q2, and Q3 sampling events indicates concentrations increased in the shallow depth (approximately 25 feet bgs) from 12  $\mu\text{g/L}$ , to 9.2  $\mu\text{g/L}$ , to 32  $\mu\text{g/L}$ . Concentrations remained nearly the same in the shallow-intermediate depth (approximately 35 feet bgs) from 11  $\mu\text{g/L}$ , to 8.2  $\mu\text{g/L}$ , to 11  $\mu\text{g/L}$ . In the intermediate depth (approximately 45 feet bgs) concentrations increased to above the HAL (2  $\mu\text{g/L}$ ) from nondetect, to 1.1  $\mu\text{g/L}$ , to 2.2  $\mu\text{g/L}$ . These increases in TNT concentrations are likely due to the on-post injection activities pushing remnants of the dissolved explosives plume downgradient. There were no detections of RDX above its HAL (2  $\mu\text{g/L}$ ) in any of the off-post direct push samples. Baseline, Q2, and Q3 data indicate that TNT concentrations  $>2$   $\mu\text{g/L}$  are present on-post slightly upgradient of the former facility boundary and extend off-post approximately 2,200 feet downgradient of the former facility boundary in a narrow and shallow plume (**Figure 2-1**).

#### 5.1.2 MNA Parameter Measurements

MNA parameters for all OU1 Rebound Study wells are presented in **Table 5-2**. MNA occurs through both destructive (biodegradation) and non-destructive (dispersion and dilution) processes. The Q3 MNA parameter results for the OU1 Rebound Study wells were comparable to baseline and Q2 parameters at the same off-post and on-post wells. In general, the data indicate these OU1 Rebound Study off-post and on-post wells continue to have higher ORP, DO (with the exception of the lower portion of the aquifer which has low DO concentrations), nitrate/nitrite, and sulfate measurements and low ammonia, TKN, DOC,  $\text{CO}_2$ , methane, alkalinity, sulfide, and  $\text{Fe}^{2+}$  measurements. Geochemical conditions most conducive to biodegradation include negative ORP values, DO concentrations less than 0.5 mg/L, low nitrate/nitrite concentrations, low sulfate concentrations, and DOC concentrations greater than 10 mg/L. Correspondingly, higher concentrations of sulfide,  $\text{Fe}^{2+}$ , and methane can indicate an environment in which biodegradation is occurring. With the exception of the deeper portion of the aquifer, the data do not provide strong

evidence that biodegradation is the primary mechanism of MNA for RDX and TNT for OU1 Rebound Study wells. Given the low and generally decreasing concentrations of RDX and TNT in the areas where the OU1 Rebound Study wells are located (generally surrounding the plume; upgradient, cross gradient, and downgradient), it is likely that dispersion and dilution play a stronger role in MNA for the OU1 Rebound Study wells than biodegradation. Overall, conditions at the OU1 Rebound Study wells continue to indicate the effectiveness of MNA at reducing RDX and TNT concentrations.

## 5.2 OU1 SUBSURFACE INJECTION PERFORMANCE MONITORING EVALUATION

### 5.2.1 RDX and TNT Concentrations

Explosives results for all OU1 subsurface injection performance monitoring locations are presented in **Table 5-3**. The Q3 event results continued to verify that TNT concentrations  $>2$   $\mu\text{g/L}$  remain at the former facility boundary; however, concentrations have been substantially reduced within the 2019 subsurface injection areas. The Q3 TNT concentrations, when compared to the baseline event and Q2 event, decreased or remained nondetect at all 20 performance monitoring locations, with only three locations remaining above the TNT HAL ( $2$   $\mu\text{g/L}$ ) (all performance monitoring locations were above the TNT HAL during the baseline event). The Q3 maximum TNT concentration of  $11$   $\mu\text{g/L}$  was detected at shallow well EW7-PM21A-25 and piezometer PZ017R. Between the baseline event and the Q3 event, the total number of locations with TNT concentrations  $>2$   $\mu\text{g/L}$  has been reduced from 20 locations, to seven locations, to three locations. Overall, TNT concentrations have decreased at all wells since the baseline event.

The Q3 RDX concentrations, when compared to the baseline event and Q2 event, decreased or remained unchanged at 13 of 20 performance monitoring locations. Of the seven locations where RDX concentrations increased, six locations increased to above the HAL ( $2$   $\mu\text{g/L}$ ). The maximum RDX concentration of  $57$   $\mu\text{g/L}$  was detected at shallow-intermediate well EW7-PM25B-35. In comparison, during the baseline, Q2, and Q3 events maximum TNT and RDX concentrations were  $29$   $\mu\text{g/L}$  and  $1.7$   $\mu\text{g/L}$ ,  $38$   $\mu\text{g/L}$  and  $37$   $\mu\text{g/L}$ , and  $11$   $\mu\text{g/L}$  and  $57$   $\mu\text{g/L}$ , respectively. The on-post groundwater explosives plume was refined based on the Q3 subsurface injection performance monitoring results as shown on **Figure 2-2**.

### 5.2.2 Water Quality Parameter Measurements

Water quality parameters for all OU1 subsurface injection performance monitoring locations are presented in **Table 5-4**. The Q3 water quality parameters for the performance monitoring wells indicate a continued anaerobic environment is present due to the 2019 subsurface injections. ORP and DO measurements continued to be low during the Q3 event. At most locations directly impacted by injections (with exception to location EW7-PM25A), significant anaerobic conditions are still present (e.g., ORP/DO measurements at shallow temporary wells averaged from  $-19.9$  mV/ $1.1$  mg/L during baseline event to  $-101.1$  mV/ $0.46$  mg/L during Q3 event). Decreases in sulfate and increases in DOC and  $\text{Fe}^{2+}$  are also indicators that anaerobic conditions are present.

## **6.0 CONCLUSIONS AND RECOMMENDATIONS**

This section presents the conclusions for the Q3 OU1 Rebound Study and subsurface injection performance monitoring activities, and recommendations for the next sampling event (Quarter 4 [Q4] – October 2020).

Additionally, this section presents the revised proposed 2020 subsurface injection and performance monitoring activity recommendations. The proposed 2020 subsurface injection and performance monitoring activities have been revised slightly from what was provided in the Final 2019 Annual Groundwater Report (Brice-AECOM 2020b). These slight revisions have been made based on current analytical data collected between the baseline and Q3/LTM sampling events. All proposed 2020 subsurface injection methodologies and procedures will remain the same and be completed in accordance with the recommendations provided in the Final 2019 Annual Groundwater Report.

### **6.1 CONCLUSIONS**

#### **6.1.1 OU1 Rebound Study**

All Q3 OU1 Rebound Study sampling activities were completed successfully, approximately seven months after EW7 shutdown (October 2019). The Q3 analytical results indicate the OU1 on-post TNT plume maintains its general shape and extent from previous sampling events, with detections below HALs to the north and south extent of EW7 (i.e., well cluster NW020 and PZ019). All concentrations of RDX within the OU1 Rebound Study monitoring wells and off-post direct push samples continue to be below the HAL (2 µg/L). In accordance with the OU1 Rebound Study Work Plan (Brice-AECOM 2019b), only off-post direct push location OS001 was sampled during the Q3 event.

TNT concentrations >2 µg/L were identified at four OU1 Rebound Study on-post wells, which was a reduction from five wells above the HAL during the baseline and Q2 events. TNT concentrations at off-post direct push location OS001 were identified >2 µg/L at all three intervals and increased at the shallow interval (25 feet bgs) to >20 µg/L. However, off-post monitoring wells downgradient of the feedlot (which have been below HALs since 2012 or longer) continue to remain nondetect for both RDX and TNT.

Following future OU1 Rebound Study sampling events (including continued direct push groundwater sampling at location OS001 and additional downgradient locations), concentrations and migration trends will be evaluated, and if necessary, additional off-post direct push sampling will be completed. Future concentrations and MNA parameters will be evaluated by comparing the previous event data to follow-up OU1 Rebound Study sampling data.

#### **6.1.2 OU1 Subsurface Injection Performance Monitoring**

All Q3 OU1 subsurface injection performance monitoring sampling was completed successfully approximately six months after the 2019 subsurface injection event (October/November 2019). Significant decreases in explosives concentrations were identified during the Q3 event due to the establishment of a highly anaerobic subsurface environment conducive to explosives biodegradation.

The Q3 performance monitoring sample results indicated most monitoring locations decreased in TNT concentrations to below the HAL, reducing the size of the  $>2 \mu\text{g/L}$  TNT plume and eliminating the  $>20 \mu\text{g/L}$  TNT plume, while eliminating a portion of the plume upgradient of EW7. RDX concentrations varied between increasing and decreasing results during the Q3 event, with seven locations having concentrations above the HAL (Q2 event: four locations, baseline event: none). Of the seven Q3 performance monitoring locations with RDX above the HAL, five were previously below the HAL during Q2 event. Additionally, slightly higher concentrations were observed in the shallow-intermediate depths (i.e., 35 feet bgs) compared to shallow depths. These increases in RDX concentrations are likely due to the continued impacts of injection activities causing mobilization of dissolved explosives (as observed during previous subsurface injection activities 2007 through 2016). These increased RDX concentrations are expected to degrade due to existing anaerobic conditions.

## 6.2 RECOMMENDATIONS

### 6.2.1 OU1 Rebound Study

Proceed with the Q4 sampling event for the OU1 Rebound Study (October 2020) per Addendum 3, UFP-QAPP (Brice-AECOM 2019b). In accordance with the OU1 Rebound Study Work Plan, the off-post direct push locations OS001, OS003, and an additional downgradient will be sampled to continue to evaluate potential explosives migration off-post and delineate the furthest extent off-post of explosives concentrations above HALs. Following future off-post data analysis, explosives concentrations and migration trends will be evaluated, and if necessary, additional off-post direct push sampling will be completed to verify the off-post extent of explosives concentrations above HALs.

### 6.2.2 OU1 Subsurface Injection Performance Monitoring

Proceed with Q4 OU1 subsurface injection performance monitoring event for the 2019 subsurface injections per Final 2018 Annual Groundwater Monitoring Report (Brice-AECOM 2019c).

### 6.2.3 Proposed Subsurface Injection and Performance Monitoring 2020

Additional injections are recommended at select locations in 2020. Immediately following completion of the Q4 OU1 subsurface injection performance monitoring activities, it is recommended that the proposed 2020 subsurface injection activities be implemented. The proposed 2020 subsurface injection activities have been revised slightly (at different locations) from what was provided in the Final 2019 Annual Groundwater Monitoring Report (Brice-AECOM 2020b). Additionally, higher volumes of amendment are recommended to be injected at either the shallow depths or shallow-intermediate depths dependent upon higher concentrations observed at select locations accordingly. These slight revisions are based on current analytical data collected between the baseline and Q3/LTM events.

Based on the Q3/LTM events analytical results, the 2020 subsurface injection activities (600 total injection points and 20 performance monitoring locations sampled for four quarters [80 total samples]) are recommended on-post at LL1, LL2, and the Decant Station where explosives concentrations are above HALs; and again at select locations between EW6 and EW7 that showed increases following the 2019 subsurface injections. **Table 6-1** summarizes details of proposed

subsurface injection transects that are shown on **Figures 6-1, 6-2** (and **Figure 2-2**). Baseline concentrations will be established using Q4 or LTM analytical results for performance monitoring locations in which the 2019 injections have not been implemented. The 2020 performance monitoring locations, sample identification numbers, sample type, sample screened intervals, QC locations, and sample parameters are provided in **Table 6-2**. The 2020 performance monitoring locations are shown highlighted in green on **Figures 6-1, 6-2** (and **Figure 2-2**).

The 2020 subsurface injection activities are tentatively planned for completion in October/November 2020. It is anticipated that the 2020 subsurface injection activities will take approximately five to six weeks to complete. Following the 2020 subsurface injection, four performance monitoring events (approximately every three months) will be completed. The treatment effects from the 2019 and recommended 2020 subsurface injections are expected to continue to enhance the anaerobic conditions and stimulate biodegradation of explosives.

## 7.0 REFERENCES

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We appreciate the opportunity to provide services for this project. If you have any questions, please contact the undersigned.

Sincerely,



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**DIRECT PUSH GROUNDWATER SAMPLES COLLECTED (OFF-POST)**  
**OU1 REBOUND STUDY, QUARTER 3**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

Sample Location ID	Coordinates <sup>1</sup>							Parameters				
	Northing	Easting						Explosives <sup>2</sup>	Field Duplicate Samples <sup>3</sup>	MS/MSD Samples <sup>4</sup>		
			Ground Elevation (feet amsl) <sup>1</sup>	Screened Interval (feet bgs)	Sample Elevation (feet amsl) <sup>1</sup>	Sample ID	Sample Date					
OU1 Rebound Study - Off-post Direct Push Samples <sup>5</sup>												
OS001	403776.40	2067811.90	1890.05	21.0 - 25.0	1865.05	OS001-DP03-25	5/26/2020	X	X			
				31.0 - 35.0	1855.05	OS001-DP03-35	5/26/2020	X				
				41.0 - 45.0	1845.05	OS001-DP03-45	5/26/2020	X		X		
Totals								3	1	1		

**Notes:**

<sup>1</sup>Horizontal coordinates are in Nebraska State Plane, North American Datum of 1983. Elevation datum based on National Geodetic Vertical Datum of 1929.

<sup>2</sup>Explosives (+MNX) analysis (SW846 Method 8330A) only completed.

<sup>3</sup>Field duplicate samples were collected at a rate of 5% (1 per 20 samples collected) for explosives only. The 21-25 foot depth interval was chosen for a field duplicate sample because, if the explosives plume does extend to that location, it will most likely be observed at that depth.

<sup>4</sup>MS/MSD samples were collected at a rate of 5% (1 per 20 samples collected) for explosives only. The 41-45 foot depth interval was chosen for an MS/MSD sample since that interval is likely clean.

<sup>5</sup>OU1 Rebound Study off-post direct push groundwater samples will be collected over eight total sampling events (one baseline, seven follow-up) at an approximate quarterly frequency, over approximately 2 years. The follow-up direct push sampling events (seven events at approximate quarterly frequency) will be collected from the established baseline location (i.e., OS001), with selective sample depths based on the baseline and/or follow-up events sample results.

% = percent

amsl = above mean sea level

bgs = below ground surface

DP = direct push

ID = identification number

MNX = mono-nitroso-RDX

MS/MSD = matrix spike/matrix spike duplicate

OS = off-post sample

OU = Operable Unit

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

**TABLE 2-2**  
**OFF-POST AND ON-POST GROUNDWATER MONITORING WELLS SAMPLED**  
**OU1 REBOUND STUDY, QUARTER 3**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

Well Number	Sample Date	Explosives <sup>1</sup>	Laboratory MNA Parameters <sup>2</sup>	Field MNA Parameters <sup>3</sup>	Field Duplicate Sample ID <sup>4</sup>	Field MS/MSD Sample ID <sup>5</sup>
<b>OU1 Off-Post Monitoring Wells</b>						
CA210	6/9/2020	X	X	X		
CA211	6/9/2020	X	X	X		
CA212	6/9/2020	X	X	X		
CA213	6/9/2020	X	X	X		
NW020	6/15/2020	X	X	X		
NW021	6/15/2020	X	X	X	NW023-20A	
NW022	6/15/2020	X	X	X		
NW050	6/10/2020	X	X	X		
NW051	6/10/2020	X	X	X		
NW052	6/10/2020	X	X	X		
NW060	6/10/2020	X	X	X		
NW061	6/10/2020	X	X	X		
NW062	6/10/2020	X	X	X		
NW070	6/9/2020	X	X	X		
NW071	6/9/2020	X	X	X		
NW080	6/8/2020	X	X	X		
NW081R	6/8/2020	X	X	X		
NW082R	6/8/2020	X	X	X		
<b>Off-Post Totals</b>		<b>18</b>	<b>18</b>	<b>18</b>	<b>1</b>	<b>0</b>
<b>OU1 On-Post Monitoring Wells</b>						
G0024	6/15/2020	X	X	X		
G0070	6/2/2020	X	X	X		G0070-20A MS/MSD
G0075	6/1/2020	X	X	X		
G0076	6/1/2020	X	X	X		
G0077	6/15/2020	X	X	X		
G0078	6/15/2020	X	X	X		
G0079	6/1/2020	X	X	X		
G0080	6/11/2020	X	X	X		
G0081	6/2/2020	X	X	X		
G0082	6/2/2020	X	X	X		
G0086	6/16/2020	X	X	X		
G0087	6/15/2020	X	X	X		
G0091	6/16/2020	X	X	X		
G0092	6/16/2020	X	X	X		
PZ017R	6/16/2020	X	X	X	PZ021-20A	
PZ018	6/16/2020	X	X	X		
PZ019	6/16/2020	X	X	X		PZ019-20A MS/MSD
PZ020	6/15/2020	X	X	X		
<b>On-Post Totals</b>		<b>18</b>	<b>18</b>	<b>18</b>	<b>1</b>	<b>2</b>
<b>Overall Totals</b>		<b>36</b>	<b>36</b>	<b>36</b>	<b>2</b>	<b>2</b>

**TABLE 2-2**  
**OFF-POST AND ON-POST GROUNDWATER MONITORING WELLS SAMPLED**  
**OU1 REBOUND STUDY, QUARTER 3**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

<b>Well Number</b>	<b>Sample Date</b>	<b>Explosives<sup>1</sup></b>	<b>Laboratory MNA Parameters<sup>2</sup></b>	<b>Field MNA Parameters<sup>3</sup></b>	<b>Field Duplicate Sample ID<sup>4</sup></b>	<b>Field MS/MSD Sample ID<sup>5</sup></b>
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**Notes:**

<sup>1</sup>Explosives (+MNX) analysis (SW846 Method 8330A).

<sup>2</sup>Laboratory MNA parameters for OU1 (on- and off-post) include: methane (Method RSK 175), total Kjeldahl nitrogen (Method 351.2), nitrate/nitrite (Method 353.2), sulfate (Method 9056A), sulfide (Method 9034), ammonia (Method 350.1), dissolved organic carbon (Method 9060A), alkalinity (Method 2320B), and carbon dioxide (back calculated Method 2320B).

<sup>3</sup>Field MNA parameters include: dissolved oxygen, oxidation/reduction potential, ferrous iron, specific conductance, turbidity, pH, and temperature.

<sup>4</sup>Field duplicate samples were collected at a rate of 5% (1 per 20 samples collected) for the full suite of laboratory parameters. NW021 and PZ017R were chosen for field duplicate samples based on presence of historic explosives concentrations at those locations.

<sup>5</sup>MS/MSD samples were collected at a rate of 5% (1 per 20 samples collected) for the full suite of laboratory parameters. G0070 and PZ019 were chosen for MS/MSD samples based on the lack of historic explosives concentrations at those locations.

% = percent

ID = identification number

MNX = mono-nitroso-RDX

MS/MSD = matrix spike/matrix spike duplicate

MNA = monitored natural attenuation

OU = Operable Unit

PZ = piezometer

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

RSK = Robert S. Kerr Environmental Research Laboratory

TABLE 2-3  
SUMMARY OF TEMPORARY PERFORMANCE MONITORING WELL CONSTRUCTION  
OU1 SUBSURFACE INJECTION, QUARTER 3  
OU1 REBOUND STUDY LETTER REPORT - QUARTER 3

Temporary Performance Monitoring Well Construction Diagram			Well	Date Installed	Time	A	B	C	F	G	H	I	N	O	P	Q	R	S
			EW7-PM21A	5/27/2020	1110	2.0	1899.12	1897.12	14.1	1883.0	19.9	1877.2	29.9	1867.2	30.0	1867.1	31.0	1866.1
			EW7-PM21B	5/27/2020	1045	2.0	1899.12	1897.12	27.9	1869.2	29.9	1867.2	39.9	1857.2	40.0	1857.1	41.0	1856.1
			EW7-PM22A	5/27/2020	1310	2.0	1900.25	1898.25	14.2	1884.1	19.9	1878.4	29.9	1868.4	30.0	1868.3	31.0	1867.3
			EW7-PM22B	5/27/2020	1250	2.0	1900.25	1898.25	27.8	1870.5	29.9	1868.4	39.9	1858.4	40.0	1858.3	41.0	1857.3
			EW7-PM23A	5/28/2020	1615	2.0	1896.55	1894.55	12.1	1882.5	19.1	1875.5	29.1	1865.5	30.0	1864.6	31.0	1863.6
			EW7-PM23B	5/28/2020	1550	2.0	1896.55	1894.55	27.9	1866.7	29.9	1864.7	39.9	1854.7	40.0	1854.6	41.0	1853.6
			EW7-PM24A	5/27/2020	1450	2.0	1899.72	1897.72	13.1	1884.6	19.9	1877.8	29.9	1867.8	30.0	1867.7	31.0	1866.7
			EW7-PM24B	5/27/2020	1430	2.0	1899.72	1897.72	27.8	1869.9	29.9	1867.8	39.9	1857.8	40.0	1857.7	41.0	1856.7
			EW7-PM25A	5/28/2020	1435	2.0	1895.73	1893.73	12.6	1881.1	19.9	1873.8	29.9	1863.8	30.0	1863.7	31.0	1862.7
			EW7-PM25B	5/28/2020	1400	2.0	1895.73	1893.73	27.9	1865.8	29.9	1863.8	39.9	1853.8	40.0	1853.7	41.0	1852.7
			EW7-PM26A	5/29/2020	0925	2.0	1899.73	1897.73	14.2	1883.5	19.9	1877.8	29.9	1867.8	30.0	1867.7	31.0	1866.7
			EW7-PM26B	5/29/2020	0900	2.0	1899.73	1897.73	27.8	1869.9	29.9	1867.8	39.9	1857.8	40.0	1857.7	41.0	1856.7
			EW7-PM27A	5/27/2020	1530	2.0	1897.55	1895.55	12.1	1883.5	19.9	1875.7	29.9	1865.7	30.0	1865.6	31.0	1864.6
			EW7-PM27B	5/28/2020	0845	2.0	1897.55	1895.55	27.8	1867.8	29.9	1865.7	39.9	1855.7	40.0	1855.6	41.0	1854.6
			EW7-PM28A	5/28/2020	1250	2.0	1894.82	1892.82	12.0	1880.8	19.9	1872.9	29.9	1862.9	30.0	1862.8	31.0	1861.8
			EW7-PM28B	5/28/2020	1145	2.0	1894.82	1892.82	27.8	1865.0	29.9	1862.9	39.9	1852.9	40.0	1852.8	41.0	1851.8
			EW7-PM29A	5/28/2020	1030	2.0	1895.35	1893.35	12.0	1881.4	19.9	1873.5	29.9	1863.5	30.0	1863.4	31.0	1862.4
			EW7-PM29B	5/28/2020	1015	2.0	1895.35	1893.35	27.7	1865.7	29.9	1863.5	39.9	1853.5	40.0	1853.4	41.0	1852.4

**Notes:**  
All temporary wells were installed by direct push methods (installation by Plains Environmental Services).  
All temporary well installation activities were directed by AECOM.  
Elevation datum based on National Geodetic Vertical Datum of 1929.

AGS = above ground surface  
BGS = below ground surface  
EW = extraction well  
I.D. = inside diameter  
OU = Operable Unit  
PM = performance monitoring

The following information is the same for all temporary wells installed:  
D = 1-inch inside diameter, Schedule 80, flush-threaded polyvinyl chloride  
E = High-solids bentonite grout  
J = Number 30-60, clean, washed, silica sand  
K = 1-inch inside diameter, schedule 80, flush threaded, factory slotted polyvinyl chloride  
M = Screen slot size standard 0.010-inch  
T = 2.125-inch diameter for shallow wells (i.e., PM21A), 3.125-inch diameter for deep wells (i.e., PM21B)

**TABLE 2-4**  
**PERFORMANCE MONITORING LOCATIONS SAMPLED**  
**OU1 SUBSURFACE INJECTION, QUARTER 3**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

		Coordinates <sup>1</sup>								Analytical Parameters						
										Explosives <sup>2</sup>	Laboratory Water Quality Parameters <sup>3</sup>	Field Water Quality Parameters <sup>4</sup>	Field Duplicate Samples <sup>5</sup>	MS/MSD Samples <sup>6</sup>		
Sample Location ID	Well Type			Northing	Easting	Top of Casing Elevation (feet amsl) <sup>1</sup>	Screened Interval (feet bgs)	Sample Depth (feet bgs)	Sample Elevation (feet amsl) <sup>1</sup>						Sample ID	Sample Date
Between EW6 and EW7																
PZ017R	Piezometer			1895.17	10 - 30	22	1873.17	PZ017R-20A	6/16/2020	X	X	X	X			
PZ018	Piezometer			1896.88	10 - 30	22	1874.88	PZ018-20A	6/16/2020	X	X	X				
EW7-PM21A	Temp. Well	403407.45	2066429.65	1899.12	20 - 30	25	1874.12	EW7-PM21A-3-25	5/28/2020	X	X	X				
EW7-PM21B	Temp. Well				30 - 40	35	1864.12	EW7-PM21B-3-35	5/29/2020	X	X	X				
EW7-PM22A	Temp. Well	403463.08	2066562.14	1900.25	20 - 30	25	1875.25	EW7-PM22A-3-25	5/28/2020	X	X	X				
EW7-PM22B	Temp. Well				30 - 40	35	1865.25	EW7-PM22B-3-35	5/29/2020	X	X	X				
EW7-PM23A	Temp. Well	403578.28	2066842.98	1896.55	20 - 30	25	1871.55	EW7-PM23A-3-25	5/31/2020	X	X	X	X			
EW7-PM23B	Temp. Well				30 - 40	35	1861.55	EW7-PM23B-3-35	5/31/2020	X	X	X				
EW7-PM24A	Temp. Well	403412.74	2066751.85	1899.72	20 - 30	25	1874.72	EW7-PM24A-3-25	5/29/2020	X	X	X				
EW7-PM24B	Temp. Well				30 - 40	35	1864.72	EW7-PM24B-3-35	5/29/2020	X	X	X				
EW7-PM25A	Temp. Well	403432.36	2066962.17	1895.73	20 - 30	25	1870.73	EW7-PM25A-3-25	5/31/2020	X	X	X				
EW7-PM25B	Temp. Well				30 - 40	35	1860.73	EW7-PM25B-3-35	5/31/2020	X	X	X				
EW7-PM26A	Temp. Well	403248.72	2066662.06	1899.73	20 - 30	25	1874.73	EW7-PM26A-3-25	5/31/2020	X	X	X				
EW7-PM26B	Temp. Well				30 - 40	35	1864.73	EW7-PM26B-3-35	6/1/2020	X	X	X				
EW7-PM27A	Temp. Well	403170.77	2066860.69	1897.55	20 - 30	25	1872.55	EW7-PM27A-3-25	5/29/2020	X	X	X				
EW7-PM27B	Temp. Well				30 - 40	35	1862.55	EW7-PM27B-3-35	5/30/2020	X	X	X				
EW7-PM28A	Temp. Well	403302.80	2067019.15	1894.82	20 - 30	25	1869.82	EW7-PM28A-3-25	5/30/2020	X	X	X				
EW7-PM28B	Temp. Well				30 - 40	35	1859.82	EW7-PM28B-3-35	5/30/2020	X	X	X				
EW7-PM29A	Temp. Well	403108.54	2067050.13	1895.35	20 - 30	25	1870.35	EW7-PM29A-3-25	5/30/2020	X	X	X				
EW7-PM29B	Temp. Well				30 - 40	35	1860.35	EW7-PM29B-3-35	5/30/2020	X	X	X			X	
Between EW6 and EW7 Totals										20	20	20	2	1		

**TABLE 2-4**  
**PERFORMANCE MONITORING LOCATIONS SAMPLED**  
**OU1 SUBSURFACE INJECTION, QUARTER 3**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

Sample Location ID	Well Type	Coordinates <sup>1</sup>		Top of Casing Elevation (feet amsl) <sup>1</sup>	Screened Interval (feet bgs)	Sample Depth (feet bgs)	Sample Elevation (feet amsl) <sup>1</sup>	Sample ID	Sample Date	Analytical Parameters				
		Northing	Easting							Explosives <sup>2</sup>	Laboratory Water Quality Parameters <sup>3</sup>	Field Water Quality Parameters <sup>4</sup>	Field Duplicate Samples <sup>5</sup>	MS/MSD Samples <sup>6</sup>

**Notes:**

<sup>1</sup>Horizontal coordinates are in Nebraska State Plane, North American Datum of 1983. Elevation datum based on National Geodetic Vertical Datum of 1929.

<sup>2</sup>Explosives (+MNX) analysis (SW846 Method 8330A).

<sup>3</sup>Laboratory water quality parameters for OU1 include: methane (Method RSK 175), total Kjeldahl nitrogen (Method 351.2), nitrate/nitrite (Method 353.2), sulfate (Method 9056A), sulfide (Method 9034), ammonia (Method 350.1), dissolved organic carbon (Method 9060A), alkalinity (Method 2320B), and carbon dioxide (back calculated Method 2320B).

<sup>4</sup>Field water quality parameters include: dissolved oxygen, oxidation/reduction potential, ferrous iron, turbidity, specific conductance, pH, and temperature.

<sup>5</sup>Field duplicate samples were collected at a rate of 5% (1 per 20 samples collected) for laboratory water quality parameters and explosives.

<sup>6</sup>MS/MSD samples were collected at a rate of 5% (1 per 20 samples collected) for laboratory water quality parameters and explosives.

% = percent

amsl = above mean sea level

bgs = below ground surface

EW = extraction well

ID = identification

MNX = mono-nitroso-RDX

MS/MSD = matrix spike/matrix spike duplicate

OU = Operable Unit

PM = performance monitoring

PZ = piezometer

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

RSK = Robert S. Kerr Environmental Research Laboratory

**TABLE 2-5**  
**SUMMARY OF EXPLOSIVES DETECTED, IDW - WATER**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

FIELD ID SAMPLE DATE	CHAAP HALs (µg/L)	WC-Q3-JUNE20 6/16/2020				
		Result	Qual	DL	LOD	LOQ
<b>EXPLOSIVES (USEPA Method 8330A) (µg/L)</b>						
1,3,5-Trinitrobenzene	NA	<	U	0.21	0.22	0.09
1,3-Dinitrobenzene	NA	<	U	0.11	0.12	0.04
2,4,6-Trinitrotoluene	2	<	U	0.11	0.12	0.05
2,4-Dinitrotoluene	NA	<	U	0.084	0.11	0.03
2,6-Dinitrotoluene	NA	<	U	0.084	0.11	0.04
2-Amino-4,6-dinitrotoluene	NA	<	U	0.11	0.12	0.05
2-Nitrotoluene	NA	<	U	0.21	0.22	0.09
3-Nitrotoluene	NA	<	U	0.42	0.42	0.21
4-Amino-2,6-dinitrotoluene	NA	<	U	0.13	0.16	0.06
4-Nitrotoluene	NA	<	U	0.42	0.43	0.11
HMX	400	<	U	0.21	0.22	0.09
MNX	NA	<	U	0.42	2.1	0.16
Nitrobenzene	NA	<	U	0.21	0.22	0.1
RDX	2	<	U	0.21	0.22	0.05
Tetryl	NA	<	U	0.11	0.12	0.03

**Notes:**

< = less than LOQ

µg/L = micrograms per liter

CHAAP = Cornhusker Army Ammunition Plant

DL = detection limit

HAL = health advisory level

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine

ID = identification number

IDW = investigation-derived waste

J = estimated

LOD = limit of detection

LOQ = limit of quantification

MNX = mono-nitroso-RDX

NA = not available

OU = Operable Unit

Qual = qualifier

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

U = nondetect

USEPA = United States Environmental Protection Agency

WC = waste characterization (water)

**TABLE 3-1**  
**SUMMARY OF EXPLOSIVES DETECTED, DIRECT PUSH GROUNDWATER LOCATIONS (OFF-POST)**  
**OU1 REBOUND STUDY, QUARTER 3**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

FIELD ID SAMPLE DATE	CHAAP	OS001-DP03-25					OS001-DP03-35					OS001-DP03-45				
	HALs	5/26/2020					5/26/2020					5/26/2020				
	(µg/L)	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ
<b>EXPLOSIVES (USEPA Method 8330A) (µg/L)</b>																
1,3,5-Trinitrobenzene	NA	0.41	J	0.09	0.21	0.22	31		0.9	2.1	2.2	49	J	0.9	2.1	2.2
1,3-Dinitrobenzene	NA	<	U	0.039	0.11	0.12	<	U	0.039	0.11	0.12	<	U	0.039	0.11	0.12
2,4,6-Trinitrotoluene	2	32	J	0.48	1.1	1.2	11		0.048	0.11	0.12	2.2	J	0.048	0.11	0.12
2,4-Dinitrotoluene	NA	<	U	0.029	0.086	0.11	<	U	0.029	0.085	0.11	<	U	0.029	0.085	0.11
2,6-Dinitrotoluene	NA	<	U	0.043	0.086	0.11	<	U	0.043	0.085	0.11	<	U	0.043	0.085	0.11
2-Amino-4,6-dinitrotoluene	NA	<	U	0.054	0.11	0.12	<	U	0.054	0.11	0.12	<	U	0.054	0.11	0.12
2-Nitrotoluene	NA	<	U	0.091	0.21	0.22	<	U	0.091	0.21	0.22	<	U	0.091	0.21	0.22
3-Nitrotoluene	NA	<	UJ	0.21	0.43	0.43	<	U	0.21	0.43	0.43	<	U	0.21	0.43	0.43
4-Amino-2,6-dinitrotoluene	NA	<	U	0.062	0.13	0.16	<	U	0.062	0.13	0.16	<	U	0.061	0.13	0.16
4-Nitrotoluene	NA	<	U	0.11	0.43	0.44	<	U	0.11	0.43	0.44	<	U	0.11	0.43	0.44
HMX	400	<	U	0.094	0.21	0.22	<	U	0.093	0.21	0.22	<	U	0.093	0.21	0.22
MNX	NA	<	U	0.16	0.43	2.1	<	U	0.16	0.43	2.1	<	U	0.16	0.43	2.1
Nitrobenzene	NA	<	U	0.097	0.21	0.22	<	U	0.097	0.21	0.22	<	U	0.097	0.21	0.22
RDX	2	0.19	J	0.055	0.21	0.22	0.21	J	0.055	0.21	0.22	0.17	J	0.055	0.21	0.22
Tetryl	NA	<	U	0.034	0.11	0.12	<	U	0.034	0.11	0.12	<	U	0.034	0.11	0.12

**Notes:**

Concentrations exceed HALs

< = less than LOQ

µg/L = micrograms per liter

CHAAP = Cornhusker Army Ammunition Plant

DL = detection limit

DP = direct push

HAL = health advisory level

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine

ID = identification number

J = estimated

LOD = limit of detection

LOQ = limit of quantification

MNX = mono-nitroso-RDX

NA = not available

OS = off-post sample

OU = Operable Unit

Qual = qualifier

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

U = nondetect

USEPA = United States Environmental Protection Agency

TABLE 3-2  
SUMMARY OF EXPLOSIVES DETECTED AND LABORATORY MNA PARAMETERS, OFF-POST AND ON-POST MONITORING WELLS  
OU1 REBOUND STUDY, QUARTER 3  
OU1 REBOUND STUDY LETTER REPORT - QUARTER 3

FIELD ID SAMPLE DATE	CHAAP HALs (µg/L)	CA210-20A 6/9/2020					CA211-20A 6/9/2020					CA212-20A 6/9/2020					CA213-20A 6/10/2020					NW020-20A 6/15/2020					NW021-20A 6/15/2020					NW022-20A 6/15/2020				
		Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ
EXPLOSIVES (USEPA Method 8330A) (µg/L)																																				
1,3,5-Trinitrobenzene	NA	<	U	0.09	0.21	0.22	<	U	0.089	0.21	0.22	<	U	0.091	0.22	0.23	<	U	0.087	0.21	0.22	<	U	0.087	0.21	0.22	<	U	0.094	0.22	0.24	<	U	0.088	0.21	0.22
1,3-Dinitrobenzene	NA	<	U	0.039	0.11	0.12	<	U	0.039	0.11	0.12	<	U	0.04	0.11	0.12	<	U	0.038	0.1	0.11	<	U	0.038	0.1	0.11	<	U	0.041	0.11	0.12	<	U	0.039	0.1	0.12
2,4,6-Trinitrotoluene	2	<	U	0.048	0.11	0.12	<	U	0.048	0.11	0.12	<	U	0.049	0.11	0.12	<	U	0.046	0.1	0.11	0.59		0.046	0.1	0.11	<	U	0.05	0.11	0.12	<	U	0.047	0.1	0.12
2,4-Dinitrotoluene	NA	<	U	0.029	0.085	0.11	<	U	0.029	0.085	0.11	<	U	0.03	0.087	0.11	<	U	0.028	0.083	0.1	<	U	0.028	0.082	0.1	<	U	0.031	0.09	0.11	<	U	0.029	0.084	0.1
2,6-Dinitrotoluene	NA	<	U	0.043	0.085	0.11	<	U	0.043	0.085	0.11	<	U	0.043	0.087	0.11	<	U	0.041	0.083	0.1	<	U	0.041	0.082	0.1	<	U	0.045	0.09	0.11	<	U	0.042	0.084	0.1
2-Amino-4,6-dinitrotoluene	NA	<	UJ	0.054	0.11	0.12	<	UJ	0.054	0.11	0.12	<	UJ	0.055	0.11	0.12	<	U	0.052	0.1	0.11	1.4		0.052	0.1	0.11	2.2		0.057	0.11	0.12	<	U	0.053	0.1	0.12
2-Nitrotoluene	NA	<	UJ	0.091	0.21	0.22	<	UJ	0.091	0.21	0.22	<	UJ	0.093	0.22	0.23	<	U	0.088	0.21	0.22	<	U	0.088	0.21	0.22	<	U	0.096	0.22	0.24	<	U	0.089	0.21	0.22
3-Nitrotoluene	NA	<	UJ	0.21	0.43	0.43	<	UJ	0.21	0.43	0.43	<	UJ	0.21	0.43	0.43	<	U	0.2	0.41	0.41	<	U	0.2	0.41	0.41	<	U	0.22	0.45	0.45	<	U	0.2	0.42	0.42
4-Amino-2,6-dinitrotoluene	NA	<	UJ	0.062	0.13	0.16	<	UJ	0.061	0.13	0.16	<	UJ	0.062	0.13	0.16	<	U	0.06	0.12	0.15	1.8		0.059	0.12	0.15	1		0.065	0.13	0.17	<	U	0.06	0.13	0.16
4-Nitrotoluene	NA	<	UJ	0.11	0.43	0.44	<	UJ	0.11	0.43	0.44	<	UJ	0.11	0.43	0.44	<	U	0.1	0.41	0.42	<	U	0.1	0.41	0.42	<	U	0.11	0.45	0.46	<	U	0.1	0.42	0.43
HMX	400	<	U	0.093	0.21	0.22	<	U	0.093	0.21	0.22	<	U	0.095	0.22	0.23	<	U	0.09	0.21	0.22	<	U	0.09	0.21	0.22	<	U	0.098	0.22	0.24	<	U	0.092	0.21	0.22
MNX	NA	<	U	0.16	0.43	2.1	<	U	0.16	0.43	2.1	<	U	0.17	0.43	2.2	<	U	0.16	0.41	2.1	<	U	0.16	0.41	2.1	<	U	0.17	0.45	2.2	<	U	0.16	0.42	2.1
Nitrobenzene	NA	<	U	0.097	0.21	0.22	<	U	0.097	0.21	0.22	<	U	0.099	0.22	0.23	<	U	0.094	0.21	0.22	<	U	0.094	0.21	0.22	<	U	0.1	0.22	0.24	<	U	0.095	0.21	0.22
RDX	2	<	U	0.055	0.21	0.22	<	U	0.055	0.21	0.22	<	U	0.056	0.22	0.23	<	U	0.053	0.21	0.22	1.5		0.053	0.21	0.22	<	U	0.058	0.22	0.24	<	U	0.054	0.21	0.22
Tetryl	NA	<	U	0.034	0.11	0.12	<	U	0.034	0.11	0.12	<	U	0.034	0.11	0.12	<	U	0.033	0.1	0.11	<	U	0.033	0.1	0.11	<	U	0.036	0.11	0.12	<	U	0.033	0.1	0.12
LABORATORY MNA PARAMETERS																																				
Ammonia USEPA 350.1 (mg/L)		0.052	J	0.022	0.05	0.1	<	U	0.022	0.05	0.1	<	U	0.022	0.05	0.1	<	U	0.022	0.05	0.1	<	U	0.022	0.05	0.1	1.4		0.022	0.05	0.1	1.4		0.022	0.05	0.1
Total Kjeldahl Nitrogen USEPA 351.2 (mg/L)		0.72	J	0.69	1	1	<	U	0.69	1	1	<	U	0.69	1	1	<	U	0.69	1	1	<	U	0.69	1	1	1.8		0.69	1	1	1.7		0.69	1	1
Nitrate/Nitrite USEPA 353.2 (mg/L)		19		0.095	0.25	0.5	33		0.19	0.5	1	18		0.095	0.25	0.5	1		0.019	0.05	0.1	42		0.19	0.5	1	1.5		0.019	0.05	0.1	<	U	0.019	0.05	0.1
Sulfide SM 9034 (mg/L)		<	U	0.79	1.9	4	0.8	J	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4
Sulfate USEPA 9056A (mg/L)		150		1	3	5	110		1	3	5	79		1	3	5	57		1	3	5	230		2.1	6	10	220		2.1	6	10	290		2.1	6	10
Dissolved Organic Carbon SM 9060A (mg/L)		14		0.35	1	1	6		0.35	1	1	3.1		0.35	1	1	1.7		0.35	1	1	5.9		0.35	1	1	2.8		0.35	1	1	2.6		0.35	1	1
Alkalinity SM 2320B (mg/L)		340		3.1	10	10	210		3.1	10	10	170		3.1	10	10	120		3.1	10	10	320		3.1	10	10	340		3.1	10	10	400		3.1	10	10
Methane RSK-175 (µg/L)		2.3	J	0.63	2	5	<	U	0.63	2	5	<	U	0.63	2	5	<	U	0.63	2	5	<	U	0.63	2	5	5.7		0.63	2	5	440		0.63	2	5
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>		151		3.1	10	10	93		3.1	10	10	76		3.1	10	10	53		3.1	10	10	142		3.1	10	10	151		3.1	10	10	178		3.1	10	10

Notes:

Concentrations exceed HALs

<sup>1</sup>Carbon dioxide back calculated from alkalinity SM 2320B.

< = less than LOQ

µg/L = micrograms per liter

CHAAP = Cornhusker Army Ammunition Plant

DL = detection limit

HAL = health advisory level

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine

ID = identification number

J = estimated

LOD = limit of detection

LOQ = limit of quantification

mg/L = milligrams per liter

MNA = monitored natural attenuation

MNX = mono-nitroso-RDX

NA = not available

OU = Operable Unit

PZ = piezometer

Qual = qualifier

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

RSK = Robert S. Kerr Environmental Research Laboratory

SM = Standard Method

U = nondetect

USEPA = United States Environmental Protection Agency

TABLE 3-2  
SUMMARY OF EXPLOSIVES DETECTED AND LABORATORY MNA PARAMETERS, OFF-POST AND ON-POST MONITORING WELLS  
OU1 REBOUND STUDY, QUARTER 3  
OU1 REBOUND STUDY LETTER REPORT - QUARTER 3

FIELD ID SAMPLE DATE	CHAAP HALs (µg/L)	NW050-20A 6/10/2020					NW051-20A 6/10/2020					NW052-20A 6/10/2020					NW060-20A 6/10/2020					NW061-20A 6/10/2020					NW062-20A 6/10/2020					NW070-20A 6/9/2020				
		Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ
EXPLOSIVES (USEPA Method 8330A) (µg/L)																																				
1,3,5-Trinitrobenzene	NA	<	U	0.088	0.21	0.22	<	U	0.088	0.21	0.22	<	U	0.088	0.21	0.22	<	U	0.088	0.21	0.22	<	U	0.088	0.21	0.22	<	U	0.09	0.21	0.22	<	U	0.089	0.21	0.22
1,3-Dinitrobenzene	NA	<	U	0.039	0.1	0.11	<	U	0.038	0.1	0.11	<	U	0.039	0.1	0.12	<	U	0.039	0.1	0.12	<	U	0.039	0.1	0.12	<	U	0.039	0.11	0.12	<	U	0.039	0.11	0.12
2,4,6-Trinitrotoluene	2	<	U	0.047	0.1	0.11	<	U	0.047	0.1	0.11	<	U	0.047	0.1	0.12	<	U	0.047	0.1	0.12	<	U	0.047	0.1	0.12	<	U	0.048	0.11	0.12	<	U	0.048	0.11	0.12
2,4-Dinitrotoluene	NA	<	U	0.029	0.084	0.1	<	U	0.029	0.083	0.1	<	U	0.029	0.084	0.1	<	U	0.029	0.084	0.1	<	U	0.029	0.084	0.1	<	U	0.029	0.086	0.11	<	U	0.029	0.085	0.11
2,6-Dinitrotoluene	NA	<	U	0.042	0.084	0.1	<	U	0.042	0.083	0.1	<	U	0.042	0.084	0.1	<	U	0.042	0.084	0.1	<	U	0.042	0.084	0.1	<	U	0.043	0.086	0.11	<	U	0.043	0.085	0.11
2-Amino-4,6-dinitrotoluene	NA	<	U	0.053	0.1	0.11	<	U	0.053	0.1	0.11	<	U	0.053	0.1	0.12	<	U	0.053	0.1	0.12	<	U	0.053	0.1	0.12	<	U	0.054	0.11	0.12	0.24	J	0.054	0.11	0.12
2-Nitrotoluene	NA	<	U	0.089	0.21	0.22	<	U	0.089	0.21	0.22	<	U	0.09	0.21	0.22	<	U	0.09	0.21	0.22	<	U	0.09	0.21	0.22	<	U	0.091	0.21	0.22	<	UJ	0.091	0.21	0.22
3-Nitrotoluene	NA	<	U	0.2	0.42	0.42	<	U	0.2	0.42	0.42	<	U	0.2	0.42	0.42	<	U	0.2	0.42	0.42	<	U	0.2	0.42	0.42	<	U	0.21	0.43	0.43	<	UJ	0.21	0.42	0.42
4-Amino-2,6-dinitrotoluene	NA	<	U	0.06	0.13	0.16	<	U	0.06	0.13	0.16	<	U	0.06	0.13	0.16	<	U	0.06	0.13	0.16	<	U	0.06	0.13	0.16	<	U	0.062	0.13	0.16	<	UJ	0.061	0.13	0.16
4-Nitrotoluene	NA	<	U	0.1	0.42	0.43	<	U	0.1	0.42	0.43	<	U	0.1	0.42	0.43	<	U	0.1	0.42	0.43	<	U	0.1	0.42	0.43	0.13	J	0.11	0.43	0.44	<	UJ	0.11	0.42	0.43
HMX	400	<	U	0.091	0.21	0.22	<	U	0.091	0.21	0.22	<	U	0.16	0.42	2.1	<	U	0.092	0.21	0.22	<	U	0.092	0.21	0.22	<	U	0.094	0.21	0.22	<	U	0.093	0.21	0.22
MNX	NA	<	U	0.16	0.42	2.1	<	U	0.16	0.42	2.1	<	U	0.092	0.21	0.22	<	U	0.16	0.42	2.1	<	U	0.16	0.42	2.1	<	U	0.16	0.43	2.1	<	U	0.16	0.42	2.1
Nitrobenzene	NA	<	U	0.095	0.21	0.22	<	U	0.095	0.21	0.22	<	U	0.095	0.21	0.22	<	U	0.095	0.21	0.22	<	U	0.095	0.21	0.22	<	U	0.097	0.21	0.22	<	U	0.096	0.21	0.22
RDX	2	<	U	0.054	0.21	0.22	<	U	0.054	0.21	0.22	<	U	0.054	0.21	0.22	<	U	0.054	0.21	0.22	<	U	0.054	0.21	0.22	<	U	0.055	0.21	0.22	<	U	0.055	0.21	0.22
Tetryl	NA	<	U	0.033	0.1	0.11	<	U	0.033	0.1	0.11	<	U	0.033	0.1	0.12	<	U	0.033	0.1	0.12	<	U	0.033	0.1	0.12	<	U	0.034	0.11	0.12	<	U	0.034	0.11	0.12
LABORATORY MNA PARAMETERS																																				
Ammonia USEPA 350.1 (mg/L)		0.98		0.022	0.05	0.1	<	U	0.022	0.05	0.1	450		0.63	2	5	<	U	0.022	0.05	0.1	4.5		0.022	0.05	0.1	0.91		0.022	0.05	0.1	0.087	J	0.022	0.05	0.1
Total Kjeldahl Nitrogen USEPA 351.2 (mg/L)		<	U	0.69	1	1	<	U	0.69	1	1	1		0.69	1	1	<	U	0.69	1	1	2.5		0.69	1	1	1.5		0.69	1	1	1.3		0.69	1	1
Nitrate/Nitrite USEPA 353.2 (mg/L)		78		0.48	1.3	2.5	24		0.095	0.25	0.5	0.031	J	0.022	0.05	0.1	2.4		0.019	0.05	0.1	5.7		0.019	0.05	0.1	<	U	0.019	0.05	0.1	<	U	0.019	0.05	0.1
Sulfide SM 9034 (mg/L)		<	U	0.79	1.9	4	<	U	0.79	1.9	4	0.052	J	0.019	0.05	0.1	<	U	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4
Sulfate USEPA 9056A (mg/L)		200		5.2	15	25	190		1	3	5	320		3.1	10	10	5.2		1	3	5	170		1	3	5	190		1	3	5	5.9		1	3	5
Dissolved Organic Carbon SM 9060A (mg/L)		6.5		0.35	1	1	9.2		0.35	1	1	140		5.2	15	25	0.96	J	0.35	1	1	4.1		0.35	1	1	2.3		0.35	1	1	10		0.35	1	1
Alkalinity SM 2320B (mg/L)		220		3.1	10	10	330		3.1	10	10	<	U	0.79	1.9	4	28		3.1	10	10	270		3.1	10	10	240		3.1	10	10	72		3.1	10	10
Methane RSK-175 (µg/L)		<	U	0.63	2	5	1.9	J	0.63	2	5	6.6		0.35	1	1	<	U	0.63	2	5	19		0.63	2	5	21		0.63	2	5	3900		0.63	2	5
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>		98		3.1	10	10	147		3.1	10	10	142		3.1	10	10	12		3.1	10	10	120		3.1	10	10	107		3.1	10	10	32		3.1	10	10

Notes:

Concentrations exceed HALs

<sup>1</sup>Carbon dioxide back calculated from alkalinity SM 2320B.

< = less than LOQ

µg/L = micrograms per liter

CHAAP = Cornhusker Army Ammunition Plant

DL = detection limit

HAL = health advisory level

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine

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NA = not available

OU = Operable Unit

PZ = piezometer

Qual = qualifier

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

RSK = Robert S. Kerr Environmental Research Laboratory

SM = Standard Method

U = nondetect

USEPA = United States Environmental Protection Agency

TABLE 3-2  
SUMMARY OF EXPLOSIVES DETECTED AND LABORATORY MNA PARAMETERS, OFF-POST AND ON-POST MONITORING WELLS  
OU1 REBOUND STUDY, QUARTER 3  
OU1 REBOUND STUDY LETTER REPORT - QUARTER 3

FIELD ID SAMPLE DATE	CHAAP HALs (µg/L)	NW071-20A 6/9/2020					NW080-20A 6/8/2020					NW081R-20A 6/8/2020					NW082R-20A 6/8/2020					G0024-20A 6/15/2020					G0070-20A 6/2/2020					G0075-20A 6/1/2020				
		Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ
EXPLOSIVES (USEPA Method 8330A) (µg/L)																																				
1,3,5-Trinitrobenzene	NA	<	U	0.09	0.21	0.22	<	U	0.088	0.21	0.22	<	U	0.093	0.22	0.23	<	U	0.09	0.21	0.22	<	U	0.09	0.21	0.22	<	U	0.093	0.22	0.23	<	U	0.089	0.21	0.22
1,3-Dinitrobenzene	NA	<	U	0.039	0.11	0.12	<	U	0.039	0.1	0.12	<	U	0.041	0.11	0.12	<	U	0.039	0.11	0.12	<	U	0.04	0.11	0.12	<	U	0.041	0.11	0.12	<	U	0.039	0.11	0.12
2,4,6-Trinitrotoluene	2	<	U	0.048	0.11	0.12	<	U	0.047	0.1	0.12	<	U	0.05	0.11	0.12	<	U	0.048	0.11	0.12	0.63	J	0.048	0.11	0.12	<	U	0.05	0.11	0.12	<	U	0.048	0.11	0.12
2,4-Dinitrotoluene	NA	<	U	0.029	0.085	0.11	<	U	0.029	0.084	0.1	<	U	0.03	0.089	0.11	<	U	0.029	0.085	0.11	<	U	0.029	0.086	0.11	<	U	0.03	0.088	0.11	<	U	0.029	0.085	0.11
2,6-Dinitrotoluene	NA	<	U	0.043	0.085	0.11	<	U	0.042	0.084	0.1	<	U	0.045	0.089	0.11	<	U	0.043	0.085	0.11	<	U	0.043	0.086	0.11	<	U	0.044	0.088	0.11	<	U	0.042	0.085	0.11
2-Amino-4,6-dinitrotoluene	NA	<	UJ	0.054	0.11	0.12	<	UJ	0.053	0.1	0.12	<	UJ	0.056	0.11	0.12	<	UJ	0.054	0.11	0.12	1.3		0.054	0.11	0.12	<	UJ	0.056	0.11	0.12	<	U	0.054	0.11	0.12
2-Nitrotoluene	NA	<	UJ	0.091	0.21	0.22	<	UJ	0.09	0.21	0.22	<	UJ	0.095	0.22	0.23	<	UJ	0.091	0.21	0.22	<	U	0.092	0.21	0.22	<	U	0.094	0.22	0.23	<	U	0.09	0.21	0.22
3-Nitrotoluene	NA	<	UJ	0.21	0.43	0.43	<	UJ	0.2	0.42	0.42	<	UJ	0.22	0.44	0.44	<	UJ	0.21	0.43	0.43	<	U	0.21	0.43	0.43	<	U	0.22	0.44	0.44	<	U	0.21	0.42	0.42
4-Amino-2,6-dinitrotoluene	NA	<	UJ	0.062	0.13	0.16	<	UJ	0.06	0.13	0.16	<	UJ	0.064	0.13	0.17	<	UJ	0.062	0.13	0.16	1.5		0.062	0.13	0.16	<	UJ	0.064	0.13	0.17	<	U	0.061	0.13	0.16
4-Nitrotoluene	NA	<	UJ	0.11	0.43	0.44	<	UJ	0.1	0.42	0.43	<	UJ	0.11	0.44	0.46	<	UJ	0.11	0.43	0.44	<	U	0.11	0.43	0.44	<	U	0.11	0.44	0.45	<	U	0.11	0.42	0.43
HMX	400	<	U	0.094	0.21	0.22	<	U	0.092	0.21	0.22	<	U	0.097	0.22	0.23	<	U	0.093	0.21	0.22	<	U	0.094	0.21	0.22	<	U	0.097	0.22	0.23	<	U	0.093	0.21	0.22
MNX	NA	<	U	0.16	0.43	2.1	<	U	0.16	0.42	2.1	<	U	0.17	0.44	2.2	<	U	0.16	0.43	2.1	<	U	0.16	0.43	2.1	<	U	0.17	0.44	2.2	<	U	0.16	0.42	2.1
Nitrobenzene	NA	<	U	0.097	0.21	0.22	<	U	0.095	0.21	0.22	<	U	0.1	0.22	0.23	<	U	0.097	0.21	0.22	<	U	0.097	0.21	0.22	<	U	0.1	0.22	0.23	<	U	0.096	0.21	0.22
RDX	2	<	U	0.055	0.21	0.22	<	U	0.054	0.21	0.22	<	U	0.057	0.22	0.23	<	U	0.055	0.21	0.22	0.59		0.055	0.21	0.22	<	U	0.057	0.22	0.23	<	U	0.054	0.21	0.22
Tetryl	NA	<	U	0.034	0.11	0.12	<	U	0.033	0.1	0.12	<	U	0.035	0.11	0.12	<	U	0.034	0.11	0.12	<	U	0.034	0.11	0.12	<	U	0.035	0.11	0.12	<	U	0.034	0.11	0.12
LABORATORY MNA PARAMETERS																																				
Ammonia USEPA 350.1 (mg/L)		<	U	0.022	0.05	0.1	<	U	0.022	0.05	0.1	<	U	0.022	0.05	0.1	0.024	J	0.022	0.05	0.1	<	U	0.022	0.05	0.1	0.039	J	0.022	0.05	0.1	0.062	J	0.022	0.05	0.1
Total Kjeldahl Nitrogen USEPA 351.2 (mg/L)		<	UJ	0.69	1	1	<	U	0.69	1	1	<	U	0.69	1	1	<	U	0.69	1	1	<	U	0.69	1	1	<	U	0.69	1	1	<	UJ	0.69	1	1
Nitrate/Nitrite USEPA 353.2 (mg/L)		30		0.19	0.5	1	26		0.095	0.25	0.5	26		0.095	0.25	0.5	17		0.038	0.1	0.2	26		0.095	0.25	0.5	<	U	0.019	0.05	0.1	2.4	J	0.019	0.05	0.1
Sulfide SM 9034 (mg/L)		<	U	0.79	1.9	4	<	U	0.79	1.9	4	0.8	J	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4
Sulfate USEPA 9056A (mg/L)		64		1	3	5	130		1	3	5	95		1	3	5	85		1	3	5	150		2.1	6	10	39		1	3	5	150		1	3	5
Dissolved Organic Carbon SM 9060A (mg/L)		3.7		0.35	1	1	3.9		0.35	1	1	5		0.35	1	1	4.2		0.35	1	1	5.5		0.35	1	1	1		0.35	1	1	3.4		0.35	1	1
Alkalinity SM 2320B (mg/L)		96		3.1	10	10	210		3.1	10	10	220		3.1	10	10	230		3.1	10	10	290		3.1	10	10	200		3.1	10	10	360		3.1	10	10
Methane RSK-175 (µg/L)		<	U	0.63	2	5	<	U	0.63	2	5	<	U	0.63	2	5	2	J	0.63	2	5	<	U	0.63	2	5	<	U	0.63	2	5	<	U	0.63	2	5
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>		43		3.1	10	10	93		3.1	10	10	98		3.1	10	10	102		3.1	10	10	129		3.1	10	10	89		3.1	10	10	160		3.1	10	10

Notes:

Concentrations exceed HALs

<sup>1</sup>Carbon dioxide back calculated from alkalinity SM 2320B.

< = less than LOQ

µg/L = micrograms per liter

CHAAP = Cornhusker Army Ammunition Plant

DL = detection limit

HAL = health advisory level

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine

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Qual = qualifier

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

RSK = Robert S. Kerr Environmental Research Laboratory

SM = Standard Method

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USEPA = United States Environmental Protection Agency

TABLE 3-2  
SUMMARY OF EXPLOSIVES DETECTED AND LABORATORY MNA PARAMETERS, OFF-POST AND ON-POST MONITORING WELLS  
OU1 REBOUND STUDY, QUARTER 3  
OU1 REBOUND STUDY LETTER REPORT - QUARTER 3

FIELD ID SAMPLE DATE	CHAAP HALs (µg/L)	G0076-20A 6/1/2020					G0077-20A 6/15/2020					G0078-20A 6/15/2020					G0079-20A 6/1/2020					G0080-20A 6/11/2020					G0081-20A 6/2/2020					G0082-20A 6/2/2020				
		Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ
EXPLOSIVES (USEPA Method 8330A) (µg/L)																																				
1,3,5-Trinitrobenzene	NA	<	U	0.092	0.22	0.23	1.9		0.089	0.21	0.22	<	U	0.089	0.21	0.22	<	U	0.091	0.22	0.23	<	U	0.088	0.21	0.22	0.27		0.089	0.21	0.22	<	U	0.097	0.23	0.24
1,3-Dinitrobenzene	NA	<	U	0.04	0.11	0.12	<	U	0.039	0.11	0.12	<	U	0.039	0.11	0.12	<	U	0.04	0.11	0.12	<	U	0.039	0.1	0.11	<	U	0.039	0.11	0.12	<	U	0.042	0.12	0.13
2,4,6-Trinitrotoluene	2	<	U	0.049	0.11	0.12	3.3		0.047	0.11	0.12	<	U	0.047	0.11	0.12	<	U	0.048	0.11	0.12	<	U	0.047	0.1	0.11	<	U	0.047	0.11	0.12	<	U	0.052	0.12	0.13
2,4-Dinitrotoluene	NA	<	U	0.03	0.087	0.11	<	U	0.029	0.084	0.11	<	U	0.029	0.084	0.11	<	U	0.03	0.086	0.11	<	U	0.029	0.084	0.1	<	U	0.029	0.084	0.11	<	U	0.032	0.092	0.12
2,6-Dinitrotoluene	NA	<	U	0.044	0.087	0.11	<	U	0.042	0.084	0.11	<	U	0.042	0.084	0.11	<	U	0.043	0.086	0.11	<	U	0.042	0.084	0.1	<	U	0.042	0.084	0.11	<	U	0.046	0.092	0.12
2-Amino-4,6-dinitrotoluene	NA	<	U	0.055	0.11	0.12	1.2		0.053	0.11	0.12	<	U	0.053	0.11	0.12	<	U	0.055	0.11	0.12	0.053	J	0.053	0.1	0.11	<	U	0.054	0.11	0.12	0.098	J	0.058	0.12	0.13
2-Nitrotoluene	NA	<	U	0.093	0.22	0.23	<	U	0.09	0.21	0.22	<	U	0.09	0.21	0.22	<	U	0.092	0.22	0.23	<	U	0.089	0.21	0.22	<	U	0.09	0.21	0.22	<	U	0.098	0.23	0.24
3-Nitrotoluene	NA	<	U	0.21	0.44	0.44	<	U	0.21	0.42	0.42	<	U	0.21	0.42	0.42	<	U	0.21	0.43	0.43	<	U	0.2	0.42	0.42	<	U	0.21	0.42	0.42	<	U	0.22	0.46	0.46
4-Amino-2,6-dinitrotoluene	NA	<	U	0.063	0.13	0.16	1.1		0.061	0.13	0.16	<	U	0.061	0.13	0.16	<	U	0.062	0.13	0.16	0.15	J	0.06	0.13	0.16	<	U	0.061	0.13	0.16	<	U	0.066	0.14	0.17
4-Nitrotoluene	NA	<	U	0.11	0.44	0.45	<	U	0.11	0.42	0.43	<	U	0.11	0.42	0.43	0.22	J	0.11	0.43	0.44	<	U	0.1	0.42	0.43	<	U	0.11	0.42	0.43	<	U	0.12	0.46	0.47
HMX	400	<	U	0.096	0.22	0.23	<	U	0.092	0.21	0.22	<	U	0.092	0.21	0.22	<	U	0.094	0.22	0.23	<	U	0.16	0.42	2.1	<	U	0.092	0.21	0.22	<	U	0.1	0.23	0.24
MNX	NA	<	U	0.17	0.44	2.2	<	U	0.16	0.42	2.1	<	U	0.16	0.42	2.1	<	U	0.17	0.43	2.2	<	U	0.091	0.21	0.22	<	U	0.16	0.42	2.1	<	U	0.18	0.46	2.3
Nitrobenzene	NA	<	U	0.099	0.22	0.23	<	U	0.096	0.21	0.22	<	U	0.096	0.21	0.22	<	U	0.098	0.22	0.23	<	U	0.095	0.21	0.22	<	U	0.096	0.21	0.22	<	U	0.1	0.23	0.24
RDX	2	0.2	J	0.056	0.22	0.23	0.46		0.054	0.21	0.22	<	U	0.054	0.21	0.22	<	U	0.055	0.22	0.23	<	U	0.054	0.21	0.22	<	U	0.054	0.21	0.22	0.68	J	0.059	0.23	0.24
Tetryl	NA	<	U	0.035	0.11	0.12	<	U	0.034	0.11	0.12	<	U	0.034	0.11	0.12	<	U	0.034	0.11	0.12	<	U	0.033	0.1	0.11	<	U	0.034	0.11	0.12	<	U	0.037	0.12	0.13
LABORATORY MNA PARAMETERS																																				
Ammonia USEPA 350.1 (mg/L)		1.4		0.022	0.05	0.1	0.052	J	0.022	0.05	0.1	0.46		0.022	0.05	0.1	0.065	J	0.022	0.05	0.1	8.8		0.63	2	5	0.31		0.022	0.05	0.1	0.11		0.022	0.05	0.1
Total Kjeldahl Nitrogen USEPA 351.2 (mg/L)		1.3		0.69	1	1	<	U	0.69	1	1	<	U	0.69	1	1	<	UJ	0.69	1	1	0.97	J	0.69	1	1	1.1		0.69	1	1	<	U	0.69	1	1
Nitrate/Nitrite USEPA 353.2 (mg/L)		<	U	0.019	0.05	0.1	13		0.19	0.5	1	<	U	0.019	0.05	0.1	0.83		0.019	0.05	0.1	0.83		0.022	0.05	0.1	<	U	0.019	0.05	0.1	0.46		0.019	0.05	0.1
Sulfide SM 9034 (mg/L)		<	U	0.79	1.9	4	0.8	J	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4	2.9		0.019	0.05	0.1	<	U	0.79	1.9	4	<	U	0.79	1.9	4
Sulfate USEPA 9056A (mg/L)		310		5.2	15	25	99		1	3	5	250		5.2	15	25	48	J	1	3	5	310		3.1	10	10	190		1	3	5	130		1	3	5
Dissolved Organic Carbon SM 9060A (mg/L)		3.3		0.35	1	1	3.6		0.35	1	1	3.8		0.35	1	1	6		0.35	1	1	87		5.2	15	25	6.6		0.35	1	1	4		0.35	1	1
Alkalinity SM 2320B (mg/L)		320		3.1	10	10	260		3.1	10	10	340		3.1	10	10	310		3.1	10	10	<	U	0.79	1.9	4	280		3.1	10	10	260		3.1	10	10
Methane RSK-175 (µg/L)		180		0.63	2	5	<	U	0.63	2	5	130		0.63	2	5	<	U	0.63	2	5	2.8		0.35	1	1	1100		0.63	2	5	460		0.63	2	5
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>		142		3.1	10	10	116		3.1	10	10	151		3.1	10	10	138		3.1	10	10	138		3.1	10	10	124		3.1	10	10	116		3.1	10	10

Notes:

Concentrations exceed HALs

<sup>1</sup>Carbon dioxide back calculated from alkalinity SM 2320B.

< = less than LOQ

µg/L = micrograms per liter

CHAAP = Cornhusker Army Ammunition Plant

DL = detection limit

HAL = health advisory level

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine

ID = identification number

J = estimated

LOD = limit of detection

LOQ = limit of quantification

mg/L = milligrams per liter

MNA = monitored natural attenuation

MNX = mono-nitroso-RDX

NA = not available

OU = Operable Unit

PZ = piezometer

Qual = qualifier

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

RSK = Robert S. Kerr Environmental Research Laboratory

SM = Standard Method

U = nondetect

USEPA = United States Environmental Protection Agency

TABLE 3-2  
SUMMARY OF EXPLOSIVES DETECTED AND LABORATORY MNA PARAMETERS, OFF-POST AND ON-POST MONITORING WELLS  
OU1 REBOUND STUDY, QUARTER 3  
OU1 REBOUND STUDY LETTER REPORT - QUARTER 3

FIELD ID SAMPLE DATE	CHAAP HALs (µg/L)	G0086-20A 6/16/2020					G0087-20A 6/15/2020					G0091-20A 6/16/2020					G0092-20A 6/16/2020					PZ017R-20A 6/16/20A					PZ018-20A 6/16/2020					PZ019-20A 6/16/2020				
		Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ
EXPLOSIVES (USEPA Method 8330A) (µg/L)																																				
1,3,5-Trinitrobenzene	NA	9.4		0.088	0.21	0.22	<	U	0.09	0.21	0.23	<	U	0.089	0.21	0.22	<	U	0.088	0.21	0.22	1.1		0.09	0.21	0.23	<	U	0.091	0.22	0.23	<	U	0.088	0.21	0.22
1,3-Dinitrobenzene	NA	<	U	0.039	0.1	0.12	<	U	0.04	0.11	0.12	<	U	0.039	0.11	0.12	<	U	0.039	0.11	0.12	<	U	0.04	0.11	0.12	<	U	0.04	0.11	0.12	<	U	0.039	0.11	0.12
2,4,6-Trinitrotoluene	2	3.6		0.047	0.1	0.12	<	U	0.048	0.11	0.12	<	U	0.048	0.11	0.12	<	U	0.047	0.11	0.12	11		0.048	0.11	0.12	<	U	0.049	0.11	0.12	<	U	0.047	0.11	0.12
2,4-Dinitrotoluene	NA	<	U	0.029	0.084	0.1	<	U	0.029	0.086	0.11	<	U	0.029	0.085	0.11	<	U	0.029	0.084	0.11	<	U	0.029	0.086	0.11	<	U	0.03	0.087	0.11	<	U	0.029	0.084	0.11
2,6-Dinitrotoluene	NA	<	U	0.042	0.084	0.1	<	U	0.043	0.086	0.11	<	U	0.042	0.085	0.11	<	U	0.042	0.084	0.11	<	U	0.043	0.086	0.11	<	U	0.043	0.087	0.11	<	U	0.042	0.084	0.11
2-Amino-4,6-dinitrotoluene	NA	1.6		0.053	0.1	0.12	<	U	0.054	0.11	0.12	0.15		0.054	0.11	0.12	<	U	0.053	0.11	0.12	4.9		0.054	0.11	0.12	0.28	J	0.055	0.11	0.12	<	U	0.053	0.11	0.12
2-Nitrotoluene	NA	<	U	0.09	0.21	0.22	<	U	0.092	0.21	0.23	<	U	0.091	0.21	0.22	<	U	0.09	0.21	0.22	<	U	0.092	0.21	0.23	<	U	0.093	0.22	0.23	<	U	0.09	0.21	0.22
3-Nitrotoluene	NA	<	U	0.2	0.42	0.42	<	U	0.21	0.43	0.43	<	U	0.21	0.42	0.42	<	U	0.21	0.42	0.42	<	U	0.21	0.43	0.43	<	U	0.21	0.43	0.43	<	U	0.2	0.42	0.42
4-Amino-2,6-dinitrotoluene	NA	1.1		0.061	0.13	0.16	<	U	0.062	0.13	0.16	0.21	J	0.061	0.13	0.16	<	U	0.061	0.13	0.16	5.9		0.062	0.13	0.16	0.17	J	0.063	0.13	0.16	<	U	0.061	0.13	0.16
4-Nitrotoluene	NA	<	U	0.1	0.42	0.43	<	U	0.11	0.43	0.44	<	U	0.11	0.42	0.43	<	U	0.11	0.42	0.43	<	U	0.11	0.43	0.44	<	U	0.11	0.43	0.44	<	U	0.11	0.42	0.43
HMX	400	<	U	0.092	0.21	0.22	0.37		0.094	0.21	0.23	<	U	0.093	0.21	0.22	<	U	0.092	0.21	0.22	1.5		0.094	0.21	0.23	0.89	J	0.095	0.22	0.23	<	U	0.092	0.21	0.22
MNX	NA	<	U	0.16	0.42	2.1	<	U	0.17	0.43	2.1	<	U	0.16	0.42	2.1	<	U	0.16	0.42	2.1	<	U	0.17	0.43	2.1	<	U	0.17	0.43	2.2	<	U	0.16	0.42	2.1
Nitrobenzene	NA	<	U	0.096	0.21	0.22	<	U	0.098	0.21	0.23	<	U	0.096	0.21	0.22	<	U	0.096	0.21	0.22	<	U	0.098	0.21	0.23	<	U	0.099	0.22	0.23	<	U	0.096	0.21	0.22
RDX	2	0.21	J	0.054	0.21	0.22	0.15	J	0.055	0.21	0.23	0.59		0.055	0.21	0.22	<	U	0.054	0.21	0.22	1.4		0.055	0.21	0.23	1		0.056	0.22	0.23	<	U	0.054	0.21	0.22
Tetryl	NA	<	U	0.033	0.1	0.12	<	U	0.034	0.11	0.12	<	U	0.034	0.11	0.12	<	U	0.033	0.11	0.12	<	U	0.034	0.11	0.12	<	U	0.034	0.11	0.12	<	U	0.033	0.11	0.12
LABORATORY MNA PARAMETERS																																				
Ammonia USEPA 350.1 (mg/L)		0.025	J	0.022	0.05	0.1	0.032	J	0.022	0.05	0.1	<	U	0.022	0.05	0.1	0.031	J	0.022	0.05	0.1	<	U	0.022	0.05	0.1	<	U	0.022	0.05	0.1	<	U	0.022	0.05	0.1
Total Kjeldahl Nitrogen USEPA 351.2 (mg/L)		<	U	0.69	1	1	1.1		0.69	1	1	<	U	0.69	1	1	<	U	0.69	1	1	<	U	0.69	1	1	<	U	0.69	1	1	<	U	0.69	1	1
Nitrate/Nitrite USEPA 353.2 (mg/L)		6.5		0.019	0.05	0.1	2.7		0.019	0.05	0.1	40		0.48	1.3	2.5	0.18		0.019	0.05	0.1	30		0.076	0.2	0.4	26		0.095	0.25	0.5	34	J	0.095	0.25	0.5
Sulfide SM 9034 (mg/L)		<	U	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4	0.8	J	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4
Sulfate USEPA 9056A (mg/L)		130		1	3	5	110		1	3	5	190		1	3	5	330		5.2	15	25	62		1	2.5	5	67		1	2.5	5	58		1	3	5
Dissolved Organic Carbon SM 9060A (mg/L)		3.6		0.35	1	1	2.9		0.35	1	1	3.8		0.35	1	1	2.9		0.35	1	1	5.1		0.35	1	1	4		0.35	1	1	2		0.35	1	1
Alkalinity SM 2320B (mg/L)		280		3.1	10	10	310		3.1	10	10	280		3.1	10	10	350		3.1	10	10	190		3.1	10	10	96		3.1	10	10	75		3.1	10	10
Methane RSK-175 (µg/L)		22		0.63	2	5	<	U	0.63	2	5	<	U	0.63	2	5	18		0.63	2	5	1800		0.63	2	5	<	U	0.63	2	5	<	U	0.63	2	5
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>		124		3.1	10	10	138		3.1	10	10	124		3.1	10	10	156		3.1	10	10	84		3.1	10	10	43		3.1	10	10	33		3.1	10	10

Notes:

Concentrations exceed HALs

<sup>1</sup>Carbon dioxide back calculated from alkalinity SM 2320B.

< = less than LOQ

µg/L = micrograms per liter

CHAAP = Cornhusker Army Ammunition Plant

DL = detection limit

HAL = health advisory level

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine

ID = identification number

J = estimated

LOD = limit of detection

LOQ = limit of quantification

mg/L = milligrams per liter

MNA = monitored natural attenuation

MNX = mono-nitroso-RDX

NA = not available

OU = Operable Unit

PZ = piezometer

Qual = qualifier

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

RSK = Robert S. Kerr Environmental Research Laboratory

SM = Standard Method

U = nondetect

USEPA = United States Environmental Protection Agency

TABLE 3-2  
SUMMARY OF EXPLOSIVES DETECTED AND LABORATORY MNA PARAMETERS, OFF-POST AND ON-POST MONITORING WELLS  
OU1 REBOUND STUDY, QUARTER 3  
OU1 REBOUND STUDY LETTER REPORT - QUARTER 3

FIELD ID SAMPLE DATE	CHAAP HALs (µg/L)	PZ020-20A 6/15/2020				
		Result	Qual	DL	LOD	LOQ
EXPLOSIVES (USEPA Method 8330A) (µg/L)						
1,3,5-Trinitrobenzene	NA	1.5		0.088	0.21	0.22
1,3-Dinitrobenzene	NA	<	U	0.038	0.1	0.11
2,4,6-Trinitrotoluene	2	2.2		0.047	0.1	0.11
2,4-Dinitrotoluene	NA	<	U	0.029	0.083	0.1
2,6-Dinitrotoluene	NA	<	U	0.042	0.083	0.1
2-Amino-4,6-dinitrotoluene	NA	<	U	0.053	0.1	0.11
2-Nitrotoluene	NA	<	U	0.089	0.21	0.22
3-Nitrotoluene	NA	<	U	0.2	0.42	0.42
4-Amino-2,6-dinitrotoluene	NA	<	U	0.06	0.12	0.16
4-Nitrotoluene	NA	<	U	0.1	0.42	0.43
HMX	400	<	U	0.091	0.21	0.22
MNX	NA	<	U	0.16	0.42	2.1
Nitrobenzene	NA	<	U	0.095	0.21	0.22
RDX	2	0.58		0.054	0.21	0.22
Tetryl	NA	<	U	0.033	0.1	0.11
LABORATORY MNA PARAMETERS						
Ammonia USEPA 350.1 (mg/L)		0.032	J	0.022	0.05	0.1
Total Kjeldahl Nitrogen USEPA 351.2 (mg/L)		<	U	0.69	1	1
Nitrate/Nitrite USEPA 353.2 (mg/L)		38		0.38	1	2
Sulfide SM 9034 (mg/L)		<	U	0.79	1.9	4
Sulfate USEPA 9056A (mg/L)		190		1	3	5
Dissolved Organic Carbon SM 9060A (mg/L)		6.4		0.35	1	1
Alkalinity SM 2320B (mg/L)		310		3.1	10	10
Methane RSK-175 (µg/L)		<	U	0.63	2	5
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>		138		3.1	10	10

Notes:

Concentrations exceed HALs

<sup>1</sup>Carbon dioxide back calculated from alkalinity SM 2320B.

< = less than LOQ

µg/L = micrograms per liter

CHAAP = Cornhusker Army Ammunition Plant

DL = detection limit

HAL = health advisory level

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine

ID = identification number

J = estimated

LOD = limit of detection

LOQ = limit of quantification

mg/L = milligrams per liter

MNA = monitored natural attenuation

MNX = mono-nitroso-RDX

NA = not available

OU = Operable Unit

PZ = piezometer

Qual = qualifier

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

RSK = Robert S. Kerr Environmental Research Laboratory

SM = Standard Method

U = nondetect

USEPA = United States Environmental Protection Agency

TABLE 3-3  
SUMMARY OF EXPLOSIVES DETECTED AND LABORATORY MNA PARAMETERS, PERFORMANCE MONITORING WELLS  
OU1 SUBSURFACE INJECTION, QUARTER 3  
OU1 REBOUND STUDY LETTER REPORT - QUARTER 3

FIELD ID	CHAAP	EW7-PM21A-3-25					EW7-PM21B-3-35					EW7-PM22A-3-25					EW7-PM22B-3-35					EW7-PM23A-3-25					EW7-PM23B-3-35					EW7-PM24A-3-25				
SAMPLE DATE	HALs	5/28/2020					5/29/2020					5/28/2020					5/29/2020					5/31/2020					5/31/2020					5/29/2020				
	(µg/L)	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ
EXPLOSIVES (USEPA Method 8330A) (µg/L)																																				
1,3,5-Trinitrobenzene	NA	6.6	J	0.091	0.22	0.23	<	U	0.21	0.23	0.09	<	U	0.09	0.21	0.22	<	U	0.23	0.24	0.1	<	U	0.093	0.22	0.23	<	U	0.91	2.2	2.3	3.3	J	0.21	0.22	0.09
1,3-Dinitrobenzene	NA	<	U	0.04	0.11	0.12	<	U	0.11	0.12	0.04	<	U	0.04	0.11	0.12	<	U	0.11	0.13	0.04	<	U	0.041	0.11	0.12	<	U	0.4	1.1	1.2	<	U	0.11	0.12	0.04
2,4,6-Trinitrotoluene	2	11	J	0.048	0.11	0.12	<	U	0.11	0.12	0.05	<	U	0.048	0.11	0.12	<	U	0.11	0.13	0.05	<	U	0.05	0.11	0.12	<	U	0.49	1.1	1.2	8.3	J	0.11	0.12	0.05
2,4-Dinitrotoluene	NA	0.44	J	0.03	0.086	0.11	<	U	0.086	0.11	0.03	<	U	0.029	0.086	0.11	<	U	0.092	0.11	0.03	<	U	0.03	0.089	0.11	<	U	0.3	0.86	1.1	<	U	0.086	0.11	0.03
2,6-Dinitrotoluene	NA	<	U	0.043	0.086	0.11	<	U	0.086	0.11	0.04	<	U	0.043	0.086	0.11	<	U	0.092	0.11	0.05	<	U	0.044	0.089	0.11	<	U	0.43	0.86	1.1	<	U	0.086	0.11	0.04
2-Amino-4,6-dinitrotoluene	NA	2.1	J	0.055	0.11	0.12	<	U	0.11	0.12	0.05	<	U	0.054	0.11	0.12	<	U	0.11	0.13	0.06	1.1	J	0.056	0.11	0.12	<	U	0.55	1.1	1.2	<	U	0.11	0.12	0.05
2-Nitrotoluene	NA	<	U	0.092	0.22	0.23	<	U	0.21	0.23	0.09	<	U	0.092	0.21	0.22	<	U	0.23	0.24	0.1	<	U	0.095	0.22	0.23	<	U	0.92	2.2	2.3	<	U	0.21	0.22	0.09
3-Nitrotoluene	NA	<	U	0.21	0.43	0.43	<	U	0.43	0.43	0.21	<	U	0.21	0.43	0.43	<	U	0.46	0.46	0.22	<	U	0.22	0.44	0.44	<	U	2.1	4.3	4.3	<	U	0.43	0.43	0.21
4-Amino-2,6-dinitrotoluene	NA	<	U	0.062	0.13	0.16	<	U	0.13	0.16	0.06	<	U	0.062	0.13	0.16	<	U	0.14	0.17	0.07	<	U	0.064	0.13	0.17	<	U	0.62	1.3	1.6	2.5	J	0.13	0.16	0.06
4-Nitrotoluene	NA	0.53	J	0.11	0.43	0.44	<	U	0.43	0.44	0.11	<	U	0.11	0.43	0.44	<	U	0.46	0.47	0.11	<	U	0.11	0.44	0.45	<	U	1.1	4.3	4.4	<	U	0.43	0.44	0.11
HMX	400	<	U	0.094	0.22	0.23	<	U	0.21	0.23	0.09	<	U	0.094	0.21	0.22	<	U	0.23	0.24	0.1	5.3	J	0.097	0.22	0.23	<	U	0.95	2.2	2.3	4.7	J	0.21	0.22	0.09
MNX	NA	<	U	0.17	0.43	2.2	<	U	0.43	2.1	0.17	<	U	0.16	0.43	2.1	<	U	0.46	2.3	0.18	<	U	0.17	0.44	2.2	<	U	1.7	4.3	22	<	U	0.43	2.1	0.16
Nitrobenzene	NA	<	U	0.098	0.22	0.23	<	U	0.21	0.23	0.1	0.97	J	0.097	0.21	0.22	<	U	0.23	0.24	0.1	<	U	0.1	0.22	0.23	<	U	0.98	2.2	2.3	<	U	0.21	0.22	0.1
RDX	2	7.3	J	0.055	0.22	0.23	<	U	0.21	0.23	0.06	<	U	0.055	0.21	0.22	<	U	0.23	0.24	0.06	<	U	0.057	0.22	0.23	<	U	0.56	2.2	2.3	<	U	0.21	0.22	0.06
Tetryl	NA	<	U	0.034	0.11	0.12	<	U	0.11	0.12	0.03	<	U	0.034	0.11	0.12	<	U	0.11	0.13	0.04	<	U	0.035	0.11	0.12	<	U	0.34	1.1	1.2	<	U	0.11	0.12	0.03
LABORATORY WATER QUALITY PARAMETERS																																				
Ammonia USEPA 350.1 (mg/L)		0.8		0.11	0.25	0.5	1.5		0.5	1	0.22	2.3		0.22	0.5	1	1		0.5	1	0.22	1.6		0.22	0.5	1	2.4		0.22	0.5	1	0.2		0.05	0.1	0.02
Total Kjeldahl Nitrogen USEPA 351.2 (mg/L)		1.8		0.69	1	1	4.6		1.3	1.3	0.86	7.5		1.7	2.5	2.5	6.4		2.5	2.5	1.7	3.7		0.69	1	1	8		1.1	1.7	1.7	2.1		1	1	0.69
Nitrate/Nitrite USEPA 353.2 (mg/L)		8		0.019	0.05	0.1	<	U	0.05	0.1	0.02	5.4		0.019	0.05	0.1	<	U	0.05	0.1	0.02	0.26		0.019	0.05	0.1	0.032	J	0.019	0.05	0.1	6.9	J	0.05	0.1	0.02
Sulfide SM 9034 (mg/L)		<	U	0.79	1.9	4	<	U	1.9	4	0.79	<	U	0.79	1.9	4	<	U	1.9	4	0.79	<	U	0.79	1.9	4	<	U	0.79	1.9	4	<	U	1.9	4	0.79
Sulfate USEPA 9056A (mg/L)		49		1	3	5	70		3	5	1	30		1	3	5	14	J	3	5	1	44		1	3	5	1.1	J	1	3	5	40		3	5	1
Dissolved Organic Carbon SM 9060A (mg/L)		11		0.35	1	1	63		1.7	1.7	0.58	68		0.69	2	2	96		2	2	0.69	12		0.35	1	1	66		0.58	1.7	1.7	20		1	1	0.35
Alkalinity SM 2320B (mg/L)		390		3.1	10	10	410		10	10	3.1	470		3.1	10	10	490		10	10	3.1	420		3.1	10	10	570		3.1	10	10	480		10	10	3.1
Methane RSK-175 (µg/L)		4700	J	0.63	2	5	6700		2	5	0.63	13000		1.9	6	15	15000		12	30	3.8	8400	J	1.9	6	15	21000		3.8	12	30	9000		6	15	1.9
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>		173		3.1	10	10	182		10	10	3.1	209		3.1	10	10	218		10	10	3.1	187		3.1	10	10	253		3.1	10	10	213		10	10	3.1

Notes:

Concentrations exceed HALs

<sup>1</sup>Carbon dioxide back calculated from alkalinity SM 2320B.

< = less than LOQ

µg/L = micrograms per liter

CHAAP = Cornhusker Army Ammunition Plant

DL = detection limit

EW = extraction well

HAL = health advisory level

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine

ID = identification number

J = estimated

LOD = limit of detection

LOQ = limit of quantification

mg/L = milligrams per liter

MNX = mono-nitroso-RDX

NA = not available

OU = Operable Unit

PM = performance monitoring

Qual = qualifier

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

RSK = Robert S. Kerr Environmental Research Laboratory

SM = Standard Method

U = nondetect

USEPA = United States Environmental Protection Agency

TABLE 3-3  
SUMMARY OF EXPLOSIVES DETECTED AND LABORATORY MNA PARAMETERS, PERFORMANCE MONITORING WELLS  
OU1 SUBSURFACE INJECTION, QUARTER 3  
OU1 REBOUND STUDY LETTER REPORT - QUARTER 3

FIELD ID	CHAAP	EW7-PM24B-3-35					EW7-PM25A-3-25					EW7-PM25B-3-25					EW7-PM26A-3-25					EW7-PM26B-3-35					EW7-PM27A-3-25					EW7-PM27B-3-35				
SAMPLE DATE	HALs	5/29/2020					5/31/2020					5/31/2020					5/31/2020					6/1/2020					5/29/2020					5/30/2020				
	(µg/L)	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ
EXPLOSIVES (USEPA Method 8330A) (µg/L)																																				
1,3,5-Trinitrobenzene	NA	<	U	0.21	0.22	0.09	<	U	0.093	0.22	0.23	<	U	0.91	2.2	2.3	0.24		0.09	0.21	0.23	<	U	0.92	2.2	2.3	<	U	0.21	0.23	0.09	<	U	0.094	0.22	0.23
1,3-Dinitrobenzene	NA	<	U	0.11	0.12	0.04	<	U	0.041	0.11	0.12	<	U	0.4	1.1	1.2	<	U	0.04	0.11	0.12	<	U	0.4	1.1	1.2	<	U	0.11	0.12	0.04	0.15	J	0.041	0.11	0.12
2,4,6-Trinitrotoluene	2	<	U	0.11	0.12	0.05	<	U	0.05	0.11	0.12	<	U	0.49	1.1	1.2	0.87		0.048	0.11	0.12	<	U	0.49	1.1	1.2	0.45	J	0.11	0.12	0.05	<	U	0.05	0.11	0.12
2,4-Dinitrotoluene	NA	<	U	0.085	0.11	0.03	<	U	0.03	0.088	0.11	<	U	0.3	0.87	1.1	<	U	0.029	0.086	0.11	<	U	0.3	0.87	1.1	<	U	0.086	0.11	0.03	<	U	0.031	0.089	0.11
2,6-Dinitrotoluene	NA	<	U	0.085	0.11	0.04	<	U	0.044	0.088	0.11	<	U	0.44	0.87	1.1	<	U	0.043	0.086	0.11	<	U	0.44	0.87	1.1	<	U	0.086	0.11	0.04	<	U	0.045	0.089	0.11
2-Amino-4,6-dinitrotoluene	NA	<	U	0.11	0.12	0.05	<	U	0.056	0.11	0.12	<	U	0.55	1.1	1.2	<	U	0.054	0.11	0.12	<	U	0.55	1.1	1.2	<	U	0.11	0.12	0.05	<	U	0.056	0.11	0.12
2-Nitrotoluene	NA	<	U	0.21	0.22	0.09	<	U	0.094	0.22	0.23	<	U	0.93	2.2	2.3	<	U	0.092	0.21	0.23	<	U	0.93	2.2	2.3	<	U	0.21	0.23	0.09	<	U	0.095	0.22	0.23
3-Nitrotoluene	NA	<	U	0.42	0.42	0.21	<	U	0.22	0.44	0.44	<	U	2.1	4.3	4.3	<	U	0.21	0.43	0.43	<	U	2.1	4.4	4.4	<	U	0.43	0.43	0.21	<	U	0.22	0.45	0.45
4-Amino-2,6-dinitrotoluene	NA	<	U	0.13	0.16	0.06	<	U	0.064	0.13	0.17	<	U	0.63	1.3	1.6	<	U	0.062	0.13	0.16	<	U	0.63	1.3	1.6	<	U	0.13	0.16	0.06	<	U	0.064	0.13	0.17
4-Nitrotoluene	NA	<	U	0.42	0.44	0.11	<	U	0.11	0.44	0.45	<	U	1.1	4.3	4.5	<	U	0.11	0.43	0.44	<	U	1.1	4.4	4.5	<	U	0.43	0.44	0.11	<	U	0.11	0.45	0.46
HMX	400	<	U	0.21	0.22	0.09	<	U	0.097	0.22	0.23	<	U	0.95	2.2	2.3	<	U	0.094	0.21	0.23	<	U	0.96	2.2	2.3	<	U	0.21	0.23	0.09	<	U	0.098	0.22	0.23
MNX	NA	<	U	0.42	2.1	0.16	<	U	0.17	0.44	2.2	56	J	1.7	4.3	22	<	U	0.17	0.43	2.1	<	U	1.7	4.4	22	<	U	0.43	2.1	0.17	<	U	0.17	0.45	2.2
Nitrobenzene	NA	<	U	0.21	0.22	0.1	<	U	0.1	0.22	0.23	<	U	0.99	2.2	2.3	<	U	0.098	0.21	0.23	<	U	0.99	2.2	2.3	<	U	0.21	0.23	0.1	<	U	0.1	0.22	0.23
RDX	2	<	U	0.21	0.22	0.06	<	U	0.057	0.22	0.23	57	J	0.56	2.2	2.3	0.46		0.055	0.21	0.23	34	J	0.56	2.2	2.3	<	U	0.21	0.23	0.06	17	J	0.057	0.22	0.23
Tetryl	NA	<	U	0.11	0.12	0.03	<	U	0.035	0.11	0.12	<	U	0.35	1.1	1.2	<	U	0.034	0.11	0.12	<	U	0.35	1.1	1.2	<	U	0.11	0.12	0.03	<	U	0.035	0.11	0.12
LABORATORY WATER QUALITY PARAMETERS																																				
Ammonia USEPA 350.1 (mg/L)		1.7		0.5	1	0.22	1.4		0.22	0.5	1	3.1		0.22	0.5	1	0.085	J	0.022	0.05	0.1	1.8		0.22	0.5	1	1.1		0.5	1	0.22	1.8		0.22	0.5	1
Total Kjeldahl Nitrogen USEPA 351.2 (mg/L)		8.2		2.5	2.5	1.7	6.8		1.1	1.7	1.7	6.8		1.1	1.7	1.7	1.5		0.69	1	1	7.2		1.1	1.7	1.7	3.6		1	1	0.69	5.7		1.1	1.7	1.7
Nitrate/Nitrite USEPA 353.2 (mg/L)		<	U	0.05	0.1	0.02	3		0.019	0.05	0.1	0.053	J	0.019	0.05	0.1	1.9		0.019	0.05	0.1	0.055	J	0.019	0.05	0.1	4.2	J	0.05	0.1	0.02	0.16		0.019	0.05	0.1
Sulfide SM 9034 (mg/L)		0.8	J	1.9	4	0.79	0.8	J	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4	<	U	1.9	4	0.79	<	U	0.79	1.9	4
Sulfate USEPA 9056A (mg/L)		6		3	5	1	38		1	3	5	<	U	1	3	5	36		1	3	5	6.8		1	3	5	47		3	5	1	37		1	3	5
Dissolved Organic Carbon SM 9060A (mg/L)		150		4.2	4.2	1.4	130		1.2	3.5	3.5	72		0.69	2	2	9.6		0.35	1	1	220		1.9	5.6	5.6	42		1	1	0.35	47		0.35	1	1
Alkalinity SM 2320B (mg/L)		500		10	10	3.1	520		3.1	10	10	770		3.1	10	10	500		3.1	10	10	520		3.1	10	10	440		10	10	3.1	490		3.1	10	10
Methane RSK-175 (µg/L)		14000		12	30	3.8	5000		0.63	2	5	18000		3.8	12	30	2600		0.63	2	5	19000		1.9	6	15	6400		2	5	0.63	16000	J	3.8	12	30
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>		222		10	10	3.1	231		3.1	10	10	342		3.1	10	10	222		3.1	10	10	231		3.1	10	10	196		10	10	3.1	218		3.1	10	10

Notes:

Concentrations exceed HALs

<sup>1</sup>Carbon dioxide back calculated from alkalinity SM 2320B.

< = less than LOQ

µg/L = micrograms per liter

CHAAP = Cornhusker Army Ammunition Plant

DL = detection limit

EW = extraction well

HAL = health advisory level

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine

ID = identification number

J = estimated

LOD = limit of detection

LOQ = limit of quantification

mg/L = milligrams per liter

MNX = mono-nitroso-RDX

NA = not available

OU = Operable Unit

PM = performance monitoring

Qual = qualifier

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

RSK = Robert S. Kerr Environmental Research Laboratory

SM = Standard Method

U = nondetect

USEPA = United States Environmental Protection Agency

TABLE 3-3  
SUMMARY OF EXPLOSIVES DETECTED AND LABORATORY MNA PARAMETERS, PERFORMANCE MONITORING WELLS  
OU1 SUBSURFACE INJECTION, QUARTER 3  
OU1 REBOUND STUDY LETTER REPORT - QUARTER 3

FIELD ID	CHAAP	EW7-PM28A-3-25					EW7-PM28B-3-35					EW7-PM29A-3-25					EW7-PM29B-3-35				
SAMPLE DATE	HALs	5/30/2020					5/30/2020					5/30/2020					5/30/2020				
	(µg/L)	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ
EXPLOSIVES (USEPA Method 8330A) (µg/L)																					
1,3,5-Trinitrobenzene	NA	<	U	0.091	0.22	0.23	<	U	0.9	2.1	2.2	<	U	0.9	2.1	2.2	<	U	0.89	2.1	2.2
1,3-Dinitrobenzene	NA	<	U	0.04	0.11	0.12	<	U	0.39	1.1	1.2	<	U	0.4	1.1	1.2	<	U	0.39	1.1	1.2
2,4,6-Trinitrotoluene	2	<	U	0.049	0.11	0.12	<	U	0.48	1.1	1.2	<	U	0.48	1.1	1.2	<	UJ	0.48	1.1	1.2
2,4-Dinitrotoluene	NA	<	U	0.03	0.086	0.11	<	U	0.29	0.86	1.1	<	U	0.29	0.86	1.1	<	U	0.29	0.85	1.1
2,6-Dinitrotoluene	NA	<	U	0.043	0.086	0.11	<	U	0.43	0.86	1.1	<	U	0.43	0.86	1.1	<	U	0.43	0.85	1.1
2-Amino-4,6-dinitrotoluene	NA	<	U	0.055	0.11	0.12	<	U	0.54	1.1	1.2	<	U	0.54	1.1	1.2	<	J	0.54	1.1	1.2
2-Nitrotoluene	NA	<	U	0.092	0.22	0.23	<	U	0.92	2.1	2.2	<	U	0.92	2.1	2.2	<	UJ	0.91	2.1	2.2
3-Nitrotoluene	NA	<	U	0.21	0.43	0.43	<	U	2.1	4.3	4.3	<	U	2.1	4.3	4.3	<	UJ	2.1	4.3	4.3
4-Amino-2,6-dinitrotoluene	NA	<	U	0.062	0.13	0.16	<	U	0.62	1.3	1.6	<	U	0.62	1.3	1.6	<	UJ	0.61	1.3	1.6
4-Nitrotoluene	NA	<	U	0.11	0.43	0.44	<	U	1.1	4.3	4.4	<	U	1.1	4.3	4.4	<	UJ	1.1	4.3	4.4
HMX	400	<	U	0.094	0.22	0.23	<	U	0.94	2.1	2.2	<	U	0.94	2.1	2.2	<	UJ	0.93	2.1	2.2
MNX	NA	<	U	0.17	0.43	2.2	<	U	1.6	4.3	21	<	U	1.6	4.3	21	59	J	1.6	4.3	21
Nitrobenzene	NA	<	U	0.098	0.22	0.23	<	U	0.97	2.1	2.2	<	U	0.97	2.1	2.2	<	UJ	0.97	2.1	2.2
RDX	2	15	J	0.056	0.22	0.23	<	U	0.55	2.1	2.2	26	J	0.55	2.1	2.2	44	J	0.55	2.1	2.2
Tetryl	NA	<	U	0.034	0.11	0.12	<	U	0.34	1.1	1.2	<	U	0.34	1.1	1.2	<	UJ	0.34	1.1	1.2
LABORATORY WATER QUALITY PARAMETERS																					
Ammonia USEPA 350.1 (mg/L)	3			0.22	0.5	1	5.8		0.22	0.5	1	0.35		0.022	0.05	0.1	1.6		0.22	0.5	1
Total Kjeldahl Nitrogen USEPA 351.2 (mg/L)	5.6			0.69	1	1	9.2		1.1	1.7	1.7	5.3		1.1	1.7	1.7	7.2	J	3.4	5	5
Nitrate/Nitrite USEPA 353.2 (mg/L)	0.15			0.019	0.05	0.1	0.035	J	0.019	0.05	0.1	0.064	J	0.019	0.05	0.1	0.049	J	0.019	0.05	0.1
Sulfide SM 9034 (mg/L)	<		U	0.79	1.9	4	0.8	J	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4
Sulfate USEPA 9056A (mg/L)	28			1	3	5	<	U	1	3	5	7.1		1	3	5	<	U	1	3	5
Dissolved Organic Carbon SM 9060A (mg/L)	46			0.69	2	2	23		0.35	1	1	38		0.35	1	1	64		0.69	2	2
Alkalinity SM 2320B (mg/L)	470			3.1	10	10	740		3.1	10	10	440		3.1	10	10	480		3.1	10	10
Methane RSK-175 (µg/L)	15000			1.9	6	15	16000		1.9	6	15	22000		3.8	12	30	9600	J	3.8	12	30
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>	209			3.1	10	10	329		3.1	10	10	196		3.1	10	10	213		3.1	10	10

Notes:

Concentrations exceed HALs

<sup>1</sup>Carbon dioxide back calculated from alkalinity SM 2320B.

< = less than LOQ

µg/L = micrograms per liter

CHAAP = Cornhusker Army Ammunition Plant

DL = detection limit

EW = extraction well

HAL = health advisory level

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine

ID = identification number

J = estimated

LOD = limit of detection

LOQ = limit of quantification

mg/L = milligrams per liter

MNX = mono-nitroso-RDX

NA = not available

OU = Operable Unit

PM = performance monitoring

Qual = qualifier

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

RSK = Robert S. Kerr Environmental Research Laboratory

SM = Standard Method

U = nondetect

USEPA = United States Environmental Protection Agency

**TABLE 3-4**  
**SUMMARY OF OU1 FIELD DUPLICATE SAMPLE PAIRS**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

WELL NUMBER FIELD ID SAMPLE DATE	OS001-DP03-25										NW021																																					
	OS001-DP03-25 5/26/2020					OS501-DP03-25 5/26/2020					RPD	NW021-20A 6/15/2020					NW023-20A 6/15/2020					RPD																										
	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ		Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ																											
EXPLOSIVES (USEPA Method 8330A) (µg/L)																																																
1,3,5-Trinitrobenzene	0.41	J	0.09	0.21	0.22	0.35		0.094	0.22	0.23	<2x	<	U	0.094	0.22	0.24	<	U	0.091	0.22	0.23																											
1,3-Dinitrobenzene	<	U	0.039	0.11	0.12	<	U	0.041	0.11	0.12		<	U	0.041	0.11	0.12	<	U	0.04	0.11	0.12																											
2,4,6-Trinitrotoluene	32	J	0.48	1.1	1.2	29		0.5	1.1	1.2	10	<	U	0.05	0.11	0.12	<	U	0.049	0.11	0.12																											
2,4-Dinitrotoluene	<	U	0.029	0.086	0.11	<	U	0.031	0.089	0.11		<	U	0.031	0.09	0.11	<	U	0.03	0.086	0.11																											
2,6-Dinitrotoluene	<	U	0.043	0.086	0.11	<	U	0.045	0.089	0.11		<	U	0.045	0.09	0.11	<	U	0.043	0.086	0.11																											
2-Amino-4,6-dinitrotoluene	<	U	0.054	0.11	0.12	<	U	0.057	0.11	0.12		2.2		0.057	0.11	0.12	2.2		0.055	0.11	0.12	0																										
2-Nitrotoluene	<	U	0.091	0.21	0.22	<	U	0.096	0.22	0.23		<	U	0.096	0.22	0.24	<	U	0.092	0.22	0.23																											
3-Nitrotoluene	<	UJ	0.21	0.43	0.43	<	U	0.22	0.45	0.45		<	U	0.22	0.45	0.45	<	U	0.21	0.43	0.43																											
4-Amino-2,6-dinitrotoluene	<	U	0.062	0.13	0.16	<	U	0.064	0.13	0.17		1		0.065	0.13	0.17	1.1		0.062	0.13	0.16	10																										
4-Nitrotoluene	<	U	0.11	0.43	0.44	<	U	0.11	0.45	0.46		<	U	0.11	0.45	0.46	<	U	0.11	0.43	0.44																											
HMX	<	U	0.094	0.21	0.22	<	U	0.098	0.22	0.23		<	U	0.098	0.22	0.24	<	U	0.095	0.22	0.23																											
MNX	<	U	0.16	0.43	2.1	<	U	0.17	0.45	2.2		<	U	0.17	0.45	2.2	<	U	0.17	0.43	2.2																											
Nitrobenzene	<	U	0.097	0.21	0.22	<	U	0.1	0.22	0.23		<	U	0.1	0.22	0.24	<	U	0.098	0.22	0.23																											
RDX	0.19	J	0.055	0.21	0.22	<	U	0.058	0.22	0.23	<2x	<	U	0.058	0.22	0.24	<	U	0.056	0.22	0.23																											
Tetryl	<	U	0.034	0.11	0.12	<	U	0.036	0.11	0.12		<	U	0.036	0.11	0.12	<	U	0.034	0.11	0.12																											
LABORATORY MNA PARAMETERS																																																
Ammonia USEPA 350.1 (mg/L)	No Analysis					No Analysis						1.4					0.022					0.05					0.1					0																
Total Kjeldahl Nitrogen USEPA 351.2 (mg/L)												1.8					0.69					1					1					<2x																
Nitrate/Nitrite USEPA 353.2 (mg/L)												1.5					0.019					0.05					0.1					0																
Sulfide SM 9034 (mg/L)												<					U					0.79					1.9					4																
Sulfate USEPA 9056A (mg/L)												220					2.1					6					10					220	2.1					6					10					0
Dissolved Organic Carbon SM 9060A (mg/L)												2.8					0.35					1					1					2.7	0.35					1					1					<2x
Alkalinity SM 2320B (mg/L)												340					3.1					10					10					360	3.1					10					10					6
Methane RSK-175 (µg/L)												5.7					0.63					2					5					4.3	J	0.63					2					5				
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>	151					3.1					10					10					160	3.1					10					10					6											

**Notes:**

<sup>1</sup>Carbon dioxide back calculated from alkalinity SM 2320.

field duplicate RPD > 30 or >2X the LOQ

< = less than LOQ

µg/L = micrograms per liter

DL = detection limit

DP = direct push

EW = extraction well

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine

ID = identification number

J = estimated

LOD = limit of detection

LOQ = limit of quantification

mg/L = milligrams per liter

MNA = monitored natural attenuation

MNX = mono-nitroso-RDX

OS = off-post sample

OU = Operable Unit

PM = performance monitoring

Qual = qualifier

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

RPD = relative percent difference

RSK = Robert S. Kerr Environmental Research Laboratory

SM = Standard Method

U = nondetect

USEPA = United States Environmental Protection Agency

X = times

**TABLE 3-4**  
**SUMMARY OF OU1 FIELD DUPLICATE SAMPLE PAIRS**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

WELL NUMBER FIELD ID SAMPLE DATE	PZ017R										EW7-PM23A-25											
	PZ017R-20A					PZ021-20A					RPD	EW7-PM23A-3-25					EW7-PM523A-3-25					RPD
	6/16/20A					6/16/20A						5/31/2020					5/31/2020					
	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ		Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	
EXPLOSIVES (USEPA Method 8330A) (µg/L)																						
1,3,5-Trinitrobenzene	1.1		0.09	0.21	0.23	1.2		0.092	0.22	0.23	9	<	U	0.093	0.22	0.23	<	U	0.092	0.22	0.23	17
1,3-Dinitrobenzene	<	U	0.04	0.11	0.12	<	U	0.04	0.11	0.12		<	U	0.041	0.11	0.12	<	U	0.04	0.11	0.12	
2,4,6-Trinitrotoluene	11		0.048	0.11	0.12	11		0.049	0.11	0.12	0	<	U	0.05	0.11	0.12	<	U	0.049	0.11	0.12	
2,4-Dinitrotoluene	<	U	0.029	0.086	0.11	<	U	0.03	0.087	0.11		<	U	0.03	0.089	0.11	<	U	0.03	0.088	0.11	
2,6-Dinitrotoluene	<	U	0.043	0.086	0.11	<	U	0.044	0.087	0.11		<	U	0.044	0.089	0.11	<	U	0.044	0.088	0.11	
2-Amino-4,6-dinitrotoluene	4.9		0.054	0.11	0.12	4.8		0.055	0.11	0.12	2	1.1	J	0.056	0.11	0.12	1.3	J	0.056	0.11	0.12	19
2-Nitrotoluene	<	U	0.092	0.21	0.23	<	U	0.093	0.22	0.23		<	U	0.095	0.22	0.23	<	U	0.094	0.22	0.23	
3-Nitrotoluene	<	U	0.21	0.43	0.43	<	U	0.21	0.44	0.44		<	U	0.22	0.44	0.44	<	U	0.21	0.44	0.44	
4-Amino-2,6-dinitrotoluene	5.9		0.062	0.13	0.16	5.8		0.063	0.13	0.16	2	<	U	0.064	0.13	0.17	<	U	0.063	0.13	0.16	
4-Nitrotoluene	<	U	0.11	0.43	0.44	<	U	0.11	0.44	0.45		<	U	0.11	0.44	0.45	<	U	0.11	0.44	0.45	
HMX	1.5		0.094	0.21	0.23	1.6		0.096	0.22	0.23	6	5.3	J	0.097	0.22	0.23	6.4	J	0.096	0.22	0.23	
MNX	<	U	0.17	0.43	2.1	<	U	0.17	0.44	2.2		<	U	0.17	0.44	2.2	<	U	0.17	0.44	2.2	
Nitrobenzene	<	U	0.098	0.21	0.23	<	U	0.099	0.22	0.23		<	U	0.1	0.22	0.23	<	U	0.1	0.22	0.23	
RDX	1.4		0.055	0.21	0.23	1.4		0.056	0.22	0.23	0	<	U	0.057	0.22	0.23	<	U	0.056	0.22	0.23	
Tetryl	<	U	0.034	0.11	0.12	<	U	0.035	0.11	0.12		<	U	0.035	0.11	0.12	<	U	0.035	0.11	0.12	
LABORATORY MNA PARAMETERS																						
Ammonia USEPA 350.1 (mg/L)	<	U	0.022	0.05	0.1	<	U	0.022	0.05	0.1		1.6		0.22	0.5	1	1.6		0.22	0.5	1	0
Total Kjeldahl Nitrogen USEPA 351.2 (mg/L)	<	U	0.69	1	1	<	U	0.69	1	1		3.7		0.69	1	1	3.3		0.69	1	1	<2x
Nitrate/Nitrite USEPA 353.2 (mg/L)	30		0.076	0.2	0.4	30		0.076	0.2	0.4	0	0.26		0.019	0.05	0.1	0.27		0.019	0.05	0.1	<2x
Sulfide SM 9034 (mg/L)	<	U	0.79	1.9	4	<	U	0.79	1.9	4		<	U	0.79	1.9	4	<	U	0.79	1.9	4	
Sulfate USEPA 9056A (mg/L)	62		1	2.5	5	63		1	2.5	5	2	44		1	3	5	43		1	3	5	2
Dissolved Organic Carbon SM 9060A (mg/L)	5.1		0.35	1	1	6.3		0.35	1	1	21	12		0.35	1	1	11		0.35	1	1	9
Alkalinity SM 2320B (mg/L)	190		3.1	10	10	190		3.1	10	10	0	420		3.1	10	10	420		3.1	10	10	0
Methane RSK-175 (µg/L)	1800		0.63	2	5	2000		0.63	2	5	11	8400	J	1.9	6	15	12000	J	1.9	6	15	35
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>	84		3.1	10	10	84		3.1	10	10	0	187		3.1	10	10	187		3.1	10	10	0

**Notes:**

<sup>1</sup>Carbon dioxide back calculated from alkalinity SM 2320.

field duplicate RPD > 30 or >2X the LOQ

< = less than LOQ

µg/L = micrograms per liter

DL = detection limit

DP = direct push

EW = extraction well

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine

ID = identification number

J = estimated

LOD = limit of detection

LOQ = limit of quantification

mg/L = milligrams per liter

MNA = monitored natural attenuation

MXN = mono-nitroso-RDX

OS = off-post sample

OU = Operable Unit

PM = performance monitoring

Qual = qualifier

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

RPD = relative percent difference

RSK = Robert S. Kerr Environmental Research Laboratory

SM = Standard Method

U = nondetect

USEPA = United States Environmental Protection Agency

X = times

**TABLE 3-5**  
**FIELD WATER QUALITY PARAMETERS, OFF-POST AND ON-POST MONITORING WELLS**  
**OU1 REBOUND STUDY, QUARTER 3**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

Well Number	Sample Date	pH	Temperature (°C)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Ferrous Iron (mg/L)
<b>OU1 Off-Post Monitoring Wells</b>								
CA210	6/9/2020	6.40	15.57	1.550	0.48	70	0.00	1.13
CA211	6/9/2020	6.46	12.81	1.110	0.78	94	0.00	0.91
CA212	6/9/2020	6.64	12.48	0.732	0.41	98	0.00	0.93
CA213	6/9/2020	7.56	12.98	0.501	0.48	95	0.00	1.02
NW020	6/15/2020	6.57	14.06	1.450	6.30	153	0.00	0.96
NW021	6/15/2020	6.84	15.25	1.180	0.34	150	0.00	1.09
NW022	6/15/2020	7.05	15.64	1.390	0.33	85	0.00	1.94
NW050	6/10/2020	5.97	14.04	0.567	0.40	130	0.80	0.30
NW051	6/10/2020	6.14	15.00	0.442	0.37	126	0.50	0.41
NW052	6/10/2020	6.26	13.63	0.312	0.36	27	1.50	0.96
NW060	6/16/2020	5.88	16.37	0.065	10.63	130	0.00	0.10
NW061	6/10/2020	6.59	13.37	0.308	0.38	180	1.40	0.20
NW062	6/10/2020	6.71	13.31	0.270	0.33	-67	1.30	0.84
NW070	6/9/2020	6.51	13.08	0.195	0.40	-7	0.00	1.21
NW071	6/9/2020	6.40	13.85	0.745	3.00	88	0.00	0.95
NW080	6/8/2020	6.26	14.33	1.070	7.66	186.0	0.00	0.26
NW081R	6/8/2020	6.42	14.87	1.050	1.46	161	0.00	0.62
NW082R	6/8/2020	6.64	14.98	0.916	0.49	153	0.00	0.33
<b>OU1 On-Post Monitoring Wells</b>								
G0024	6/15/2020	6.71	13.75	1.170	7.26	119	0.00	1.26
G0070	6/2/2020	7.01	13.67	0.511	1.40	120	3.42	0.32
G0075	6/1/2020	6.83	16.06	0.987	0.71	73	1.54	0.25
G0076	6/1/2020	6.93	14.76	1.260	0.56	-27	2.61	0.25
G0077	6/15/2020	6.68	15.09	0.874	2.67	115	0.00	1.28
G0078	6/15/2020	6.91	15.06	1.280	0.31	68	0.00	1.11
G0079	6/1/2020	6.63	13.31	0.706	5.90	69	1.24	0.25
G0080	6/11/2020	6.70	12.60	0.884	0.39	36	0.10	0.78
G0081	6/2/2020	6.43	15.50	1.020	0.59	52	2.41	0.71
G0082	6/2/2020	6.47	15.82	0.858	0.47	-12	2.07	0.10
G0086	6/16/2020	7.03	12.71	0.923	1.14	111	6.03	0.16
G0087	6/15/2020	7.03	12.78	0.851	0.40	111	5.23	0.16
G0091	6/16/2020	7.29	14.23	1.300	6.55	105	5.98	0.28
G0092	6/16/2020	7.54	16.26	1.240	0.41	103	7.44	0.22
PZ017R	6/16/2020	6.90	13.94	0.788	3.44	111	8.40	0.42
PZ018	6/16/2020	6.46	13.66	0.590	9.26	127	7.94	0.42
PZ019	6/16/2020	6.49	13.30	0.616	10.83	112	6.03	0.23
PZ020	6/15/2020	6.86	14.30	1.350	7.07	104	0.00	0.91

**Notes:**

Field water quality parameters for all wells were measured using a Horiba U-52 MPS equipped with a flow-through cell with the exception of turbidity and ferrous iron. Turbidity was measured using a LaMotte turbidity meter (2020). Ferrous iron was measured using a Hach colorimeter (DR/820).

°C = degrees Celsius

mS/cm = milliSiemens per centimeter

OU = Operable Unit

DO = dissolved oxygen

mV = millivolts

PZ = piezometer

mg/L = milligrams per liter

NTU = nephelometric turbidity units

MPS = multiprobe system

ORP = oxidation/reduction potential

**TABLE 3-6**  
**FIELD WATER QUALITY PARAMETERS, PERFORMANCE MONITORING WELLS**  
**OU1 SUBSURFACE INJECTION, QUARTER 3**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

Well Number	Sample Date	pH	Temperature (°C)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Ferrous Iron (mg/L)
<b>Between EW6 and EW7</b>								
EW7-PM21A	5/28/20	6.38	14.26	0.920	0.69	-235	12.00	5.73
EW7-PM21B	5/29/20	6.29	12.91	0.952	0.39	-122	26.90	>15
EW7-PM22A	5/28/20	6.16	18.57	0.932	0.53	-148	59.10	>15
EW7-PM22B	5/29/20	6.15	13.93	1.090	0.34	-123	63.70	>15
EW7-PM23A	5/31/20	6.54	16.46	0.949	0.41	-91	7.90	10.28
EW7-PM23B	5/31/20	6.14	14.51	1.270	0.40	-91	5.34	>15
EW7-PM24A	5/29/20	6.44	13.49	1.070	0.54	-68	18.30	>15
EW7-PM24B	5/29/20	6.13	14.20	1.160	0.34	-135	50.60	>15
EW7-PM25A	5/31/20	6.21	12.44	1.230	8.07	7	12.30	3.30
EW7-PM25B	5/31/20	6.46	13.64	1.530	0.42	-79	6.43	4.28
EW7-PM26A	5/31/20	6.54	15.25	1.050	0.49	-53	0.00	4.52
EW7-PM26B	6/1/20	6.06	13.60	1.280	0.41	-82	6.11	>15
EW7-PM27A	5/29/20	6.07	13.03	1.010	0.31	-99	26.90	6.60
EW7-PM27B	5/30/20	6.41	13.01	1.180	0.36	-107	10.10	4.32
EW7-PM28A	5/30/20	6.23	12.59	1.110	0.35	-53	38.90	7.05
EW7-PM28B	5/30/20	6.74	14.01	1.460	0.29	-141	9.60	5.48
EW7-PM29A	5/30/20	6.25	12.24	0.955	0.37	-62	16.30	2.64
EW7-PM29B	5/30/20	6.32	13.11	1.110	0.29	-105	43.80	6.51

**Notes:**

Field water quality parameters for all wells were measured using a Horiba U-52 MPS equipped with a flow-through cell with the exception of turbidity and ferrous iron. Turbidity was measured using a LaMotte turbidity meter (2020). Ferrous iron was measured using a Hach colorimeter (DR/820).

> = greater than

°C = degrees Celsius

DO = dissolved oxygen

EW = extraction well

mg/L = milligrams per liter

MPS = multiprobe system

mS/cm = milliSiemens per centimeter

mV = millivolts

NTU = nephelometric turbidity units

ORP = oxidation/reduction potential

OU = Operable Unit

PM = performance monitoring

**TABLE 5-1**  
**SUMMARY OF RDX AND TNT CONCENTRATIONS**  
**OU1 REBOUND STUDY LOCATIONS**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

Well Number / Sample Interval	BASELINE		QUARTER 2		QUARTER 3	
	RDX (µg/L)	TNT (µg/L)	RDX (µg/L)	TNT (µg/L)	RDX (µg/L)	TNT (µg/L)
<b>OU1 Off-Post Wells</b>						
CA210	ND	ND	ND	ND	ND	ND
CA211	ND	ND	ND	ND	ND	ND
CA212	ND	ND	ND	ND	ND	ND
CA213	ND	ND	ND	ND	ND	ND
NW020	0.2	ND	0.94	0.6	1.5	0.59
NW021	ND	ND	ND	ND	ND	ND
NW022	ND	ND	ND	ND	ND	ND
NW050	ND	ND	ND	ND	ND	ND
NW051	ND	ND	ND	ND	ND	ND
NW052	ND	ND	ND	ND	ND	ND
NW060	ND	ND	ND	ND	ND	ND
NW061	ND	ND	ND	ND	ND	ND
NW062	ND	ND	ND	ND	ND	ND
NW070	ND	ND	ND	ND	ND	ND
NW071	ND	ND	ND	ND	ND	ND
NW080	ND	ND	ND	ND	ND	ND
NW081R	ND	ND	ND	ND	ND	ND
NW082R	ND	ND	ND	ND	ND	ND
<b>OU1 On-Post Wells</b>						
G0024	ND	ND	ND	ND	0.59	0.63
G0070	ND	ND	ND	ND	ND	ND
G0075	ND	ND	ND	ND	ND	ND
G0076	ND	ND	ND	ND	0.2	ND
G0077	0.91	3.2	0.19	2.7	0.46	3.3
G0078	ND	ND	ND	ND	ND	ND
G0079	ND	ND	ND	ND	ND	ND
G0080	ND	ND	ND	ND	ND	ND
G0081	ND	0.29	ND	ND	ND	ND
G0082	0.63	ND	ND	ND	0.68	ND
G0086	ND	3.8	ND	5.9	0.21	3.6
G0087	ND	ND	ND	ND	0.15	ND
G0091	0.81	ND	0.83	ND	0.59	ND
G0092	ND	ND	ND	ND	ND	ND
PZ017R	0.87	15	1.4	17	1.4	11
PZ018	0.88	8	ND	19	1	ND
PZ019	ND	ND	ND	ND	ND	ND
PZ020	0.42	3.7	0.62	3.2	0.58	2.2

**TABLE 5-1**  
**SUMMARY OF RDX AND TNT CONCENTRATIONS**  
**OU1 REBOUND STUDY LOCATIONS**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

Well Number / Sample Interval	BASELINE		QUARTER 2		QUARTER 3	
	RDX (µg/L)	TNT (µg/L)	RDX (µg/L)	TNT (µg/L)	RDX (µg/L)	TNT (µg/L)
<b>Direct Push Samples (Off-Post)</b>						
OS001-25	ND	12	ND	9.2	0.19	32
OS001-35	ND	11	ND	8.2	0.21	11
OS001-45	ND	ND	ND	1.1	0.17	2.2
OS002-25	0.63	1.3	NS		NS	
OS002-35	ND	ND	NS		NS	
OS002-45	ND	3.3	NS		NS	
OS003-25	ND	ND	NS		NS	
OS003-35	ND	3	NS		NS	
OS003-45	ND	ND	NS		NS	

**Notes:**

 Concentrations exceed HALs

µg/L = micrograms per liter

ND = nondetect

NS = not sampled

OS = off-post sample

OU = Operable Unit

PZ = piezometer

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

TNT = 2,4,6-trinitrotoluene

TABLE 5-2  
SUMMARY OF MNA PARAMETERS, OFF-POST AND ON-POST MONITORING WELLS  
OU1 REBOUND STUDY  
OU1 REBOUND STUDY LETTER REPORT - QUARTER 3

Well Number	ORP (mV)			DO (mg/L)			Nitrate/Nitrite (mg/L)			Ammonia (mg/L)			TKN (mg/L)			DOC (mg/L)			CO <sub>2</sub> (mg/L)		
	Oct-19	Mar-20	Jun-20	Oct-19	Mar-20	Jun-20	Oct-19	Mar-20	Jun-20	Oct-19	Mar-20	Jun-20	Oct-19	Mar-20	Jun-20	Oct-19	Mar-20	Jun-20	Oct-19	Mar-20	Jun-20
Shallow Wells																					
CA210	165.5	61.3	70	0.45	1.99	0.48	22	13	19	ND	ND	0.052	ND	1.5	0.72	9.7	14	14	138	156	151
NW020	113.9	41.1	153	3.30	6.04	6.30	62	49	42	0.46	0.025	ND	ND	ND	ND	3.6	6.1	5.9	129	138	142
NW050	112.8	140.3	130	0.24	0.37	0.40	62	79	78	4.8	0.72	0.98	ND	ND	ND	8.1	8.7	6.5	107	116	98
NW060	171.6	29.2	130	10.75	10.20	10.63	1.8	3.0	2.4	0.14	ND	ND	ND	ND	ND	1.8	1.6	0.96	15	14	12
NW070	127.0	-307.4	-7	0.38	1.59	0.40	0.03	ND	ND	0.024	0.059	0.087	ND	1.1	1.3	7.2	9.3	10	23	49	32
NW080	197.0	146.2	186	7.28	8.38	7.66	47	32	26	0.029	ND	ND	ND	ND	ND	4.7	3.9	3.9	111	116	93
G0024	156.5	22.5	119	4.88	5.57	7.26	40	32	26	ND	0.025	ND	ND	ND	ND	4.9	5.8	5.5	49	89	129
G0079	144.0	170.4	69	3.82	5.13	5.90	0.21	0.36	0.83	ND	0.058	0.065	0.76	ND	ND	3.2	2.6	6.0	58	58	138
G0091	156.8	27.4	105	2.79	3.13	6.55	32	27	40	ND	ND	ND	ND	ND	ND	3.6	3.4	3.8	160	160	124
PZ017R	173.9	154.3	111	5.68	2.63	3.44	41	26	30	0.060	0.13	ND	ND	ND	ND	3.5	4.5	5.1	62	116	84
PZ018	167.4	177.2	127	1.34	9.09	9.26	24	31	26	0.21	0.023	ND	ND	ND	ND	3.3	3.3	4.0	89	32	43
PZ019	77.3	-4.3	112	6.44	9.44	10.83	34	31	34	ND	ND	ND	ND	ND	ND	2.2	2.1	2.0	39	32	33
PZ020	160.2	166.3	104	2.54	4.17	7.07	29	28	38	ND	ND	0.032	ND	ND	ND	3.8	4.6	6.4	124	142	138
Shallow-Intermediate Wells																					
CA211	161.2	33.6	94	0.44	0.93	0.78	30	34	33	0.11	ND	ND	ND	ND	ND	4.3	4.9	6.0	89	93	93
NW021	112.2	26.7	150	0.26	0.83	0.34	0.84	0.43	1.5	3.8	2.7	1.4	3.5	2.8	1.8	2.9	2.8	2.8	182	178	151
NW051	132.3	157.2	126	0.32	7.01	0.37	27	36	24	ND	0.033	ND	ND	ND	ND	9.0	9.4	9.2	156	156	147
NW061	137.4	0.1	180	0.18	0.68	0.38	4.6	10	5.7	5.7	3.8	4.5	4.9	2.6	2.5	4.4	4.2	4.1	133	124	120
NW071	158.1	-151.2	88	2.18	3.43	3.00	2.9	32	30	ND	ND	ND	ND	ND	ND	ND	3.3	3.7	49	44	43
NW081R	171.2	144.8	161	0.65	0.62	1.46	29	29	26	ND	ND	ND	ND	ND	ND	4.5	4.6	5.0	111	111	98
G0075	132.7	154.9	73	6.86	1.05	0.71	1.2	0.94	2.4	0.056	ND	0.062	0.92	ND	ND	3.4	3.1	3.4	173	164	160
G0077	144.8	20.4	115	1.86	5.43	2.67	20	16	13	ND	ND	0.052	ND	ND	ND	4.5	4.0	3.6	138	111	116
G0080	-16.4	32.0	36	1.23	1.02	0.39	2.7	2.8	2.9	0.064	0.41	0.83	ND	0.70	0.97	2.9	2.7	2.8	156	151	138
G0081	14.9	24.2	52	0.18	0.75	0.59	0.36	0.051	ND	0.26	0.26	0.31	ND	0.69	1.1	7.8	6.5	6.6	164	156	124
G0082	32.9	14.4	-12	0.20	0.51	0.47	3.4	0.31	0.46	ND	ND	0.11	ND	ND	ND	ND	4.5	4.0	111	138	116
G0086	156.2	12.2	111	0.52	0.69	1.14	4.8	2.6	6.5	ND	0.039	0.025	ND	ND	ND	2.6	2.7	3.6	138	151	124
G0087	164.9	14.3	111	0.39	0.80	0.40	1.3	2.0	2.7	ND	ND	0.032	ND	ND	1.1	2.9	2.8	2.9	138	142	138
G0092	122.9	14.7	103	0.26	0.74	0.41	0.45	0.19	0.18	ND	ND	0.031	ND	ND	ND	2.9	2.8	2.9	182	169	156
Intermediate Wells																					
CA212	149.6	22.3	98	0.46	0.89	0.41	14	17	18	ND	ND	ND	ND	ND	ND	2.6	2.7	3.1	84	102	76
NW022	26.7	15.4	85	0.19	0.72	0.33	53	ND	ND	0.42	0.47	1.4	ND	0.70	1.7	2.9	2.7	2.6	182	191	178
NW052	134.5	87.4	27	0.66	0.31	0.36	0.12	0.022	0.052	0.027	0.039	0.031	0.80	0.80	1.0	6.3	6.7	6.6	169	160	142
NW062	38.6	-15.8	-67	0.26	0.65	0.33	ND	ND	ND	0.59	0.63	0.91	1.0	1.3	1.5	2.8	2.5	2.3	120	120	107
NW082R	153.8	144.8	153	0.50	0.51	0.49	20	18	17	ND	ND	0.024	ND	ND	ND	ND	4.0	4.2	107	107	102
G0076	-36.2	83.2	-27	1.91	0.23	0.56	ND	ND	ND	1.1	1.1	1.4	1.3	1.2	1.3	ND	2.9	3.3	156	156	142
G0078	28.1	9.9	68	0.25	0.45	0.31	ND	ND	ND	0.53	0.48	0.46	ND	ND	ND	2.8	2.8	3.8	187	182	151
Deep Wells																					
CA213	118.3	17.4	95	0.22	1.51	0.48	1.3	1.4	1.0	ND	ND	ND	0.97	ND	ND	2.2	2.0	1.7	58	53	53
G0070	16.5	87.3	120	3.29	0.58	1.40	0.025	ND	ND	ND	0.023	0.039	ND	ND	ND	1.0	0.89	1.0	98	102	89

Notes:  
µg/L = micrograms per liter  
CO<sub>2</sub>= carbon dioxide  
DO = dissolved oxygen  
DOC = dissolved organic carbon  
mg/L = milligrams per liter  
MNA = monitored natural attenuation  
mS/cm = milliSiemens per centimeter  
mV = millivolts  
NA = no analysis  
ND = nondetect  
NS = not sampled  
ORP = oxidation/reduction potential  
OU = Operable Unit  
PZ = piezometer  
TKN = total Kjeldahl nitrogen

TABLE 5-2  
SUMMARY OF MNA PARAMETERS, OFF-POST AND ON-POST MONITORING WELLS  
OU1 REBOUND STUDY  
OU1 REBOUND STUDY LETTER REPORT - QUARTER 3

Well Number	Methane (µg/L)			Alkalinity (mg/L)			Ferrous Iron (mg/L)			Sulfate (mg/L)			Sulfide (mg/L)			pH			Conductance (mS/cm)		
	Oct-19	Mar-20	Jun-20	Oct-19	Mar-20	Jun-20	Oct-19	Mar-20	Jun-20	Oct-19	Mar-20	Jun-20	Oct-19	Mar-20	Jun-20	Oct-19	Mar-20	Jun-20	Oct-19	Mar-20	Jun-20
Shallow Wells																					
CA210	23	6.6	2.3	310	350	340	ND	0.44	1.13	120	99	150	ND	ND	ND	6.55	5.83	6.40	0.977	0.708	1.550
NW020	ND	ND	ND	290	310	320	0.07	0.14	0.96	150	200	230	ND	NA	ND	6.53	6.45	6.57	1.118	0.994	1.450
NW050	1.4	ND	ND	240	260	220	ND	0.02	0.30	120	210	200	ND	NA	ND	6.71	6.50	5.97	1.178	1.916	0.567
NW060	ND	ND	ND	33	31	28	ND	ND	0.10	3.8	7.5	5.2	ND	0.8	ND	6.01	5.82	5.88	0.075	0.077	0.065
NW070	18	630	3900	51	110	72	ND	0.35	1.21	3.9	6.4	5.9	ND	0.8	ND	7.10	6.59	6.51	0.096	0.184	0.195
NW080	ND	ND	ND	250	260	210	ND	0.02	0.26	200	160	130	ND	ND	ND	6.23	6.12	6.26	1.161	0.991	1.070
G0024	ND	ND	ND	110	200	290	ND	0.07	1.26	50	110	150	ND	NA	ND	6.36	6.60	6.71	0.670	0.729	1.170
G0079	ND	ND	ND	130	130	310	0.06	ND	0.25	17	12	48	ND	ND	ND	6.34	5.73	6.63	0.278	0.273	0.706
G0091	ND	ND	ND	360	360	280	ND	ND	0.28	190	200	190	ND	ND	ND	6.83	6.65	7.29	1.325	0.973	1.300
PZ017R	140	520	1800	140	260	190	ND	0.04	0.42	74	83	62	ND	NA	ND	6.34	6.16	6.90	0.652	0.797	0.788
PZ018	240	ND	ND	200	73	96	ND	0.02	0.42	100	62	67	ND	NA	ND	6.57	5.52	6.46	0.664	0.520	0.590
PZ019	ND	ND	ND	88	73	75	0.07	0.06	0.23	67	57	58	ND	0.8	ND	6.16	6.03	6.49	0.602	0.377	0.616
PZ020	ND	ND	ND	280	320	310	0.11	0.06	0.91	160	160	190	ND	NA	ND	6.67	6.54	6.86	1.061	1.049	1.350
Shallow-Intermediate Wells																					
CA211	ND	ND	ND	200	210	210	ND	ND	0.91	93	99	110	ND	ND	0.8	6.49	6.45	6.46	0.662	0.705	1.110
NW021	55	1.2	5.7	410	400	340	ND	0.06	1.09	210	210	220	ND	NA	ND	6.77	6.69	6.84	1.154	0.825	1.180
NW051	8.3	4.9	1.9	350	350	330	ND	0.08	0.41	170	180	190	ND	NA	ND	6.47	6.32	6.14	1.088	1.451	0.442
NW061	21	14	19	300	280	270	ND	NS	0.20	170	160	170	ND	ND	ND	7.00	7.01	6.59	0.790	0.685	0.308
NW071	ND	ND	ND	110	100	96	ND	0.12	0.95	60	54	64	ND	ND	ND	6.32	6.32	6.40	0.563	0.519	0.745
NW081R	ND	ND	ND	250	250	220	ND	ND	0.62	98	91	95	ND	ND	0.8	6.51	6.48	6.42	0.797	0.925	1.050
G0075	12	ND	ND	390	370	360	ND	ND	0.25	150	170	150	ND	ND	ND	6.57	6.44	6.83	0.995	0.926	0.987
G0077	26	ND	ND	310	250	260	ND	0.06	1.28	150	100	99	ND	NA	0.8	6.63	6.65	6.68	1.012	0.620	0.874
G0080	1.1	4.6	8.8	350	340	310	0.45	ND	0.78	ND	72	87	2.9	ND	ND	6.64	6.48	6.70	0.795	0.557	0.884
G0081	3500	2400	1100	370	350	280	0.68	0.62	0.71	120	140	190	ND	0.8	ND	6.19	6.22	6.43	0.910	0.664	1.020
G0082	1100	2700	460	250	310	260	0.04	1.35	0.1	76	130	130	ND	ND	ND	6.28	6.29	6.47	0.652	0.637	0.858
G0086	110	150	22	310	340	280	ND	0.04	0.16	140	150	130	ND	NA	ND	6.84	6.69	7.03	0.684	0.725	0.923
G0087	ND	ND	ND	310	320	310	0.06	0.23	0.16	120	120	110	ND	NA	ND	6.70	6.75	7.03	0.808	0.663	0.851
G0092	1.1	1.4	18	410	380	350	ND	ND	0.22	300	290	330	ND	ND	0.8	7.14	7.06	7.54	1.269	0.940	1.240
Intermediate Wells																					
CA212	ND	ND	ND	190	230	170	ND	2.98	0.93	72	73	79	ND	ND	ND	6.70	6.88	6.64	0.496	0.573	0.732
NW022	290	250	440	410	430	400	0.27	1.02	1.94	360	260	290	ND	NA	ND	6.96	7.02	7.05	1.270	1.019	1.390
NW052	150	240	450	380	360	320	ND	0.39	0.96	130	130	140	ND	NA	ND	7.24	6.15	6.26	0.738	0.920	0.312
NW062	18	21	21	270	270	240	0.18	0.94	0.84	180	180	190	ND	ND	ND	8.11	6.97	6.71	0.701	0.584	0.270
NW082R	ND	0.66	2.0	240	240	230	0.34	ND	0.33	86	88	85	ND	NA	ND	6.84	6.48	6.64	0.687	0.884	0.916
G0076	330	200	180	350	350	320	1.68	1.21	0.25	280	280	310	ND	ND	ND	6.66	6.62	6.93	1.189	1.116	1.26
G0078	350	240	130	420	410	340	0.48	0.79	1.11	250	260	250	ND	NA	ND	6.90	6.94	6.91	1.213	0.972	1.280
Deep Wells																					
CA213	ND	ND	ND	130	120	120	ND	0.09	1.02	63	60	57	ND	NA	ND	7.47	7.64	7.56	0.373	0.378	0.501
G0070	ND	ND	ND	220	230	200	ND	ND	0.32	34	33	39	ND	ND	ND	7.12	6.88	7.01	0.461	0.452	0.511

Notes:  
µg/L = micrograms per liter  
CO<sub>2</sub>= carbon dioxide  
DO = dissolved oxygen  
DOC = dissolved organic carbon  
mg/L = milligrams per liter  
MNA = monitored natural attenuation  
mS/cm = milliSiemens per centimeter  
mV = millivolts  
NA = no analysis  
ND = nondetect  
NS = not sampled  
ORP = oxidation/reduction potential  
OU = Operable Unit  
PZ = piezometer  
TKN = total Kjeldahl nitrogen

**TABLE 5-3**  
**SUMMARY OF RDX AND TNT CONCENTRATIONS**  
**OU1 PERFORMANCE MONITORING LOCATIONS**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

Performance Monitoring Location	BASELINE		QUARTER 2		QUARTER 3	
	RDX (µg/L)	TNT (µg/L)	RDX (µg/L)	TNT (µg/L)	RDX (µg/L)	TNT (µg/L)
<b>Between EW6 and EW7</b>						
PZ017R	0.87	15	1.4	17	1.4	11
PZ018	0.88	8	ND	19	1	ND
EW7-PM21A-25	1	29	6.2	17	7.3	11
EW7-PM21B-35	0.39	5.7	ND	ND	ND	ND
EW7-PM22A-25	0.47	27	ND	1.1	ND	ND
EW7-PM22B-35	0.28	5.7	ND	ND	ND	ND
EW7-PM23A-25	1	28	2.2	38	ND	ND
EW7-PM23B-35	0.32	5.2	ND	ND	ND	ND
EW7-PM24A-25	1.4	9.8	0.19	0.53	ND	8.3
EW7-PM24B-35	0.41	11	ND	ND	ND	ND
EW7-PM25A-25	1.6	13	ND	2.3	ND	ND
EW7-PM25B-35	ND	4.1	ND	ND	57	ND
EW7-PM26A-25	0.97	14	ND	0.73	0.46	0.87
EW7-PM26B-35	0.38	7.2	37	ND	34	ND
EW7-PM27A-25	1.7	9.5	2.2	9.8	ND	0.45
EW7-PM27B-35	0.62	4.9	ND	0.26	17	ND
EW7-PM28A-25	1.1	13	1.1	8.2	15	ND
EW7-PM28B-35	0.22	5.6	ND	ND	ND	ND
EW7-PM29A-25	1.2	5.9	ND	ND	26	ND
EW7-PM29B-35	ND	3.6	ND	ND	44	ND

**Notes:**

Concentrations exceed HALs

µg/L = micrograms per liter

EW = extraction well

ND = nondetect

OU = Operable Unit

PM = performance monitoring

PZ = piezometer

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

TNT = 2,4,6-trinitrotoluene

TABLE 5-4  
SUMMARY OF WATER QUALITY PARAMETERS, PERFORMANCE MONITORING LOCATIONS  
OU1 SUBSURFACE INJECTION  
OU1 REBOUND STUDY LETTER REPORT - QUARTER 3

Performance Monitroing Well Number	ORP (mV)			DO (mg/L)			Nitrate/Nitrite (mg/L)			Ammonia (mg/L)			TKN (mg/L)			DOC (mg/L)			CO <sub>2</sub> (mg/L)		
	Oct-19	Feb-20	May-20	Oct-19	Feb-20	May-20	Oct-19	Feb-20	May-20	Oct-19	Feb-20	May-20	Oct-19	Feb-20	May-20	Oct-19	Feb-20	May-20	Oct-19	Feb-20	May-20
Shallow Wells																					
PZ017R	173.9	159.3	111	5.68	2.63	3.44	41	26	30.0	0.06	0.13	ND	ND	ND	ND	3.5	4.5	5.1	62	116	84
PZ018	167.4	177.2	127	1.34	9.09	9.26	24	31	26	0.21	0.023	ND	ND	ND	ND	3.3	3.3	4.0	89	32	43
EW7-PM21A	-36.9	-307.7	-235	0.57	1.45	0.69	23	11	8	1.1	0.77	0.8	ND	1.3	1.8	3.7	7.6	11	142	173	173
EW7-PM22A	-10.3	-326.1	-148	0.32	1.04	0.53	13	2.3	5.4	1.8	0.59	2.3	ND	3.9	7.5	3.5	84	68	147	227	209
EW7-PM23A	-26.7	-325.2	-91	0.36	1.18	0.41	24	24	0.26	1.8	1.3	1.6	ND	ND	3.7	3.6	3.8	12	147	147	187
EW7-PM24A	-28.7	-288.4	-68	1.49	0.35	0.54	51	10	6.9	0.33	0.34	0.20	ND	1.3	2.1	3.8	14	20	151	178	213
EW7-PM25A	17.9	-331.9	7	3.48	0.33	8.07	25	6.8	3.0	0.13	1.2	1.4	ND	3.8	6.8	4.4	100	130	142	182	231
EW7-PM26A	-39.0	-321.4	-53	0.83	0.16	0.49	11	2.1	1.9	0.086	1.0	0.09	ND	2.0	1.5	3.9	27	9.6	147	196	222
EW7-PM27A	-6.6	222.5	-99	2.02	2.95	0.31	26	22	4.2	0.15	0.21	1.1	ND	ND	3.6	4.2	13	42	124	164	196
EW7-PM28A	-28.2	-211.3	-53	0.12	0.40	0.35	16	3.9	0.15	0.53	2.4	3.0	ND	3.9	5.6	4.8	29	46	164	187	209
EW7-PM29A	-20.7	-137.6	-62	0.35	0.61	0.37	12	0.13	0.06	0.12	0.19	0.35	ND	2.4	5.3	3.1	93	38	102	160	196
Shallow-Intermediate Wells																					
EW7-PM21B	-121.5	-160.7	-122	0.16	0.25	0.39	2.5	0.18	ND	1.5	0.68	1.5	1.4	2.3	4.6	3.2	43	63	133	160	182
EW7-PM22B	-36.6	-33.1	-123	0.20	0.32	0.34	1.9	ND	ND	1.3	4.4	1.0	1.2	21	6.4	3.3	480	96	133	142	218
EW7-PM23B	-51.6	-20.1	-91	0.18	0.52	0.40	4.4	ND	0.032	1.2	1.5	2.4	1.6	7.4	8.0	3.2	270	66	138	196	253
EW7-PM24B	-92.2	-321.0	-135	0.30	0.67	0.34	11	0.053	ND	1.3	0.27	1.70	ND	5.0	8.2	3.8	140	150	147	178	222
EW7-PM25B	4.6	-330.7	-79	0.15	0.34	0.42	1.7	ND	0.053	1.5	3.1	3.1	1.5	1.0	6.8	4.8	69	72	182	271	342
EW7-PM26B	-108.3	-318.6	-82	0.28	1.07	0.41	7.5	ND	0.055	0.57	1.3	1.8	0.7	11	7.2	4.7	490	220	173	196	231
EW7-PM27B	-86.3	-297.6	-107	0.24	0.50	0.36	8.3	0.056	0.16	1.1	1.8	1.8	1.1	3.9	5.7	5.1	120	47	173	222	218
EW7-PM28B	-12.2	-240.9	-141	0.23	0.29	0.29	2.7	0.031	0.035	1.0	9.9	5.8	5.2	12	9.2	6.5	25	23	200	311	329
EW7-PM29B	-55.6	-300.9	-105	0.20	0.54	0.29	2.5	0.037	0.049	2.4	0.33	1.6	2.4	8.1	7.2	3.7	280	64	156	244	213

Notes:  
µg/L = micrograms per liter  
CO<sub>2</sub>= dissolved oxygen  
DO = dissolved oxygen  
DOC = dissolved organic carbon  
EW = extraction well  
mg/L = milligrams per liter  
mS/cm = milliSiemens per centimeter  
mV = millivolts  
ND = nondetect  
ORP = oxidation/reduction potential  
OU = Operable Unit  
PM = performance monitoring  
PZ = piezometer  
TKN = total Kjeldahl nitrogen

TABLE 5-4  
SUMMARY OF WATER QUALITY PARAMETERS, PERFORMANCE MONITORING LOCATIONS  
OU1 SUBSURFACE INJECTION  
OU1 REBOUND STUDY LETTER REPORT - QUARTER 3

Performance Monitroing Well Number	Methane (µg/L)			Alkalinity (mg/L)			Ferrous Iron (mg/L)			Sulfate (mg/L)			Sulfide (mg/L)			pH			Conductance (mS/cm)		
	Oct-19	Feb-20	May-20	Oct-19	Feb-20	May-20	Oct-19	Feb-20	May-20	Oct-19	Feb-20	May-20	Oct-19	Feb-20	May-20	Oct-19	Feb-20	May-20	Oct-19	Feb-20	May-20
Shallow Wells																					
PZ017R	140	520	1800	140	260	190	ND	0.04	0.42	74	83	62	ND	ND	ND	6.34	6.16	6.90	0.652	0.797	0.788
PZ018	240	ND	ND	200	73	96	ND	0.02	0.42	100	62	67	ND	ND	ND	6.57	5.52	6.46	0.664	0.520	0.590
EW7-PM21A	340	320	4700	320	390	390	0.99	2.62	5.73	84	61	49	ND	ND	ND	7.66	6.12	6.38	0.724	0.700	0.920
EW7-PM22A	800	2700	13000	330	510	470	2.89	3.06	>15	85	22	30	ND	0.8	ND	7.05	6.11	6.16	0.673	0.817	0.932
EW7-PM23A	420	460	8400	330	330	420	2.73	0.90	10.28	90	91	44	ND	ND	ND	8.21	6.53	6.54	0.740	0.705	0.949
EW7-PM24A	380	760	9000	340	400	480	2.62	3.30	>15	84	57	40	ND	0.8	ND	7.56	6.33	6.44	0.903	0.716	1.070
EW7-PM25A	590	1600	5000	320	410	520	1.56	7.68	3.30	87	39	38	ND	0.8	0.8	7.23	5.87	6.21	0.794	0.814	1.230
EW7-PM26A	1600	1300	2600	330	440	500	2.89	2.83	4.52	73	20	36	ND	ND	ND	7.69	6.18	6.54	0.684	0.674	1.050
EW7-PM27A	610	170	6400	280	370	440	2.89	2.48	6.60	120	83	47	ND	ND	ND	7.01	6.35	6.07	0.771	0.753	1.010
EW7-PM28A	1600	3300	15000	370	420	470	3.30	4.42	7.05	80	53	28	ND	ND	ND	7.45	6.11	6.23	0.797	0.731	1.110
EW7-PM29A	450	1900	22000	230	360	440	3.30	11.28	2.64	97	7.9	7.1	ND	ND	ND	7.29	5.71	6.25	0.600	0.623	0.955
Shallow-Intermediate Wells																					
EW7-PM21B	770	1300	6700	300	360	410	2.89	>15	>15	150	29	70	ND	ND	ND	9.46	6.15	6.29	0.697	0.646	0.952
EW7-PM22B	690	1500	15000	300	320	490	2.89	>15	>15	160	45	14	ND	ND	ND	7.64	5.32	6.15	0.734	0.933	1.090
EW7-PM23B	620	3300	21000	310	440	570	2.89	>15	>15	150	4.0	1.1	ND	ND	ND	7.98	5.72	6.14	0.750	0.870	1.270
EW7-PM24B	1300	1100	14000	330	400	500	3.30	9.56	>15	110	43	6	ND	ND	0.8	8.84	5.80	6.13	0.707	0.786	1.160
EW7-PM25B	3900	1600	18000	410	610	770	0.72	2.12	4.28	110	4.0	ND	ND	ND	ND	7.11	6.38	6.46	0.791	0.971	1.530
EW7-PM26B	2900	3700	19000	390	440	520	2.78	>15	>15	79	29	6.8	ND	ND	ND	9.22	5.28	6.06	0.792	1.091	1.280
EW7-PM27B	1700	3400	16000	390	500	490	2.89	6.20	4.32	90	16	37	ND	0.8	ND	8.70	5.80	6.41	0.798	0.897	1.180
EW7-PM28B	3500	2200	16000	450	700	740	3.30	11.28	5.48	71	3.40	ND	ND	ND	0.8	7.09	6.44	6.74	0.802	1.028	1.460
EW7-PM29B	750	3100	9600	350	550	480	3.30	12.08	6.51	140	ND	ND	ND	0.8	ND	8.07	5.66	6.32	0.769	1.099	1.11

Notes:  
µg/L = micrograms per liter  
CO<sub>2</sub>= dissolved oxygen  
DO = dissolved oxygen  
DOC = dissolved organic carbon  
EW = extraction well  
mg/L = milligrams per liter  
mS/cm = milliSiemens per centimeter  
mV = millivolts  
ND = nondetect  
ORP = oxidation/reduction potential  
OU = Operable Unit  
PM = performance monitoring  
PZ = piezometer  
TKN = total Kjeldahl nitrogen

**TABLE 6-1**  
**2020 OU1 PROPOSED SUBSURFACE INJECTION LOCATIONS**  
**OU1 SUBSURFACE INJECTION**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

Injection Transect ID	Point Spacings (ft)	Approximate Injection Interval Depth (feet bgs)		Injection Interval Thickness (ft)	Number of Injection Points	Injection Transect Length (ft)	Planned Volume of Mixture <sup>1</sup> Per Point (gallons)	Planned Volume of Mixture Per Transect (gallons)	Required Volume of Mixture Per 5-Foot Interval (gallons) <sup>2</sup>
		Top	Bottom						
Between EW6 and EW7 Transects									
EW7-T17	15	15	40	25	12	165	1000	12000	A
EW7-T18	15	15	40	25	12	165	1000	12000	A
EW7-T19	15	15	40	25	12	165	1000	12000	B
EW7-T20	15	15	40	25	12	165	1000	12000	B
EW7-T21	15	15	40	25	24	345	1000	24000	B
EW7-T22	15	15	40	25	12	165	1000	12000	B
EW7-T23	15	15	40	25	36	525	1000	36000	B
EW7-T24	15	15	40	25	36	525	1000	36000	B
EW7-T25	15	15	40	25	36	525	1000	36000	B
EW7-T26	15	15	40	25	30	435	1000	30000	B
EW7-T27	15	15	40	25	12	165	1000	12000	B
Between EW6 and EW7 Transect Totals					234	3345	234000		
Load Line 1									
LL1-T129	15	12	37	25	12	165	1000	12000	A
LL1-T130	15	12	37	25	18	255	1000	18000	A

Notes:

<sup>1</sup> Amendment and mixture percentage used: WB 66-10 at 9.8 percent (by volume).

<sup>2</sup> Amendment mixture will be injected vertically at 5-foot intervals. Volume of mixed amendment injected per 5-foot interval (from shallow depths to deep depths) will be as follows:

A) 200 gallons (10-18 ft bgs), 300 gallons (15-23 ft bgs), 300 gallons (20-28 ft bgs), 100 gallons (25-33 ft bgs), and 100 gallons (30-38 ft bgs).

B) 100 gallons (18 ft bgs), 200 gallons (23 ft bgs), 200 gallons (28 ft bgs), 300 gallons (33 ft bgs), and 200 gallons (38 ft bgs).

bgs = below ground surface

DS = Decant Station

EW = extraction well

ft = feet

ID = identification number

LL = load line

OU = operable unit

T = transect

WB 66-10 = Wesblend 66 with 10% oil

**TABLE 6-1**  
**2020 OU1 PROPOSED SUBSURFACE INJECTION LOCATIONS**  
**OU1 SUBSURFACE INJECTION**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

Injection Transect ID	Point Spacings (ft)	Approximate Injection Interval Depth (feet bgs)		Injection Interval Thickness (ft)	Number of Injection Points	Injection Transect Length (ft)	Planned Volume of Mixture <sup>1</sup> Per Point (gallons)	Planned Volume of Mixture Per Transect (gallons)	Required Volume of Mixture Per 5-Foot Interval (gallons) <sup>2</sup>
		Top	Bottom						
LL1-T131	15	12	37	25	18	255	1000	18000	A
LL1-T132	15	12	37	25	18	255	1000	18000	A
LL1-T133	15	12	37	25	18	255	1000	18000	A
LL1-T134	15	12	37	25	18	255	1000	18000	A
LL1-T135	15	12	37	25	12	165	1000	12000	A
LL1-T136	15	12	37	25	6	75	1000	6000	A
LL1-T137	15	12	37	25	12	165	1000	12000	A
LL1-T138	15	12	37	25	12	165	1000	12000	A
LL1-T139	15	12	37	25	6	75	1000	6000	A
<b>Load Line 1 Transect Totals</b>					<b>150</b>	<b>2085</b>		<b>150000</b>	
<b>Load Line 2</b>									
LL2-T125	15	12	37	25	6	75	1000	6000	A
LL2-T126	15	12	37	25	12	165	1000	12000	A
LL2-T127	15	12	37	25	12	165	1000	12000	A
LL2-T128	15	12	37	25	12	165	1000	12000	A
LL2-T129	15	12	37	25	6	75	1000	6000	A

Notes:

<sup>1</sup>Amendment and mixture percentage used: WB 66-10 at 9.8 percent (by volume).

<sup>2</sup>Amendment mixture will be injected vertically at 5-foot intervals. Volume of mixed amendment injected per 5-foot interval (from shallow depths to deep depths) will be as follows:

A) 200 gallons (10-18 ft bgs), 300 gallons (15-23 ft bgs), 300 gallons (20-28 ft bgs), 100 gallons (25-33 ft bgs), and 100 gallons (30-38 ft bgs).

B) 100 gallons (18 ft bgs), 200 gallons (23 ft bgs), 200 gallons (28 ft bgs), 300 gallons (33 ft bgs), and 200 gallons (38 ft bgs).

bgs = below ground surface

DS = Decant Station

EW = extraction well

ft = feet

ID = identification number

LL = load line

OU = operable unit

T = transect

WB 66-10 = Wesblend 66 with 10% oil

**TABLE 6-1**  
**2020 OU1 PROPOSED SUBSURFACE INJECTION LOCATIONS**  
**OU1 SUBSURFACE INJECTION**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

Injection Transect ID	Point Spacings (ft)	Approximate Injection Interval Depth (feet bgs)		Injection Interval Thickness (ft)	Number of Injection Points	Injection Transect Length (ft)	Planned Volume of Mixture <sup>1</sup> Per Point (gallons)	Planned Volume of Mixture Per Transect (gallons)	Required Volume of Mixture Per 5-Foot Interval (gallons) <sup>2</sup>
		Top	Bottom						
LL2-T130	15	12	37	25	6	75	1000	6000	A
LL2-T131	15	12	37	25	12	165	1000	12000	A
LL2-T132	15	12	37	25	12	165	1000	12000	A
LL2-T133	15	12	37	25	6	75	1000	6000	A
LL2-T134	15	12	37	25	12	165	1000	12000	A
LL2-T135	15	12	37	25	24	345	1000	24000	A
LL2-T136	15	12	37	25	24	345	1000	24000	A
LL2-T137	15	12	37	25	24	345	1000	24000	A
LL2-T138	15	12	37	25	18	255	1000	18000	A
LL2-T139	15	12	37	25	6	75	1000	6000	A
<b>Load Line 2 Transect Totals</b>					<b>192</b>	<b>2655</b>		<b>192000</b>	
<b>Decant Station</b>									
DS-T24	15	7	32	25	3	30	1000	3000	A
DS-T25	15	7	32	25	6	75	1000	6000	A
DS-T26	15	7	32	25	6	75	1000	6000	A
DS-T27	15	7	32	25	6	75	1000	6000	A
DS-T28	15	7	32	25	3	30	1000	3000	A
<b>Decant Station Transect Totals</b>					<b>24</b>	<b>285</b>		<b>24000</b>	
<b>Overall 2020 Transect Totals</b>					<b>600</b>	<b>8370</b>		<b>600000</b>	

Notes:

<sup>1</sup>Amendment and mixture percentage used: WB 66-10 at 9.8 percent (by volume).

<sup>2</sup>Amendment mixture will be injected vertically at 5-foot intervals. Volume of mixed amendment injected per 5-foot interval (from shallow depths to deep depths) will be as follows:

A) 200 gallons (10-18 ft bgs), 300 gallons (15-23 ft bgs), 300 gallons (20-28 ft bgs), 100 gallons (25-33 ft bgs), and 100 gallons (30-38 ft bgs).

B) 100 gallons (18 ft bgs), 200 gallons (23 ft bgs), 200 gallons (28 ft bgs), 300 gallons (33 ft bgs), and 200 gallons (38 ft bgs).

bgs = below ground surface

LL = load line

DS = Decant Station

OU = operable unit

EW = extraction well

T = transect

ft = feet

WB 66-10 = Wesblend 66 with 10% oil

ID = identification number

**TABLE 6-2**  
**2020 PROPOSED PERFORMANCE MONITORING LOCATIONS AND PARAMETERS**  
**OU1 SUBSURFACE INJECTION**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

							Analytical Parameters				
							Explosives <sup>1</sup>	Laboratory Water Quality Parameters <sup>2</sup>	Field Water Quality Parameters <sup>3</sup>	Field Duplicate Samples <sup>4</sup>	MS/MSD Samples <sup>5</sup>
Sample Location ID	Groundwater Sample Type	Approximate Screened Interval (feet bgs)			Pump Placement Depth (feet bgs)	Sample ID					
Between EW6 and EW7 <sup>6</sup>											
G0022	Monitoring Well	18	-	33	25	G0022-5	X	X	X		
PZ017R	Piezometer	10	-	30	25	PZ017R-4	X	X	X	X	
PZ018	Piezometer	10	-	30	25	PZ018-4	X	X	X		
EW7-PM21A	Temp. Well	20	-	30	25	EW7-PM21A-4-25	X	X	X		
EW7-PM24A	Temp. Well	20	-	30	25	EW7-PM24A-4-25	X	X	X		
EW7-PM25A	Temp. Well	20	-	30	25	EW7-PM25A-4-25	X	X	X		X
EW7-PM25B	Temp. Well	30	-	40	35	EW7-PM25B-4-35	X	X	X		
EW7-PM26A	Temp. Well	20	-	30	25	EW7-PM26A-4-25	X	X	X		
EW7-PM26B	Temp. Well	30	-	40	35	EW7-PM26B-4-35	X	X	X		
EW7-PM27B	Temp. Well	30	-	40	35	EW7-PM27B-4-35	X	X	X		
EW7-PM28A	Temp. Well	20	-	30	25	EW7-PM28A-4-25	X	X	X		
EW7-PM29A	Temp. Well	20	-	30	25	EW7-PM29A-4-25	X	X	X		
EW7-PM29B	Temp. Well	30	-	40	35	EW7-PM29B-4-35	X	X	X		
Between EW6 and EW7 Totals							13	13	13	1	1
Load Line 1											
G0094	Monitoring Well	15	-	25	20	G0094-5	X	X	X		
G0096	Monitoring Well	15	-	25	20	G0096-5	X	X	X		
Load Line 1 Totals							2	2	2	0	0
Load Line 2											
G0111	Monitoring Well	15	-	25	20	G0111-5	X	X	X		
G0121	Monitoring Well	20	-	30	25	G0121-5	X	X	X		
G0122	Monitoring Well	20	-	30	25	G0122-5	X	X	X		
G0123	Monitoring Well	20	-	30	25	G0123-5	X	X	X		
Load Line 2 Totals							4	4	4	0	0
Decant Station											
G0102	Monitoring Well	14	-	24	20	G0102-5	X	X	X		
Decant Station Totals							1	1	1	0	0
Overall Totals							20	20	20	1	1

**TABLE 6-2**  
**2020 PROPOSED PERFORMANCE MONITORING LOCATIONS AND PARAMETERS**  
**OU1 SUBSURFACE INJECTION**  
**OU1 REBOUND STUDY LETTER REPORT - QUARTER 3**

Sample Location ID	Groundwater Sample Type	Approximate Screened Interval (feet bgs)	Pump Placement Depth (feet bgs)	Sample ID	Analytical Parameters				
					Explosives <sup>1</sup>	Laboratory Water Quality Parameters <sup>2</sup>	Field Water Quality Parameters <sup>3</sup>	Field Duplicate Samples <sup>4</sup>	MS/MSD Samples <sup>5</sup>

Notes:

\*For the 2020 subsurface injection performance monitoring, baseline concentrations will be established using Quarter 4 or LTM analytical results for performance monitoring locations in which the 2019 injections have not been implemented (i.e., wells G0022, G0094, G0096, G0102, G0111, G0121, G0122, and G0123). All wells/temporary wells will be sampled during future quarterly 2020 subsurface injection performance monitoring events (four total).

<sup>1</sup>Explosives (+ MNX) analysis (SW846 Method 8330A) and laboratory water quality parameter analysis will be completed on normal turnaround basis (21 day).

<sup>2</sup>Laboratory water quality parameters: methane (Method RSK 175), total Kjeldahl nitrogen (Method 351.2), nitrate/nitrite (Method 353.2), sulfate (Method 9056A), sulfide (Method 9034), ammonia (Method 350.1), dissolved organic carbon (Method 9060A), alkalinity (Method 2320B), and carbon dioxide (back calculated Method 2320B).

<sup>3</sup>Field water quality parameters include: dissolved oxygen, oxidation/reduction potential, ferrous iron, turbidity, specific conductance, pH, and temperature.

<sup>4</sup>Field duplicate samples will be collected at a rate of 5% (1 per 20 samples collected) for the full suite of laboratory parameters.

<sup>5</sup>MS/MSD samples will be collected at a rate of 5% (1 per 20 samples collected) for the full suite of laboratory parameters.

<sup>6</sup>Temporary well locations and interval depths selected based upon previous PM analytical results (i.e., baseline, Quarter 2, and Quarter 3). Laboratory analysis will be completed by TestAmerica, Inc., Denver, Colorado.

% = percent

amsl = above mean sea level

bgs = below ground surface

EW = extraction well

ID = identification

LTM = long term monitoring

MNX = mono-nitroso-RDX

MS/MSD = matrix spike/matrix spike duplicate

OU = Operable Unit

PM = performance monitoring

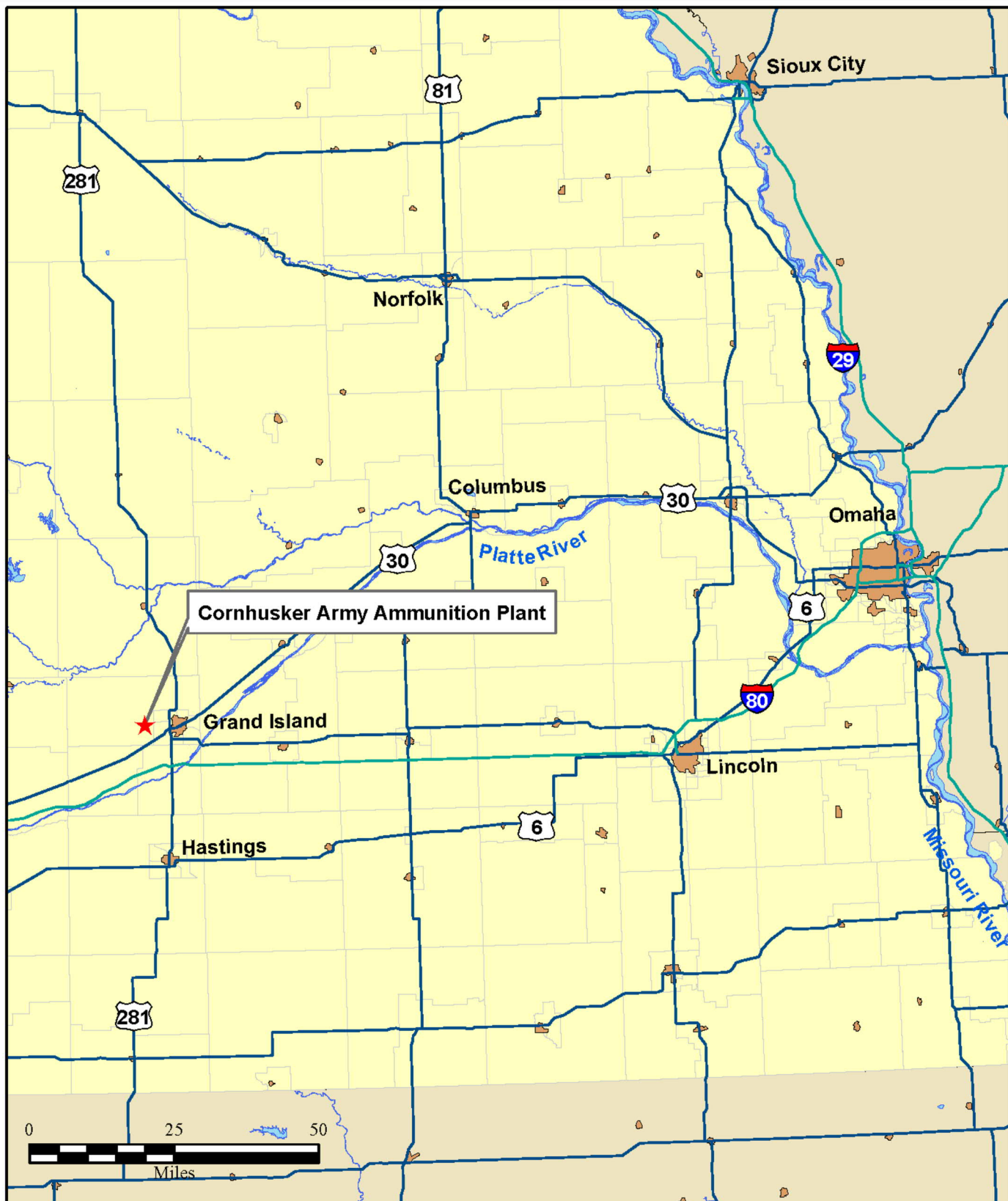
PZ = piezometer

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

RSK = Robert S. Kerr Environmental Research Laboratory

## Figures

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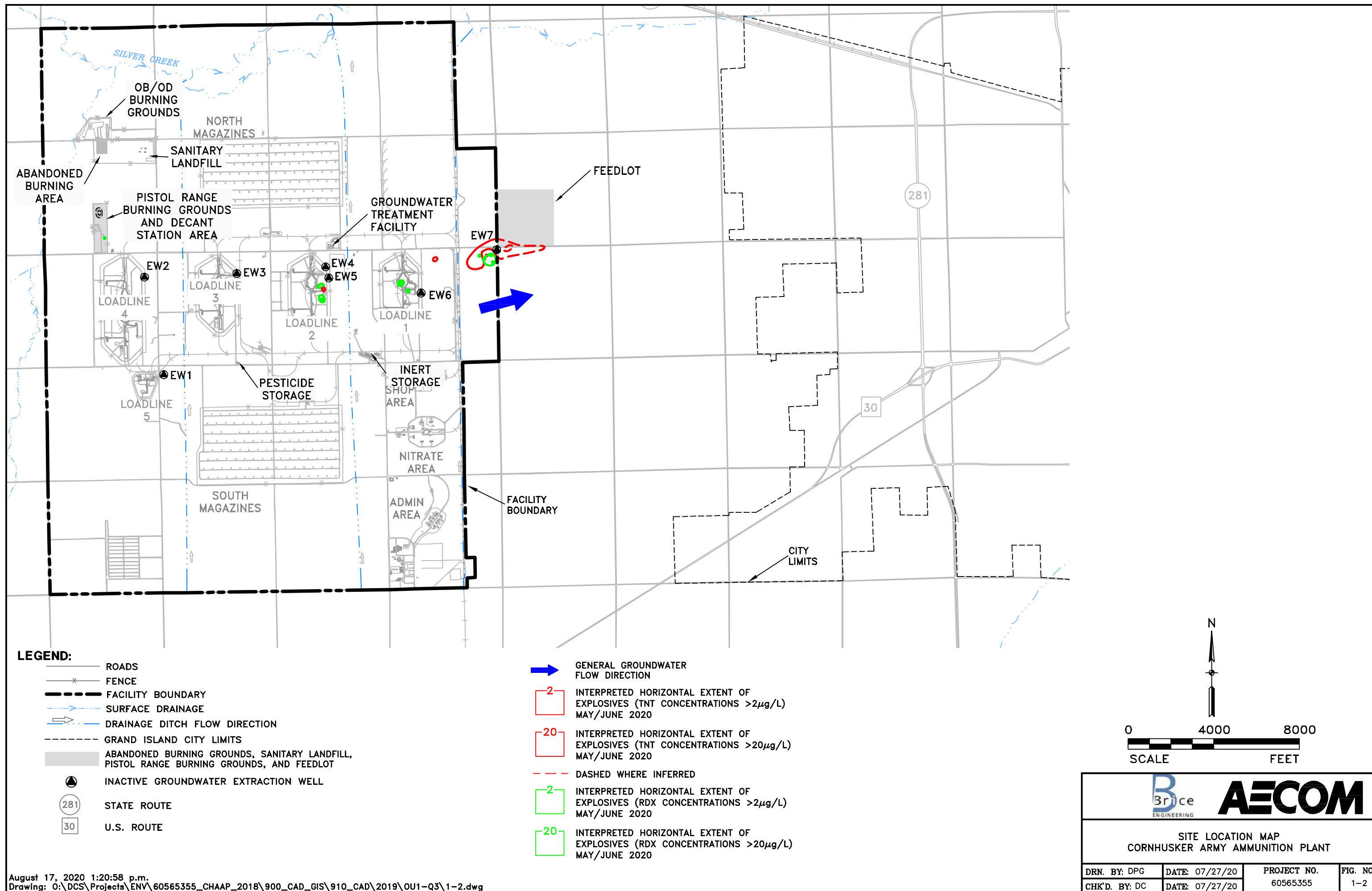


**B**  
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ENGINEERING

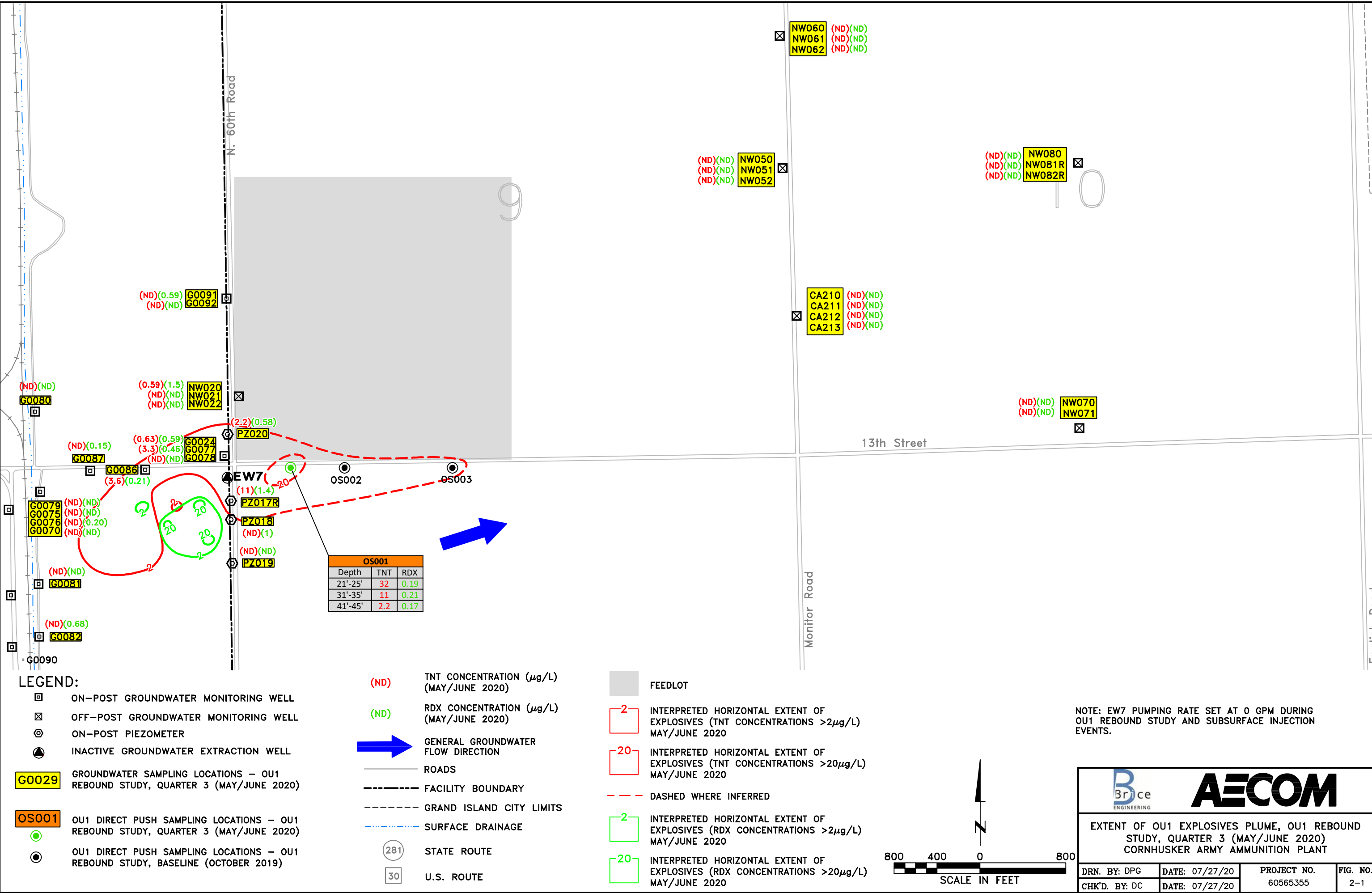
**AECOM**

FACILITY LOCATION MAP  
CORNHUSKER ARMY AMMUNITION PLANT

DRN. BY: DPG	DATE: 07/27/20	PROJECT NO.	FIG. NO.
CHK'D. BY: DC	DATE: 07/27/20	60565355	1-1



September 14, 2020 8:59:06 a.m.  
Drawing: O:\DCS\Projects\EN\60565355\_CHAAP\_2018\900\_CAD\_GIS\910\_CAD\2019\OU1-Q3-1.dwg



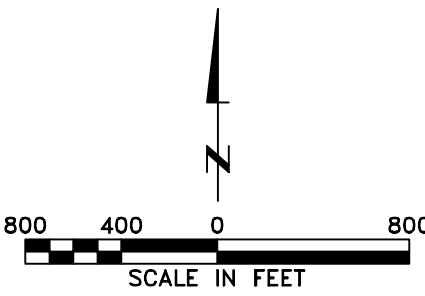
LEGEND:

- ON-POST GROUNDWATER MONITORING WELL
- OFF-POST GROUNDWATER MONITORING WELL
- ON-POST PIEZOMETER
- INACTIVE GROUNDWATER EXTRACTION WELL
- G0029 GROUNDWATER SAMPLING LOCATIONS – OU1 REBOUND STUDY, QUARTER 3 (MAY/JUNE 2020)
- OS001 OU1 DIRECT PUSH SAMPLING LOCATIONS – OU1 REBOUND STUDY, QUARTER 3 (MAY/JUNE 2020)
- OU1 DIRECT PUSH SAMPLING LOCATIONS – OU1 REBOUND STUDY, BASELINE (OCTOBER 2019)

- (ND) TNT CONCENTRATION (µg/L) (MAY/JUNE 2020)
- (ND) RDX CONCENTRATION (µg/L) (MAY/JUNE 2020)
- GENERAL GROUNDWATER FLOW DIRECTION
- ROADS
- FACILITY BOUNDARY
- GRAND ISLAND CITY LIMITS
- SURFACE DRAINAGE
- STATE ROUTE
- U.S. ROUTE

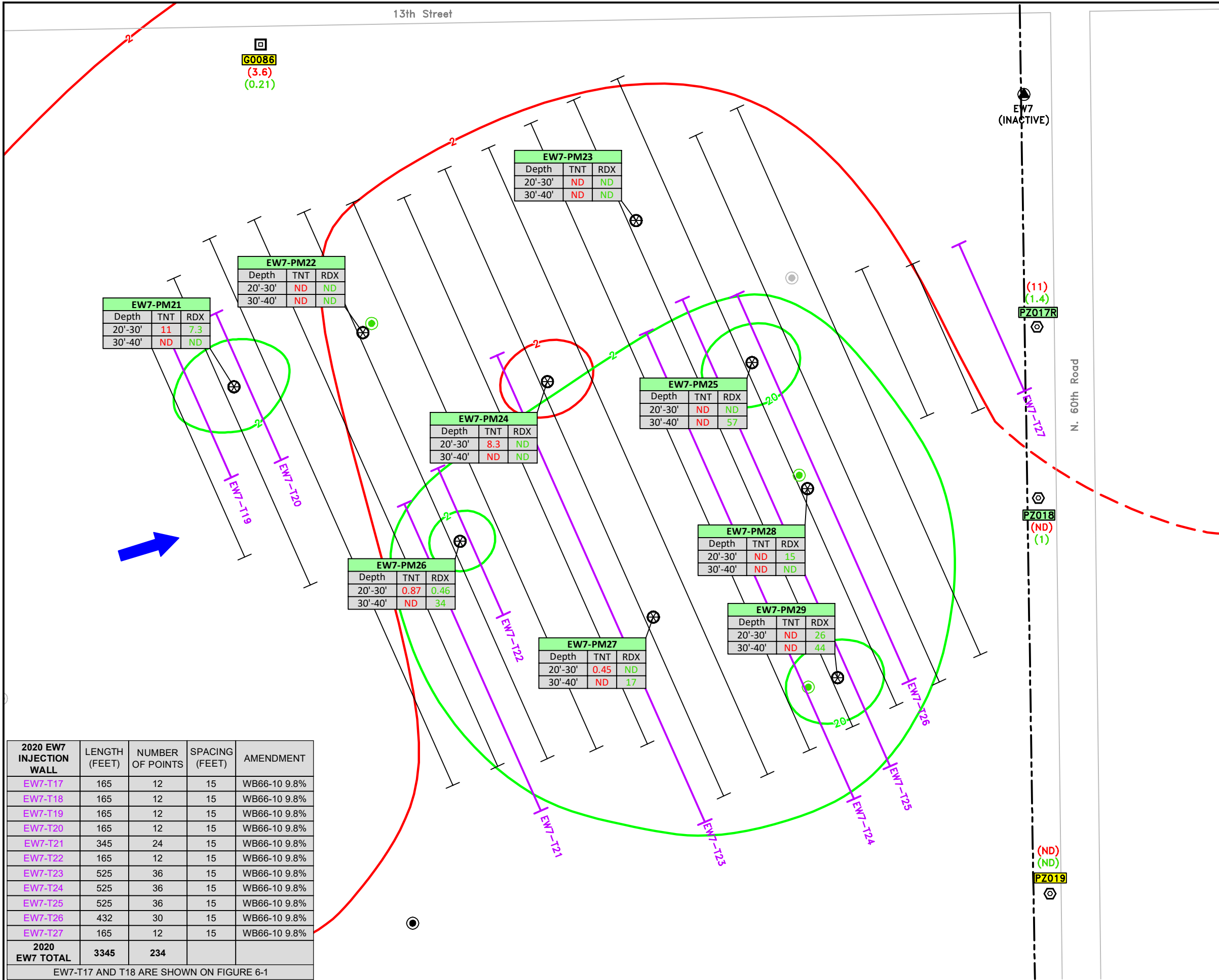
- FEEDLOT
- INTERPRETED HORIZONTAL EXTENT OF EXPLOSIVES (TNT CONCENTRATIONS >2µg/L) MAY/JUNE 2020
- INTERPRETED HORIZONTAL EXTENT OF EXPLOSIVES (TNT CONCENTRATIONS >20µg/L) MAY/JUNE 2020
- INTERPRETED HORIZONTAL EXTENT OF EXPLOSIVES (RDX CONCENTRATIONS >2µg/L) MAY/JUNE 2020
- INTERPRETED HORIZONTAL EXTENT OF EXPLOSIVES (RDX CONCENTRATIONS >20µg/L) MAY/JUNE 2020
- DASHED WHERE INFERRED

NOTE: EW7 PUMPING RATE SET AT 0 GPM DURING OU1 REBOUND STUDY AND SUBSURFACE INJECTION EVENTS.



EXTENT OF OU1 EXPLOSIVES PLUME, OU1 REBOUND STUDY, QUARTER 3 (MAY/JUNE 2020)  
CORNHUSKER ARMY AMMUNITION PLANT

DRN. BY: DPG	DATE: 07/27/20	PROJECT NO. 60565355	FIG. NO. 2-1
CHK'D. BY: DC	DATE: 07/27/20		



**LEGEND**

**GROUNDWATER SAMPLING LOCATIONS - OU1 REBOUND STUDY, QUARTER 3 (MAY/JUNE 2020)**

**GROUNDWATER SAMPLING LOCATIONS - PERFORMANCE MONITORING, QUARTER 3 (MAY/JUNE 2020)**

**TNT CONCENTRATION ( $\mu\text{g/L}$ ) (MAY/JUNE 2020)**

**RDX CONCENTRATION ( $\mu\text{g/L}$ ) (MAY/JUNE 2020)**

**2020 PROPOSED WESBLEND 66-10 TREATMENT WALL LOCATION (9.8% BY VOLUME)**

**WESBLEND 66-10 TREATMENT WALL LOCATION (9.8% BY VOLUME) (OCTOBER/NOVEMBER 2019)**

**BLDG 14 FORMER SITE FEATURES**

**ROADS**

**FACILITY BOUNDARY**

**EW7 (INACTIVE)**

**EXTRACTION WELL**

**ON-POST GROUNDWATER MONITORING WELL**

**ON-POST PIEZOMETER**

**PERFORMANCE MONITORING SAMPLING LOCATION (TEMPORARY WELL)**

**2018 DIRECT PUSH GROUNDWATER SAMPLING LOCATION (MARCH)**

**2016 DIRECT PUSH GROUNDWATER SAMPLING LOCATION (FEBRUARY)**

**2015 DIRECT PUSH GROUNDWATER SAMPLING LOCATION (MARCH)**

**INTERPRETED HORIZONTAL EXTENT OF EXPLOSIVES (TNT CONCENTRATIONS  $>2\mu\text{g/L}$ ) MAY/JUNE 2020**

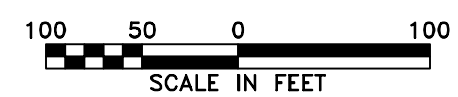
**DASHED WHERE INFERRED**

**INTERPRETED HORIZONTAL EXTENT OF EXPLOSIVES (RDX CONCENTRATIONS  $>2\mu\text{g/L}$ ) MAY/JUNE 2020**

**INTERPRETED HORIZONTAL EXTENT OF EXPLOSIVES (RDX CONCENTRATIONS  $>20\mu\text{g/L}$ ) MAY/JUNE 2020**

**GENERAL GROUNDWATER FLOW DIRECTION**

**NOTE:**  
EW7 PUMPING RATE SET AT 0 GPM DURING OU1 REBOUND STUDY AND SUBSURFACE INJECTION EVENTS.

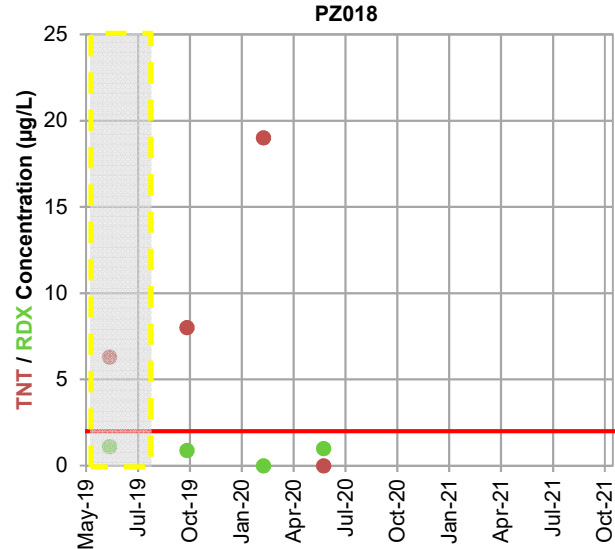
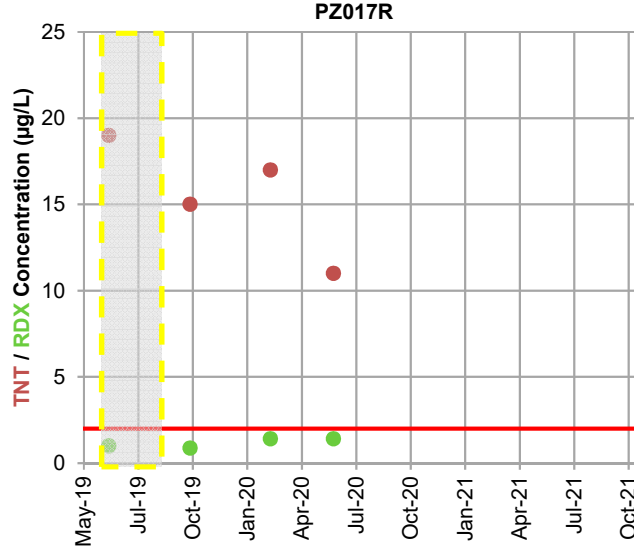
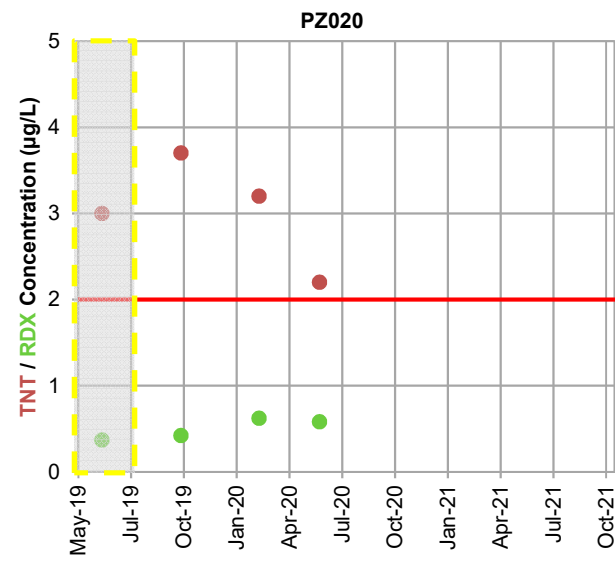
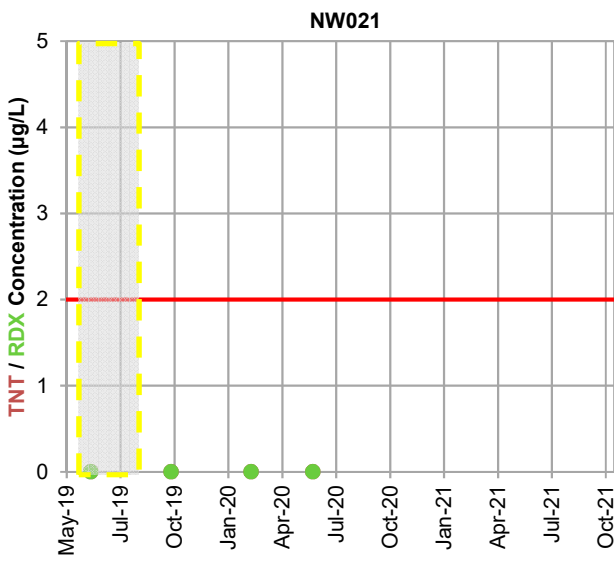
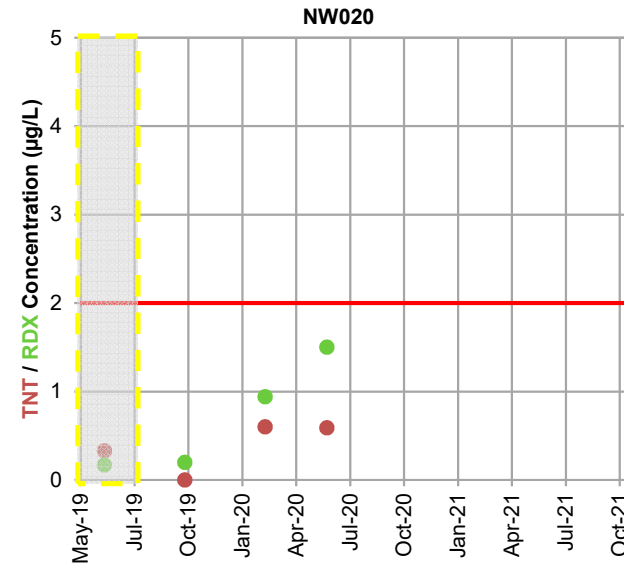
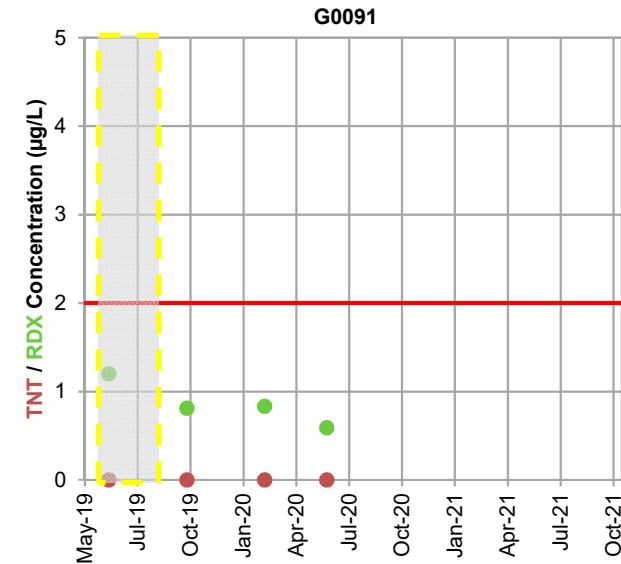


**Brice ENGINEERING**

**AECOM**

**EXTENT OF OU1 EXPLOSIVES PLUME, OU1 SUBSURFACE INJECTION PERFORMANCE MONITORING, QUARTER 3 (MAY/JUNE 2020) CORNHUSKER ARMY AMMUNITION PLANT**

DRN. BY: DPG	DATE: 07/27/20	PROJECT NO. 60565355	FIG. NO. 2-2
CHK'D. BY: DC	REVISION: 0		



Nonparametric Trend Analysis for **TNT** and **RDX** (OU1 Rebound Study)

Well	Detect	Non-detect	Total Samples	Detection Frequency	Min (µg/L)	Max (µg/L)	Mean (µg/L)	Median (µg/L)	MK Result	Trend
G0091	0 / 3	3 / 0	3 / 3	ND / 100%	ND / 0.59	ND / 0.83	ND / 0.74	ND / 0.81	NA / NA	NA / NA
NW020	2 / 3	1 / 0	3 / 3	66% / 100%	ND / 0.20	0.60 / 1.50	0.40 / 0.88	0.59 / 0.94	NA / NA	NA / NA
NW021	0 / 0	3 / 3	3 / 3	ND / ND	ND / ND	ND / ND	ND / ND	ND / ND	NA / NA	NA / NA
PZ020	3 / 3	0 / 0	3 / 3	100% / 100%	2.20 / 0.42	3.70 / 0.62	3.03 / 0.54	3.20 / 0.58	NA / NA	NA / NA
G0024	1 / 1	2 / 2	3 / 3	33% / 33%	ND / ND	0.63 / 0.59	0.21 / 0.20	ND / ND	NA / NA	NA / NA
G0077	3 / 3	0 / 0	3 / 3	100% / 100%	2.70 / 0.19	3.30 / 0.91	3.07 / 0.52	3.20 / 0.46	NA / NA	NA / NA
PZ017R	3 / 3	0 / 0	3 / 3	100% / 100%	11.0 / 0.87	17.0 / 1.40	14.3 / 1.22	15.0 / 1.40	NA / NA	NA / NA
PZ018	2 / 2	1 / 1	3 / 3	66% / 66%	ND / ND	19.0 / 1.00	9.00 / 0.63	8.00 / 0.88	NA / NA	NA / NA

Notes:

Trend analysis performed using Mann-Kendall test at 0.05 significance level.

µg/L = micrograms per liter

MK = Mann-Kendall

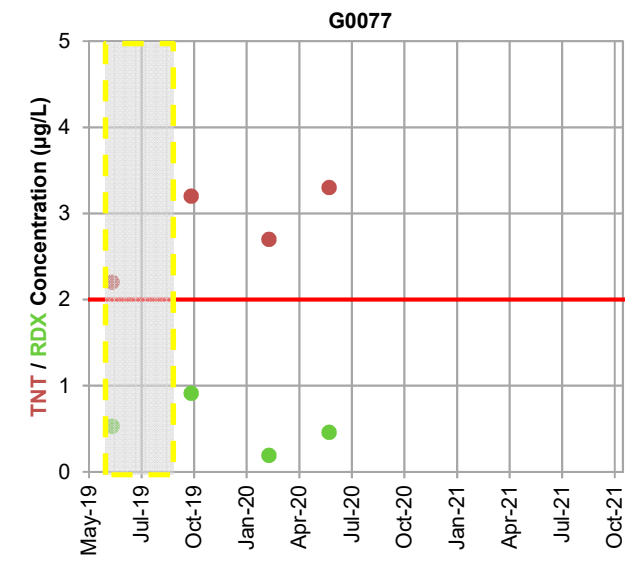
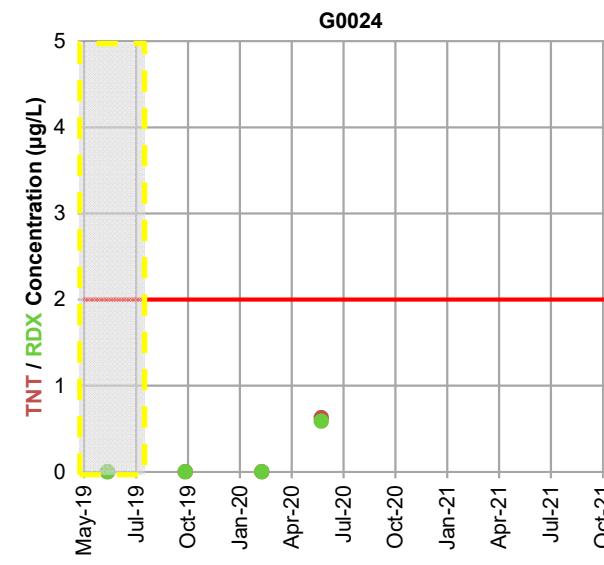
TNT = 2,4,6-trinitrotoluene

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

= Historic data not used for OU1 Rebound Study

= HAL (1994) TNT/RDX

NA = not applicable for MK until minimum of 4 sample results



Mann-Kendall Analysis for TNT and RDX  
Former Facility Boundary Wells (OU1)  
Cornhusker Army Ammunition Plant

Drawn By:

KW

Date:

7/27/2020

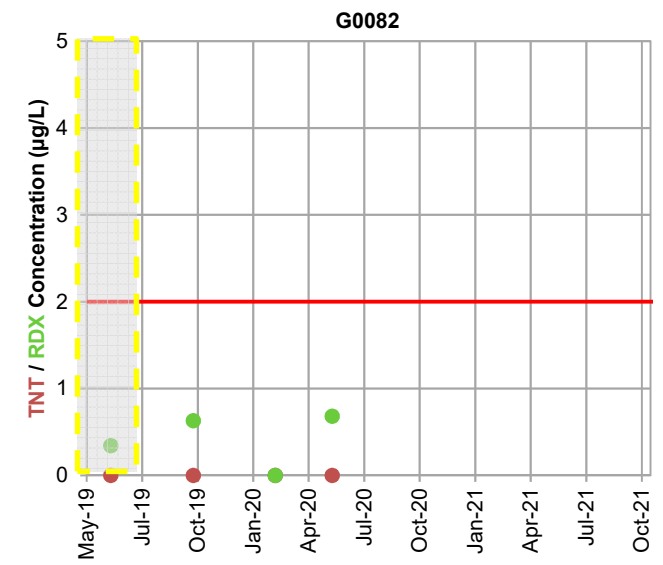
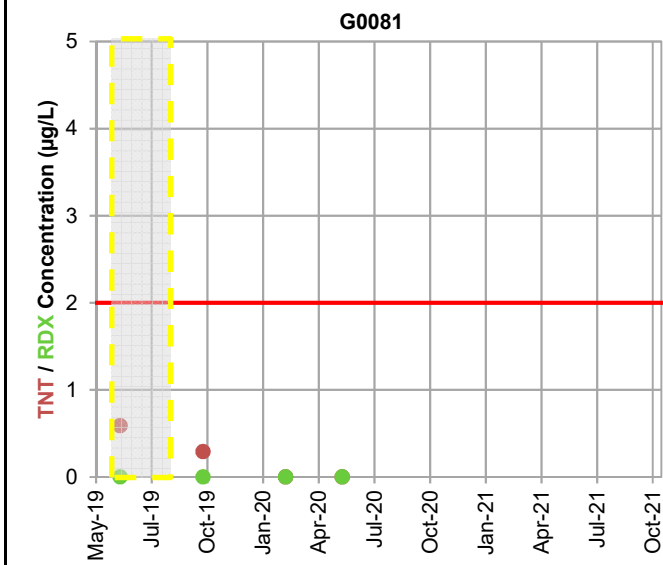
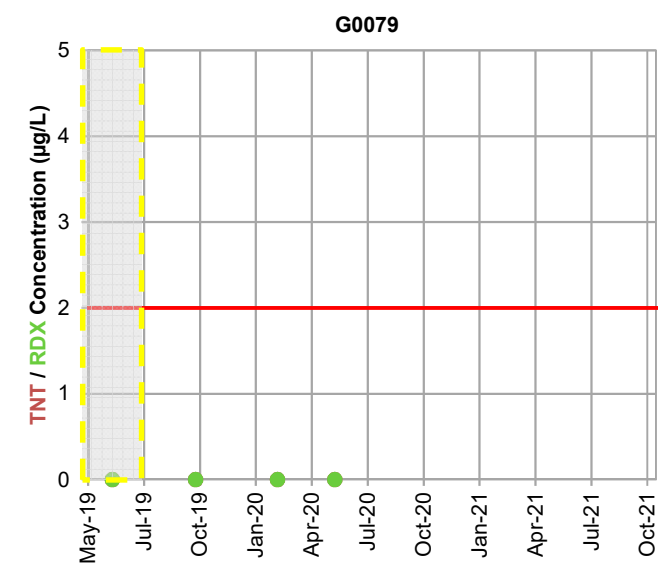
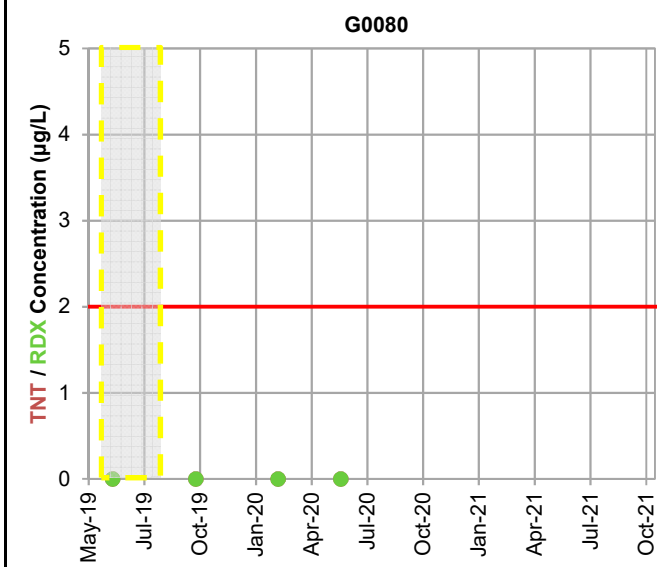
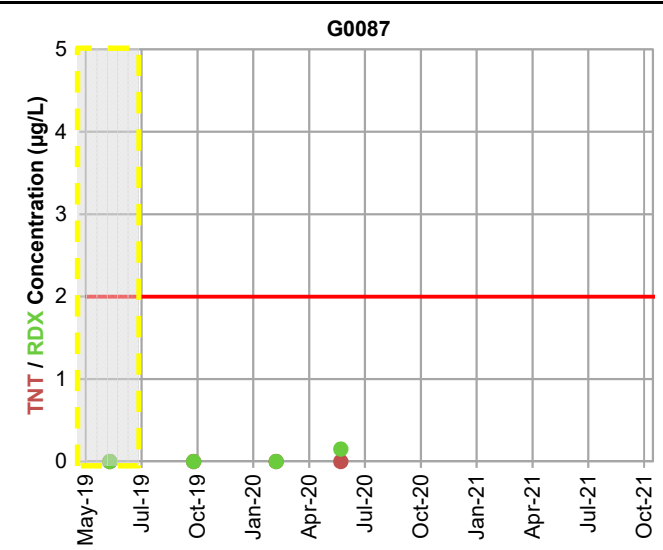
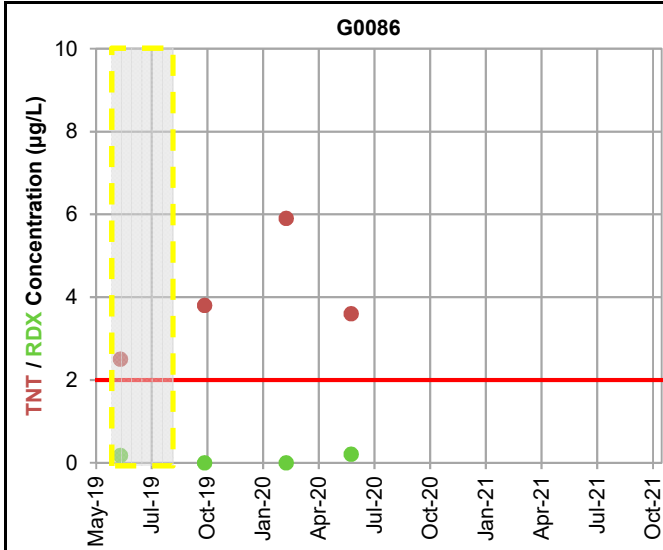
Checked By:

DC

Project No.:

60565355

Figure 4-1



Nonparametric Trend Analysis for **TNT** and **RDX** (OU1 Rebound Study)

Well	Detect	Non-detect	Total Samples	Detection Frequency	Min (µg/L)	Max (µg/L)	Mean (µg/L)	Median (µg/L)	MK Result	Trend
G0086	3 / 1	0 / 2	3 / 3	100% / 33%	3.60 / ND	5.90 / 0.21	4.43 / 0.07	3.80 / ND	NA / NA	NA / NA
G0087	0 / 1	3 / 2	3 / 3	ND / 33%	ND / ND	ND / 0.15	ND / 0.05	ND / ND	NA / NA	NA / NA
G0080	0 / 0	3 / 3	3 / 3	ND / ND	ND / ND	ND / ND	ND / ND	ND / ND	NA / NA	NA / NA
G0079	0 / 0	3 / 3	3 / 3	ND / ND	ND / ND	ND / ND	ND / ND	ND / ND	NA / NA	NA / NA
G0075	0 / 0	3 / 3	3 / 3	ND / ND	ND / ND	ND / ND	ND / ND	ND / ND	NA / NA	NA / NA
G0081	1 / 0	2 / 3	3 / 3	33% / ND	ND / ND	0.29 / ND	0.10 / ND	ND / ND	NA / NA	NA / NA
G0082	0 / 2	3 / 1	3 / 3	ND / 66%	ND / ND	ND / 0.68	ND / 0.44	ND / 0.63	NA / NA	NA / NA

Notes:

Trend analysis performed using Mann-Kendall test at 0.05 significance level.

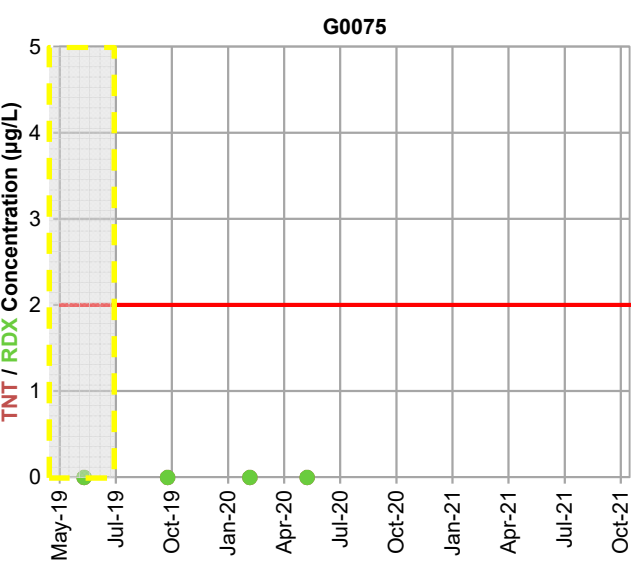
µg/L = micrograms per liter      MK = Mann-Kendall



TNT = 2,4,6-trinitrotoluene      RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

= Historic data not used for OU1 Rebound Study

= HAL (1994) TNT/RDX

NA = not applicable for MK until minimum of 4 sample results





Mann-Kendall Analysis for TNT and RDX  
Upgradient Wells (OU1)  
Cornhusker Army Ammunition Plant

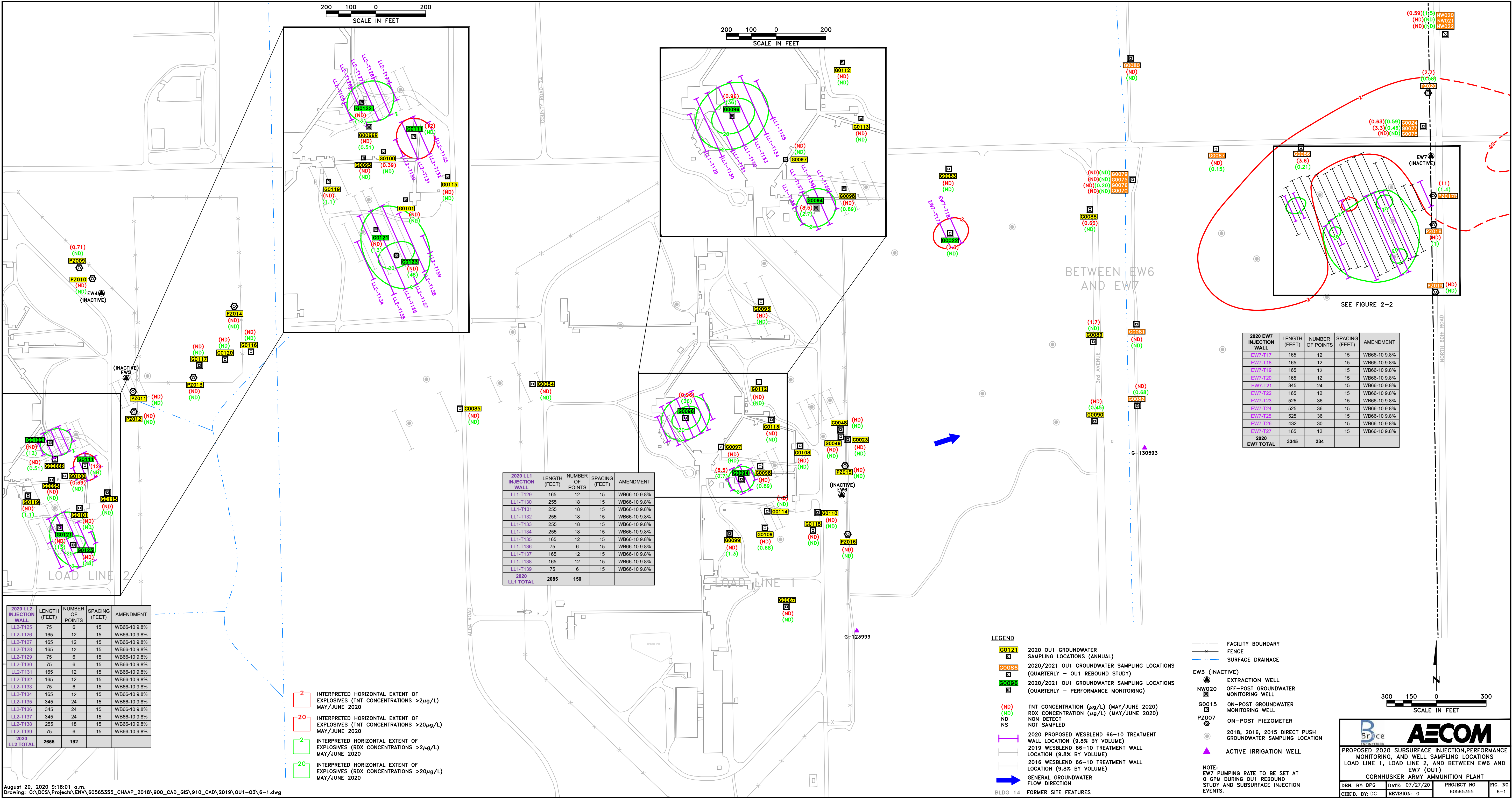
Drawn By:  
KW

Date:  
7/27/2020

Checked By:  
DC

Project No.:  
60565355

Figure 4-2



LEGEND:

- x— 4-FOOT BARBED WIRE FENCE
- G0102 2020/2021 OU1 GROUNDWATER SAMPLING LOCATIONS (QUARTERLY-PERFORMANCE MONITORING)
- (ND) RDX CONCENTRATION ( $\mu\text{g/L}$ ) (MAY/JUNE 2020)
- (ND) TNT CONCENTRATION ( $\mu\text{g/L}$ ) (MAY/JUNE 2020)
- NS = NOT SAMPLED  
ND = NON DETECT

— 2020 PROPOSED WESBLEND 66-10 TREATMENT WALL LOCATION (9.8% BY VOLUME)

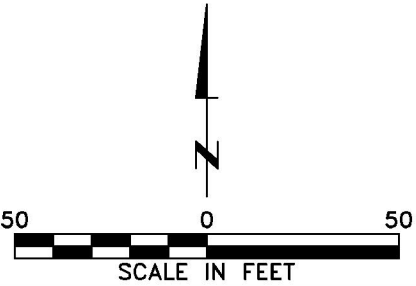
→ GENERAL GROUNDWATER FLOW DIRECTION



2 INTERPRETED HORIZONTAL EXTENT OF EXPLOSIVES (RDX CONCENTRATIONS  $>2\mu\text{g/L}$ ) MAY/JUNE 2020

20 INTERPRETED HORIZONTAL EXTENT OF EXPLOSIVES (RDX CONCENTRATIONS  $>20\mu\text{g/L}$ ) MAY/JUNE 2020

2020 DECANT STATION INJECTION WALL	LENGTH (FEET)	NUMBER OF POINTS	SPACING (FEET)	AMENDMENT
DS-T24	30	3	15	WB66-10 9.8%
DS-T25	75	6	15	WB66-10 9.8%
DS-T26	75	6	15	WB66-10 9.8%
DS-T27	75	6	15	WB66-10 9.8%
DS-T28	30	3	15	WB66-10 9.8%
2020 TOTAL	285	24		

August 11, 2020 2:22:48 p.m.  
Drawing: O:\DCS\Projects\ENV\60565355\_CHAAP\_2018\900\_CAD\_GIS\910\_CAD\2019\OU1-Q3\6-2.dwg





PROPOSED 2020 SUBSURFACE INJECTION, PERFORMANCE MONITORING LOCATIONS DECANT STATIONS (OU1) CORNHUSKER ARMY AMMUNITION PLANT

DRN. BY: DPG	DATE: 08/03/20	PROJECT NO. 60565355	FIG. NO. 6-2
CHK'D. BY: DC	DATE: 08/03/20		

**Appendix A**  
**Well Drilling Licenses**



## Public Health Licensure Unit Certification of Licensure

This certificate serves as primary source verification of licensure in the State of Nebraska as of the close of the business day before 10/ 9/2019.

**Name:** Corey S Anderson  
**Type:** WD-PIC  
**Number:** 39516  
**Status:** Active  
**Issued:** 01/02/2011  
**Expiration:** 12/31/2020  
**Education:** None on record at this time

### Disciplinary/Non-Disciplinary Information:

No disciplinary/non-disciplinary actions taken against this license.

If you have questions about this information, please contact the  
Licensure Unit at (402) 471-2115 or [DHHS.LicensureUnit@nebraska.gov](mailto:DHHS.LicensureUnit@nebraska.gov).



## Public Health Licensure Unit Certification of Licensure

This certificate serves as primary source verification of licensure in the State of Nebraska as of the close of the business day before 10/ 9/2019.

**Name:** Jesse V Kalvig  
**Type:** Well Drilling Contractor  
**Number:** 19210  
**Status:** Active  
**Issued:** 09/19/2000  
**Expiration:** 12/31/2020  
**Education:** None on record at this time

### Disciplinary/Non-Disciplinary Information:

No disciplinary/non-disciplinary actions taken against this license.

If you have questions about this information, please contact the  
Licensure Unit at (402) 471-2115 or [DHHS.LicensureUnit@nebraska.gov](mailto:DHHS.LicensureUnit@nebraska.gov).

**Appendix B**  
**OU1 Rebound Study and Performance Monitoring Completed Field Forms**

# WATER SAMPLE COLLECTION FIELD SHEET

PROJECT NAME CHAAP OUI Rebound Study- Direct Push GW (Screen Point) PROJECT NO. 25 60565355

SAMPLE NO. 05001-DP02-25 SAMPLE DEPTH: TV 21-24' bgs

DATE/TIME COLLECTED 5-26-20 / 1410 PERSONNEL T. Young  
J. Ortiz

SAMPLE METHOD Peristaltic Pump w/ Tubing

SAMPLE MEDIA: Groundwater

SAMPLE QA SPLIT: YES NO SPLIT SAMPLE NO. NA

SAMPLE QC DUPLICATE: YES YES NO DPLICATE SAMPLE NO. 05501-DP02-25 @ 0800

MS/MSD REQUESTED YES NO MS/MSD SAMPLE NO. NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
<u>4</u> <u>2</u> - 500mL Amber	<u>6°C</u>	<u>Explosives + MNX (8330A)</u>
<u>TV</u>		
	<u>TV</u>	

## WELL PURGING DATA

	PID Measurements
Date <u>5-26-20</u>	Background <u>ND</u>
Time Started <u>1355</u>	Breathing Zone <u>ND</u>
Time Completed <u>1410</u>	Well Head <u>ND</u>
Purge Volume (gal) <u>TV 5</u>	Purge Water <u>ND</u>
Sample Turbidity <u>47 NTU</u>	
Depth to Water (ft bgs) <u>4.1</u>	

## GENERAL COMMENTS

# WATER SAMPLE COLLECTION FIELD SHEET

PROJECT NAME CHAAP OU1 Rebound Study- Direct Push GW (Screen Point) PROJECT NO. 35 60565355  
SAMPLE NO. 05001-DP03-35 SAMPLE DEPTH: TY 31-34 bgs  
DATE/TIME COLLECTED 5-26-20 @ 1505 PERSONNEL T. Young  
SAMPLE METHOD Peristaltic Pump w/ Tubing J. Ortiz  
SAMPLE MEDIA: Groundwater  
SAMPLE QA SPLIT: YES NO SPLIT SAMPLE NO. - NA  
SAMPLE QC DUPLICATE: YES NO DUPLICATE SAMPLE NO. - NA  
MS/MSD REQUESTED YES NO MS/MSD SAMPLE NO. - NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
<u>2 - 500mL Amber</u>	<u>6°C</u>	<u>Explosives + MNX (8330A)</u>
<u>TV</u>		

## WELL PURGING DATA

		PID Measurements
Date	<u>5-26-20</u>	
Time Started	<u>1445</u>	Background <u>ND</u>
Time Completed	<u>1505</u>	Breathing Zone <u>ND</u>
Purge Volume (gal)	<u>3+1 5</u>	Well Head <u>ND</u>
Sample Turbidity	<u>56.1 NTU</u>	Purge Water <u>ND</u>
Depth to Water (ft bgs)	<u>3.90</u>	

## GENERAL COMMENTS

# WATER SAMPLE COLLECTION FIELD SHEET

**TY 45'**

PROJECT NAME CHAAP OU1 Rebound Study- Direct Push GW (Screen Point) PROJECT NO. 60565355

SAMPLE NO. 05001-DP08-45 SAMPLE DEPTH 41-44' bas

DATE/TIME COLLECTED 5-26-20 @ 1545 PERSONNEL T. Young  
J. Ortiz

SAMPLE METHOD Peristaltic Pump w/ Tubing

SAMPLE MEDIA: Groundwater

SAMPLE QA SPLIT: YES ☒ NO ☐ SPLIT SAMPLE NO. - NA

SAMPLE QC DUPLICATE: YES ☒ NO ☐ DUPLICATE SAMPLE NO. - NA

MS/MSD REQUESTED ☒ YES ☐ NO MS/MSD SAMPLE NO. 05001-DP08-45

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
<u>67 - 500mL Amber</u>	<u>6°C</u>	<u>Explosives + MNX (8330A)</u>
<u>TY</u>		
	<u>TY</u>	

## WELL PURGING DATA

		PID Measurements
Date	<u>5-26-20</u>	
Time Started	<u>1530</u>	Background <u>ND</u>
Time Completed	<u>1545</u>	Breathing Zone <u>ND</u>
Purge Volume (gal)	<u>345</u>	Well Head <u>ND</u>
Sample Turbidity	<u>27.8 NTU</u>	Purge Water <u>ND</u>
Depth to Water (ft bgs)	<u>3.90</u>	

## GENERAL COMMENTS

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME CHAAP PROJECT NO. 60565355  
SAMPLE NO. CA210-20A WELL NO. CA210  
DATE/TIME COLLECTED 6/9/20 1230 PERSONNEL CA/JO  
SAMPLE METHOD PRO-ACTIVE SS MONSOON

SAMPLE MEDIA: Groundwater  
SAMPLE QA SPLIT: YES NO SPLIT SAMPLE NO. NA  
SAMPLE QC DUPLICATE: YES NO DUPLICATE SAMPLE NO. NA  
MS/MSD REQUESTED YES NO MS/MSD SAMPLE NO. NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	Well Depth (ft BTOC)
<u>6/9/20</u>	<u>16.85</u>
Time Started	Depth to Water (ft BTOC)
<u>1140</u>	<u>0.38</u>
Time Completed	Water Column Length
<u>1230</u>	<u>10.47</u>
PID Measurements	Well Casing Volume (per ft)
Background	<u>2.47</u>
Breathing Zone	Volume of Water in Well (L)
<u>ND</u>	<u>25.86</u>
Well Head	Casing Volumes to Purge
<u>ND</u>	<u>NA</u>
Purge Water	Minimum to Purge (L)
<u>ND</u>	<u>20L</u>
	Actual Purge (L)
	<u>25</u>

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
<u>1145</u>	<u>2.5</u>	<u>6.37</u>	<u>12.68</u>	<u>1.57</u>	<u>1.11</u>	<u>133</u>	<u>0.0</u>	<u>6.39</u>	<u>0.5</u>
<u>1150</u>	<u>5.0</u>	<u>6.34</u>	<u>13.59</u>	<u>1.58</u>	<u>0.77</u>	<u>130</u>	<u>0.0</u>	<u>6.39</u>	<u>2.5</u>
<u>1155</u>	<u>7.5</u>	<u>6.35</u>	<u>13.45</u>	<u>1.58</u>	<u>0.61</u>	<u>111</u>	<u>0.0</u>	<u>6.39</u>	
<u>1200</u>	<u>10.0</u>	<u>6.35</u>	<u>14.05</u>	<u>1.57</u>	<u>0.58</u>	<u>106</u>	<u>0.0</u>	<u>6.39</u>	
<u>1205</u>	<u>12.5</u>	<u>6.36</u>	<u>14.53</u>	<u>1.56</u>	<u>0.53</u>	<u>98</u>	<u>0.0</u>	<u>6.39</u>	
<u>1210</u>	<u>15.0</u>	<u>6.37</u>	<u>14.55</u>	<u>1.55</u>	<u>0.51</u>	<u>92</u>	<u>0.0</u>	<u>6.39</u>	
<u>1215</u>	<u>17.5</u>	<u>6.38</u>	<u>14.54</u>	<u>1.55</u>	<u>0.47</u>	<u>84</u>	<u>0.0</u>	<u>6.39</u>	
<u>1220</u>	<u>20.0</u>	<u>6.39</u>	<u>14.79</u>	<u>1.55</u>	<u>0.45</u>	<u>77</u>	<u>0.0</u>	<u>6.39</u>	
<u>1225</u>	<u>22.5</u>	<u>6.40</u>	<u>15.20</u>	<u>1.55</u>	<u>0.46</u>	<u>73</u>	<u>0.0</u>	<u>6.39</u>	
<u>1230</u>	<u>25.0</u>	<u>6.40</u>	<u>15.57</u>	<u>1.55</u>	<u>0.48</u>	<u>70</u>	<u>0.0</u>	<u>6.39</u>	
Parameters Stable, Collect Sample									

## FIELD EQUIPMENT AND CALIBRATION

Model	Calibration
Water Level Probe <u>Solinst 102</u>	Checked Against Calibrated Length
Water Quality Meter <u>JO YSI 556 Multi-Parameter Probe</u>	Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron = 1.13 mg/L  
Multi-Parameter Probe Unit # 59600 #1  
Field Parameters Measured in Flow-Through Cell  
Pump Placement Depth = 12.9 ft  
Pump Rate = 0.5 L/min  
Well Diameter = 4"  
Screen Interval = 7.9 - 17.9

	Historic (7-year average low and high / 2019 / Avg in Bold)			
ORP	61.3	165.5	61.3	<b>113.4</b>
DO	0.45	1.99	1.99	<b>1.22</b>
PH	5.83	6.55	6.19	<b>6.19</b>
Cond.	0.708	0.977	0.843	<b>0.843</b>

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME CHAAP PROJECT NO. 60565355  
 SAMPLE NO. To CA211-20A WELL NO. CA211  
 DATE/TIME COLLECTED 6/9/20 1400 PERSONNEL To CH  
 SAMPLE METHOD PRO-ACTIVE SS MONSOON

SAMPLE MEDIA: Groundwater  
 SAMPLE QA SPLIT: YES NO SPLIT SAMPLE NO. NA  
 SAMPLE QC DUPLICATE: YES NO DUPLICATE SAMPLE NO. NA  
 MS/MSD REQUESTED YES NO MS/MSD SAMPLE NO. NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	Well Depth (ft BTOC)
<u>6/9/20</u>	<u>43.10</u>
Time Started <u>1320</u>	Depth to Water (ft BTOC) <u>6.47</u>
Time Completed <u>1400</u>	Water Column Length <u>36.63</u>
PID Measurements	Well Casing Volume (per ft) <u>2.47</u>
Background <u>ND</u>	Volume of Water in Well (L) <u>90.5</u>
Breathing Zone <u>ND</u>	Casing Volumes to Purge <u>N/A</u>
Well Head <u>ND</u>	Minimum to Purge (L) <u>20</u>
Purge Water <u>ND</u>	Actual Purge (L) <u>20</u>

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1325	2.5	6.59	13.02	1.12	1.62	91	0.0	6.49	0.5
1330	5.0	6.46	12.97	1.12	1.13	91	0.0	6.49	↓
1335	7.5	6.44	13.00	1.12	1.02	91	0.0	6.49	
1340	10.0	6.43	13.07	1.12	0.94	92	0.0	6.49	
1345	12.5	6.44	12.86	1.12	0.88	92	0.0	6.49	
1350	15.0	6.44	12.81	1.12	0.84	93	0.0	6.49	
1355	17.5	6.45	12.77	1.12	0.81	93	0.0	6.49	
1400	20.0	6.46	12.81	1.11	0.78	94	0.0	6.49	
Parameters Stable, Collect Sample									

## FIELD EQUIPMENT AND CALIBRATION

Model	Calibration
Water Level Probe <u>Solinst 102</u>	Checked Against Calibrated Length
Water Quality Meter <u>YSI 556 Multi-Parameter Probe</u>	Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron = 0.41 mg/L  
 Multi-Parameter Probe Unit # 59600 #1  
 Field Parameters Measured in Flow-Through Cell  
 Pump Placement Depth = 37.8 ft  
 Pump Rate = 0.5 L/min  
 Well Diameter = 4"  
 Screen Interval = 32.8 - 42.8

	Historic (7-year average low and high / 2019 / Avg in Bold)			
ORP	33.6	177.2	33.6	<b>124.0</b>
DO	0.44	0.93	0.93	<b>0.70</b>
PH	6.17	6.49	6.17	<b>6.37</b>
Cond.	0.662	0.811	0.811	<b>0.726</b>

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP	PROJECT NO.	60565355
SAMPLE NO.	CA212-20A	WELL NO.	CA212
DATE/TIME COLLECTED	6/9/20 1515	PERSONNEL	JO CH
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		

SAMPLE MEDIA: Groundwater		
SAMPLE QA SPLIT:	YES	NO
SAMPLE QC DUPLICATE:	YES	NO
MS/MSD REQUESTED	YES	NO

SPLIT SAMPLE NO.	NA
DUPLICATE SAMPLE NO.	NA
MS/MSD SAMPLE NO.	NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	6/9/20	Well Depth (ft BTOC)	67.12
Time Started	1435	Depth to Water (ft BTOC)	6.44
Time Completed	1515	Water Column Length	60.68
PID Measurements		Well Casing Volume (per ft)	2.47
Background	ND	Volume of Water in Well (L)	149.8
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20
Purge Water	ND	Actual Purge (L)	20

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1440	2.5	6.97	12.58	0.735	0.68	101	0.0	6.46	0.5
1445	5.0	6.79	12.48	0.735	0.59	101	0.0	6.46	
1450	7.5	6.66	12.57	0.735	0.53	100	0.0	6.46	
1455	10.0	6.64	12.56	0.734	0.48	99	0.0	6.46	
1500	12.5	6.63	12.56	0.733	0.46	99	0.0	6.46	
1505	15.0	6.63	12.53	0.732	0.44	99	0.0	6.46	
1510	17.5	6.64	12.51	0.732	0.43	98	0.0	6.46	
1515	20.0	6.64	12.48	0.732	0.41	98	0.0	6.46	
Parameters Stable / collect sample									
/ / / / / / / / /									

## FIELD EQUIPMENT AND CALIBRATION

<table border="0"> <tr> <td style="width: 50%;">Water Level Probe</td> <td style="width: 50%;">Model Solinst 102</td> </tr> <tr> <td>Water Quality Meter</td> <td>YSI 556 Multi-Parameter Probe</td> </tr> </table>	Water Level Probe	Model Solinst 102	Water Quality Meter	YSI 556 Multi-Parameter Probe	<table border="0"> <tr> <td style="width: 50%;">Calibration</td> <td style="width: 50%;">Checked Against Calibrated Length</td> </tr> <tr> <td colspan="2">Twice Daily Calibration Verification also Calibrated Weekly</td> </tr> </table>	Calibration	Checked Against Calibrated Length	Twice Daily Calibration Verification also Calibrated Weekly	
Water Level Probe	Model Solinst 102								
Water Quality Meter	YSI 556 Multi-Parameter Probe								
Calibration	Checked Against Calibrated Length								
Twice Daily Calibration Verification also Calibrated Weekly									

## GENERAL COMMENTS

Ferrous Iron = 0.93 mg/L				
Multi-Parameter Probe Unit # 59600 #1				
Field Parameters Measured in Flow-Through Cell				
Pump Placement Depth = 62 ft				
Pump Rate = 0.5 L/min				
Well Diameter = 4"	Historic (7-year average low and high / 2019 / Avg in Bold)			
Screen Interval = 57.0 - 67.0	ORP	22.3	187.4	22.3
	DO	0.16	0.89	0.89
	PH	6.50	6.88	6.50
	Cond.	0.496	0.648	0.648
				<b>119.8</b>
				<b>0.50</b>
				<b>6.69</b>
				<b>0.572</b>

## GENERAL INFORMATION

**SAMPLE METHOD** **PRO-ACTIVE SS MONSOON**

SAMPLE MEDIA:	Groundwater		
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO. <u>NA</u>
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO. <u>NA</u>
MS/MSD REQUESTED	YES	NO	MS/MSD SAMPLE NO. <u>NA</u>

<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

Date	6/9/20	Well Depth (ft BTOC)	91.34
Time Started	1600	Depth to Water (ft BTOC)	7.25
Time Completed	1640	Water Column Length	84.09
<u>PID Measurements</u>		Well Casing Volume (per ft)	2.47
Background	ND	Volume of Water in Well (L)	207.7
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20
Purge Water	ND	Actual Purge (L)	20

[illegible]

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Solinst 102	Checked Against Calibrated Length
Water Quality Meter	<del>YSI 556 Multi-Parameter Probe</del>	Twice Daily Calibration Verification also Calibrated Weekly

Ferrous Iron = 1.02 mg/L  
 Multi-Parameter Probe Unit # 59600 #1  
 Field Parameters Measured in Flow-Through Cell  
 Pump Placement Depth = 84.6 ft  
 Pump Rate = 0.5 L/min  
 Well Diameter = 4"

	Historic (7-year average low and high / 2019 / Avg in Bold)				
Screen Interval = 79.6 - 89.6	ORP	17.4	183.9	17.4	<b>106.5</b>
	DO	0.22	1.51	1.51	<b>0.65</b>
	PH	7.25	7.64	7.25	<b>7.45</b>
	Cond.	0.373	0.406	0.406	<b>0.386</b>

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP	PROJECT NO.	60565355
SAMPLE NO.	NW020-20A	WELL NO.	NW020
DATE/TIME COLLECTED	6/15/20 @ 820	PERSONNEL	CH/JO
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		

SAMPLE MEDIA: Groundwater	
SAMPLE QA SPLIT: YES	NO
SAMPLE QC DUPLICATE: YES	NO
MS/MSD REQUESTED: YES	NO

SPLIT SAMPLE NO.	NA
DUPLICATE SAMPLE NO.	NA
MS/MSD SAMPLE NO.	NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	6/15/20 @	Well Depth (ft BTOC)	29.92
Time Started	740	Depth to Water (ft BTOC)	11.02
Time Completed	820	Water Column Length	18.9
PID Measurements		Well Casing Volume (per ft)	2.47
Background	ND	Volume of Water in Well (L)	46.7
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20
Purge Water	ND	Actual Purge (L)	20

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
745	2.5	6.25	15.67	1.40	7.91	189	0.0	11.00	0.5
750	5.0	6.35	14.44	1.43	7.10	178	0.0	11.01	
755	7.5	6.40	14.29	1.43	6.86	169	0.0	11.01	
800	10.0	6.46	13.84	1.44	6.84	162	0.0	11.01	
805	12.5	6.49	13.85	1.44	6.64	159	0.0	11.01	
810	15.0	6.52	13.90	1.45	6.50	157	0.0	11.01	
815	17.5	6.55	13.90	1.45	6.40	155	0.0	11.01	
820	20.0	6.57	14.06	1.45	6.30	153	0.0	11.01	
Parameters Stable			Collect	Sample	-	-	-	-	-

## FIELD EQUIPMENT AND CALIBRATION

Model	Calibration
Water Level Probe	Heron
Water Quality Meter	Horiba U-52 Multi-Parameter Probe
	Checked Against Calibrated Length
	Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron = 0.96 mg/L	
Multi-Parameter Probe Unit # 5960 #1	
Field Parameters Measured in Flow-Through Cell	
Pump Placement Depth = 20 ft	
Pump Rate = 0.5 L/min	
Historic (7-year average low and high / 2019 / Avg in Bold)	
Well Diameter = 4"	ORP 41.1 195.7 41.1 130.0
Screen Interval = 15-25	DO 2.72 6.04 6.04 4.04
	PH 6.11 6.53 6.45 6.35
	Cond. 0.713 1.118 0.994 0.921

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP	PROJECT NO.	60565355
SAMPLE NO.	NW021-20A	WELL NO.	NW021
DATE/TIME COLLECTED	6/15/16 @ 930	PERSONNEL	CH/JO
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		

SAMPLE MEDIA: Groundwater		
SAMPLE QA SPLIT:	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	SPLIT SAMPLE NO. NA
SAMPLE QC DUPLICATE:	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	DUPLICATE SAMPLE NO. NW023-20A @ 800
MS/MSD REQUESTED	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	MS/MSD SAMPLE NO. NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	6/15/16	Well Depth (ft BTOC)	45.75
Time Started	850	Depth to Water (ft BTOC)	11.27
Time Completed	930	Water Column Length	34.48
PID Measurements		Well Casing Volume (per ft)	2.47
Background	ND	Volume of Water in Well (L)	85.2
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20
Purge Water	ND	Actual Purge (L)	20

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
855	2.5	6.78	15.36	1.19	0.65	150	0.0	11.28	0.5
900	5.0	6.79	15.19	1.19	0.54	151	0.0	11.29	
905	7.5	6.83	15.08	1.19	0.48	150	0.0	11.28	
910	10.0	6.84	15.07	1.19	0.41	150	0.0	11.28	
915	12.5	6.83	14.37	1.19	0.39	151	0.0	11.28	
920	15.0	6.83	14.85	1.19	0.36	151	0.0	11.28	
925	17.5	6.83	14.86	1.19	0.35	151	0.0	11.29	
930	20.0	6.84	15.25	1.18	0.34	150	0.0	11.28	
Parameters collected Sample									

## FIELD EQUIPMENT AND CALIBRATION

Model	Calibration
Water Level Probe	Heron
Water Quality Meter	Checked Against Calibrated Length
	Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron = 1.09 mg/L				
Multi-Parameter Probe Unit # 59600 #1				
Field Parameters Measured in Flow-Through Cell				
Pump Placement Depth = 39.5 ft				
Pump Rate = 0.15 L/min				
Historic (7-year average low and high / 2019 / Avg in Bold)				
Well Diameter = 4"	ORP	26.7	182.3	26.7
Screen Interval = 37-42	DO	0.06	1.18	0.83
	PH	6.53	6.91	6.69
	Cond.	0.800	1.154	0.825
				<b>110.6</b>
				<b>0.48</b>
				<b>6.73</b>
				<b>0.907</b>

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP	PROJECT NO.	60565355
SAMPLE NO.	NW022-20A	WELL NO.	NW022
DATE/TIME COLLECTED	6/15/20 @ 1050	PERSONNEL	CH/JO
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		

SAMPLE MEDIA: Groundwater	
SAMPLE QA SPLIT: YES	NO
SAMPLE QC DUPLICATE: YES	NO
MS/MSD REQUESTED: YES	NO

SPLIT SAMPLE NO.	NA
DUPLICATE SAMPLE NO.	NA
MS/MSD SAMPLE NO.	NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	6/15/20	Well Depth (ft BTOC)	66.60
Time Started	1010	Depth to Water (ft BTOC)	11.20
Time Completed	1050	Water Column Length	55.4
PID Measurements		Well Casing Volume (per ft)	2.47
Background	ND	Volume of Water in Well (L)	136.8
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20
Purge Water	ND	Actual Purge (L)	20

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1015	2.5	6.98	15.32	1.39	0.39	141	0.0	11.21	0.5
1020	5.0	6.90	16.89	1.40	0.42	135	0.0	11.21	
1025	7.5	6.92	17.27	1.40	0.42	127	0.0	11.21	
1030	10.0	6.98	16.64	1.40	0.39	116	0.0	11.22	
1035	12.5	7.01	16.36	1.40	0.37	107	0.0	11.22	
1040	15.0	7.03	16.16	1.39	0.35	99	0.0	11.22	
1045	17.5	7.05	15.97	1.39	0.34	92	0.0	11.22	
1050	20.0	7.05	15.64	1.39	0.33	85	0.0	11.23	
Parameters Stable Collect Sample									
/	/	/	/	/	/	/	/	/	/

## FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	YSI 556 Multi-Parameter Probe	Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron =	1.94	mg/L
Multi-Parameter Probe Unit #	59600	#1
Field Parameters Measured in Flow-Through Cell		
Pump Placement Depth =	61.5	ft
Pump Rate =	0.5	
	Historic (7-year average low and high / 2019 / Avg in Bold)	
Well Diameter = 4"	ORP	-45.3      207.7      15.4 <b>52.6</b>
Screen Interval = 59 - 64	DO	0.08      1.15      0.72 <b>0.46</b>
	PH	6.77      7.34      7.02 <b>7.01</b>
	Cond.	0.964      1.270      1.019 <b>1.075</b>

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP	PROJECT NO.	60565355
SAMPLE NO.	NW050-20A <del>CH NW050-2</del>	WELL NO.	NW050
DATE/TIME COLLECTED	6/10/20 @ 1320	PERSONNEL	CH/JO
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		

SAMPLE MEDIA: Groundwater		
SAMPLE QA SPLIT:	YES	NO
SAMPLE QC DUPLICATE:	YES	NO
MS/MSD REQUESTED	YES	NO

SPLIT SAMPLE NO.	NA
DUPLICATE SAMPLE NO.	NA
MS/MSD SAMPLE NO.	NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	6/10/20	Well Depth (ft BTOC)	20.11
Time Started	1240	Depth to Water (ft BTOC)	25.98 5.97
Time Completed	1320	Water Column Length	14.13
PID Measurements		Well Casing Volume (per ft)	2.47
Background	ND	Volume of Water in Well (L)	34.9
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20
Purge Water	ND	Actual Purge (L)	20

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1245	2.5	6.19	13.96	0.568	0.98	119	0.0	5.95	0.5
1250	5.0	6.07	13.76	0.573	0.71	123	0.0	5.95	
1255	7.5	6.02	13.82	0.571	0.59	125	0.9	5.95	
1300	10.0	5.99	13.81	0.570	0.52	127	1.3	5.96	
1305	12.5	5.97	13.90	0.569	0.47	129	0.77-0.8	5.96	
1310	15.0	5.96	13.90	0.569	0.43	130	1.2	5.96	
1315	17.5	5.96	14.01	0.567	0.41	130	1.5	5.96	
1320	20.0	5.97	14.04	0.567	0.40	130	0.8	5.96	
Parameters stable collect sample									

## FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	YSI 556 Multi-Parameter Probe <del>CH</del> <del>YSI 556 Multi-Parameter Probe</del> HORIZON	Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron =	0.30 mg/L
Multi-Parameter Probe Unit #	59600 #1
Field Parameters Measured in Flow-Through Cell	
Pump Placement Depth =	15.1 ft
Pump Rate =	0.5 L/min
Well Diameter = 4"	
Screen Interval = 10.1 - 20.1	
	Historic (7-year average low and high / 2019 / Avg in Bold)
ORP	112.8 166.4 140.3 139.8
DO	0.24 4.31 0.37 1.64
PH	6.50 6.71 6.56 6.59
Cond.	1.178 1.916 1.259 1.451

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP	PROJECT NO.	60565355
SAMPLE NO.	NW051-20A <del>NW051-2</del>	WELL NO.	NW051
DATE/TIME COLLECTED	6/10/20 @ 1435	PERSONNEL	CH 150
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		

SAMPLE MEDIA:	Groundwater		
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO. NA
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO. NA
MS/MSD REQUESTED	YES	NO	MS/MSD SAMPLE NO. NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	6/10/20	Well Depth (ft BTOC)	34.53
Time Started	1355	Depth to Water (ft BTOC)	6.20
Time Completed	1435	Water Column Length	28.33
PID Measurements		Well Casing Volume (per ft)	2.47
Background	ND	Volume of Water in Well (L)	70.0
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20
Purge Water	ND	Actual Purge (L)	20

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1400	2.5	6.19	14.00	0.440	0.78	124	0.0	6.22	0.5
1405	5.0	6.17	13.94	0.442	0.60	125	0.9	6.22	
1410	7.5	6.15	13.61	0.443	0.52	125	1.7	6.22	
1415	10.0	6.14	13.70	0.443	0.46	126	1.8	6.22	
1420	12.5	6.14	14.20	0.442	0.43	126	1.5	6.22	
1425	15.0	6.14	14.11	0.446	0.40	125	1.9	6.22	
1430	17.5	6.14	14.48	0.443	0.38	125	1.6	6.22	
1435	20.0	6.14	15.00	0.442	0.37	126	0.5	6.22	
Parameters stable collect sample									

## FIELD EQUIPMENT AND CALIBRATION

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	YSI 556 Multi-Parameter Probe	Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron = 0.41 mg/L				
Multi-Parameter Probe Unit # 59600 #1				
Field Parameters Measured in Flow-Through Cell				
Pump Placement Depth = 32.0 ft				
Pump Rate = 0.5 L/min				
Historic (7-year average low and high / 2019 / Avg in Bold)				
Well Diameter = 4"	ORP	132.3	179.4	157.2
Screen Interval = 29.5 - 34.5	DO	0.32	7.01	7.01
	PH	6.32	6.49	6.49
	Cond.	1.088	1.451	1.257
				<b>1.265</b>

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP	PROJECT NO.	60565355
SAMPLE NO.	NW052-20A <del>CH NW052-2</del>	WELL NO.	NW052
DATE/TIME COLLECTED	6/10/20 @ 1550	PERSONNEL	CH/50
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		

SAMPLE MEDIA: Groundwater		
SAMPLE QA SPLIT:	YES	NO
SAMPLE QC DUPLICATE:	YES	NO
MS/MSD REQUESTED	YES	NO

SPLIT SAMPLE NO.	NA
DUPLICATE SAMPLE NO.	NA
MS/MSD SAMPLE NO.	NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	6/10/20	Well Depth (ft BTOC)	60.95
Time Started	1505	Depth to Water (ft BTOC)	5.51
Time Completed	1550	Water Column Length	55.44
PID Measurements		Well Casing Volume (per ft)	2.47
Background	ND	Volume of Water in Well (L)	136.9
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20.0
Purge Water	ND	Actual Purge (L)	22.5

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1510	2.5	6.42	14.18	0.318	0.92	70	0.5	5.54	0.5
1515	5.0	6.31	14.08	0.317	0.69	52	1.0	5.54	
1520	7.5	6.27	14.29	0.317	0.57	43	0.6	5.54	
1525	10.0	6.26	14.41	0.316	0.51	36	1.7	5.54	
1530	12.5	6.26	14.68	0.316	0.46	31	1.5	5.54	
1535	15.0	6.26	14.93	0.316	0.46	28	1.3	5.54	
1540	17.5	6.26	13.96	0.313	0.40	27	1.4	5.54	
1545	20.0	6.27	13.86	0.313	0.38	26	1.2	5.54	
1550	22.5	6.26	13.63	0.312	0.36	27	1.5	5.54	
Parameters stable collect sample									

## FIELD EQUIPMENT AND CALIBRATION

Model	Calibration
Water Level Probe	Heron
Water Quality Meter	YSI 556 Multi-Parameter Probe
	Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron = 0.96 mg/L				
Multi-Parameter Probe Unit # 59600 #1				
Field Parameters Measured in Flow-Through Cell				
Pump Placement Depth = 58.1 ft				
Pump Rate = 0.15 L/min				
Historic (7-year average low and high / 2019 / Avg in Bold)				
Well Diameter = 4"	ORP	-34.5	134.5	87.4
Screen Interval = 55.6 - 60.6	DO	0.31	0.66	0.31
	PH	6.15	7.24	6.80
	Cond.	0.738	0.920	0.906

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP <u>NW060-20A</u>	PROJECT NO.	60565355
SAMPLE NO.	<u>NW060-2</u>	WELL NO.	NW060
DATE/TIME COLLECTED	<u>6/10/20 @ 855</u>	PERSONNEL	<u>CH/JO</u>
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		

SAMPLE MEDIA: Groundwater		
SAMPLE QA SPLIT:	YES	NO
SAMPLE QC DUPLICATE:	YES	NO
MS/MSD REQUESTED	YES	NO

SPLIT SAMPLE NO.	NA
DUPLICATE SAMPLE NO.	NA
MS/MSD SAMPLE NO.	NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	<u>6/10/20</u>	Well Depth (ft BTOC)	20.15
Time Started	<u>815</u>	Depth to Water (ft BTOC)	<u>8.35</u>
Time Completed	<u>855</u>	Water Column Length	<u>11.7</u>
PID Measurements		Well Casing Volume (per ft)	<u>2.47</u>
Background	<u>ND</u>	Volume of Water in Well (L)	<u>28.9</u>
Breathing Zone	<u>ND</u>	Casing Volumes to Purge	<u>NA</u>
Well Head	<u>ND</u>	Minimum to Purge (L)	<u>20L</u>
Purge Water	<u>NO</u>	Actual Purge (L)	<u>20</u>

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
820	2.5	5.44	11.48	0.031	13.10	185	0.0	8.33	0.5
825	5.0	5.17	11.46	0.031	13.02	183	0.0	8.33	
830	7.5	5.11	11.44	0.031	12.97	181	0.0	8.33	
835	10.0	5.09	11.43	0.031	12.90	178	0.0	8.33	
840	12.5	5.10	11.46	0.030	12.80	176	0.0	8.33	
845	15.0	5.13	11.54	0.031	12.74	176	0.0	8.33	
850	17.5	5.15	11.58	0.031	12.72	176	0.0	8.33	
855	20.0	5.18	11.66	0.031	12.64	176	0.0	8.33	
Parameters stable collect sample									

## FIELD EQUIPMENT AND CALIBRATION

Model Water Level Probe Solinst 102 Water Quality Meter <u>CH YSI 556 Multi-Parameter Probe</u> <u>HORIBA</u>	Calibration Checked Against Calibrated Length Twice Daily Calibration Verification also Calibrated Weekly
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## GENERAL COMMENTS

Ferrous Iron = <u>0.10</u> mg/L				
Multi-Parameter Probe Unit # <u>59600 #1</u>				
Field Parameters Measured in Flow-Through Cell				
Pump Placement Depth = <u>15</u> ft				
Pump Rate = <u>0.5 L/min</u>				
Historic (7-year average low and high / 2019 / Avg in Bold)				
Well Diameter = 4"	ORP	29.2	200.5	29.2
Screen Interval = 10.0 - 20.0	DO	9.09	10.75	10.20
	PH	5.77	6.01	5.77
	Cond.	0.075	0.130	0.130
				<b>133.8</b>
				<b>10.01</b>
				<b>5.87</b>
				<b>0.094</b>

Repurge

Cond.	0.075	0.130	0.130	<b>0.094</b>
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# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP	PROJECT NO.	60565355
SAMPLE NO.	NW061-20A <del>NW061-2</del>	WELL NO.	NW061
DATE/TIME COLLECTED	6/10/20 @ 1015	PERSONNEL	CH/50
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		

SAMPLE MEDIA:	Groundwater		
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO. NA
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO. NA
MS/MSD REQUESTED	YES	NO	MS/MSD SAMPLE NO. NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	6/10/20	Well Depth (ft BTOC)	44.90
Time Started	935	Depth to Water (ft BTOC)	8.05
Time Completed	1015	Water Column Length	36.85
PID Measurements		Well Casing Volume (per ft)	2.47
Background	ND	Volume of Water in Well (L)	91.0
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20.0
Purge Water	ND	Actual Purge (L)	20.0

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
940	2.5	6.35	13.43	0.310	0.73	170	7.4	8.05	0.5
945	5.0	6.46	13.15	0.310	0.55	181	4.2	8.05	
950	7.5	6.50	13.30	0.310	0.49	182	3.4	8.05	
955	10.0	6.52	13.20	0.311	0.46	182	2.7	8.05	
1000	12.5	6.55	13.26	0.310	0.43	181	2.5	8.05	
1005	15.0	6.56	13.31	0.309	0.41	181	2.6	8.05	
1010	17.5	6.58	13.44	0.307	0.39	181	5.0	8.05	
1015	20.0	6.59	13.37	0.308	0.38	180	1.4	8.05	
Parameters stable collect sample									

## FIELD EQUIPMENT AND CALIBRATION

Water Level Probe	Model Solinst 102	Calibration Checked Against Calibrated Length
Water Quality Meter	YSI 556 Multi-Parameter Probe HORIBA	Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron = 0.20 mg/L	
Multi-Parameter Probe Unit #	59600 #1
Field Parameters Measured in Flow-Through Cell	
Pump Placement Depth =	35.3 ft 42.8'
Pump Rate =	0.5 L/min
Well Diameter = 4"	
Screen Interval = 40.3 - 45.3	

	Historic (7-year average low and high / 2019 / Avg in Bold)			
ORP	0.1	151.1	0.1	96.2
DO	0.18	0.91	0.68	0.59
PH	6.77	7.01	6.77	6.93
Cond.	0.685	0.790	0.757	0.744

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME CHAAP PROJECT NO. 60565355

SAMPLE NO. NW062-20A WELL NO. NW062

DATE/TIME COLLECTED 6/10/20 @ 1200 PERSONNEL CH / JO

SAMPLE METHOD PRO-ACTIVE SS MONSOON

SAMPLE MEDIA: Groundwater

SAMPLE QA SPLIT: YES NO SPLIT SAMPLE NO. NA

SAMPLE QC DUPLICATE: YES NO DUPLICATE SAMPLE NO. NA

MS/MSD REQUESTED YES NO MS/MSD SAMPLE NO. NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	<u>6/10/20</u>	Well Depth (ft BTOC)	<u>63.45</u>
Time Started	<u>1100</u>	Depth to Water (ft BTOC)	<u>8.19</u>
Time Completed	<u>1200</u>	Water Column Length	<u>55.26</u>
PID Measurements		Well Casing Volume (per ft)	<u>2.47</u>
Background	<u>ND</u>	Volume of Water in Well (L)	<u>136.5</u>
Breathing Zone	<u>ND</u>	Casing Volumes to Purge	<u>NA</u>
Well Head	<u>ND</u>	Minimum to Purge (L)	<u>20.0</u>
Purge Water	<u>ND</u>	Actual Purge (L)	<u>30</u>

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1105	2.5	6.82	13.37	0.275	1.25	119	1.7	8.19	0.5
1110	5.0	6.68	13.50	0.274	0.83	80	1.4	8.19	
1115	7.5	6.65	13.43	0.274	0.66	50	1.0	8.19	
1120	10.0	6.64	13.31	0.274	0.53	28	1.2	8.19	
1125	12.5	6.65	13.36	0.273	0.46	8	1.4	8.19	
1130	15.0	6.66	13.33	0.273	0.43	-13	0.9	8.19	
1135	17.5	6.67	13.24	0.273	0.40	-30	1.3	8.19	
1140	20.0	6.68	13.31	0.272	0.38	-44	1.2	8.19	
1145	22.5	6.69	13.25	0.272	0.36	-52	1.4	8.19	
1150	25.0	6.70	13.41	0.271	0.35	-58	1.1	8.19	
1155	27.5	6.71	13.37	0.270	0.34	-63	1.0	8.19	
1200	30.0	6.71	13.31	0.270	0.33	-67	1.3	8.19	
Parameters stable collect sample									

## FIELD EQUIPMENT AND CALIBRATION

Model	Calibration
Water Level Probe <u>Solinst 102</u>	Checked Against Calibrated Length
Water Quality Meter <u>YSI 556 Multi-Parameter Probe</u>	Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron = <u>0.84</u> mg/L	
Multi-Parameter Probe Unit # <u>59600 #1</u>	
Field Parameters Measured in Flow-Through Cell	
Pump Placement Depth = <u>60.6</u> ft	
Pump Rate = <u>0.5</u> L/min	
Well Diameter = 4"	Historic (7-year average low and high / 2019 / Avg in Bold)
Screen Interval = 58.1 - 63.1	ORP -15.8 133.1 -15.8 <b>52.0</b>
	DO 0.17 0.65 0.65 <b>0.36</b>
	PH 6.97 8.11 7.01 <b>7.36</b>
	Cond. 0.584 0.701 0.646 <b>0.644</b>

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP	PROJECT NO.	60565355
SAMPLE NO.	NW070-20A <del>NW070-20A</del>	WELL NO.	NW070
DATE/TIME COLLECTED	6/9/20 @ 945	PERSONNEL	CH/JO
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		

SAMPLE MEDIA: Groundwater		
SAMPLE QA SPLIT:	YES	NO
SAMPLE QC DUPLICATE:	YES	NO
MS/MSD REQUESTED	YES	NO

SPLIT SAMPLE NO.	NA
DUPLICATE SAMPLE NO.	NA
MS/MSD SAMPLE NO.	NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	6/9/20	Well Depth (ft BTOC)	20.91
Time Started	845	Depth to Water (ft BTOC)	5.47
Time Completed	945	Water Column Length	15.44'
PID Measurements		Well Casing Volume (per ft)	2.47 L/A
Background	ND	Volume of Water in Well (L)	38.1 L
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20L
Purge Water	ND	Actual Purge (L)	30.0 L

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
850	2.5	6.34	13.47	0.213	1.35	158	0.0	5.49	0.5
855	5.0	6.33	12.94	0.212	0.84	111	0.0	5.49	0.5
900	7.5	6.28	13.12	0.209	0.68	88	0.0	5.50	0.5
905	10.0	6.27	13.07	0.205	0.59	70	0.0	5.50	0.5
910	12.5	6.31	13.23	0.201	0.53	57	0.0	5.50	0.5
915	15.0	6.35	13.22	0.199	0.50	43	0.0	5.50	0.5
920	17.5	6.39	13.12	0.198	0.46	27	0.0	5.50	0.5
925	20.0	6.42	13.08	0.197	0.45	19	0.0	5.50	0.5
930	22.5	6.44	13.10	0.196	0.44	10	0.0	5.50	0.5
935	25.0	6.46	13.10	0.196	0.43	4	0.0	5.50	0.5
940	27.5	6.49	13.03	0.195	0.41	-2	0.0	5.50	0.5
945	30.0	6.51	13.03	0.195	0.40	-7	0.0	5.50	0.5

## FIELD EQUIPMENT AND CALIBRATION

Water Level Probe	Model Solinst 102	Calibration	Checked Against Calibrated Length
Water Quality Meter	CA YSL556 Multi-Parameter Probe HCR12A		Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron =	1.21 mg/L
Multi-Parameter Probe Unit #	59600 #1
Field Parameters Measured in Flow-Through Cell	
Pump Placement Depth =	15.6 ft
Pump Rate =	0.15 L/min
Well Diameter = 4"	
Screen Interval = 10.6 - 20.6	
	Historic (7-year average low and high / 2019 / Avg in Bold)
ORP	127.0 142.3 NS 134.7
DO	0.35 1.59 1.59 0.77
PH	6.59 7.10 7.04 6.91
Cond.	0.096 0.335 0.335 0.205

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP	PROJECT NO.	60565355
SAMPLE NO.	NW071-20A <del>CH-NW071-2</del>	WELL NO.	NW071
DATE/TIME COLLECTED	6/9/20 @ 1050	PERSONNEL	CH/50
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		

SAMPLE MEDIA:	Groundwater		
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO. NA
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO. NA
MS/MSD REQUESTED	YES	NO	MS/MSD SAMPLE NO. NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	6/9/20	Well Depth (ft BTOC)	60.43
Time Started	1010	Depth to Water (ft BTOC)	5.30
Time Completed	1050	Water Column Length	55.13'
PID Measurements		Well Casing Volume (per ft)	2.47 L/ft
Background	ND	Volume of Water in Well (L)	136.2 L
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20L
Purge Water	ND	Actual Purge (L)	20L

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1015	2.5	6.52	13.66	0.718	5.15	74	0.0	5.30	0.5
1020	5.0	6.46	13.74	0.727	4.37	77	0.0	5.30	
1025	7.5	6.43	13.74	0.732	3.92	79	0.0	5.30	
1030	10.0	6.42	13.73	0.735	3.68	81	0.0	5.30	
1035	12.5	6.42	13.78	0.736	3.55	82	0.0	5.30	
1040	15.0	6.41	13.72	0.740	3.25	84	0.0	5.30	
1045	17.5	6.40	13.80	0.742	3.11	86	0.0	5.30	
1050	20.0	6.40	13.85	0.745	3.00	88	0.0	5.30	
Parameters stable collect Sample									

## FIELD EQUIPMENT AND CALIBRATION

Water Level Probe	Model Solinst 102	Calibration Checked Against Calibrated Length
Water Quality Meter	YSI 556 Multi-Parameter Probe <del>CH</del> HORIBA	Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron = 0.95 mg/L	
Multi-Parameter Probe Unit #	59600 #1
Field Parameters Measured in Flow-Through Cell	
Pump Placement Depth =	54.7 ft
Pump Rate =	0.5 L/min
Well Diameter = 4"	
Screen Interval = 55.2 - 60.2	

	Historic (7-year average low and high / 2019 / Avg in Bold)			
ORP	157.6	158.1	NS	157.9
DO	1.42	3.43	3.43	2.34
PH	6.32	6.54	6.54	6.39
Cond.	0.519	0.564	0.564	0.549

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP	PROJECT NO.	60565355
SAMPLE NO.	NW080-20A <del>NW080-3</del> RH	WELL NO.	NW080
DATE/TIME COLLECTED	6/8/20 @ 1345	PERSONNEL	CH/JO
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		

SAMPLE MEDIA: Groundwater		
SAMPLE QA SPLIT:	YES	NO
SAMPLE QC DUPLICATE:	YES	NO
MS/MSD REQUESTED	YES	NO

SPLIT SAMPLE NO.	NA
DUPLICATE SAMPLE NO.	NA
MS/MSD SAMPLE NO.	NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	6/8/200	Well Depth (ft BTOC)	21.40
Time Started	1305	Depth to Water (ft BTOC)	7.10
Time Completed	1345	Water Column Length	14.31
PID Measurements		Well Casing Volume (per ft)	2.47 L
Background	ND	Volume of Water in Well (L)	35.3 L
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20L
Purge Water	NA	Actual Purge (L)	20L

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1510	2.5	6.35	14.87	1.07	8.19	204	0.0	7.10	0.5
1315	5.0	6.27	14.45	1.07	7.98	202	0.0	7.10	
1320	7.5	6.20	14.26	1.07	7.77	199	0.0	7.10	
1325	10.0	6.15	13.98	1.07	7.86	195	0.0	7.10	
1330	12.5	6.15	14.04	1.07	7.87	193	0.0	7.10	
1335	15.0	6.19	14.37	1.07	7.68	190	0.0	7.10	
1340	17.5	6.22	14.15	1.07	7.74	188	0.0	7.10	
1345	20.0	6.26	14.33	1.07	7.66	186	0.0	7.10	
Parameters stable min volume of 20 L purged collect sample									

## FIELD EQUIPMENT AND CALIBRATION

Model	Calibration
Water Level Probe	Heron
Water Quality Meter	CA XSI-556 Multi-Parameter Probe HORIBA
	Checked Against Calibrated Length
	Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron = 0.26 mg/L				
Multi-Parameter Probe Unit # 59600 #1				
Field Parameters Measured in Flow-Through Cell				
Pump Placement Depth = 13 ft				
Pump Rate = 0.5 L/min				
Well Diameter = 4"	ORP	146.2	197.0	146.2
Screen Interval = 8 - 18	DO	7.28	9.72	8.38
	PH	6.12	6.35	6.30
	Cond.	0.991	1.194	1.056

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP	PROJECT NO.	60565355
SAMPLE NO.	NW081R-20A <del>NW081R-3</del>	WELL NO.	NW081R
DATE/TIME COLLECTED	6/8/20 1515	PERSONNEL	CH/50
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		

SAMPLE MEDIA: Groundwater		
SAMPLE QA SPLIT:	YES	NO
SAMPLE QC DUPLICATE:	YES	NO
MS/MSD REQUESTED	YES	NO

SPLIT SAMPLE NO.	NA
DUPLICATE SAMPLE NO.	NA
MS/MSD SAMPLE NO.	NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	6/8/20	Well Depth (ft BTOC)	CH 47.75 47.72'
Time Started	1435	Depth to Water (ft BTOC)	6.67'
Time Completed	1515	Water Column Length	41.05'
PID Measurements		Well Casing Volume (per ft)	0.62 L
Background	NA	Volume of Water in Well (L)	25.5 L
Breathing Zone	NA	Casing Volumes to Purge	NA
Well Head	NA	Minimum to Purge (L)	20.0 L
Purge Water	NA	Actual Purge (L)	20.0 L

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1440	2.5	6.59	15.18	1.05	2.30	148	0.0	6.65	0.5
1445	5.0	6.45	15.67	1.05	2.08	153	0.0	6.65	
1450	7.5	6.42	15.55	1.05	1.86	156	0.0	6.65	
1455	10.0	6.42	14.85	1.05	1.63	158	0.0	6.65	
1500	12.5	6.40	14.72	1.05	1.49	160	0.0	6.65	
1505	15.0	6.40	15.12	1.05	1.58	160	0.0	6.65	
1510	17.5	6.42	14.93	1.05	1.54	161	0.0	6.65	
1515	20.0	6.42	14.87	1.05	1.46	161	0.0	6.65	
Parameters stable & min volume met collect Suppl									

## FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	CH XSL556 Multi-Parameter Probe Horiba	Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron =	0.62 mg/L
Multi-Parameter Probe Unit #	59600
Field Parameters Measured in Flow-Through Cell	
Pump Placement Depth =	40 ft
Pump Rate =	0.5 L/min
Well Diameter =	4" x 2"
Screen Interval =	35 - 45
	Historic (7-year average low and high / 2019 / Avg in Bold)
ORP	61.2 173.9 144.8 <b>146.5</b>
DO	0.62 2.35 0.62 <b>1.51</b>
PH	6.48 6.64 6.58 <b>6.56</b>
Cond.	0.797 1.107 0.931 <b>0.933</b>

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME CHAAP PROJECT NO. 60565355

SAMPLE NO. NW082R-20A ~~NW082R-3~~ WELL NO. NW082R

DATE/TIME COLLECTED 6/8/20 @ 1635 PERSONNEL CH/JO

SAMPLE METHOD PRO-ACTIVE SS MONSOON

SAMPLE MEDIA: Groundwater

SAMPLE QA SPLIT:	YES	<u>NO</u>	SPLIT SAMPLE NO.	<u>NA</u>
SAMPLE QC DUPLICATE:	YES	<u>NO</u>	DUPLICATE SAMPLE NO.	<u>NA</u>
MS/MSD REQUESTED	YES	<u>NO</u>	MS/MSD SAMPLE NO.	<u>NA</u>

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	<u>6/8/20</u>	Well Depth (ft BTOC)	<u>CH 59.49 59.48</u>
Time Started	<u>1545</u>	Depth to Water (ft BTOC)	<u>6.70</u>
Time Completed	<u>1635</u>	Water Column Length	<u>52.70</u>
PID Measurements		Well Casing Volume (per ft)	<u>0.62</u>
Background	<u>NA</u>	Volume of Water in Well (L)	<u>32.7</u>
Breathing Zone	<u>NA</u>	Casing Volumes to Purge	<u>NA</u>
Well Head	<u>NA</u>	Minimum to Purge (L)	<u>20.0</u>
Purge Water	<u>NA</u>	Actual Purge (L)	<u>25.0</u>

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1550	2.5	6.79	15.37	0.913	1.38	147	22.8	6.65	0.5
1555	5.0	6.72	15.38	0.917	0.91	149	0.3	6.65	
1600	7.5	6.63	15.20	0.917	0.75	154	0.0	6.65	
1605	10.0	6.58	15.36	0.916	0.70	156	0.0	6.65	
1610	12.5	6.57	15.22	0.916	0.64	156	0.0	6.65	
1615	15.0	6.59	15.12	0.916	0.60	155	0.0	6.65	
1620	17.5	6.61	14.84	0.916	0.62	154	0.0	6.65	
1625	20.0	6.62	14.78	0.917	0.53	154	0.0	6.65	
1630	22.5	6.63	15.17	0.919	0.51	153	0.0	6.65	
1635	25.0	6.64	14.98	0.916	0.49	153	0.0	6.65	
25.0 meters Stable Collected Sample									

## FIELD EQUIPMENT AND CALIBRATION

Model	Calibration
Water Level Probe	Heron
Water Quality Meter	Checked Against Calibrated Length
<u>HI 9142 Multi-Parameter Probe</u>	Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron = <u>0.33</u> mg/L	
Multi-Parameter Probe Unit # <u>59600 #1</u>	
Field Parameters Measured in Flow-Through Cell	
Pump Placement Depth = <u>51</u> ft	
Pump Rate = <u>0.5 L/min</u>	
Well Diameter = <u>4.25</u>	
Screen Interval = 46 - 56	
	Historic (7-year average low and high / 2019 / Avg in Bold)
ORP	82.0 166.8 144.8 <b>142.5</b>
DO	0.22 0.51 0.51 <b>0.38</b>
PH	6.48 6.84 6.70 <b>6.67</b>
Cond.	0.687 1.041 0.869 <b>0.859</b>

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP	PROJECT NO.	60565355
SAMPLE NO.	G0024-20A	WELL NO.	G0024
DATE/TIME COLLECTED	6/15/20 @ 1205	PERSONNEL	JO CH
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		

SAMPLE MEDIA: Groundwater		
SAMPLE QA SPLIT:	YES	SPLIT SAMPLE NO. NA
SAMPLE QC DUPLICATE:	YES	DUPLICATE SAMPLE NO. NA
MS/MSD REQUESTED	YES	MS/MSD SAMPLE NO. NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date: 6/15/20 Time Started: 1125 Time Completed: 1205 PID Measurements: Background: ND Breathing Zone: ND Well Head: ND Purge Water: ND	Well Depth (ft BTOC): 33.28 Depth to Water (ft BTOC): 8.31 Water Column Length: 24.97 Well Casing Volume (per ft): 2.47 Volume of Water in Well (L): 70 61.6 61.7 Casing Volumes to Purge: NA Minimum to Purge (L): 20L Actual Purge (L): 20L
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## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1130	2.5	6.98	14.07	1.18	7.55	104	0.0	8.53	0.5
1135	5.0	6.75	13.96	1.18	7.25	113	0.0	8.51	
1140	7.5	6.62	13.75	1.17	7.24	120	0.0	8.52	
1145	10.0	6.63	13.67	1.17	7.26	121	0.0	8.53	
1150	12.5	6.65	13.64	1.12	7.25	121	0.0	8.53	
1155	15.0	6.68	13.62	1.17	7.26	120	0.0	8.53	
1200	17.5	6.64	13.74	1.17	7.25	120	0.0	8.52	
1205	20.0	6.71	13.75	1.17	7.26	119	0.0	8.53	
Parameters			Stable	Collect	Sample				

## FIELD EQUIPMENT AND CALIBRATION

Model: Heron Water Level Probe: Heron Water Quality Meter: Horiba U-52 Multi-Parameter Probe	Calibration: Checked Against Calibrated Length Twice Daily Calibration Verification also Calibrated Weekly
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## GENERAL COMMENTS

Ferrous Iron = 1.26 mg/L				
Multi-Parameter Probe Unit # 59600 #1				
Field Parameters Measured in Flow-Through Cell				
Pump Placement Depth = 23.5 ft				
Pump Rate = 0.5 L/min				
Well Diameter = 4"				
Screen Interval = 16-31				
	Historic (7-year average low and high / 2019 / Avg in Bold)			
ORP	56.8	197.9	101.8	122.2
DO	4.70	9.01	8.09	6.59
PH	6.19	6.93	6.42	6.63
Cond.	0.226	1.201	0.226	0.788

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP	PROJECT NO.	60565355
SAMPLE NO.	G0070-20A	WELL NO.	G0070
DATE/TIME COLLECTED	<del>06-02-20</del> 06-02-20 / 0825		
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		
SAMPLE MEDIA:	Groundwater		
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO. NA
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO. NA
MS/MSD REQUESTED	YES	NO	MS/MSD SAMPLE NO. G0070-20A MS/MSD

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	06-02-20	Well Depth (ft BTOC)	82.65
Time Started	0735	Depth to Water (ft BTOC)	10.91
Time Completed	0825	Water Column Length	71.74
PID Measurements		Well Casing Volume (per ft)	2.47L
Background	ND	Volume of Water in Well (L)	177.20
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20
Purge Water	ND	Actual Purge (L)	25

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
0740	2.5	6.71	13.73	0.508	4.78	202	37.3	11.19	0.5
0745	5.0	6.78	13.60	0.512	3.29	195	40.2	11.19	0.5
0750	7.5	6.82	13.70	0.512	2.39	181	24.8	11.19	0.5
0755	10.0	6.88	13.70	0.512	2.09	170	18.3	11.19	0.5
0800	12.5	6.91	13.72	0.512	1.88	162	12.7	11.19	0.5
0805	15.0	6.94	13.69	0.510	1.79	155	10.67	11.19	0.5
0810	17.5	6.96	13.74	0.511	1.63	146	6.97	11.19	0.5
0815	20.0	6.98	13.76	0.511	1.47	138	4.53	11.19	0.5
0820	22.5	7.00	13.66	0.511	1.42	126	3.99	11.19	0.5
0825	25.0	7.01	13.67	0.511	1.40	120	3.42	11.19	0.5

## FIELD EQUIPMENT AND CALIBRATION

	Model	Calibration
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	Horiba U-52 Multi-Parameter Probe	Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron = 0.32 mg/L	
Multi-Parameter Probe Unit # 89600 #1	
Field Parameters Measured in Flow-Through Cell	
Pump Placement Depth = 77.5 ft	
Pump Rate = 0.5 L/min	
Well Diameter = 4"	
Screen Interval = 75-80	
	Historic (7-year average low and high / 2019 / Avg in Bold)
ORP	6.3 138.1 114.4 61.1
DO	0.23 2.76 2.76 0.95
PH	6.35 7.22 6.78 6.96
Cond.	0.354 0.490 0.374 0.408

## GENERAL INFORMATION

MS/MSD REQUESTED	YES	NO	MS/MSD SAMPLE NO.	10A
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<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

Date	06-01-20	Well Depth (ft BTOC)	37.71
Time Started	1145	Depth to Water (ft BTOC)	10.80
Time Completed	1225	Water Column Length	26.91
<u>PID Measurements</u>		Well Casing Volume (per ft)	2.47
Background	ND	Volume of Water in Well (L)	66.47
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20L
Purge Water	ND	Actual Purge (L)	20L

[illegible]

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	Horiba U-52 Multi-Parameter Probe	Twice Daily Calibration Verification also Calibrated Weekly

PH	6.10	6.86	6.52	<b>6.52</b>
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Historic (7-year average low and high / 2019 / Avg in Bold)

## GENERAL INFORMATION

MS/MSD REQUESTED	YES	NO	MS/MSD SAMPLE NO.	N/A
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<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

Date	06-01-20	Well Depth (ft BTOC)	65.20
Time Started	1305	Depth to Water (ft BTOC)	10.95
Time Completed	1345	Water Column Length	54.65
<u>PID Measurements</u>		Well Casing Volume (per ft)	2.47
Background	ND	Volume of Water in Well (L)	134.99
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20
Purge Water	ND	Actual Purge (L)	20

[illegible]

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	Horiba U-52 Multi-Parameter Probe	Twice Daily Calibration Verification also Calibrated Weekly

Cond.	0.748	1.024	0.870	<b>0.873</b>
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## GENERAL INFORMATION

SAMPLE MEDIA:	<b>Groundwater</b>		
SAMPLE QA SPLIT:	YES	<b>NO</b>	SPLIT SAMPLE NO. <u>NA</u>
SAMPLE QC DUPLICATE:	YES	<b>NO</b>	DUPLICATE SAMPLE NO. <u>NA</u>
MS/MSD REQUESTED	YES	<b>NO</b>	MS/MSD SAMPLE NO. <u>NA</u>

<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

Date	6/15/20	Well Depth (ft BTOC)	37.70
Time Started	1240	Depth to Water (ft BTOC)	8.23
Time Completed	1320	Water Column Length	28.98
<u>PID Measurements</u>		Well Casing Volume (per ft)	2.47
Background	ND	Volume of Water in Well (L)	71.6
Breathing Zone	<del>DD</del> ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20 L
Purge Water	ND	Actual Purge (L)	20 L

[illegible]

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	Horiba U-52 Multi-Parameter Probe	Twice Daily Calibration Verification also Calibrated Weekly

Ferrous Iron = 1.28 mg/L  
 Multi-Parameter Probe Unit # 59600 #1  
 Field Parameters Measured in Flow-Through Cell  
 Pump Placement Depth = 30 ft  
 Pump Rate = 0.5 L/min  
 Well Diameter = 4"

	Historic (7-year average low and high / 2019 / Avg in Bold)			
ORP	48.3	187.5	73.2	106.2
DO	0.95	3.63	3.63	1.79
PH	6.35	6.94	6.75	6.72
Cond.	0.716	1.006	0.835	0.857

Screen Interval = 25-35

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP	PROJECT NO.	60565355
SAMPLE NO.	G0078-20A	WELL NO.	G0078
DATE/TIME COLLECTED	6/15/20 @ 1430		
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		
PERSONNEL JO CH			
SAMPLE MEDIA: Groundwater			
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO. NA
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO. NA
MS/MSD REQUESTED	YES	NO	MS/MSD SAMPLE NO. NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date: 6/15/20 Time Started: 1350 Time Completed: 1430 PID Measurements: Background: ND Breathing Zone: ND Well Head: ND Purge Water: ND	Well Depth (ft BTOC): 62.80 Depth to Water (ft BTOC): 6.69 Water Column Length: 54.11 Well Casing Volume (per ft): 3.47 Volume of Water in Well (L): 133.7 Casing Volumes to Purge: NA Minimum to Purge (L): 20L Actual Purge (L): 20L
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## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1355	2.5	6.96	15.32	1.30	0.44	111	0.0	8.72	0.5
1400	5.0	6.83	15.04	1.30	0.38	107	0.0	8.72	↓
1405	7.5	6.86	15.14	1.30	0.34	101	0.0	8.72	
1410	10.0	6.82	15.20	1.29	0.33	93	0.0	8.72	
1415	12.5	6.85	15.16	1.29	0.32	86	0.0	8.72	
1420	15.0	6.87	15.15	1.29	0.32	79	0.0	8.72	
1425	17.5	6.84	15.10	1.29	0.31	74	0.0	8.72	
1430	20.0	6.91	15.06	1.28	0.31	68	0.0	8.72	
		Parameters		Stable		Collect		sample	

## FIELD EQUIPMENT AND CALIBRATION

Model: Heron Water Level Probe: Heron Water Quality Meter: Horiba U-52 Multi-Parameter Probe	Calibration: Checked Against Calibrated Length Twice Daily Calibration Verification also Calibrated Weekly
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## GENERAL COMMENTS

Ferrous Iron = 1.11 mg/L  
 Multi-Parameter Probe Unit # 59600 #1  
 Field Parameters Measured in Flow-Through Cell  
 Pump Placement Depth = 55 ft  
 Pump Rate = 0.5 L/min  
 Well Diameter = 4"

	Historic (7-year average low and high / 2019 / Avg in Bold)			
ORP	-25.8	99.4	25.8	15.8
DO	0.12	0.42	0.29	0.25
PH	6.75	7.28	7.10	7.04
Cond.	0.878	1.207	1.065	1.030

Screen Interval = 50-60

## GENERAL INFORMATION

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

## WELL PURGING DATA

## FIELD MEASUREMENTS

## FIELD EQUIPMENT AND CALIBRATION

## GENERAL COMMENTS

Cond.	0.174	0.174	0.174	<b>0.174</b>
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# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP	PROJECT NO.	60565355
SAMPLE NO.	G0080-20A	WELL NO.	G0080
DATE/TIME COLLECTED	6/11/20 @ 1345	PERSONNEL	CH/JO
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		

SAMPLE MEDIA: Groundwater		
SAMPLE QA SPLIT:	YES	SPLIT SAMPLE NO. NA
SAMPLE QC DUPLICATE:	YES	DUPLICATE SAMPLE NO. NA
MS/MSD REQUESTED	YES	MS/MSD SAMPLE NO. NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

<p>Date: 6/11/20</p> <p>Time Started: 1305</p> <p>Time Completed: 1345</p> <p><u>PID Measurements</u></p> <p>Background: ND</p> <p>Breathing Zone: ND</p> <p>Well Head: ND</p> <p>Purge Water: ND</p>	<p>Well Depth (ft BTOC): 37.70</p> <p>Depth to Water (ft BTOC): 9.88</p> <p>Water Column Length: 278.2</p> <p>Well Casing Volume (per ft): 2.47</p> <p>Volume of Water in Well (L): 68.7</p> <p>Casing Volumes to Purge: NA</p> <p>Minimum to Purge (L): 20</p> <p>Actual Purge (L): 20</p>
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## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1310	2.5	6.93	12.87	0.818	0.85	41	12.5	9.88	0.5
1315	5.0	6.79	12.65	0.820	0.68	39	2.6	9.88	
1320	7.5	6.74	12.57	0.820	0.57	38	2.2	9.88	
1325	10.0	6.64	12.51	0.825	0.51	41	1.4	9.88	
1330	12.5	6.64	12.58	0.847	0.46	40	1.5	9.88	
1335	15.0	6.66	12.60	0.868	0.43	38	1.2	9.88	
1340	17.5	6.68	12.47	0.874	0.41	37	1.2	9.88	
1345	20.0	6.70	12.60	0.884	0.39	36	0.1	9.88	
parameters		Stable		collect sample					

## FIELD EQUIPMENT AND CALIBRATION

<p><u>Model</u></p> <p>Water Level Probe: Heron</p> <p>Water Quality Meter: Horiba U-52 Multi-Parameter Probe</p>	<p><u>Calibration</u></p> <p>Checked Against Calibrated Length</p> <p>Twice Daily Calibration Verification also Calibrated Weekly</p>
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## GENERAL COMMENTS

Ferrous Iron = 0.78 mg/L				
Multi-Parameter Probe Unit # 59600 #1				
Field Parameters Measured in Flow-Through Cell				
Pump Placement Depth = 30 ft				
Pump Rate = 0.5 L/min				
Well Diameter = 2"				
Screen Interval = 25-35				

	Historic (7-year average low and high / 2019 / Avg in Bold)			
ORP	25.8	160.8	50.8	69.0
DO	0.08	3.68	0.18	1.43
PH	6.58	6.82	6.67	6.69
Cond.	0.413	0.724	0.610	0.600

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP	PROJECT NO.	60565355
SAMPLE NO.	G0081-20A	WELL NO.	G0081
DATE/TIME COLLECTED	06-02-20 / 0945	PERSONNEL	TY
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		30
SAMPLE MEDIA: Groundwater			
SAMPLE QA SPLIT:	YES	SPLIT SAMPLE NO.	NA
SAMPLE QC DUPLICATE:	YES	DUPLICATE SAMPLE NO.	NA
MS/MSD REQUESTED	YES	MS/MSD SAMPLE NO.	NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date: 06-02-20 Time Started: 0905 Time Completed: 0945 PID Measurements: Background: ND Breathing Zone: ND Well Head: ND Purge Water: ND	Well Depth (ft BTOC): 41.30 Depth to Water (ft BTOC): 11.18 Water Column Length: 30.12 Well Casing Volume (per ft): 0.62 Volume of Water in Well (L): 18.67 Casing Volumes to Purge: NA Minimum to Purge (L): 20L Actual Purge (L): 20
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## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV) ORP	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
0910	2.5	6.43	14.38	0.929	2.72	110	4.17	11.18	0.5
0915	5.0	6.32	14.50	0.989	1.00	89	3.28	11.17	0.5
0920	7.5	6.34	14.78	1.01	0.79	79	2.66	11.17	0.5
0925	10.0	6.38	14.86	1.01	0.69	72	2.25	11.17	0.5
0930	12.5	6.40	15.14	1.02	0.63	65	2.60	11.17	0.5
0935	15.0	6.42	15.26	1.02	0.61	60	2.41	11.17	0.5
0940	17.5	6.43	15.35	1.02	0.65	55	2.18	11.17	0.5
0945	20.0	6.43	15.50	1.02	0.59	52	2.41	11.17	0.5

## FIELD EQUIPMENT AND CALIBRATION

Model: Heron Water Level Probe Water Quality Meter: Horiba U-52 Multi-Parameter Probe	Calibration: Checked Against Calibrated Length Twice Daily Calibration Verification also Calibrated Weekly
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## GENERAL COMMENTS

Ferrous Iron = 0.71 mg/L				
Multi-Parameter Probe Unit # 79600 #1				
Field Parameters Measured in Flow-Through Cell				
Pump Placement Depth = 33 ft				
Pump Rate = 0.5 L/min				
Well Diameter = 2"				
Screen Interval = 28-38				
	Historic (7-year average low and high / 2019 / Avg in Bold)			
ORP	43.9	211.5	174.2	129.9
DO	0.09	1.63	1.63	0.64
PH	5.93	6.65	6.11	6.30
Cond.	0.659	0.881	0.659	0.741

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME	CHAAP	PROJECT NO.	60565355
SAMPLE NO.	G0082-20A	WELL NO.	G0082
DATE/TIME COLLECTED	06-02-20 / 1055	PERSONNEL	TY JO
SAMPLE METHOD	PRO-ACTIVE SS MONSOON		

SAMPLE MEDIA: Groundwater		
SAMPLE QA SPLIT:	YES	SPLIT SAMPLE NO. NA
SAMPLE QC DUPLICATE:	YES	DUPLICATE SAMPLE NO. NA
MS/MSD REQUESTED	YES	MS/MSD SAMPLE NO. NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

<table border="0"> <tr><td>Date</td><td>06-02-20</td></tr> <tr><td>Time Started</td><td>1010</td></tr> <tr><td>Time Completed</td><td>1055</td></tr> <tr><td colspan="2">PID Measurements</td></tr> <tr><td>Background</td><td>ND</td></tr> <tr><td>Breathing Zone</td><td>ND</td></tr> <tr><td>Well Head</td><td>ND</td></tr> <tr><td>Purge Water</td><td>ND</td></tr> </table>	Date	06-02-20	Time Started	1010	Time Completed	1055	PID Measurements		Background	ND	Breathing Zone	ND	Well Head	ND	Purge Water	ND	<table border="0"> <tr><td>Well Depth (ft BTOC)</td><td>41.01</td></tr> <tr><td>Depth to Water (ft BTOC)</td><td>10.70</td></tr> <tr><td>Water Column Length</td><td>30.31</td></tr> <tr><td>Well Casing Volume (per ft)</td><td>0.62 L</td></tr> <tr><td>Volume of Water in Well (L)</td><td>18.79</td></tr> <tr><td>Casing Volumes to Purge</td><td>NA</td></tr> <tr><td>Minimum to Purge (L)</td><td>20</td></tr> <tr><td>Actual Purge (L)</td><td>22.5</td></tr> </table>	Well Depth (ft BTOC)	41.01	Depth to Water (ft BTOC)	10.70	Water Column Length	30.31	Well Casing Volume (per ft)	0.62 L	Volume of Water in Well (L)	18.79	Casing Volumes to Purge	NA	Minimum to Purge (L)	20	Actual Purge (L)	22.5
Date	06-02-20																																
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Time Completed	1055																																
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Casing Volumes to Purge	NA																																
Minimum to Purge (L)	20																																
Actual Purge (L)	22.5																																

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV) ORP	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1015	2.5	6.42	15.95	0.867	0.85	4	8.03	10.70	0.5
1020	5.0	6.41	16.47	0.866	0.59	-3	6.37	10.70	0.5
1025	7.5	6.44	16.36	0.862	0.59	-8	7.04	10.69	0.5
1030	10.0	6.46	15.93	0.852	0.46	-10	3.35	10.69	0.5
1035	12.5	6.46	15.75	0.849	0.46	-11	2.77	10.69	0.5
1040	15.0	6.46	15.81	0.853	0.41	-11	2.40	10.69	0.5
1045	17.5	6.46	15.86	0.856	0.48	-11	2.23	10.69	0.5
1050	20.0	6.47	15.78	0.857	0.48	-11	2.44	10.69	0.5
1055	22.5	6.47	15.82	0.858	0.47	-12	2.07	10.69	0.5

## FIELD EQUIPMENT AND CALIBRATION

<table border="0"> <tr><td colspan="2"><u>Model</u></td></tr> <tr><td>Water Level Probe</td><td>Heron</td></tr> <tr><td>Water Quality Meter</td><td>Horiba U-52 Multi-Parameter Probe</td></tr> </table>	<u>Model</u>		Water Level Probe	Heron	Water Quality Meter	Horiba U-52 Multi-Parameter Probe	<table border="0"> <tr><td colspan="2"><u>Calibration</u></td></tr> <tr><td colspan="2">Checked Against Calibrated Length</td></tr> <tr><td colspan="2">Twice Daily Calibration Verification also Calibrated Weekly</td></tr> </table>	<u>Calibration</u>		Checked Against Calibrated Length		Twice Daily Calibration Verification also Calibrated Weekly	
<u>Model</u>													
Water Level Probe	Heron												
Water Quality Meter	Horiba U-52 Multi-Parameter Probe												
<u>Calibration</u>													
Checked Against Calibrated Length													
Twice Daily Calibration Verification also Calibrated Weekly													

## GENERAL COMMENTS

Ferrous Iron = 0.10 mg/L				
Multi-Parameter Probe Unit # 59600 #1				
Field Parameters Measured in Flow-Through Cell				
Pump Placement Depth = 33 ft				
Pump Rate = 0.5 L/min				
Well Diameter = 2"				
Screen Interval = 28-38				

	Historic (7-year average low and high / 2019 / Avg in Bold)			
ORP	43.3	205.9	164.0	<b>110.3</b>
DO	0.06	1.40	1.40	<b>0.61</b>
PH	6.06	6.72	6.21	<b>6.39</b>
Cond.	0.488	0.799	0.488	<b>0.655</b>

## GENERAL INFORMATION

MS/MSD REQUESTED	YES	NO	MS/MSD SAMPLE NO.	NA
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Cond.	0.585	0.782	0.742	<b>0.678</b>
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## GENERAL INFORMATION

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

## WELL PURGING DATA

Date	6-15-20	Well Depth (ft BTOC)	37.56
Time Started	1600	Depth to Water (ft BTOC)	8.84
Time Completed	1640	Water Column Length	28.72
<u>PID Measurements</u>		Well Casing Volume (per ft)	0.02 L
Background	ND	Volume of Water in Well (L)	17.81
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20
Purge Water	ND	Actual Purge (L)	20

## FIELD MEASUREMENTS

[illegible]

## FIELD EQUIPMENT AND CALIBRATION

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	Horiba U-52 Multi-Parameter Probe	Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron = 0.160 mg/L

Multi-Parameter Probe Unit # 3

### Field Parameters Measured in Flow-Through Cell

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Pump Placement Depth = 20 ft

Pump Rate =  $0.5 \text{ L/min}$

Well Diameter = 2"

Pump Rate = 0.52/min	Historic (7-year average low and high / 2019 / Avg in Bold)				
Well Diameter = 2"	ORP	37.2	136.4	37.2	92.6
Screen Interval = 25-35	DO	0.08	0.87	0.21	0.43
	PH	6.44	6.87	6.74	6.69
	Cond.	0.448	0.655	0.655	0.566

## GENERAL INFORMATION

MS/MSD REQUESTED YES ☒ NO ☐ MS/MSD SAMPLE NO. N/A

Cond.	0.847	1.362	1.362	1.088
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## GENERAL INFORMATION

SAMPLE METHOD	PRO-ACTIVE SS MONSOON	G. COMSOL
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SAMPLE MEDIA: **Groundwater**

SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO.	NA
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO.	NA
MS/MSD REQUESTED	YES	NO	MS/MSD SAMPLE NO.	NA

<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

Date	6-16-20	Well Depth (ft BTOC)	52.78
Time Started	1000	Depth to Water (ft BTOC)	10.17
Time Completed	1040	Water Column Length	42.61
<u>PID Measurements</u>		Well Casing Volume (per ft)	0.622
Background	ND	Volume of Water in Well (L)	26.42
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20
Purge Water	ND	Actual Purge (L)	20

[illegible]

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	Horiba U-52 Multi-Parameter Probe	Twice Daily Calibration Verification also Calibrated Weekly

Ferrous Iron = 0.22 mg/L					
Multi-Parameter Probe Unit # 3					
Field Parameters Measured in Flow-Through Cell					
Pump Placement Depth = 45 ft					
Pump Rate = 0.5 L/min					
Historic (7-year average low and high / 2019 / Avg in Bold)					
Well Diameter = 2"	ORP	66.2	170.4	102.3	110.2
Screen Interval = 40-50	DO	0.15	2.15	0.31	0.59
	PH	6.94	7.55	7.22	7.26
	Cond.	0.899	1.289	1.289	1.077

## GENERAL INFORMATION

SAMPLE MEDIA: **Groundwater**

SAMPLE QA SPLIT:	YES	NO
SAMPLE QC DUPLICATE:	YES	NO
MS/MSD REQUESTED	YES	NO

SPLIT SAMPLE NO. NA

DUPLICATE SAMPLE NO. PZ021-20A (05) 0800

MS/MSD SAMPLE NO. NA

<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

Date	6-16-20	Well Depth (ft. BTOC)	32.42
Time Started	1310	Depth to Water (ft. BTOC)	7.55
Time Completed	1355	Water Column Length	24.87
<u>PID Measurements</u>		Well Casing Volume (per ft)	0.02 L
Background	ND	Volume of Water in Well (L)	15.42
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20
Purge Water	ND	Actual Purge (L)	22.5

[illegible]

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	Horiba U-52 Multi-Parameter Probe	Twice Daily Calibration Verification also Calibrated Weekly

Ferrous Iron = 0.42 mg/L  
 Multi-Parameter Probe Unit # 3  
 Field Parameters Measured in Flow-Through Cell  
 Pump Placement Depth = 20 ft  
 Pump Rate = 0.5 L/min  
 Well Diameter = 2"

	Historic (7-year average low and high / 2019 / Avg in Bold)				
Well Diameter = 2"	ORP	90.5	202.6	120.9	130.8
Screen Interval = 10-30	DO	1.12	5.92	5.92	3.03
	PH	6.22	6.71	6.45	6.47
	Cond.	0.516	0.820	0.820	0.638

## GENERAL INFORMATION

SAMPLE MEDIA:	Groundwater		
SAMPLE QA SPLIT:	YES	NO	SPLIT SAMPLE NO. NA
SAMPLE QC DUPLICATE:	YES	NO	DUPLICATE SAMPLE NO. NA
MS/MSD REQUESTED	YES	NO	MS/MSD SAMPLE NO. NA

<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

Date	6-16-20	Well Depth (ft. BTOC)	51.90
Time Started	1435	Depth to Water (ft. BTOC)	9.18
Time Completed	1515	Water Column Length	22.72
<u>PID Measurements</u>		Well Casing Volume (per ft)	0.62 L
Background	ND	Volume of Water in Well (L)	14.09
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20
Purge Water	ND	Actual Purge (L)	20

[illegible]

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	Horiba U-52 Multi-Parameter Probe	Twice Daily Calibration Verification also Calibrated Weekly

Ferrous Iron = 0.42 mg/L					
Multi-Parameter Probe Unit # 3					
Field Parameters Measured in Flow-Through Cell					
Pump Placement Depth = 20 ft					
Pump Rate = 0.5 L/min					
	Historic (7-year average low and high / 2019 / Avg in Bold)				
Well Diameter = 2"	ORP	77.0	187.6	94.4	124.4
Screen Interval = 10-30	DO	0.26	6.54	0.33	1.48
	PH	6.37	6.78	6.45	6.55
	Cond.	0.527	0.822	0.822	0.657

## GENERAL INFORMATION

MS/MSD REQUESTED	YES	NO	MS/MSD SAMPLE NO.	PZ019-20A MS/MSD
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<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

Date	6-16-20	Well Depth (ft. BTOC)	32.23
Time Started	1120	Depth to Water (ft. BTOC)	13.40
Time Completed	1200	Water Column Length	18.83
<u>PID Measurements</u>		Well Casing Volume (per ft)	0.624
Background	ND	Volume of Water in Well (L)	11.67
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20
Purge Water	ND	Actual Purge (L)	20

[illegible]

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	Horiba U-52 Multi-Parameter Probe	Twice Daily Calibration Verification also Calibrated Weekly

PH	5.92	6.52	5.92	6.18
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Historic (7-year average low and high / 2019 / Avg in Bold)

## GENERAL INFORMATION

SAMPLE METHOD PRO-ACTIVE SS MONSOON

SAMPLE MEDIA:	<b>Groundwater</b>		
SAMPLE QA SPLIT:	YES	<b>NO</b>	SPLIT SAMPLE NO. <u>NA</u>
SAMPLE QC DUPLICATE:	YES	<b>NO</b>	DUPLICATE SAMPLE NO. <u>NA</u>
MS/MSD REQUESTED	YES	<b>NO</b>	MS/MSD SAMPLE NO. <u>NA</u>

<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

Date	6/15/20	Well Depth (ft. BTOC)	32.33
Time Started	1500	Depth to Water (ft. BTOC)	11.69
Time Completed	1540	Water Column Length	20.64
<u>PID Measurements</u>		Well Casing Volume (per ft)	0.62
Background	ND	Volume of Water in Well (L)	12.8
Breathing Zone	ND	Casing Volumes to Purge	NA
Well Head	ND	Minimum to Purge (L)	20 L
Purge Water	ND	Actual Purge (L)	20 L

[illegible]

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	Horiba U-52 Multi-Parameter Probe	Twice Daily Calibration Verification also Calibrated Weekly

Ferrous Iron = 0.91 mg/L  
 Multi-Parameter Probe Unit # 59600 #1  
 Field Parameters Measured in Flow-Through Cell  
 Pump Placement Depth = 20.8 ft  
 Pump Rate = 0.5 L/min  
 Well Diameter = 2"

	Historic (7-year average low and high / 2019 / Avg in Bold)				
Screen Interval = 10-30	ORP	21.7	203.1	68.6	<b>101.0</b>
	DO	1.73	4.72	3.65	<b>3.21</b>
	PH	6.31	6.84	6.73	<b>6.65</b>
	Cond.	0.796	1.047	1.047	<b>0.911</b>

# WELL DEVELOPMENT LOG

Project: CHAAP OU1 RAO Performance Monitoring  
 Project No: 60565355  
 Develo. Method Peristaltic pump and tubing

Well No: PM21A  
 Date: 10-5-28-20  
 Samplers: PH

## WELL MEASUREMENTS

Well inside diameter (in): 1"  
 Screen length (ft): 10'  
 Depth of well casing (ft bgs): 30 BGS  
 Initial water level (ft bgs): 7.50  
 Top of Casing Stick-up (ft): 2'  
 Fluid well casing volume (Liters): (30 - 7.5) = 22.5 X .16 = 3.6 L  
 Weather conditions: clear windy

## SAMPLING MEASUREMENT

### DISCHARGE

Time	0940	0945	0950	0955	1000	1005	1010	1015	1020	1025
Water level (ft. bgs)	7.53	7.53	7.53	7.53	7.53	7.53	7.53	7.53	7.53	7.53
Pump Placement Depth (ft bgs)	29	27	25	22	20	25	25	25	25	25
Discharge (Liters)	5	10	15	20	25	30	35	40	45	50

### WATER QUALITY DATA

pH	6.33	6.26	6.24	6.24	6.23	6.23	6.26	6.28	6.30	6.30
Temperature (°C)	12.49	12.59	12.52	12.63	12.61	12.65	12.85	13.02	13.07	13.01
Conductivity (mS/cm)	0.951	0.939	0.929	0.930	0.928	0.925	0.927	0.924	0.930	0.922
Dissolved Oxygen (mg/L)	1.67	1.09	0.67	0.66	0.62	0.60	0.59	0.58	0.54	0.56
Redox (ORP) (mV)	-82	-179	-213	-213	-222	-229	-230	-237	-239	-239
Turbidity (NTUs) initial/end	68.5 / 36.1	42.1 / 37.9	37.2 / 35.2	36.1 / 37.9	43.0 / 31.6	68.7 / 50.5	48.7 / 47.6	44.6 / 33.7	40.2 / 35.2	33.4 / 31.8
Color	lt. Bn to clear	clear	clear	clear	clear	clear	clear	clear	clear	clear
Odor	None	None	None	None	None	None	None	None	None	None

Total discharge: 50 L Casing volumes removed: 13.88  
 Method of disposal of discharged water: LOW TANK

## QUALITY ASSURANCE

Water Level Indicator: Solinst Indicator Calibrated: ✓  
 Water Quality Meters: HORIBA - 452 Calibrated: ✓  
 Comments: 1 gallon added = 3.8 L X 3 = 11.4 L

$$(3.6 L \times 10) + 11.4 L = 47.4$$

# WELL DEVELOPMENT LOG

Project: CHAAP OU1 RAO Performance Monitoring  
 Project No: 60565355  
 Develo. Method Peristaltic pump and tubing

Well No: PM-21B  
 Date: 5-29-20  
 Samplers: TY RH

## WELL MEASUREMENTS

Well inside diameter (in): 1  
 Screen length (ft): 10  
 Depth of well casing (ft bgs): 40  
 Initial water level (ft bgs): 7.72  
 Top of Casing Stick-up (ft): 2  
 Fluid well casing volume (Liters):  $(40 - 7.72) = 32.28 \times .16 = 5.16L$   
 Weather conditions: Cloudy, calm, 65°F

## SAMPLING MEASUREMENT

### DISCHARGE

Time	0810	0815	0820	0825	0830	0840	0850	0900	0910	0920
Water level (ft. bgs)	7.72	7.72	7.72	7.72	7.72	7.72	7.72	7.72	7.72	7.72
Pump Placement Depth (ft bgs)	39	37	35	33	30	35	35	35	35	35
Discharge (Liters)	5	10	15	20	25	35	45	55	65	75

### WATER QUALITY DATA

pH	6.20	6.23	6.22	6.20	6.20	6.22	6.26	6.28	6.29	6.29
Temperature (°C)	12.30	12.00	12.15	12.15	12.27	12.61	12.72	12.70	12.58	12.63
Conductivity (mS/cm)	0.989	0.986	0.967	0.967	0.967	0.960	0.957	0.954	0.953	0.953
Dissolved Oxygen (mg/L)	2.33	0.91	0.79	0.71	0.64	0.57	0.48	0.46	0.43	0.41
Redox (ORP) (mV)	-7	-63	-75	-85	-93	-101	-108	-113	-117	-119
Turbidity (NTUs) initial/end	37.8 / 84.3	61.3 / 79.8	77.7 / 70.3	49.1 / 78.2	52.8 / 44.4	43.3 / 47.0	45.0 / 42.0	42.2 / 41.8	37.5 / 35.1	31.8 / 33.2
Color	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Odor	none	none	none	none	none	none	none	none	none	none

Total discharge: 75L

Casing volumes removed: ~~14.53~~ 14.53

Method of disposal of discharged water: IDW Tank

## QUALITY ASSURANCE

Water Level Indicator:  
 Water Quality Meters:  
 Comments:

Solinst Indicator

Horiba - V52

Calibrated:

Calibrated:

✓  
✓

2 gallon added = 7.6L x 3 = 22.8L

$$(5.16L \times 10) + 22.8 = 74.4L$$

# WELL DEVELOPMENT LOG

Project: CHAAP OU1 RAO Performance Monitoring  
 Project No: 60565355  
 Develo. Method Peristaltic pump and tubing

Well No: PM-22A  
 Date: 5-28-20  
 Samplers: RH

## WELL MEASUREMENTS

Well inside diameter (in): 1"  
 Screen length (ft): 10'  
 Depth of well casing (ft bgs): 30' BGS  
 Initial water level (ft bgs): 8.62  
 Top of Casing Stick-up (ft): 2'  
 Fluid well casing volume (Liters):  $(30 - 8.62) \times 2.138 \times .16 = 3.42$   
 Weather conditions: Clear Windy

## SAMPLING MEASUREMENT

### DISCHARGE

Time	1120	1125	1130	1135	1140	1145	1150	1155	1200	1205
Water level (ft. bgs)	8.67	8.67	8.67	8.67	8.67	8.67	8.67	8.67	8.67	8.67
Pump Placement Depth (ft bgs)	29	27	25	22	20	25	25	25	25	25
Discharge (Liters)	5	10	15	20	25	30	35	40	45	50

### WATER QUALITY DATA

pH	6.18	6.14	6.12	6.12	6.11	6.10	6.11	6.12	6.13	6.14
Temperature (°C)	13.01	17.55	17.47	17.47	17.23	17.44	17.44	17.51	17.54	17.63
Conductivity (mS/cm)	.940	.944	.936	.927	.932	.935	.926	.929	.929	.933
Dissolved Oxygen (mg/L)	0.41	0.38	0.37	0.35	0.35	0.45	0.36	0.35	0.34	0.34
Redox (ORP) (mV)	-178	-171	-167	-164	-160	-158	-154	-152	-151	-150
Turbidity (NTUs) initial/end	43.8	42.1	67.1	77.5	54.1	57.8	55.4	56.2	53.4	52.2
	29.7	35.4	53.8	70.7	57.3	61.3	56.7	55.2	65.0	63.8
Color	Lt. Brown	Yellow Tint	Yellow Tint	Yellow Tint	Yellow Tint	Yellow Tint	Yellow Tint	Yellow Tint	Yellow Tint	Yellow Tint
Odor	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight

Total discharge: 50L Casing volumes removed: 14.6L  
 Method of disposal of discharged water: IN A TANK

## QUALITY ASSURANCE

Water Level Indicator: \_\_\_\_\_ Solinst Indicator \_\_\_\_\_ Calibrated: ☒  
 Water Quality Meters: HANNA \_\_\_\_\_ Calibrated: ☒  
 Comments: \_\_\_\_\_

1 Gallon Added = 3.8L X 3 = 11.4 L  
Yellowish Tint Probably Reason For Turb Readings  
Being high.

$$(3.42 \times 10) + 11.4 L = 45.6 L$$

# WELL DEVELOPMENT LOG

Project: CHAAP OUI RAO Performance Monitoring  
 Project No: 60565355  
 Develo. Method Peristaltic pump and tubing

Well No: PM-22B  
 Date: 5-29-20  
 Samplers: TY RH JO

## WELL MEASUREMENTS

Well inside diameter (in): 1  
 Screen length (ft): 10  
 Depth of well casing (ft bgs): 40  
 Initial water level (ft bgs): 8.72  
 Top of Casing Stick-up (ft): 2  
 Fluid well casing volume (Liters):  $(40 - 8.72) \times 3.14 \times 1.6 = 15.00$   
 Weather conditions: Cloudy, calm, 65°

## SAMPLING MEASUREMENT

### DISCHARGE

Time	1000	1005	1010	1015	1020	1030	1040	1050	1100	1110
Water level (ft. bgs)	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77	8.77
Pump Placement Depth (ft bgs)	39	37	35	33	30	30	35	35	35	35
Discharge (Liters)	5	10	15	20	25	35	45	55	65	75

### WATER QUALITY DATA

pH	6.25	6.14	6.11	6.11	6.11	6.13	6.13	6.13	6.14	6.15
Temperature (°C)	12.77	12.45	12.59	12.73	12.67	12.82	12.86	12.98	13.07	13.23
Conductivity (mS/cm)	1.11	1.11	1.11	1.13	1.10	1.10	1.09	1.09	1.09	1.09
Dissolved Oxygen (mg/L)	0.75	0.51	0.44	0.41	0.39	0.37	0.36	0.34	0.34	0.33
Redox (ORP) (mV)	-101	-109	-111	-114	-115	-116	-118	-120	-121	-122
Turbidity (NTUs) initial/end	124 / 157	333 / 111	171 / 90.9	174 / 95.6	129 / 107	239 / 115	130 / 41.7	73.8 / 82.8	82.4 / 84.0	95.8 / 74.7
Color	light brown	lt. brown	none	none	none	lt. Brown	none	none	none	none
Odor	none	none	none	none	none	none	none	none	none	none

Total discharge: 75L Casing volumes removed: 15  
 Method of disposal of discharged water: IDW Tank

## QUALITY ASSURANCE

Water Level Indicator: Solinst Indicator Calibrated: ✓  
 Water Quality Meters: Horiba-U52 Calibrated: ✓  
 Comments:

2 gallon added = 7.6L x 3 = 22.8

$(15.00L \times 10) + 22.8 = 72.8L$

# WELL DEVELOPMENT LOG

Project: CHAAP OU1 RAO Performance Monitoring  
 Project No: 60565355  
 Develo. Method Peristaltic pump and tubing

Well No: PM23A  
 Date: 5-31-20  
 Samplers: TV JO

## WELL MEASUREMENTS

Well inside diameter (in): 1  
 Screen length (ft): 10  
 Depth of well casing (ft bgs): 30  
 Initial water level (ft bgs): 5.68  
 Top of Casing Stick-up (ft):  $(30 - 5.68) \times 1.6 = 3.89$   $\uparrow$   
 Fluid well casing volume (Liters): 2  $\uparrow$   
 Weather conditions: Sunny, 75°F, 23mph winds

## SAMPLING MEASUREMENT

### DISCHARGE

Time	1125	1130	1135	1140	1145	1150	1155	1200	1205	1215
Water level (ft. bgs)	5.82	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5.77
Pump Placement Depth (ft bgs)	29	27	25	23	21	20	25	25	25	25
Discharge (Liters)	5	10	15	20	25	30	35	40	45	55

### WATER QUALITY DATA

pH	6.56	6.43	6.40	6.44	6.45	6.47	6.52	6.52	6.53	6.57
Temperature (°C)	12.92	13.04	13.26	13.32	13.58	13.62	13.50	13.68	13.75	13.81
Conductivity (mS/cm)	0.973	0.965	0.958	0.953	0.952	0.943	0.950	0.953	0.947	0.949
Dissolved Oxygen (mg/L)	1.14	0.83	0.64	0.57	0.53	0.50	0.69	0.51	0.48	0.44
Redox (ORP) (mV)	-32	-45	-56	-64	-68	-71	-79	-80	-83	-87
Turbidity (NTUs) initial/end	67.1 / 24.6	49.1 / 32.3	28.9 / 12.05	37.7 / 14.82	20.6 / 11.72	33.6 / 13.12	16.8 / 11.70	9.67 / 10.5	13.9 / 7.71	62.3 / 5.86
Color	lt. yellow	lt. yellow	lt. yellow	none	none	none	none	none	none	none
Odor	none	none	none	none	none	none	none	none	none	none

Total discharge: 55L Casing volumes removed: 14.14  
 Method of disposal of discharged water: IDW Tank

## QUALITY ASSURANCE

Water Level Indicator: Solinst Indicator Calibrated: ✓  
 Water Quality Meters: Hanba U-52 Calibrated: ✓  
 Comments: \_\_\_\_\_

1 gallon added = 3.8L x 3 = 11.4L

$$(3.89L \times 10) + 11.4L = 50.3$$

# WELL DEVELOPMENT LOG

Project: CHAAP OU1 RAO Performance Monitoring  
 Project No: 60565355  
 Develo. Method: Peristaltic pump and tubing

Well No: PM23B  
 Date: 7-31-20  
 Samplers: TY JO

## WELL MEASUREMENTS

Well inside diameter (in): 1  
 Screen length (ft): 10  
 Depth of well casing (ft bgs): 40  
 Initial water level (ft bgs): 5.79  
 Top of Casing Stick-up (ft): 2  
 Fluid well casing volume (Liters):  $(40 - 5.79) \times 1.6 = 5.47$   
 Weather conditions: Sunny, 80°F, 25 mph

## SAMPLING MEASUREMENT

### DISCHARGE

Time  
 Water level (ft. BTOE) <sub>bgs</sub>  
 Pump Placement Depth (ft BTOC) <sub>bgs</sub>  
 Discharge (Liters)

1255	1300	1305	1310	1320	1330	1340	1350	1400	1410
5.92	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87
39	37	35	33	31	30	35	35	35	35
5	10	15	20	30	40	50	60	70	80

### WATER QUALITY DATA

pH  
 Temperature (°C)  
 Conductivity (mS/cm)  
 Dissolved Oxygen (mg/L)  
 Redox (ORP) (mV)  
 Turbidity (NTUs) initial/end  
 Color  
 Odor

6.24	6.16	6.11	6.10	6.09	6.16	6.08	6.17	6.17	6.19
13.79	14.26	13.92	14.07	14.42	14.50	14.21	14.02	14.35	14.11
1.27	1.29	1.29	1.30	1.29	1.27	1.29	1.29	1.29	1.28
0.42	0.42	0.41	0.40	0.40	0.42	0.39	0.40	0.53	0.39
-62	-69	-72	-74	-79	-82	-84	-85	-87	-88
49.7 22.9	38.4 12.2	29.4 11.5	11.7 8.49	7.90 5.46	12.0 5.57	34.8 5.32	5.69 5.73	7.66 4.92	6.01 5.26
Lt. yellow	Lt. yellow	Lt. yellow	Lt. yellow	none	none	none	none	none	none
none	none	none	none	none	none	none	none	none	none

Total discharge: 80L

Casing volumes removed: 14.63

Method of disposal of discharged water:

IDW Tank

## QUALITY ASSURANCE

Water Level Indicator:  
 Water Quality Meters:  
 Comments:

Solinst Indicator  
 Ty YSI 556 MPS, LaMotte turb  
Horiwa U-52

Calibrated: ✓  
 Calibrated: ✓

2 gallons added = 7.6L x 3 = 22.8L

$$(5.47L \times 10) + 22.8L = 77.5$$

# WELL DEVELOPMENT LOG

Project: CHAAP OU1 RAO Performance Monitoring  
 Project No: 60565355  
 Develo. Method Peristaltic pump and tubing

Well No: DM-24BA  
 Date: 5-29-20  
 Samplers: TY JO

## WELL MEASUREMENTS

Well inside diameter (in): 1  
 Screen length (ft): 10  
 Depth of well casing (ft bgs): 30  
 Initial water level (ft bgs): 9.00  
 Top of Casing Stick-up (ft): 2'  
 Fluid well casing volume (Liters):  $(30-9) \times 2.1 = 3.36$   
 Weather conditions: Cloudy, calm, 70°F

## SAMPLING MEASUREMENT

### DISCHARGE

Time	1155	1200	1205	1210	1215	1220	1225	1230	1235	
Water level (ft. bgs)	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	
Pump Placement Depth (ft bgs)	29	27	25	23	21	20	25	25	25	
Discharge (Liters)	5	10	15	20	25	30	35	40	45	

### WATER QUALITY DATA

pH	6.45	6.47	6.42	6.43	6.45	6.45	6.44	6.44	6.45	
Temperature (°C)	12.76	13.08	12.89	13.37	13.34	13.46	13.14	13.41	13.54	
Conductivity (mS/cm)	1.05	1.07	1.07	1.07	1.07	1.07	1.08	1.08	1.08	
Dissolved Oxygen (mg/L)	0.62	0.58	0.60	0.55	0.55	0.57	0.49	0.57	0.56	
Redox (ORP) (mV)	-114	-104	-94	-87	-82	-77	-80	-76	-73	
Turbidity (NTUs) initial/end	267 104	679 483	467 97.5	160 469	105 673	74.6 35.7	160 58.3	33.0 27.7	25.5 23.4	
Color	Lt. brown	none	Lt. brown	none	none	none	none	none	none	none <sup>TY</sup>
Odor	none	none	none	none	none	none	none	none	none	none <sup>TY</sup>

Total discharge: 45 Casing volumes removed: 13.39  
 Method of disposal of discharged water: IDW Tanks

## QUALITY ASSURANCE

Water Level Indicator: \_\_\_\_\_ Solinst Indicator \_\_\_\_\_ Calibrated: ✓  
 Water Quality Meters: Horiba-U62 \_\_\_\_\_ Calibrated: ✓  
 Comments: \_\_\_\_\_

1 gallon added = 3.8L x 3 = 11.4L

$$(3.36 \times 10) + 11.4L = 45$$

# WELL DEVELOPMENT LOG

Project: CHAAP OU1 RAO Performance Monitoring  
 Project No: 60565355  
 Develo. Method: Peristaltic pump and tubing

Well No: PM24B  
 Date: 5-29-20  
 Samplers: TY JO

## WELL MEASUREMENTS

Well inside diameter (in): 1"  
 Screen length (ft): 10  
 Depth of well casing (ft bgs): 40  
 Initial water level (ft bgs): 8.87  
 Top of Casing Stick-up (ft): 2'  
 Fluid well casing volume (Liters):  $(40 - 8.87) \times 1.6 = 4.98L$   
 Weather conditions: Sunny, calm, 72°F

## SAMPLING MEASUREMENT

### DISCHARGE

Time	1305	1310	1315	1320	1325	1335	1345	1355	1405	1415
Water level (ft. bgs)	8.85	8.85	8.85	8.85	8.85	8.85	8.85	8.85	8.85	8.85
Pump Placement Depth (ft bgs)	39	37	35	33	31	30	35	35	35	35
Discharge (Liters)	5	10	15	20	25	35	45	55	65	75

### WATER QUALITY DATA

pH	<del>6.29</del>	6.20	6.18	6.16	6.17	6.14	6.13	6.13	6.12	6.12
Temperature (°C)	13.60	13.72	13.79	13.74	13.66	13.71	13.75	13.69	14.08	13.88
Conductivity (mS/cm)	1.24	1.23	1.21	1.19	1.19	1.18	1.19	1.18	1.18	1.19
Dissolved Oxygen (mg/L)	<del>0.36</del>	0.32	0.34	0.32	0.30	0.31	0.31	0.31	0.29	0.30
Redox (ORP) (mV)	-103	-121	-125	-128	-129	-130	-132	-133	-133	-134
Turbidity (NTUs) initial/end	724 207	433 208	155 328	123 234	103 155	146 623	180 697	63.3 540	50.8 46.7	49.8 49.7
Color	lt. yellow	lt. yellow	lt. brown	lt. brown	none	none	none	none	none	none
Odor	none	none	none	none	none	none	none	none	none	none

Total discharge: 75 Casing volumes removed: 15.06  
 Method of disposal of discharged water: IDW Tank

## QUALITY ASSURANCE

Water Level Indicator: Solinst Indicator Calibrated: ✓  
 Water Quality Meters: Hoviba - V62 Calibrated: ✓  
 Comments: 2 gallons added = 7.6L x 3 = 22.8L

$$(4.98L \times 10) + 22.8 = 72.6$$

# WELL DEVELOPMENT LOG

Project: CHAAP OU1 RAO Performance Monitoring  
 Project No: 60565355  
 Develo. Method: Peristaltic pump and tubing

Well No: PM25A  
 Date: 5-31-20  
 Samplers: TY 20 RH

## WELL MEASUREMENTS

Well inside diameter (in): 1  
 Screen length (ft): 10  
 Depth of well casing (ft bgs): 30  
 Initial water level (ft bgs): 0.71'  
 Top of Casing Stick-up (ft): 2  
 Fluid well casing volume (Liters):  $(30 - 0.71) \times 1.6 = 4.69$   
 Weather conditions: Clear, 68°F, 16mph winds

## SAMPLING MEASUREMENT

### DISCHARGE

Time	0750	0755	0800	0805	0810	0815	0825	0835	0845	0855
Water level (ft. bgs)	1.66	1.90	2.66	2.99	3.22	3.57	3.57	3.57	4.12	4.12
Pump Placement Depth (ft bgs)	29	27	25	23	21	20	25	25	25	25
Discharge (Liters)	5	10	15	20	25	30	40	50	60	70

### WATER QUALITY DATA

pH	6.16	6.13	6.11	6.10	6.06	6.11	6.11	6.18	6.20	6.21
Temperature (°C)	12.23	12.19	12.21	12.33	12.32	12.11	12.25	12.19	12.15	12.33
Conductivity (mS/cm)	1.42	1.43	1.43	1.37	1.35	1.34	1.33	1.31	1.28	1.25
Dissolved Oxygen (mg/L)	10.01	9.16	8.83	8.52	8.50	7.19	8.30	8.18	8.13	8.40
Redox (ORP) (mV)	24	7	1	0	0	-2	1	5	8	8
Turbidity (NTUs) initial/end	221 / 78.1	162 / 97.0	134 / 26.1	27.0 / 15.9	28.4 / 19.3	16.4 / 12.9	27.8 / 8.13	7.60 / 10.60	9.71 / 4.45	6.43 / 15.9
Color	lt. yellow	lt. yellow	lt. yellow	none	none	none	none	none	none	none
Odor	none	none	none	none	none	none	none	none	none	none

Total discharge: 70L Casing volumes removed: 14.93  
 Method of disposal of discharged water: IDW Tank

## QUALITY ASSURANCE

Water Level Indicator: Solinst Indicator Calibrated: ✓  
 Water Quality Meters: Horiba U-52 Calibrated: ✓  
 Comments: Air bubbles coming from the ground  
2 gallons added =  $7.6L \times 3 = 22.8L$

$$(4.69L \times 10) + 22.8L = 69.7$$

# WELL DEVELOPMENT LOG

Project: CHAAP OU1 RAO Performance Monitoring  
 Project No: 60565355  
 Develo. Method Peristaltic pump and tubing

Well No: PM25B  
 Date: 8-31-20  
 Samplers: TY JO RH

## WELL MEASUREMENTS

Well inside diameter (in): 1  
 Screen length (ft): 10  
 Depth of well casing (ft bgs): 40  
 Initial water level (ft bgs): 3.90  
 Top of Casing Stick-up (ft): 2  
 Fluid well casing volume (Liters):  $(40-3.90) \times 1.6 = 5.78$   
 Weather conditions: Sunny 66°F, 22 mph winds

## SAMPLING MEASUREMENT

### DISCHARGE

Time  
 Water level (ft. ~~BTOC~~  
 bgs  
 Pump Placement Depth (ft  
~~BTOC~~  
 bgs  
 Discharge (Liters)

0925	0930	0935	0945	0955	1005	1015	1025	1035	1045
3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90
39	37	35	33	31	30	35	35	35	35
5	10	15	25	35	45	55	65	75	85

### WATER QUALITY DATA

pH  
 Temperature (°C)  
 Conductivity (mS/cm)  
 Dissolved Oxygen (mg/L)  
 Redox (ORP) (mV)  
 Turbidity (NTUs) initial/end  
 Color  
 Odor

6.36	6.38	6.38	6.34	6.38	6.38	6.41	6.42	6.42	6.43
12.91	12.83	13.04	13.17	13.28	13.65	13.51	13.42	13.50	13.66
1.51	1.52	1.53	1.52	1.53	1.49	1.53	1.51	1.53	1.52
1.69	0.55	0.48	0.44	0.69	0.45	0.43	0.42	0.49	0.43
0	-28	-42	-50	-60	-63	-66	-70	-72	-75
17.5 11.3	28.5 19.4	37.6 29.2	22.3 6.18	11.0 5.72	9.89 5.36	6.21 5.69	11.6 4.24	9.1 4.28	5.71 4.39
none	none	none	none	none	none	none	none	none	none
none	none	none	none	none	none	none	none	none	none

Total discharge: 85L Casing volumes removed: 14.71  
 Method of disposal of discharged water: IDW Tank

## QUALITY ASSURANCE

Water Level Indicator: Solinst Indicator Calibrated: ✓  
 Water Quality Meters: YSI 556 MPS, LaMotte turb Calibrated: ✓  
 Comments: Hanna U-F2  
2 gallons added = 7.6L x 3 = 22.8L

$$(5.78L \times 10) + 22.8L = 80.6L$$

# WELL DEVELOPMENT LOG

Project: CHAAP OUI RAO Performance Monitoring  
 Project No: 60565355  
 Develo. Method Peristaltic pump and tubing

Well No: PM26A  
 Date: 5-31-20  
 Samplers: TV JO

## WELL MEASUREMENTS

Well inside diameter (in): 1  
 Screen length (ft): 10  
 Depth of well casing (ft bgs): 30  
 Initial water level (ft bgs): 8.44  
 Top of Casing Stick-up (ft): 2  
 Fluid well casing volume (Liters):  $(30 - 8.44) \times 1.6 = 3.45$   
 Weather conditions: Cloudy

## SAMPLING MEASUREMENT

### DISCHARGE

Time

Water level (ft. ~~BTOC~~ bgs)  
 Pump Placement Depth (ft ~~BTOC~~ bgs)  
 Discharge (Liters)

1500	1505	1510	1515	1520	1525	1530	1535	1540	1545
29	27	25	23	21	20	25	25	25	25
8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
5	10	15	20	25	30	35	40	45	50

### WATER QUALITY DATA

pH

Temperature (°C)

Conductivity (mS/cm)

Dissolved Oxygen (mg/L)

Redox (ORP) (mV)

Turbidity (NTUs) initial/end

Color

Odor

6.45	6.32	6.32	6.33	6.36	6.41	6.43	6.49	6.49	6.50
12.87	13.22	13.17	13.50	13.86	14.43	13.62	13.59	13.76	13.65
1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.06	1.06	1.06
1.07	0.86	0.73	0.66	0.61	0.56	0.60	0.54	0.51	0.51
-8	-16	-21	-26	-32	-37	-41	-45	-46	-47
20.5 7.72	34.6 27.9	49.5 27.2	30.4 13.8	24.4 12.8	19.0 8.76	15.2 11.8	10.6 4.80	5.99 6.22	12.4 3.54
lt. yellow	none	none	none	none	none	none	none	none	none
None	none	none	none	none	none	none	none	none	none

Total discharge: 50L

Method of disposal of discharged water:

Casing volumes removed: 14.49

IDW Tanks

## QUALITY ASSURANCE

Water Level Indicator:

Water Quality Meters:

Comments:

Solinst Indicator

ty YSI 556 MPS, LaMotte turb

Horiwa U-52

Calibrated:

Calibrated:

1 gallon added = 3.8L x 3 = 11.4L

$$(3.45L \times 10) + 11.4L = 45.9$$

# WELL DEVELOPMENT LOG

Project: CHAAP OUI RAO Performance Monitoring  
 Project No: 60565355  
 Develo. Method: Peristaltic pump and tubing

Well No: PM26B  
 Date: 06-01-20  
 Samplers: TV JO

## WELL MEASUREMENTS

Well inside diameter (in): 1  
 Screen length (ft): 10  
 Depth of well casing (ft bgs): 40  
 Initial water level (ft bgs): 8.55  
 Top of Casing Stick-up (ft): 2  
 Fluid well casing volume (Liters): (40-8.55) x 1.10 = 5.03  
 Weather conditions: Sunny, 71°F, 20 mph winds

## SAMPLING MEASUREMENT

### DISCHARGE

Time  
 Water level (ft. ~~BTOE~~  
 bgs  
 Pump Placement Depth (ft  
~~BTOE~~  
 bgs  
 Discharge (Liters)

0815	0820	0825	0830	0835	0845	0855	0905	0915	0925
8.67	8.67	8.67	8.67	8.67	8.67	8.67	8.67	8.67	8.67
39	37	35	33	31	30	35	35	35	35
5	10	15	20	25	35	45	55	65	75

### WATER QUALITY DATA

pH  
 Temperature (°C)  
 Conductivity (mS/cm)  
 Dissolved Oxygen (mg/L)  
 Redox (ORP) (mV)  
 Turbidity (NTUs) initial/end  
 Color  
 Odor

5.87	5.77	5.77	5.80	5.82	5.87	5.94	5.99	6.00	6.03
14.19	13.43	13.47	13.70	13.76	13.73	13.85	13.81	13.62	13.69
1.50	1.40	1.38	1.36	1.36	1.33	1.32	1.30	1.30	1.28
1.34	0.84	0.70	0.60	0.57	0.68	0.50	0.47	0.50	0.43
0	-25	-37	-49	-53	-61	-67	-72	-75	-78
45.7 23.3	44.5 28.1	36.2 12.6	39.5 17.01	34.4 9.26	20.7 13.3	8.88 7.94	6.11 7.31	6.71 6.42	7.47 6.96
lt. gray	none	none	none	none	none	none	none	none	none
none	none	none	none	none	none	none	none	none	none

Total discharge: 75L

Casing volumes removed: 14.91

Method of disposal of discharged water:

IDW Tank

## QUALITY ASSURANCE

Water Level Indicator:  
 Water Quality Meters:  
 Comments:

Solinst Indicator  
~~YSI 556~~ MPS, LaMotte turb  
 Horiba U-52

Calibrated:  
 Calibrated:

✓  
✓

2 gallon added = 7.6L x 3 = 22.8

$$(5.03L \times 10) + 22.8L = 73.1L$$

# WELL DEVELOPMENT LOG

Project: CHAAP OU1 RAO Performance Monitoring  
 Project No: 60565355  
 Develo. Method Peristaltic pump and tubing

Well No: Pm 27A  
 Date: 5-29-20  
 Samplers: TY JO

## WELL MEASUREMENTS

Well inside diameter (in): 1  
 Screen length (ft): 10  
 Depth of well casing (ft bgs): 30  
 Initial water level (ft bgs): 6.72  
 Top of Casing Stick-up (ft): 2  
 Fluid well casing volume (Liters):  $(30-6.72) \times 0.16 = 3.72$   
 Weather conditions: partly cloudy, calm, 74°

## SAMPLING MEASUREMENT

### DISCHARGE

Time	1455	1500	1505	1510	1515	1520	1525	1530	1535	1540
Water level (ft. bgs)	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72
Pump Placement Depth (ft bgs)	29	27	25	23	21	20	25	25	25	25
Discharge (Liters)	5	10	15	20	25	30	35	40	45	50

### WATER QUALITY DATA

pH	6.11	6.09	6.08	6.07	6.08	6.08	6.05	6.05	6.05	6.04
Temperature (°C)	12.85	12.79	12.66	12.77	12.70	12.79	12.98	12.66	12.70	12.78
Conductivity (mS/cm)	<del>1.03</del>	1.02	1.02	0.993	0.991	1.00	1.01	1.01	1.01	1.02
Dissolved Oxygen (mg/L)	<del>0.39</del>	0.35	0.35	0.33	0.32	0.40	0.32	0.31	0.31	0.30
Redox (ORP) (mV)	-121	-120	-117	-113	-110	-109	-109	-106	-103	-101
Turbidity (NTUs) initial/end	79.9 / 55.1	287 / 60.9	78.9 / 37	40.4 / 129	105 / 145	88.3 / 71.2	103 / 78.4	54.5 / 35.4	31.8 / 24.6	23.4 / 19.4
Color	none	none	none	none	none	none	none	none	none	none
Odor	none	none	none	none	none	none	none	none	none	none

Total discharge: 50L Casing volumes removed: 13.44  
 Method of disposal of discharged water: IDW Tank

## QUALITY ASSURANCE

Water Level Indicator: Solinst Indicator Calibrated: ✓  
 Water Quality Meters: Horiba-U162 Calibrated: ✓  
 Comments: 1 gallon added = 3.8L x 3 = 11.4L

$$(3.72 \times 10) + 11.4 = 48.6L$$

# WELL DEVELOPMENT LOG

Project: CHAAP OUI RAO Performance Monitoring  
 Project No: 60565355  
 Develo. Method Peristaltic pump and tubing

Well No: PM27B  
 Date: 5-30-20  
 Samplers: TV JO

## WELL MEASUREMENTS

Well inside diameter (in): 1  
 Screen length (ft): 10  
 Depth of well casing (ft bgs): 40  
 Initial water level (ft bgs): 6.71  
 Top of Casing Stick-up (ft): 2  
 Fluid well casing volume (Liters):  $(40 - 6.71) \times 1.6 = 5.33$   
 Weather conditions: Cloudy, 60°F, 15 mph wind

## SAMPLING MEASUREMENT

### DISCHARGE

Time  
 Water level (ft. ~~BTOE~~  
 bgs  
 Pump Placement Depth (ft  
~~BTOE~~) bgs  
 Discharge (Liters)

0750	0755	0800	0805	0815	0825	0835	0845	0855	0905
6.79	6.79	6.79	6.79	6.79	6.79	6.79	6.79	6.79	6.79
39	37	35	33	31	30	35	35	35	35
5	10	15	20	30	40	50	60	70	80

### WATER QUALITY DATA

pH  
 Temperature (°C)  
 Conductivity (mS/cm)  
 Dissolved Oxygen (mg/L)  
 Redox (ORP) (mV)  
 Turbidity (NTUs) initial/end  
 Color  
 Odor

6.24	6.28	6.27	6.26	6.24	6.28	6.34	6.35	6.38	6.39
12.40	12.39	12.43	12.48	12.53	12.64	12.61	12.84	12.68	12.62
1.18	1.18	1.18	1.19	1.18	1.18	1.17	1.17	1.17	1.17
0.62	0.52	0.49	0.47	0.55	0.45	0.42	0.63	0.38	0.36
9	-40	-64	-74	-82	-89	-97	-103	-104	-105
210 136	224 76.0	240 36.8	200 38.0	93.5 20.4	43.1 17.5	61.0 15.9	17.4 10.3	12.6 9.8	11.4 9.2
Lt. yellow	Lt. yellow	none	none	none	none	none	none	none	none
none	none	none	none	none	none	none	none	none	none

Total discharge: 30L

Casing volumes removed: 15.01

Method of disposal of discharged water:

IDW Tank

## QUALITY ASSURANCE

Water Level Indicator:  
 Water Quality Meters:  
 Comments:

Solinst Indicator  
 TV YSI 556 MPS, LaMotte turb Horiba-U52  
 Calibrated: ✓  
 Calibrated: ✓

2 gallons added = 7.6 L x 3 = 22.8 L

$$(5.33 \text{ L} \times 10) + 22.8 \text{ L} = 76.1 \text{ L}$$

# WELL DEVELOPMENT LOG

Project: CHAAP OU1 RAO Performance Monitoring  
 Project No: 60565355  
 Develo. Method: Peristaltic pump and tubing

Well No: PM28A  
 Date: 5-30-20  
 Samplers: TY 30

## WELL MEASUREMENTS

Well inside diameter (in): 1  
 Screen length (ft): 30" 10  
 Depth of well casing (ft bgs): 30  
 Initial water level (ft bgs): 4.27  
 Top of Casing Stick-up (ft): 2  
 Fluid well casing volume (Liters):  $(30 - 4.27) \times 1.6 = 4.12$   
 Weather conditions: Partly Cloudy, 106°, breezy

## SAMPLING MEASUREMENT

### DISCHARGE

Time	1325	1330	1335	1340	1345	1350	1355	1400	1405	1415
Water level (ft. bgs)	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	2.40	4.40
Pump Placement Depth (ft bgs)	29	27	25	23	20	20	25	25	25	25
Discharge (Liters)	5	10	15	20	25	30	35	40	45	55

### WATER QUALITY DATA

pH	6.15	6.03	6.14	6.14	6.16	6.17	6.18	6.18	6.18	6.20
Temperature (°C)	11.84	11.79	11.92	12.36	12.39	12.24	11.97	12.12	12.39	12.47
Conductivity (mS/cm)	1.12	1.12	1.12	1.11	1.12	1.11	1.11	1.11	1.10	1.10
Dissolved Oxygen (mg/L)	0.39	0.75	0.65	0.57	0.52	0.49	0.44	0.42	0.40	0.39
Redox (ORP) (mV)	-11	-19	-30	-35	-39	-41	-44	-45	-46	-48
Turbidity (NTUs) initial/end	620 193	225 160	289 112	165 150	155 101	132 98.1	118 92.7	89.5 69.2	73.3 61.4	51.6 499
Color	Lt. brown	Lt. brown	Lt. Brown	Lt. brown	Lt. brown	Lt. brown	none	none	none	none
Odor	none	none	none	none	none	none	none	none	none	none

Total discharge: 55L Casing volumes removed: 13.35  
 Method of disposal of discharged water: 10W Tank

## QUALITY ASSURANCE

Water Level Indicator: Solinst Indicator Calibrated: ✓  
 Water Quality Meters: Horiba U-52 Calibrated: ✓  
 Comments: 1 gallon added = 3.8L x 3 = 11.4L

$$(4.12L \times 10) + 11.4L = 52.6L$$

# WELL DEVELOPMENT LOG

Project: CHAAP OU1 RAO Performance Monitoring  
 Project No: 60565355  
 Develo. Method: Peristaltic pump and tubing

Well No: PM28B  
 Date: 5-30-20  
 Samplers: TY 10

## WELL MEASUREMENTS

Well inside diameter (in): 1  
 Screen length (ft): 10  
 Depth of well casing (ft bgs): 40  
 Initial water level (ft bgs): 4.41  
 Top of Casing Stick-up (ft): 2  
 Fluid well casing volume (Liters):  $(40 - 4.41) \times 1.6 = 5.69$   
 Weather conditions: Clear, breezy, 70°F

## SAMPLING MEASUREMENT

### DISCHARGE

Time	1445	1450	1455	1500	1510	1520	1530	1540	1550	1600
Water level (ft. bgs)	4.39	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41
Pump Placement Depth (ft bgs)	39	37	35	33	31	30	35	35	35	35
Discharge (Liters)	5	10	15	20	30	40	50	60	70	80

### WATER QUALITY DATA

pH	6.70	6.70	6.67	6.66	6.63	6.70	6.70	6.68	6.70	6.72
Temperature (°C)	13.13	13.12	13.41	13.44	13.70	13.69	13.23	13.42	13.56	13.44
Conductivity (mS/cm)	1.50	1.50	1.48	1.49	1.44	1.46	1.46	1.47	1.46	1.47
Dissolved Oxygen (mg/L)	0.73	0.48	0.40	0.38	0.35	0.40	0.31	0.30	0.29	0.29
Redox (ORP) (mV)	-127	-130	-131	-132	-130	-135	-136	-136	-138	-139
Turbidity (NTUs) initial/end	219 / 48.0	514 / 53.2	132 / 23.8	250 / 52.7	109 / 9.5	40.7 / 8.6	67.1 / 9.1	7.4 / 13.7	6.4 / 8.6	12.9 / 5.9
Color	lt. brown	lt. brown	none	none	none	none	none	none	none	none
Odor	none	none	none	none	none	none	none	none	none	none

Total discharge: 80L Casing volumes removed: 14.06  
 Method of disposal of discharged water: LDW Tank

## QUALITY ASSURANCE

Water Level Indicator: Solinst Indicator Calibrated: ✓  
 Water Quality Meters: Horiba U-52 Calibrated: ✓  
 Comments: 2 gallons added 7.6L x 3 = 22.8

$$(5.69L \times 10) + 22.8L = 79.7L$$

# WELL DEVELOPMENT LOG

Project: CHAAP OU1 RAO Performance Monitoring  
 Project No: 60565355  
 Develo. Method: Peristaltic pump and tubing

Well No: PM29A  
 Date: 5-30-20  
 Samplers: TV 30

## WELL MEASUREMENTS

Well inside diameter (in): 1  
 Screen length (ft): 10  
 Depth of well casing (ft bgs): 30  
 Initial water level (ft bgs): 4.67  
 Top of Casing Stick-up (ft): 2  
 Fluid well casing volume (Liters):  $(30-4.67) \times 0.16 = 4.05$   
 Weather conditions: Cloudy, 63°F, 15 mph winds

## SAMPLING MEASUREMENT

### DISCHARGE

Time	0945	0950	0955	1000	1005	1010	1015	1020	1025	1035
Water level (ft. bgs)	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86
Pump Placement Depth (ft bgs)	29	27	25	23	21	20	25	25	25	25
Discharge (Liters)	5	10	15	20	25	30	35	40	45	55

### WATER QUALITY DATA

pH	6.17	6.13	6.17	6.19	6.21	6.22	6.21	6.22	6.22	6.22
Temperature (°C)	11.73	11.83	11.81	11.90	11.98	12.00	11.91	11.83	11.83	11.82
Conductivity (mS/cm)	0.997	0.971	0.973	0.955	0.961	0.950	0.958	0.957	0.954	0.955
Dissolved Oxygen (mg/L)	0.65	0.45	0.42	0.39	0.37	0.35	0.36	0.35	0.34	0.34
Redox (ORP) (mV)	-25	-35	-43	-46	-49	-52	-54	-56	-57	-58
Turbidity (NTUs) initial/end	108 / 67.4	122 / 52.7	118 / 66.2	103 / 78.9	96.6 / 32.9	89.6 / 51.8	188 / 60.0	31.5 / 26.4	44.3 / 39.9	28.9 / 31.6
Color	none	none	none	none	none	none	none	none	none	none
Odor	none	none	none	none	none	none	none	none	none	none

Total discharge: 55 Casing volumes removed: 13.58  
 Method of disposal of discharged water: IDW Tank

## QUALITY ASSURANCE

Water Level Indicator: Solinst Indicator Calibrated: ✓  
 Water Quality Meters: Hanba - U52 Calibrated: ✓  
 Comments:

1 gallon added = 3.8L x 3 = 11.4L

$$(4.05L \times 10) + 11.4L = 51.9L$$

# WELL DEVELOPMENT LOG

Project: CHAAP OU1 RAO Performance Monitoring  
 Project No: 60565355  
 Develo. Method Peristaltic pump and tubing

Well No: PM29B  
 Date: 5-30-20  
 Samplers: TY JO RH

## WELL MEASUREMENTS

Well inside diameter (in): 1  
 Screen length (ft): 10  
 Depth of well casing (ft bgs): 40  
 Initial water level (ft bgs): 4.72  
 Top of Casing Stick-up (ft): 2  
 Fluid well casing volume (Liters):  $(40 - 4.72) \times 0.16 = 5.64$   
 Weather conditions: Cloudy, breezy, 65°F

## SAMPLING MEASUREMENT

### DISCHARGE

Time	1110	1115	1120	1125	1135	1145	1155	1205	1215	1225
Water level (ft. bgs)	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77
Pump Placement Depth (ft bgs)	39	37	35	33	31	30	35	35	35	35
Discharge (Liters)	5	10	15	20	30	40	50	60	70	80

### WATER QUALITY DATA

pH	6.25	6.15	6.25	6.23	6.29	6.29	6.30	6.31	6.32	6.33
Temperature (°C)	12.45	12.38	12.50	12.52	12.64	12.70	12.69	12.74	12.79	12.72
Conductivity (mS/cm)	1.14	1.13	1.13	1.14	1.13	1.13	1.12	1.12	1.12	1.12
Dissolved Oxygen (mg/L)	0.38	0.35	0.32	0.32	0.31	0.31	0.30	0.30	0.29	0.29
Redox (ORP) (mV)	-85	-87	-91	-91	-97	-99	-100	-102	-103	-104
Turbidity (NTUs) initial/end	93.9 / 40	175 / 57.5	180 / 78.5	135 / 97.7	117 / 46.0	67.1 / 62.4	66.4 / 69.3	34.7 / 25.0	30.9 / 30.0	31.3 / 27.1
Color	lt. yellow	lt. yellow	lt. yellow	lt. yellow	none	none	none	none	none	none
Odor	none	none	none	none	none	none	none	none	none	none

Total discharge: 30L Casing volumes removed: 14.18  
 Method of disposal of discharged water: IDW Tank

## QUALITY ASSURANCE

Water Level Indicator: Solinst Indicator Calibrated: ✓  
 Water Quality Meters: Horiba U-52 Calibrated: ✓  
 Comments:

2 gallons added = 7.6L x 3 = 22.8L

$(5.64L \times 10) + 22.8L = 79.2L$

# WATER SAMPLE COLLECTION FIELD SHEET

## GENERAL INFORMATION

SITE NAME CHAAP OU1 RAO Performance Monitoring PROJECT NO. 60565355  
 SAMPLE NO. EW7-PM21A-3-25 WELL NO. PM-21A  
 DATE/TIME COLLECTED 5-28-20 / 1045 PERSONNEL RA  
 SAMPLE METHOD Peristaltic Pump and tubing  
 SAMPLE MEDIA: Groundwater  
 SAMPLE QA SPLIT: YES NO SPLIT SAMPLE NO. —  
 SAMPLE QC DUPLICATE: YES NO DUPLICATE SAMPLE NO. —  
 MS/MSD REQUESTED YES NO MS/MSD SAMPLE NO. —

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

Sample Container	Preservative	Analysis Requested
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	Time Started	Time Completed	PID Measurements	Background	Breathing Zone	Well Head	Purge Water	Well Depth (ft bgs)	Depth to Water (ft bgs)	Water Column Length	Well Casing Volume (per ft)	Volume of Water in Well (L)	Casing Volumes to Purge	Minimum to Purge (L)	Actual Purge (L)
<u>5-28-20</u>	<u>1030</u>	<u>1040</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>	<u>30'</u>	<u>7.50</u>	<u>22.5</u>	<u>.16</u>	<u>3.6 L</u>	<u>3</u>	<u>—</u>	<u>7.5 L</u>

## FIELD MEASUREMENTS

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
<u>1030</u>	<u>2.5</u>	<u>6.35</u>	<u>14.20</u>	<u>0.924</u>	<u>0.53</u>	<u>-236</u>	<u>15.0</u>	<u>7.50</u>	<u>.5</u>
<u>1035</u>	<u>5</u>	<u>6.37</u>	<u>14.21</u>	<u>0.919</u>	<u>0.54</u>	<u>-235</u>	<u>13.3</u>	<u>7.50</u>	<u>.5</u>
<u>1040</u>	<u>7.5</u>	<u>6.38</u>	<u>14.26</u>	<u>0.920</u>	<u>0.69</u>	<u>-235</u>	<u>12.0</u>	<u>7.50</u>	<u>.5</u>

## FIELD EQUIPMENT AND CALIBRATION

Model	Calibration
Water Level Probe <u>Heron</u>	Checked Against Calibrated Length
Water Quality Meter <u>Hach D-49 Multi-Parameter Probe</u>	Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron = mg/L 1.91 X 3 = 5.73  
 Multi-Parameter Probe Unit # HOR-64-452  
 Field Parameters Measured in Flow-Through Cell  
 Sample Depth (ft bgs) = 25'  
 Pump Rate = .5  
 Temp Well Diameter = 1"  
 Screen Interval (ft bgs) = 20-30'

## GENERAL INFORMATION

SAMPLE METHOD	Peristaltic Pump and tubing	RH
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**SAMPLE MEDIA:** **Groundwater**

SAMPLE QA SPLIT: YES ~~NO~~ SPLIT SAMPLE NO. 11A

SAMPLE QC DUPLICATE: YES NO DUPLICATE SAMPLE NO. N/A

MS/MSD REQUESTED YES NO MS/MSD SAMPLE NO. NA

## SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS

<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

## WELL PURGING DATA

Date	5-29-20	Well Depth (ft bgs)	40'
Time Started	0810	Depth to Water (ft bgs)	7.72'
Time Completed	0935	Water Column Length	32.28'
<u>PID Measurements</u>		Well Casing Volume (per ft)	0.16 L
Background	ND	Volume of Water in Well (L)	5.16
Breathing Zone	ND	Casing Volumes to Purge	3 TV
Well Head	ND	Minimum to Purge (L)	-
Purge Water	ND	Actual Purge (L)	15 TV 7.5 L

## FIELD MEASUREMENTS

[illegible]

## FIELD EQUIPMENT AND CALIBRATION

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	Hydro-49 Multi-Parameter Probe	Twice Daily Calibration Verification also Calibrated Weekly

## GENERAL COMMENTS

Ferrous Iron = 715 mg/L  
Multi-Parameter Probe Unit # 59600  
Field Parameters Measured in Flow-Through Cell  
Sample Depth (ft bgs) = 35  
Pump Rate = 0.5 L/min  
Temp Well Diameter = 1"  
Screen Interval (ft bgs) = 30-40

Water was light yellow at sample time

## GENERAL INFORMATION

Ferrous Iron = 15 mg/L  
Multi-Parameter Probe Unit # Horiba - 452  
Field Parameters Measured in Flow-Through Cell  
Sample Depth (ft bgs) = 25'  
Pump Rate = -5  
Temp Well Diameter = 1"  
Screen Interval (ft bgs) = 20' - 30'

## GENERAL INFORMATION

SAMPLE METHOD	Peristaltic Pump and tubing	30
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SAMPLE MEDIA: **Groundwater**

SAMPLE QA SPLIT:	YES	<u>NO</u>	SPLIT SAMPLE NO.	<u>NA</u>
SAMPLE QC DUPLICATE:	YES	<u>NO</u>	DUPLICATE SAMPLE NO.	<u>NA</u>
MS/MSD REQUESTED	YES	<u>NO</u>	MS/MSD SAMPLE NO.	<u>NA</u>

<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

Date	5-29-20	Well Depth (ft bgs)	40
Time Started	1000	Depth to Water (ft bgs)	8.77
Time Completed	1025	Water Column Length	31.23
<u>PID Measurements</u>		Well Casing Volume (per ft)	0.16
Background	ND	Volume of Water in Well (L)	5.00
Breathing Zone	ND	Casing Volumes to Purge	-
Well Head	ND	Minimum to Purge (L)	-
Purge Water	ND	Actual Purge (L)	7.56

[illegible]

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	Hach-D9 Multi-Parameter Probe	Twice Daily Calibration Verification also Calibrated Weekly

Ferrous Iron = 715 mg/L  
Multi-Parameter Probe Unit # 59600  
Field Parameters Measured in Flow-Through Cell  
Sample Depth (ft bgs) = 35  
Pump Rate = 0.5 L/min  
Temp Well Diameter = 1"  
Screen Interval (ft bgs) = 30-40

water was light yellow at time of sample

## GENERAL INFORMATION

Screen Interval (ft bgs) = 20-30

## GENERAL INFORMATION

MS/MSD REQUESTED YES NO MS/MSD SAMPLE NO. NA

Ferrous Iron = 215 mg/L  
Multi-Parameter Probe Unit # 59600  
Field Parameters Measured in Flow-Through Cell  
Sample Depth (ft bgs) = 35  
Pump Rate = 0.5 l/min  
Temp Well Diameter = 1"  
Screen Interval (ft bgs) = 30-40

## GENERAL INFORMATION

SAMPLE METHOD	Peristaltic Pump and tubing	50
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SAMPLE MEDIA: **Groundwater**

SAMPLE QA SPLIT: YES NO SPLIT SAMPLE NO. NA

SAMPLE QC DUPLICATE: YES NO DUPLICATE SAMPLE NO. NA

MS/MSD REQUESTED YES NO MS/MSD SAMPLE NO. NA

<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

Date	5-29-20	Well Depth (ft bgs)	30
Time Started	1155	Depth to Water (ft bgs)	9.00
Time Completed	1250	Water Column Length	21.0
<u>PID Measurements</u>		Well Casing Volume (per ft)	0.16
Background	ND	Volume of Water in Well (L)	$(21 \times .16) = 3.36$
Breathing Zone	ND	Casing Volumes to Purge	-
Well Head	ND	Minimum to Purge (L)	-
Purge Water	ND	Actual Purge (L)	7.5

[illegible]

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	Hach D-49 Multi-Parameter Probe	Twice Daily Calibration Verification also Calibrated Weekly

Ferrous Iron = 215 mg/L  
Multi-Parameter Probe Unit # 79600  
Field Parameters Measured in Flow-Through Cell  
Sample Depth (ft bgs) = 25  
Pump Rate = 0.5 L/min  
Temp Well Diameter = 1"  
Screen Interval (ft bgs) = 20-30

## GENERAL INFORMATION

SAMPLE METHOD	Peristaltic Pump and tubing	30
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SAMPLE MEDIA: **Groundwater**

SAMPLE QA SPLIT: YES NO SPLIT SAMPLE NO. NA

SAMPLE QC DUPLICATE: YES NO DUPLICATE SAMPLE NO. NA

MS/MSD REQUESTED YES NO MS/MSD SAMPLE NO. NA

<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

Date	5-29-20	Well Depth (ft bgs)	40
Time Started	1305	Depth to Water (ft bgs)	8.85
Time Completed	1430	Water Column Length	31.15
<u>PID Measurements</u>		Well Casing Volume (per ft)	0.16
Background	ND	Volume of Water in Well (L)	4.98
Breathing Zone	ND	Casing Volumes to Purge	-
Well Head	ND	Minimum to Purge (L)	-
Purge Water	ND	Actual Purge (L)	7.5

[illegible]

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	Hach D49 Multi-Parameter Probe	Twice Daily Calibration Verification also Calibrated Weekly

Ferrous Iron = 715 mg/L  
Multi-Parameter Probe Unit # 59600  
Field Parameters Measured in Flow-Through Cell  
Sample Depth (ft bgs) = 35  
Pump Rate = 0.5 L/min  
Temp Well Diameter = 1"  
Screen Interval (ft bgs) = 30-40

## GENERAL INFORMATION

SAMPLE METHOD	Peristaltic Pump and tubing	30
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MS/MSD SAMPLE NO. 11A

<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

Date	5-31-20	Well Depth (ft bgs)	30
Time Started	0750	Depth to Water (ft bgs)	4.12
Time Completed	0910	Water Column Length	25.88
<u>PID Measurements</u>		Well Casing Volume (per ft)	0.16
Background	ND	Volume of Water in Well (L)	4.14
Breathing Zone	ND	Casing Volumes to Purge	-
Well Head	ND	Minimum to Purge (L)	-
Purge Water	ND	Actual Purge (L)	7.5

[illegible]

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	YSI 556 Multi-Parameter Probe Hanna U-52	Twice Daily Calibration Verification also Calibrated Weekly

Ferrous Iron = 3.30 mg/L  
Multi-Parameter Probe Unit # 59600  
Field Parameters Measured in Flow-Through Cell  
Sample Depth (ft bgs) = 25  
Pump Rate = 0.5 L/min  
Temp Well Diameter = 1"  
Screen Interval (ft bgs) = 20-30

## GENERAL INFORMATION

MS/MSD REQUESTED YES NO MS/MSD SAMPLE NO. NA

Ferrous Iron = 4.28 mg/L  
Multi-Parameter Probe Unit # 59600  
Field Parameters Measured in Flow-Through Cell  
Sample Depth (ft bgs) = 35  
Pump Rate = 0.5 L/min  
Temp Well Diameter = 1"  
Screen Interval (ft bgs) = 30-40

## GENERAL INFORMATION

MS/MSD REQUESTED YES ☒ (NO) MS/MSD SAMPLE NO. NA

<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

Date	5-31-20	Well Depth (ft bgs)	30
Time Started	1500	Depth to Water (ft bgs)	8.50
Time Completed	1600	Water Column Length	21.50
<u>PID Measurements</u>		Well Casing Volume (per ft)	0.16
Background	ND	Volume of Water in Well (L)	3.44
Breathing Zone	ND	Casing Volumes to Purge	-
Well Head	ND	Minimum to Purge (L)	-
Purge Water	ND	Actual Purge (L)	7.5

[illegible]

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	<del>YSI 556 Multi-Parameter Probe</del> Hanna U-52	Twice Daily Calibration Verification also Calibrated Weekly

Ferrous Iron = 4.52 mg/L  
Multi-Parameter Probe Unit # 59600  
Field Parameters Measured in Flow-Through Cell  
Sample Depth (ft bgs) = 25  
Pump Rate = 0.5 L/min  
Temp Well Diameter = 1"  
Screen Interval (ft bgs) = 20 - 30

## GENERAL INFORMATION

SAMPLE MEDIA:	<b>Groundwater</b>		
SAMPLE QA SPLIT:	YES	<input checked="" type="radio"/> NO	SPLIT SAMPLE NO. <u>NA</u>
SAMPLE QC DUPLICATE:	YES	<input checked="" type="radio"/> NO	DUPLICATE SAMPLE NO. <u>NA</u>
MS/MSD REQUESTED	YES	<input checked="" type="radio"/> NO	MS/MSD SAMPLE NO. <u>NA</u>

<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

Date	06-01-20	Well Depth (ft bgs)	40
Time Started	0815	Depth to Water (ft bgs)	8.67
Time Completed	0940	Water Column Length	31.33
<u>PID Measurements</u>		Well Casing Volume (per ft)	0.100
Background	ND	Volume of Water in Well (L)	7.01
Breathing Zone	ND	Casing Volumes to Purge	-
Well Head	ND	Minimum to Purge (L)	-
Purge Water	ND	Actual Purge (L)	7.5

[illegible]

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	✓ YSI 556 Multi-Parameter Probe	Twice Daily Calibration Verification also Calibrated Weekly
	Horiba U-52	

Ferrous Iron = 215 mg/L  
Multi-Parameter Probe Unit # 59600  
Field Parameters Measured in Flow-Through Cell  
Sample Depth (ft bgs) = 35  
Pump Rate = 0.5 L/min  
Temp Well Diameter = 1"  
Screen Interval (ft bgs) = 30-40

## GENERAL INFORMATION

MS/MSD REQUESTED	YES	NO	MS/MSD SAMPLE NO.	114
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Screen Interval (ft bgs) = 20-30

## GENERAL INFORMATION

SAMPLE MEDIA: **Groundwater**

SAMPLE QA SPLIT: YES ☒ NO ☐ SPLIT SAMPLE NO. NA

SAMPLE QC DUPLICATE: YES ☒ NO ☐ DUPLICATE SAMPLE NO. NA

MS/MSD REQUESTED YES ☒ NO ☐ MS/MSD SAMPLE NO. NA

<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

Date	5-30-20	Well Depth (ft bgs)	40
Time Started	0750	Depth to Water (ft bgs)	6.79
Time Completed	0920	Water Column Length	33.21'
<u>PID Measurements</u>		Well Casing Volume (per ft)	0.16
Background	ND	Volume of Water in Well (L)	5.31
Breathing Zone	ND	Casing Volumes to Purge	-
Well Head	ND	Minimum to Purge (L)	-
Purge Water	ND	Actual Purge (L)	7.5'

[illegible]

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	TV Hook-up 491 Multi-Parameter Probe Hanna-052	Twice Daily Calibration Verification also Calibrated Weekly

Ferrous Iron = 4.32 mg/L  
Multi-Parameter Probe Unit # 59600  
Field Parameters Measured in Flow-Through Cell  
Sample Depth (ft bgs) = 35  
Pump Rate = 0.5 L/min  
Temp Well Diameter = 1"  
Screen Interval (ft bgs) = 30-40

## GENERAL INFORMATION

SAMPLE MEDIA: **Groundwater**

SAMPLE QA SPLIT: YES NO SPLIT SAMPLE NO. NA

SAMPLE QC DUPLICATE: YES NO DUPLICATE SAMPLE NO. NA

MS/MSD REQUESTED YES NO MS/MSD SAMPLE NO. NA

<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

Date	5-30-20	Well Depth (ft bgs)	30
Time Started	1325	Depth to Water (ft bgs)	4.40
Time Completed	1430	Water Column Length	25.60
<u>PID Measurements</u>		Well Casing Volume (per ft)	0.16
Background	ND	Volume of Water in Well (L)	4.10
Breathing Zone	ND	Casing Volumes to Purge	-
Well Head	ND	Minimum to Purge (L)	-
Purge Water	ND	Actual Purge (L)	7.5

[illegible]

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	<del>YSL556</del> Multi-Parameter Probe	Twice Daily Calibration Verification also Calibrated Weekly

Ferrous Iron = 7.05 mg/L  
Multi-Parameter Probe Unit # 79600  
Field Parameters Measured in Flow-Through Cell  
Sample Depth (ft bgs) = 25  
Pump Rate = 0.5 L/min  
Temp Well Diameter = 1"  
Screen Interval (ft bgs) = 20-30

## GENERAL INFORMATION

SAMPLE METHOD	Peristaltic Pump and tubing	70
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MS/MSD SAMPLE NO. 11A

<u>Sample Container</u>	<u>Preservative</u>	<u>Analysis Requested</u>
2 - 500 mL Amber	6°C	Explosives + MNX (8330A)
3 - 40 mL VOA	6°C, HCl	Methane (RSK 175)
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>	TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)
1 - 250 mL HDPE	6°C	SO <sub>4</sub> (9056A), Alkalinity (2320B)
1 - 250 mL HDPE	6°C, ZnOAc/NaOH	Sulfide (9034)
1 - 250 mL Amber	6°C	DOC (9060A)

Date	5-30-20	Well Depth (ft bgs)	40
Time Started	1445	Depth to Water (ft bgs)	4.41
Time Completed	1615	Water Column Length	35.59
<u>PID Measurements</u>		Well Casing Volume (per ft)	0.16
Background	ND	Volume of Water in Well (L)	5.69
Breathing Zone	ND	Casing Volumes to Purge	-
Well Head	ND	Minimum to Purge (L)	-
Purge Water	ND	Actual Purge (L)	7.5

Time	Amount Purged (L)	pH	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (ORP) (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
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[illegible]

	<u>Model</u>	<u>Calibration</u>
Water Level Probe	Heron	Checked Against Calibrated Length
Water Quality Meter	YSI 556 Multi-Parameter Probe Hanna U-52	Twice Daily Calibration Verification also Calibrated Weekly

Screen Interval (ft bgs) = 30.40

## GENERAL INFORMATION

MS/MSD REQUESTED      YES      NO      MS/MSD SAMPLE NO.      NA

Ferrous Iron = 2.64 mg/L  
Multi-Parameter Probe Unit # 59600  
Field Parameters Measured in Flow-Through Cell  
Sample Depth (ft bgs) = 25  
Pump Rate = 0.5 L/min  
Temp Well Diameter = 1"  
Screen Interval (ft bgs) = 20-30

## GENERAL INFORMATION

MS/MSD REQUESTED ☒ YES ☐ NO MS/MSD SAMPLE NO. FW7-PM29B-3-35 ms / msd

Screen Interval (ft bgs) = 30-40

# DAILY QUALITY CONTROL REPORT

Date **05/26/20**

Day	S	S	M	T X	W	T	F
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On Site Hours	1000 - 1730
Travel Time	2.5
Office Time	1

COE Project Manager Jeff Gill  
 Project CHAAP OU1 Rebound Study/  
 PMs-Q#3 & OU1-OU3 LTM  
 Project No. 60565355  
 Contract No. W9128F-18-D-0020

Weather	Bright Sun X	Clear X	Overcast	Rain	Snow
Temp	To 32	32-50	50-70 X	70-85	85 up
Wind	Still	Moderate X	High	<b>Report No.</b>  1	
Humidity	Dry	Moderate X	Humid		

## **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer

## **Equipment on Site:**

One direct push rig (Geoprobe 6620DT), Screen point sampler (SP15), support trucks, hand-held GPS unit, performance monitoring (PM) temporary well materials (1"-OD PVC., 10' screens, filter pack sand, granular bentonite, coated chips, grout mix), peristaltic pump and tubing, laboratory provided sample containers, IDW buckets, decon supplies, Horiba MPS, LaMotte turbidity meter, Hach Colormeter, water level meters, MiniRAE PID, level D PPE, first-aid/safety supplies, and field/safety paperwork.

## **Visitors on Site:**

None.

## **AECOM/Brice Personnel on Site:**

AECOM - Taylor Young, Ryan Herold, Jonathan Ortiz

## **Field Work Performed (including sampling):**

-Began OU1 Rebound Study Q#3 and OU1-OU3 LTM sampling events (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).

### Direct Push (Screen Point) Groundwater Samples Collected

OS001-DP03-25 (+Dup OS001-DP503-25)

OS001-DP03-35

OS001-DP03-45 (+MS/MSD)

-OU1 and OU3 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.

-Containerized IDW purge/decontamination water in a designated labeled 1000-gallon poly tank at GWTF.

## **Quality Control Activities (including field calibration):**

-Completed staking of sample locations using hand-held GPS with predetermined coordinates. Utility locates and notifying property owners of field activities were completed week of 5/18/20.

-Calibration check of PIDs (serial #'s 110-014926, 110-014888) and water level indicators (#'s 1324-T, 1323-T).

-Duplicate sample OS001-DP503-25 and MS/MSD was collected.

## **Health and Safety and Activities:**

Had the initial H&S meeting with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, hazards with direct push rigs, traffic safety, potential exposure to explosives contamination, fire hazards, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.

-Completed Daily Tailgate Meeting Sheet

-Completed Daily Task Hazard Assessment Sheet

**Observations/Problems Encountered/Corrective Action Taken:**

None.

**Office Work Performed:**

- Organized paperwork and equipment, scanned SCFSs.
- Completed DQCR.

**By** Ryan Herold

**Title** Field Manager

# DAILY QUALITY CONTROL REPORT

Date **05/27/20**

Day	S	S	M	T	W X	T	F
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On Site Hours	0700 - 1600
Travel Time	0.5
Office Time	1

COE Project Manager Jeff Gill  
Project CHAAP OU1 Rebound Study/  
PMs-Q#3 & OU1-OU3 LTM  
Project No. 60565355  
Contract No. W9128F-18-D-0020

Weather	Bright Sun	Clear X	Overcast X	Rain	Snow
Temp	To 32	32-50	50-70 X	70-85	85 up
Wind	Still	Moderate X	High	<b>Report No.  2</b>	
Humidity	Dry	Moderate X	Humid		

## **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer

## **Equipment on Site:**

One direct push rig (Geoprobe 6620DT), Screen point sampler (SP15), support trucks, hand-held GPS unit, performance monitoring (PM) temporary well materials (1"-OD PVC., 10' screens, filter pack sand, granular bentonite, coated chips, grout mix), peristaltic pump and tubing, laboratory provided sample containers, IDW buckets, decon supplies, Horiba MPS, LaMotte turbidity meter, Hach Colormeter, water level meters, MiniRAE PID, level D PPE, first-aid/safety supplies, and field/safety paperwork.

## **Visitors on Site:**

None.

## **AECOM/Brice Personnel on Site:**

AECOM - Taylor Young, Ryan Herold, Jonathan Ortiz

## **Field Work Performed (including sampling):**

-Continued OU1 Rebound Study Q#3 and OU1-OU3 LTM sampling events (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).

## **Installed (7) temp wells**

EW7-PM21A-30                      EW7-PM24B-40  
EW7-PM21B-40                      EW7-PM27A-30  
EW7-PM22A-30  
EW7-PM22B-40  
EW7-PM24A-30

-OU1 and OU3 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.

-Containerized IDW purge/decontamination water in a designated labeled 1000-gallon poly tank at GWTF.

## **Quality Control Activities (including field calibration):**

-Calibration check of PIDs (serial #'s 110-014926, 110-014888) and water level indicators (#'s 1324-T, 1323-T).

## **Health and Safety and Activities:**

Had the daily H&S meeting with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, hazards with direct push rigs, traffic safety, potential exposure to explosives contamination, fire hazards, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.

-Re-capped overall health and safety concerns, stressed road, COVID-19, and direct push safety.

-Completed Daily Tailgate Meeting Sheet

-Completed Daily Task Hazard Assessment Sheet

**Observations/Problems Encountered/Corrective Action Taken:**

None.

**Office Work Performed:**

- Organized paperwork and equipment.
- Completed DQCR.

**By** Ryan Herold

**Title** Field Manager

# DAILY QUALITY CONTROL REPORT

Date **05/28/20**

Day	S	S	M	T	W	T	F
						X	

On Site Hours	0700 - 1700
Travel Time	0.5
Office Time	1

COE Project Manager Jeff Gill  
Project CHAAP OU1 Rebound Study/  
PMs-Q#3 & OU1-OU3 LTM  
Project No. 60565355  
Contract No. W9128F-18-D-0020

Weather	Bright Sun	Clear X	Overcast	Rain	Snow
Temp	To 32	32-50	50-70 X	70-85	85 up
Wind	Still	Moderate	High X	<b>Report No. 3</b>	
Humidity	Dry	Moderate X	Humid		

## **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer

## **Equipment on Site:**

One direct push rig (Geoprobe 6620DT), Screen point sampler (SP15), support trucks, hand-held GPS unit, performance monitoring (PM) temporary well materials (1"-OD PVC., 10' screens, filter pack sand, granular bentonite, coated chips, grout mix), peristaltic pump and tubing, laboratory provided sample containers, IDW buckets, decon supplies, Horiba MPS, LaMotte turbidity meter, Hach Colormeter, water level meters, MiniRAE PID, level D PPE, first-aid/safety supplies, and field/safety paperwork.

## **Visitors on Site:**

Safety-Kleen - Mark Schmidt

## **AECOM/Brice Personnel on Site:**

AECOM - Taylor Young, Ryan Herold and John Ortiz

## **Field Work Performed (including sampling):**

-Continued OU1 Rebound Study Q#3 and OU1-OU3 LTM sampling events (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).

### Installed (7) temp wells

EW7-PM27B-40      EW7-PM29A-30  
EW7-PM25A-30      EW7-PM29B-40  
EW7-PM25B-40      EW7-PM23A-30  
EW7-PM28A-30      EW7-PM23B-40  
EW7-PM28B-40

### Sampled (2) PM wells

EW7-PM21A-3-25  
EW7-PM22A-3-25

-OU1 and OU3 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.

-Containerized IDW purge/decontamination water in a designated labeled 1000-gallon poly tank at GWTF.

## **Quality Control Activities (including field calibration):**

-Calibration check of PIDs (serial #'s 110-014926, 110-014888) , water level indicators (#'s 1324-T, 1323-T), Horiba-U52 (serial #'s U61502X).

## **Health and Safety and Activities:**

Had the daily H&S meeting with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, hazards with direct push rigs, traffic safety, potential exposure to explosives contamination, fire hazards, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.

-Re-capped overall health and safety concerns, stressed road, COVID-19, and direct push safety.

-Completed Daily Tailgate Meeting Sheet

-Completed Daily Task Hazard Assessment Sheet

**Observations/Problems Encountered/Corrective Action Taken:**

Safety-Kleen onsite to collect additional water IDW sample (from MW install activities - 4/2020).

**Office Work Performed:**

- Organized paperwork and equipment, scanned SCFSs.
- Completed DQCR.

**By** Ryan Herold

**Title** Field Manager

# DAILY QUALITY CONTROL REPORT

Date **05/29/20**

Day	S	S	M	T	W	T	F
							X

On Site Hours	0700 - 1700
Travel Time	0.5
Office Time	1

COE Project Manager Jeff Gill  
 Project CHAAP OU1 Rebound Study/  
 PMs-Q#3 & OU1-OU3 LTM  
 Project No. 60565355  
 Contract No. W9128F-18-D-0020

Weather	Bright Sun	Clear X	Overcast	Rain	Snow
Temp	To 32	32-50	50-70	70-85 X	85 up
Wind	Still X	Moderate	High	<b>Report No.</b>  <b>4</b>	
Humidity	Dry	Moderate X	Humid		

## **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer

## **Equipment on Site:**

One direct push rig (Geoprobe 6620DT), Screen point sampler (SP15), support trucks, hand-held GPS unit, performance monitoring (PM) temporary well materials (1"-OD PVC., 10' screens, filter pack sand, granular bentonite, coated chips, grout mix), peristaltic pump and tubing, laboratory provided sample containers, IDW buckets, decon supplies, Horiba MPS, LaMotte turbidity meter, Hach Colormeter, water level meters, MiniRAE PID, level D PPE, first-aid/safety supplies, and field/safety paperwork.

## **Visitors on Site:**

None.

## **AECOM/Brice Personnel on Site:**

AECOM - Taylor Young, Ryan Herold, Jonathan Ortiz

## **Field Work Performed (including sampling):**

-Continued OU1 Rebound Study Q#3 and OU1-OU3 LTM sampling events (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).

### Installed (2) temp wells

EW7-PM26A-30

EW7-PM26B-40

### Sampled (5) PM wells

EW7-PM21B-3-35

EW7-PM27A-3-25

EW7-PM22B-3-35

EW7-PM24A-3-25

EW7-PM24B-3-35

-OU1 and OU3 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.

-Containerized IDW purge/decontamination water in a designated labeled 1000-gallon poly tank at GWTF.

## **Quality Control Activities (including field calibration):**

-Calibration check of PIDs (serial #'s 110-014926, 110-014888) , water level indicators (#'s 1324-T, 1323-T), Horiba-U52 (serial #'s U61502X).

## **Health and Safety and Activities:**

Had the daily H&S meeting with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, hazards with direct push rigs, traffic safety, potential exposure to explosives contamination, fire hazards, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.

-Re-capped overall health and safety concerns, stressed road, COVID-19, and direct push safety.

-Completed Daily Tailgate Meeting Sheet

-Completed Daily Task Hazard Assessment Sheet

**Observations/Problems Encountered/Corrective Action Taken:**

None.

**Office Work Performed:**

- Organized paperwork and equipment, scanned SCFSs.
- Completed DQCR.

**By** Ryan Herold

**Title** Field Manager

# DAILY QUALITY CONTROL REPORT

Date **05/30/20**

Day

S X	S	M	T	W	T	F
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On Site Hours

0700 - 1700

Travel Time

0.5

Office Time

0.5

**COE Project Manager**  
**Project**

Jeff Gill  
CHAAP OU1 Rebound Study/  
PMs-Q#3 & OU1-OU3 LTM

**Project No.**

60565355

**Contract No.**

W9128F-18-D-0020

Weather

Bright Sun	Clear X	Overcast X	Rain	Snow
To 32	32-50	50-70 X	70-85	85 up

Temp

Wind

Still	Moderate X	High	<b>Report No.</b>  <b>5</b>	
Dry	Moderate X	Humid		

Humidity

## **Subcontractors on Site:**

None.

## **Equipment on Site:**

Support trucks, hand-held GPS unit, peristaltic pump and tubing, laboratory provided sample containers, IDW buckets, decon supplies, Horiba MPS, LaMotte turbidity meter, MiniRAE PID, Hach Colormeter, water level meters, level D PPE, first-aid/safety supplies, and field/safety paperwork.

## **Visitors on Site:**

None.

## **AECOM/Brice Personnel on Site:**

AECOM - Taylor Young, Ryan Herold, Jonathan Ortiz

## **Field Work Performed (including sampling):**

-Continued OU1 Rebound Study Q#3 and OU1-OU3 LTM sampling events (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).

### Sampled (5) PM wells

EW7-PM27B-3-35

EW7-PM29A-3-25

EW7-PM29B-3-35 (+ MS/MSD)

EW7-PM28A-3-25

EW7-PM28B-3-35

-OU1 and OU3 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.

-Containerized IDW purge/decontamination water in a designated labeled 1000-gallon poly tank at GWTF.

## **Quality Control Activities (including field calibration):**

-Calibration check of PIDs (serial #'s 110-014926, 110-014888) , water level indicators (#'s 1324-T, 1323-T), Horiba-U52 (serial #'s U61502X).

-MS/MSD was collected.

## **Health and Safety and Activities:**

Had the daily H&S meeting with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, hazards with direct push rigs, traffic safety, potential exposure to explosives contamination, fire hazards, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.

-Re-capped overall health and safety concerns, stressed road, COVID-19, and direct push safety.

-Completed Daily Tailgate Meeting Sheet

-Completed Daily Task Hazard Assessment Sheet

**Observations/Problems Encountered/Corrective Action Taken:**

None.

**Office Work Performed:**

- Organized paperwork and equipment, scanned SCFSs.
- Completed DQCR.

**By** Ryan Herold

**Title** Field Manager

# DAILY QUALITY CONTROL REPORT

Date

05/31/20

Day

S	S X	M	T	W	T	F
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On Site Hours

0700 - 1700

Travel Time

0.5

Office Time

0.5

COE Project Manager  
Project

Jeff Gill  
CHAAP OU1 Rebound Study/  
PMs-Q#3 & OU1-OU3 LTM

Project No.

60565355

Contract No.

W9128F-18-D-0020

Weather

Bright Sun	Clear X	Overcast X	Rain	Snow
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Temp

To 32	32-50	50-70 X	70-85	85 up
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Wind

Still	Moderate	High X	Report No.  6	
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Humidity

Dry	Moderate X	Humid		
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## Subcontractors on Site:

None.

## Equipment on Site:

Support trucks, hand-held GPS unit, peristaltic pump and tubing, laboratory provided sample containers, IDW buckets, decon supplies, Horiba MPS, LaMotte turbidity meter, Hach Colormeter, water level meters, MiniRAE PID, level D PPE, first-aid/safety supplies, and field/safety paperwork.

## Visitors on Site:

None.

## AECOM/Brice Personnel on Site:

AECOM - Taylor Young, Ryan Herold, Jonathan Ortiz

## Field Work Performed (including sampling):

-Continued OU1 Rebound Study Q#3 and OU1-OU3 LTM sampling events (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).

### Sampled (5) PM wells

EW7-PM25A-3-25

EW7-PM25B-3-35

EW7-PM23A-3-25 (+ duplicate)

EW7-PM23B-3-25

EW7-PM26A-3-25

-OU1 and OU3 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.

-Containerized IDW purge/decontamination water in a designated labeled 1000-gallon poly tank at GWTF.

## Quality Control Activities (including field calibration):

-Calibration check of PIDs (serial #'s 110-014926, 110-014888) , water level indicators (#'s 1324-T, 1323-T), Horiba-U52 (serial #'s U61502X).

-Duplicate sample EW7-PM523A-3-25 was collected.

## Health and Safety and Activities:

Had the daily H&S meeting with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, hazards with direct push rigs, traffic safety, potential exposure to explosives contamination, fire hazards, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.

-Re-capped overall health and safety concerns, stressed road, COVID-19, and direct push safety.

-Completed Daily Tailgate Meeting Sheet

-Completed Daily Task Hazard Assessment Sheet

**Observations/Problems Encountered/Corrective Action Taken:**

None.

**Office Work Performed:**

- Organized paperwork and equipment, scanned SCFSs.
- Completed DQCR.

**By** Ryan Herold

**Title** Field Manager

# DAILY QUALITY CONTROL REPORT

Date **06/01/20**

Day	S	S	M X	T	W	T	F
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On Site Hours	0700 - 1600
Travel Time	0.5
Office Time	0.5

COE Project Manager Jeff Gill  
 Project CHAAP OU1 Rebound Study/  
 PMs-Q#3 & OU1-OU3 LTM  
 Project No. 60565355  
 Contract No. W9128F-18-D-0020

Weather	Bright Sun X	Clear	Overcast	Rain	Snow
Temp	To 32	32-50	50-70	70-85	85 up X
Wind	Still	Moderate	High X	<b>Report No.</b>  <b>7</b>	
Humidity	Dry	Moderate X	Humid		

## **Subcontractors on Site:**

None.

## **Equipment on Site:**

Support trucks, hand-held GPS unit, peristaltic and Monsoon pumps and tubing, laboratory provided sample containers, IDW buckets, decon supplies, Horiba MPS, LaMotte turbidity meter, Hach Colormeter, water level meters, MiniRAE PID, level D PPE, first-aid/safety supplies, and field/safety paperwork.

## **Visitors on Site:**

None.

## **AECOM/Brice Personnel on Site:**

AECOM - Taylor Young, Ryan Herold, Jonathan Ortiz

## **Field Work Performed (including sampling):**

-Continued OU1 Rebound Study Q#3 and OU1-OU3 LTM sampling events (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).

<u>Sampled (1) PM wells</u>	<u>Sampled (3) OU1 wells</u>
EW7-PM26B-3-35	G0079-20A
	G0075-20A
	G0076-20A

-OU1 and OU3 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.

-Containerized IDW purge/decontamination water in a designated labeled 1000-gallon poly tank at GWTF.

## **Quality Control Activities (including field calibration):**

-Calibration check of PIDs (serial #'s 110-014926, 110-014888) , water level indicators (#'s 1324-T, 1323-T), Horiba-U52 (serial #'s U61502X).

## **Health and Safety and Activities:**

Had the daily H&S meeting with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, hazards with direct push rigs, traffic safety, potential exposure to explosives contamination, fire hazards, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.

-Re-capped overall health and safety concerns, stressed road, COVID-19, and direct push safety.

-Completed Daily Tailgate Meeting Sheet

-Completed Daily Task Hazard Assessment Sheet

**Observations/Problems Encountered/Corrective Action Taken:**

None.

**Office Work Performed:**

- Organized paperwork and equipment, scanned SCFSs.
- Completed DQCR.

**By** Ryan Herold

**Title** Field Manager

# DAILY QUALITY CONTROL REPORT

Date **06/02/20**

Day	S	S	M	T X	W	T	F
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On Site Hours	0630 - 1300
Travel Time	2.5
Office Time	0.5

COE Project Manager Jeff Gill  
 Project CHAAP OU1 Rebound Study/  
 PMs-Q#3 & OU1-OU3 LTM  
 Project No. 60565355  
 Contract No. W9128F-18-D-0020

Weather	Bright Sun X	Clear	Overcast	Rain	Snow
Temp	To 32	32-50	50-70	70-85	85 up X
Wind	Still	Moderate	High X	<b>Report No. 8</b>	
Humidity	Dry	Moderate X	Humid		

## **Subcontractors on Site:**

None.

## **Equipment on Site:**

Support trucks, hand-held GPS unit, Monsoon pump and tubing, laboratory provided sample containers, IDW buckets, decon supplies, Horiba MPS, LaMotte turbidity meter, Hach Colormeter, water level meters, MiniRAE PID, level D PPE, first-aid/safety supplies, and field/safety paperwork.

## **Visitors on Site:**

None.

## **AECOM/Brice Personnel on Site:**

AECOM - Taylor Young, Ryan Herold, Jonathan Ortiz

## **Field Work Performed (including sampling):**

-Continued OU1 Rebound Study Q#3 and OU1-OU3 LTM sampling events (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).

Sampled (3) OU1 wells      Abandoned (18) temp wells

G0070-20A (+MS/MSD)

G0081-20A

G0082-20A

-OU1 and OU3 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.

-Containerized IDW purge/decontamination water in a designated labeled 1000-gallon poly tank at GWTF.

## **Quality Control Activities (including field calibration):**

-Calibration check of PIDs (serial #'s 110-014926, 110-014888) , water level indicators (#'s 1324-T, 1323-T), Horiba-U52 (serial #'s U61502X).

-MS/MSD was collected.

## **Health and Safety and Activities:**

Had the daily H&S meeting with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, hazards with direct push rigs, traffic safety, potential exposure to explosives contamination, fire hazards, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.

-Re-capped overall health and safety concerns, stressed road, COVID-19, and direct push safety.

-Completed Daily Tailgate Meeting Sheet

-Completed Daily Task Hazard Assessment Sheet

**Observations/Problems Encountered/Corrective Action Taken:**

Demobed from site to resume activities on 6/8/20.

**Office Work Performed:**

- Organized paperwork and equipment, scanned SCFSs.
- Completed DQCR.

**By** Ryan Herold

**Title** Field Manager

# DAILY QUALITY CONTROL REPORT

Date **06/08/20**

Day	S	S	M X	T	W	T	F
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On Site Hours	0700-1730
Travel Time	0
Office Time	0.5

COE Project Manager Jeff Gill  
Project CHAAP OU1 Rebound Study/  
PMs-Q#3 & OU1-OU3 LTM  
Project No. 60565355  
Contract No. W9128F-18-D-0020

Weather	Bright Sun	Clear X	Overcast	Rain	Snow
Temp	To 32	32-50	50-70	70-85	85 up X
Wind	Still	Moderate X	High X	<b>Report No. 9</b>	
Humidity	Dry	Moderate	Humid x		

## **Subcontractors on Site:**

None.

## **Equipment on Site:**

Support trucks, Monsoon pumps and tubing, laboratory provided sample containers, IDW buckets, decon supplies, Horiba-U52s, LaMotte turbidity meters, Hach Colormeters, water level meters, MiniRAE PIDs, level D PPE, first-aid/safety supplies, and field/safety paperwork.

## **Visitors on Site:**

None.

## **AECOM/Brice Personnel on Site:**

AECOM - Taylor Young, Ryan Herold, Jonathan Ortiz  
Brice - Chris Holt, Gary Carson

## **Field Work Performed (including sampling):**

-Continued OU1 Rebound Study Q#3 and OU1-OU3 LTM sampling events (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).

Began site-wide water level measurement round.

## **Collected (3) OU1 monitoring well samples**

NW080-20A  
NW081R-20A  
NW082R-20A

-OU1/OU3 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.  
-Containerized IDW purge/decontamination water in a designated labeled 1000-gallon poly tank at GWTF.

## **Quality Control Activities (including field calibration):**

-Calibration check of PIDs (serial #'s 110-014926, 110-014888) , water level indicators (#'s 1324-T, 1323-T), Horiba-U52 #1 (serial #U61502X) #2 (Serial #T272TRPO).

## **Health and Safety and Activities:**

Had the initial/daily H&S meeting with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, traffic safety, potential exposure to explosives contamination, fire hazards, heat stress, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.

-Re-capped overall health and safety concerns, stressed road, COVID-19, and sampling safety.

-Completed Daily Tailgate Meeting Sheet

-Completed Daily Task Hazard Assessment Sheet

**Observations/Problems Encountered/Corrective Action Taken:**

None.

**Office Work Performed:**

- Organized paperwork and equipment, scanned SCFSs.
- Completed DQCR.

**By** Ryan Herold

**Title** Field Manager

# DAILY QUALITY CONTROL REPORT

Date **06/09/20**

Day	S	S	M	T X	W	T	F
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On Site Hours	0700-1800
Travel Time	0
Office Time	0.5

COE Project Manager Jeff Gill  
 Project CHAAP OU1 Rebound Study/  
 PMs-Q#3 & OU1-OU3 LTM  
 Project No. 60565355  
 Contract No. W9128F-18-D-0020

Weather	Bright Sun	Clear	Overcast X	Rain X	Snow
Temp	To 32	32-50	50-70 X	70-85	85 up
Wind	Still	Moderate X	High X	Report No.  10	
Humidity	Dry	Moderate	Humid x		

## **Subcontractors on Site:**

None.

## **Equipment on Site:**

Support trucks, Monsoon pumps and tubing, laboratory provided sample containers, IDW buckets, decon supplies, Horiba-U52s, LaMotte turbidity meters, Hach Colormeters, water level meters, MiniRAE PIDs, level D PPE, first-aid/safety supplies, and field/safety paperwork.

## **Visitors on Site:**

None.

## **AECOM/Brice Personnel on Site:**

AECOM - Taylor Young, Ryan Herold, Jonathan Ortiz  
 Brice - Chris Holt, Gary Carson

## **Field Work Performed (including sampling):**

-Continued OU1 Rebound Study Q#3 and OU1-OU3 LTM sampling events (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).

Completed site-wide water level measurement round.

## **Collected (7) OU1 monitoring well samples**

NW070-20A	CA211-20A	PZ001-20A (+MS/MSD)
NW071-20A	CA212-20A	
CA210-20A	CA213-20A	

-OU1/OU3 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.

-Containerized IDW purge/decontamination water in a designated labeled 1000-gallon poly tank at GWTF.

## **Quality Control Activities (including field calibration):**

-Calibration check of PIDs (serial #'s 110-014926, 110-014888) , water level indicators (#'s 1324-T, 1323-T), Horiba-U52 #1 (serial #U61502X) #2 (Serial #T272TRPO).

-MS/MSD was collected.

## **Health and Safety and Activities:**

Had the daily H&S meeting with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, traffic safety, potential exposure to explosives contamination, fire hazards, heat stress, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.

-Re-capped overall health and safety concerns, stressed road, COVID-19, and sampling safety.

-Completed Daily Tailgate Meeting Sheet

-Completed Daily Task Hazard Assessment Sheet

**Observations/Problems Encountered/Corrective Action Taken:**

None.

**Office Work Performed:**

- Organized paperwork and equipment, scanned SCFSs.
- Completed DQCR.

**By** Ryan Herold

**Title** Field Manager

# DAILY QUALITY CONTROL REPORT

Date **06/10/20**

Day	S	S	M	T	W X	T	F
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On Site Hours	0700-1730
Travel Time	0
Office Time	0.5

COE Project Manager Jeff Gill  
Project CHAAP OU1 Rebound Study/  
PMs-Q#3 & OU1-OU3 LTM  
Project No. 60565355  
Contract No. W9128F-18-D-0020

Weather	Bright Sun	Clear X	Overcast	Rain	Snow
Temp	To 32	32-50	50-70 X	70-85	85 up
Wind	Still	Moderate X	High X	Report No.  11	
Humidity	Dry	Moderate	Humid X		

## **Subcontractors on Site:**

None.

## **Equipment on Site:**

Support trucks, Monsoon pumps and tubing, laboratory provided sample containers, IDW buckets, decon supplies, Horiba-U52s, LaMotte turbidity meters, Hach Colormeters, water level meters, MiniRAE PIDs, level D PPE, first-aid/safety supplies, and field/safety paperwork.

## **Visitors on Site:**

None.

## **AECOM/Brice Personnel on Site:**

AECOM - Taylor Young, Ryan Herold, Jonathan Ortiz  
Brice - Chris Holt, Gary Carson

## **Field Work Performed (including sampling):**

-Continued OU1 Rebound Study Q#3 and OU1-OU3 LTM sampling events (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).

### Collected (12) OU1 monitoring well samples

NW050-20A	NW062-20A	PZ012-20A
NW051-20A	PZ004-20A	G0044-20A
NW052-20A	PZ009-20A	
NW060-20A	PZ010-20A	
NW061-20A	PZ011-20A	

-OU1/OU3 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.

-Containerized IDW purge/decontamination water in a designated labeled 1000-gallon poly tank at GWTF.

## **Quality Control Activities (including field calibration):**

-Calibration check of PIDs (serial #'s 110-014926, 110-014888) , water level indicators (#'s 1324-T, 1323-T), Horiba-U52 #1 (serial #U61502X) #2 (Serial #T272TRPO).

## **Health and Safety and Activities:**

Had the daily H&S meeting with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, traffic safety, potential exposure to explosives contamination, fire hazards, heat stress, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.

-Re-capped overall health and safety concerns, stressed road, COVID-19, and sampling safety.

-Completed Daily Tailgate Meeting Sheet

-Completed Daily Task Hazard Assessment Sheet

**Observations/Problems Encountered/Corrective Action Taken:**

None.

**Office Work Performed:**

- Organized paperwork and equipment, scanned SCFSs.
- Completed DQCR.

**By** Ryan Herold

**Title** Field Manager

# DAILY QUALITY CONTROL REPORT

Date **06/11/20**

Day	S	S	M	T	W	T	F
						X	

On Site Hours	0700-1800
Travel Time	0
Office Time	0.5

COE Project Manager Jeff Gill  
 Project CHAAP OU1 Rebound Study/  
 PMs-Q#3 & OU1-OU3 LTM  
 Project No. 60565355  
 Contract No. W9128F-18-D-0020  
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Weather	Bright Sun	Clear X	Overcast	Rain	Snow
Temp	To 32	32-50	50-70	70-85 X	85 up
Wind	Still	Moderate X	High	<b>Report No.</b>  <b>12</b>	
Humidity	Dry	Moderate	Humid X		

## **Subcontractors on Site:**

None.

## **Equipment on Site:**

Support trucks, Monsoon pumps and tubing, laboratory provided sample containers, IDW buckets, decon supplies, Horiba-U52s, LaMotte turbidity meters, Hach Colormeters, water level meters, MiniRAE PIDs, level D PPE, first-aid/safety supplies, and field/safety paperwork.

## **Visitors on Site:**

None.

## **AECOM/Brice Personnel on Site:**

AECOM - Taylor Young, Ryan Herold, Jonathan Ortiz  
 Brice - Chris Holt, Gary Carson

## **Field Work Performed (including sampling):**

-Continued OU1 Rebound Study Q#3 and OU1-OU3 LTM sampling events (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).

### Collected (10) OU1 monitoring well and (2) OU3 monitoring well samples

SHGW02-20A (+ duplicate)	G0102-20A (+MS/MSD)	PZ005-20A
SHGW03-20A	G0103-20A	PZ007-20A (+MS/MSD)
G0017-20A	G0105-20A	
G0045-20A	G0106-20A	
G0080-20A	G0107-20A	

-OU1/OU3 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.

-Containerized IDW purge/decontamination water in a designated labeled 1000-gallon poly tank at GWTF.

## **Quality Control Activities (including field calibration):**

-Calibration check of PIDs (serial #'s 110-014926, 110-014888) , water level indicators (#'s 1324-T, 1323-T), Horiba-U52 #1 (serial #U61502X) #2 (Serial #T272TRPO) #3 (Serial # PHKKGNSB).

-Duplicate sample SHGW05-20A was collected. Two MS/MSDs were collected.

## **Health and Safety and Activities:**

Had the daily H&S meeting with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, traffic safety, potential exposure to explosives contamination, fire hazards, heat stress, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.

-Re-capped overall health and safety concerns, stressed road, COVID-19, and sampling safety.

-Completed Daily Tailgate Meeting Sheet

-Completed Daily Task Hazard Assessment Sheet

**Observations/Problems Encountered/Corrective Action Taken:**

Horiba #2 was identified as giving inaccurate dissolved oxygen measurements at several wells during purging; however, stabilization was verified from other parameters and samples were collected. Horiba #2 was replaced (with #3) and wells will be repurged for parameters at later dates.

**Office Work Performed:**

- Organized paperwork and equipment, scanned SCFSs.
- Completed DQCR.

**By** Ryan Herold**Title** Field Manager

# DAILY QUALITY CONTROL REPORT

Date **06/12/20**

Day	S	S	M	T	W	T	F
							<b>X</b>

On Site Hours	0700-1730
Travel Time	0
Office Time	0.5

**COE Project Manager** Jeff Gill  
**Project** CHAAP OU1 Rebound Study/  
PMs-Q#3 & OU1-OU3 LTM  
**Project No.** 60565355  
**Contract No.** W9128F-18-D-0020

Weather	Bright Sun	Clear <b>X</b>	Overcast	Rain	Snow
Temp	To 32	32-50	50-70	70-85	85 up <b>X</b>
Wind	Still	Moderate <b>X</b>	High	<b>Report No. 13</b>	
Humidity	Dry	Moderate	Humid <b>X</b>		

## **Subcontractors on Site:**

None.

## **Equipment on Site:**

Support trucks, Monsoon pumps and tubing, laboratory provided sample containers, IDW buckets, decon supplies, Horiba-U52s, LaMotte turbidity meters, Hach Colormeters, water level meters, MiniRAE PIDs, level D PPE, first-aid/safety supplies, and field/safety paperwork.

## **Visitors on Site:**

None.

## **AECOM/Brice Personnel on Site:**

AECOM - Taylor Young, Ryan Herold, Jonathan Ortiz  
 Brice - Chris Holt, Gary Carson

## **Field Work Performed (including sampling):**

-Continued OU1 Rebound Study Q#3 and OU1-OU3 LTM sampling events (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).

### Collected (11) OU1 monitoring well samples

G0095-20A	G0115-20A	PZ013-20A
G0100-20A	G0116-20A	PZ013-20A
G0101-20A	G0117-20A	
G0104-20A	G0120-20A	
G0111-20A	PZ013-20A	

-OU1/OU3 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.

-Containerized IDW purge/decontamination water in a designated labeled 1000-gallon poly tank at GWTF.

## **Quality Control Activities (including field calibration):**

-Calibration check of PIDs (serial #'s 110-014926, 110-014888) , water level indicators (#'s 1324-T, 1323-T), Horiba-U52 #1 (serial #U61502X) #3 (Serial # PHKKGNSB).

## **Health and Safety and Activities:**

Had the daily H&S meeting with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, traffic safety, potential exposure to explosives contamination, fire hazards, heat stress, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.

-Re-capped overall health and safety concerns, stressed road, COVID-19, and sampling safety.

-Completed Daily Tailgate Meeting Sheet

-Completed Daily Task Hazard Assessment Sheet

**Observations/Problems Encountered/Corrective Action Taken:**

OU3 monitoring wells SHGW02 and SHGW03 were repurged for parameters. No additional samples were collected.

**Office Work Performed:**

- Organized paperwork and equipment, scanned SCFSs.
- Completed DQCR.

**By** Ryan Herold

**Title** Field Manager

# DAILY QUALITY CONTROL REPORT

Date **06/13/20**

Day	S	S	M	T	W	T	F
	X						

On Site Hours	0700-1700
Travel Time	0
Office Time	0.5

COE Project Manager Jeff Gill  
Project CHAAP OU1 Rebound Study/  
PMs-Q#3 & OU1-OU3 LTM  
Project No. 60565355  
Contract No. W9128F-18-D-0020

Weather	Bright Sun	Clear X	Overcast	Rain	Snow
Temp	To 32	32-50	50-70	70-85	85 up X
Wind	Still	Moderate X	High X	<b>Report No. 14</b>	
Humidity	Dry	Moderate	Humid X		

## **Subcontractors on Site:**

None.

## **Equipment on Site:**

Support trucks, Monsoon pumps and tubing, laboratory provided sample containers, IDW buckets, decon supplies, Horiba-U52s, LaMotte turbidity meters, Hach Colormeters, water level meters, MiniRAE PIDs, level D PPE, first-aid/safety supplies, and field/safety paperwork.

## **Visitors on Site:**

None.

## **AECOM/Brice Personnel on Site:**

AECOM - Taylor Young, Ryan Herold, Jonathan Ortiz  
Brice - Chris Holt, Gary Carson

## **Field Work Performed (including sampling):**

-Continued OU1 Rebound Study Q#3 and OU1-OU3 LTM sampling events (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).

### Collected (11) OU1 monitoring well samples

G0023-20A	G0084-20A	PZ015-20A
G0048-20A	G0085-20A (+ duplicate)	PZ016-20A
G0049-20A	G0110-20A	
G0066R-20A	G0119-20A	
G0067-20A	G0121-20A	

-OU1/OU3 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.

-Containerized IDW purge/decontamination water in a designated labeled 1000-gallon poly tank at GWTF.

## **Quality Control Activities (including field calibration):**

-Calibration check of PIDs (serial #'s 110-014926, 110-014888) , water level indicators (#'s 1324-T, 1323-T), Horiba-U52 #1 (serial #U61502X) #3 (Serial # PHKKGNSB).

-Duplicate sample G0285-20A was collected.

## **Health and Safety and Activities:**

Had the daily H&S meeting with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, traffic safety, potential exposure to explosives contamination, fire hazards, heat stress, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.

-Re-capped overall health and safety concerns, stressed road, COVID-19, and sampling safety.

-Completed Daily Tailgate Meeting Sheet

-Completed Daily Task Hazard Assessment Sheet

**Observations/Problems Encountered/Corrective Action Taken:**

None.

**Office Work Performed:**

- Organized paperwork and equipment, scanned SCFSs.
- Completed DQCR.

**By** Ryan Herold

**Title** Field Manager

# DAILY QUALITY CONTROL REPORT

Date **06/14/20**

Day	S	S X	M	T	W	T	F
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On Site Hours	0800-1700
Travel Time	0
Office Time	0.5

COE Project Manager Jeff Gill  
Project CHAAP OU1 Rebound Study/  
PMs-Q#3 & OU1-OU3 LTM  
Project No. 60565355  
Contract No. W9128F-18-D-0020

Weather	Bright Sun	Clear X	Overcast	Rain	Snow
Temp	To 32	32-50	50-70	70-85	85 up X
Wind	Still	Moderate	High X	<b>Report No.</b>  <b>15</b>	
Humidity	Dry	Moderate X	Humid		

## **Subcontractors on Site:**

None.

## **Equipment on Site:**

Support trucks, Monsoon pumps and tubing, laboratory provided sample containers, IDW buckets, decon supplies, Horiba-U52s, LaMotte turbidity meters, Hach Colormeters, water level meters, MiniRAE PIDs, level D PPE, first-aid/safety supplies, and field/safety paperwork.

## **Visitors on Site:**

None.

## **AECOM/Brice Personnel on Site:**

AECOM - Taylor Young, Ryan Herold, Jonathan Ortiz  
Brice - Chris Holt, Gary Carson

## **Field Work Performed (including sampling):**

-Continued OU1 Rebound Study Q#3 and OU1-OU3 LTM sampling events (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).

### Collected (8) OU1 monitoring well samples

G0083-20A                      G0113-20A  
G0097-20A                      G0114-20A  
G0098-20A                      G0118-20A  
G0108-20A  
G0112-20A

-OU1/OU3 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.

-Containerized IDW purge/decontamination water in a designated labeled 1000-gallon poly tank at GWTF.

## **Quality Control Activities (including field calibration):**

-Calibration check of PIDs (serial #'s 110-014926, 110-014888) , water level indicators (#'s 1324-T, 1323-T), Horiba-U52 #1 (serial #U61502X) #3 (Serial # PHKKGNSB).

## **Health and Safety and Activities:**

Had the daily H&S meeting with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, traffic safety, potential exposure to explosives contamination, fire hazards, heat stress, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.

-Re-capped overall health and safety concerns, stressed road, COVID-19, and sampling safety.

-Completed Daily Tailgate Meeting Sheet

-Completed Daily Task Hazard Assessment Sheet

**Observations/Problems Encountered/Corrective Action Taken:**

OU1 monitoring wells PZ010, PZ011, PZ012 were repurged for parameters. No additional samples were collected.

**Office Work Performed:**

- Organized paperwork and equipment, scanned SCFSs.
- Completed DQCR.

**By** Ryan Herold

**Title** Field Manager

# DAILY QUALITY CONTROL REPORT

Date **06/15/20**

Day	S	S	M X	T	W	T	F
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On Site Hours	0700-1700
Travel Time	0
Office Time	0.5

COE Project Manager Jeff Gill  
Project CHAAP OU1 Rebound Study/  
PMs-Q#3 & OU1-OU3 LTM  
Project No. 60565355  
Contract No. W9128F-18-D-0020

Weather	Bright Sun	Clear X	Overcast	Rain	Snow
Temp	To 32	32-50	50-70	70-85	85 up X
Wind	Still	Moderate	High X	<b>Report No.  16</b>	
Humidity	Dry	Moderate X	Humid X		

## **Subcontractors on Site:**

None.

## **Equipment on Site:**

Support trucks, Monsoon pumps and tubing, laboratory provided sample containers, IDW buckets, decon supplies, Horiba-U52s, LaMotte turbidity meters, Hach Colormeters, water level meters, MiniRAE PIDs, level D PPE, first-aid/safety supplies, and field/safety paperwork.

## **Visitors on Site:**

None.

## **AECOM/Brice Personnel on Site:**

AECOM - Taylor Young, Ryan Herold, Jonathan Ortiz  
Brice - Chris Holt, Gary Carson

## **Field Work Performed (including sampling):**

-Continued OU1 Rebound Study Q#3 and OU1-OU3 LTM sampling events (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).

### Collected (14) OU1 monitoring well samples

NW020-20A	G0077-20A	G0094-20A
NW021-20A (+ duplicate)	G0078-20A	G0099-20A
NW022-20A	G0087-20A	G0109-20A
G0022-20A	G0088-20A	PZ020-20A
G0024-20A	G0089-20A	

-OU1/OU3 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.

-Containerized IDW purge/decontamination water in a designated labeled 1000-gallon poly tank at GWTF.

## **Quality Control Activities (including field calibration):**

-Calibration check of PIDs (serial #'s 110-014926, 110-014888) , water level indicators (#'s 1324-T, 1323-T), Horiba-U52 #1 (serial #U61502X) #3 (Serial # PHKKGNSB).

-Duplicate sample NW023-20A was collected.

## **Health and Safety and Activities:**

Had the daily H&S meeting with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, traffic safety, potential exposure to explosives contamination, fire hazards, heat stress, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.

-Re-capped overall health and safety concerns, stressed road, COVID-19, and sampling safety.

-Completed Daily Tailgate Meeting Sheet

-Completed Daily Task Hazard Assessment Sheet

**Observations/Problems Encountered/Corrective Action Taken:**

None.

**Office Work Performed:**

- Organized paperwork and equipment, scanned SCFSs.
- Completed DQCR.

**By** Ryan Herold

**Title** Field Manager

# DAILY QUALITY CONTROL REPORT

**COE Project Manager** Jeff Gill  
**Project** CHAAP OU1 Rebound Study/  
 PMs-Q#3 & OU1-OU3 LTM  
**Project No.** 60565355  
**Contract No.** W9128F-18-D-0020

Date **06/16/20**

Day	S	S	M	T	W	T	F
			X				

On Site Hours	0700-1800
Travel Time	0
Office Time	0.5

Weather	Bright Sun	Clear X	Overcast	Rain	Snow
Temp	To 32	32-50	50-70	70-85	85 up X
Wind	Still	Moderate	High X	<b>Report No.</b>  <b>17</b>	
Humidity	Dry	Moderate X	Humid X		

## **Subcontractors on Site:**

None.

## **Equipment on Site:**

Support trucks, Monsoon pumps and tubing, laboratory provided sample containers, IDW buckets, decon supplies, Horiba-U52s, LaMotte turbidity meters, Hach Colormeters, water level meters, MiniRAE PIDs, level D PPE, first-aid/safety supplies, and field/safety paperwork.

## **Visitors on Site:**

None.

## **AECOM/Brice Personnel on Site:**

AECOM - Taylor Young, Ryan Herold, Jonathan Ortiz  
 Brice - Chris Holt, Gary Carson

## **Field Work Performed (including sampling):**

-Continued OU1 Rebound Study Q#3 and OU1-OU3 LTM sampling events (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).

### Collected (11) OU1 monitoring well samples

G0086-20A	G0096-20A (+ duplicate)	PZ019-20A (+ MS/MSD)
G0090-20A	G0122-20A	
G0091-20A	G0123-20A	
G0092-20A	PZ017R-20A (+ duplicate)	
G0093-20A	PZ018-20A	

### Collected IDW water sample

WaterWC-Q3-Jun20

-OU1/OU3 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.

-Containerized IDW purge/decontamination water in a designated labeled 1000-gallon poly tank at GWTF.

## **Quality Control Activities (including field calibration):**

-Calibration check of PIDs (serial #'s 110-014926, 110-014888) , water level indicators (#'s 1324-T, 1323-T), Horiba-U52 #1 (serial #U61502X) #3 (Serial # PHKKGNSB).

-Duplicate samples PZ021-20A and G00296-20A were collected. MS/MSD was collected.

**Health and Safety and Activities:**

Had the daily H&S meeting with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, traffic safety, potential exposure to explosives contamination, fire hazards, heat stress, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.

-Re-capped overall health and safety concerns, stressed road, COVID-19, and sampling safety.

-Completed Daily Tailgate Meeting Sheet

-Completed Daily Task Hazard Assessment Sheet

**Observations/Problems Encountered/Corrective Action Taken:**

OU1 monitoring wells PZ001, NW060 were repurged for parameters. No additional samples were collected.

**Office Work Performed:**

-Organized paperwork and equipment, scanned SCFSs.

-Completed DQCR.

**By** Ryan Herold

**Title** Field Manager

# DAILY QUALITY CONTROL REPORT

Date **06/17/20**

Day	S	S	M	T	W X	T	F
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On Site Hours	0800-1000
Travel Time	2.5
Office Time	0.5

COE Project Manager Jeff Gill  
 Project CHAAP OU1 Rebound Study/  
 PMs-Q#3 & OU1-OU3 LTM  
 Project No. 60565355  
 Contract No. W9128F-18-D-0020  
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Weather	Bright Sun	Clear X	Overcast	Rain	Snow
Temp	To 32	32-50	50-70	70-85	85 up X
Wind	Still	Moderate	High X	<b>Report No.</b>  <b>18</b>	
Humidity	Dry	Moderate	Humid X		

## **Subcontractors on Site:**

None.

## **Equipment on Site:**

Support trucks, Monsoon pumps and tubing, laboratory provided sample containers, IDW buckets, decon supplies, Horiba-U52s, LaMotte turbidity meters, Hach Colormeters, water level meters, MiniRAE PIDs, level D PPE, first-aid/safety supplies, and field/safety paperwork.

## **Visitors on Site:**

None.

## **AECOM/Brice Personnel on Site:**

AECOM - Taylor Young, Ryan Herold, Jonathan Ortiz  
 Brice - Chris Holt

## **Field Work Performed (including sampling):**

-Continued OU1 Rebound Study Q#3 and OU1-OU3 LTM sampling events (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).

Sampling events complete. Completed site restoration, equipment organization, and clean-up activities.

## **Quality Control Activities (including field calibration):**

None.

## **Health and Safety and Activities:**

Had the daily H&S meeting with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, traffic safety, potential exposure to explosives contamination, fire hazards, heat stress, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.

-Re-capped overall health and safety concerns, stressed road, COVID-19, and sampling safety.

-Completed Daily Tailgate Meeting Sheet

-Completed Daily Task Hazard Assessment Sheet

## **Observations/Problems Encountered/Corrective Action Taken:**

None.

## **Office Work Performed:**

-Organized paperwork and equipment, scanned SCFSs.

-Completed DQCR.

**By** Ryan Herold

**Title** Field Manager

# WEEKLY REPORT

COE Project Manager	Jeff Gill	Report No.	1
Project	CHAAP - OU1 Rebound Study/ PMs-Quarter #3 & OU1-OU3 LTM	Date	5/26/20 to 5/29/20
Project No.	60565355	Brice/AECOM On-site Hours	109
Contract No.	Brice W9128F-18-D-0020	Subcontractor Hours	29
Delivery Order No.	F0041		

## **AECOM/Brice Personnel on Site:**

Ryan Herold, Taylor Young, Jonathan Ortiz (AECOM)

## **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer

## **Visitors on Site:**

Safety-Kleen Systems - Mark Schmidt

## **Summary of Work Performed:**

- Contacted private land owners and informed them of the upcoming OU1 Rebound Study/subsurface injection field activities. Completed utility locates prior to subsurface activities (week of 5/18/20).
- Mobilized to site, conducted initial health and safety meeting, prepped field equipment, and staked all direct push (DP) locations using hand-held GPS including: 1 off-site (screen point) location - OS001; and 18 temporary wells for performance monitoring (PM) - EW7-PM21A/B through PM29A/B.
- Calibration (weekly) and calibration checks (daily) of field PIDs, water level indicators, and Horiba MPS.

## **BEGAN QUARTER #3 (Q3) OU1 REBOUND STUDY AND INJECTION PM SAMPLING ACTIVITIES:**

- Collected 3 DP groundwater samples (screen point) at depths 25 feet, 35 feet, and 45 feet bgs for explosives + MNX (Method 8330A) analysis only (**OS001-DP03-25, OS001-DP03-35, OS001-DP03-45**).
- Onsite, installed 18 temporary PM wells (1" PVC via DP techniques) at 9 locations for subsurface injection PM. Each location included one shallow well (10-foot screen, 20 to 30 feet bgs) and shallow intermediate well (10-foot screen, 30-40 feet bgs).
- Collected 7 of the 18 groundwater samples at temporary PM wells (**EW7-PM21A, PM21B, PM22A, PM22B, PM24A, PM24B, PM27A**). Each PM well was developed prior to sample collection and sampled using low-flow groundwater sampling techniques. Each PM well sample will be analyzed for explosives+MNX (Method 8330A) and water quality parameters including: TKN (351.2), NH3 (350.1), NO2/NO3 (353.2), SO4 (9056A), Alkalinity (2320B), Sulfide (9034), DOC (9060A), and Methane (RSK 175). CO2 will be back calculated from 2320B.
- IDW water (purge and decon) from all sample locations were containerized in an IDW-labeled poly tank located at GWTF. At the completion of Q3-LTM field activities, the IDW water will be sampled for site waste characterization analysis (Explosives + MNX [Method 8330A]) prior to disposal or discharge to ground surface.
- All field and sampling activities were completed in accordance with the 2019 Final Addendum 3 UFP-QAPP, the 2018 Final Addendum 2 UFP-QAPP, and recommendations provided in the 2018 and 2019 Annual Groundwater Monitoring Reports and OU1 Rebound Study Letter Report - Quarter 2 Event.

## **Percentage of Work Completed:**

Mobilization, 3 of 3 planned off-site DP (screen point) groundwater samples were completed, 18 of 18 temporary PM wells were installed, 7 of 18 temporary PM wells were sampled. 0 of 96 OU1-OU3 wells (including 36 for OU1 Rebound Study) sampled. Approximately 9% of the Q3 OU1 Rebound Study/injection PM and 2020 annual OU1/OU3 LTM sampling field work is now complete.

## **Schedule for Next Week:**

Calibration of water quality equipment. Complete Q3 PM well sampling (11 PM wells remain). Abandon all temporary PM wells. Complete groundwater purge and sample collection activities at 96 OU1-OU3 monitoring wells for the 2020 annual OU1/OU3 LTM event (includes 36 OU1 Rebound Study wells).

# WEEKLY REPORT

COE Project Manager Jeff Gill  
 Project CHAAP - OU1 Rebound Study/  
 PMs-Quarter #3 & OU1-OU3 LTM  
 Project No. 60565355  
 Contract No. Brice W9128F-18-D-0020  
 Delivery Order No. F0041

Report No. 1  
 Date 5/26/20 to 5/29/20  
 Brice/AECOM On-site Hours 109  
 Subcontractor Hours 29

## Health and Safety and Activities:

- Had the initial and daily H&S meetings with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, potential exposure to explosives contamination, direct push equipment hazards and safety, cold stress, slip-trip-falls, traffic hazards, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.
- Completed equipment and vehicle safety checks.
- Completed Daily Tailgate Meeting Sheets.
- Completed Daily Task Hazard Assessment Sheets.

## Deviations from SOW and/or WP:

None.

## Problems Encountered/Corrective Action Taken:

None.

## Recommendations:

None.

## Communication Notice This Week:

Safety-Kleen on site 5/28/20 to sample IDW water (monitoring well installation activities) prior to disposal.

## Key Personnel Changes:

Jason Auernheimer (PES) off site 5/29/20.



Installation of temporary PM wells: EW7-PM26A (shallow) and PM26B (shallow intermediate) (facing northeast).



Development and sample purging of EW7-PM24B.

By: Ryan Herold

Title: Field Manager

# WEEKLY REPORT

COE Project Manager	Jeff Gill	Report No.	2
Project	CHAAP - OU1 Rebound Study/ PMs-Quarter #3 & OU1-OU3 LTM	Date	5/30/20 to 6/2/20
Project No.	60565355	Brice/AECOM On-site Hours	107
Contract No.	Brice W9128F-18-D-0020	Subcontractor Hours	0
Delivery Order No.	F0041		

## AECOM/Brice Personnel on Site:

Ryan Herold, Taylor Young, Jonathan Ortiz (AECOM)

## Subcontractors on Site:

None.

## Visitors on Site:

None.

## Summary of Work Performed:

### CONTINUED QUARTER #3 (Q3) OU1 REBOUND STUDY / INJECTION PERFORMANCE MONITORING, AND ANNUAL OU1-OU3 LTM SAMPLING ACTIVITIES:

-Collected 11 of the 18 groundwater samples at temporary PM wells (**EW7-PM23A, PM23B, PM25A, PM25B, PM26A, PM26B, PM27B, PM28A, PM28B, PM29A, PM29B**). Each PM well was developed prior to sample collection and sampled using low-flow groundwater sampling techniques. Each PM well sample will be analyzed for explosives+MNX (Method 8330A) and water quality parameters including: TKN (351.2), NH3 (350.1), NO2/NO3 (353.2), SO4 (9056A), Alkalinity (2320B), Sulfide (9034), DOC (9060A), and Methane (RSK 175). CO2 will be back calculated from 2320B.

-Abandoned all 18 temporary PM wells.

-Collected groundwater samples from 6 of the 94 annual OU1 LTM wells/piezometers (**G0070, G0075, G0076, G0079, G0081, G0082**). Each well will be analyzed for explosives+MNX (Method 8330A) and MNA water quality parameters (see above).

-IDW water (purge and decon) from all sample locations were containerized in an IDW-labeled poly tank located at GWTF. At the completion of Q3-LTM field activities, the IDW water will be sampled for site waste characterization analysis (Explosives + MNX [Method 8330A]) prior to disposal or discharge to ground surface.

-All field and sampling activities were completed in accordance with the 2019 Final Addendum 3 UFP-QAPP, the 2018 Final Addendum 2 UFP-QAPP, and recommendations provided in the 2018 and 2019 Annual Groundwater Monitoring Reports and OU1 Rebound Study Letter Report - Quarter 2 Event.

-Calibration (weekly) and calibration checks (daily) of field PIDs, water level indicators, and Horiba MPS.

## Percentage of Work Completed:

Mobilization, 3 of 3 planned off-site DP (screen point) groundwater samples were completed, 18 of 18 temporary PM wells were installed, developed, sampled, and abandoned, and 6 of 96 OU1-OU3 wells (including 36 for OU1 Rebound Study) were sampled. Approximately 23% of the Q3 OU1 Rebound Study/injection PM and 2020 annual OU1/OU3 LTM sampling field work is now complete.

## Schedule for Next Week:

Calibration of water quality equipment, complete sitewide water level measurement round, and continue groundwater purge and sample collection activities at 96 OU1-OU3 monitoring wells for the 2020 annual OU1/OU3 LTM event (includes 36 OU1 Rebound Study wells).

# WEEKLY REPORT

COE Project Manager Jeff Gill  
 Project CHAAP - OU1 Rebound Study/  
 PMs-Quarter #3 & OU1-OU3 LTM  
 Project No. 60565355  
 Contract No. Brice W9128F-18-D-0020  
 Delivery Order No. F0041

Report No. 2  
 Date 5/30/20 to 6/2/20  
 Brice/AECOM On-site Hours 107  
 Subcontractor Hours 0

## Health and Safety and Activities:

- Had the initial and daily H&S meetings with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, potential exposure to explosives contamination, direct push equipment hazards and safety, cold stress, slip-trip-falls, traffic hazards, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.
- Completed equipment and vehicle safety checks.
- Completed Daily Tailgate Meeting Sheets.
- Completed Daily Task Hazard Assessment Sheets.

## Deviations from SOW and/or WP:

None.

## Problems Encountered/Corrective Action Taken:

None.

## Recommendations:

None.

## Communication Notice This Week:

None.

## Key Personnel Changes:

Field personnel off site on 6/2/20 and will resume field activities on 6/8/20.



Groundwater purging at OU1 on-post monitoring well G0082 (facing north).



Groundwater sample collection at OU1 on-post monitoring well G0070.

By: Ryan Herold

Title: Field Manager

# WEEKLY REPORT

COE Project Manager	Jeff Gill	Report No.	3
Project	CHAAP - OU1 Rebound Study/ PMs-Quarter #3 & OU1-OU3 LTM	Date	6/8/20 to 6/12/20
Project No.	60565355	Brice/AECOM On-site Hours	267
Contract No.	Brice W9128F-18-D-0020	Subcontractor Hours	0
Delivery Order No.	F0041		

## **AECOM/Brice Personnel on Site:**

Ryan Herold, Taylor Young, Jonathan Ortiz (AECOM)

Chris Holt, Gary Carson (Brice)

## **Subcontractors on Site:**

None.

## **Visitors on Site:**

None.

## **Summary of Work Performed:**

### **CONTINUED QUARTER #3 (Q3) OU1 REBOUND STUDY / INJECTION PERFORMANCE MONITORING, AND ANNUAL OU1-OU3 LTM SAMPLING ACTIVITIES:**

-Completed site-wide water level measurement round at OU1 off-post and OU1/OU3 on-post monitoring wells and piezometers.

-Source water sample was collected and analyzed for explosives+MNX (8330A) and VOCs (8260B).

-Collected groundwater samples from 43 of the 94 annual OU1 LTM wells/piezometers (CA210, CA211, CA212, CA213, NW050, NW051, NW052, NW060, NW061, NW062, NW070, NW071, NW080, NW081R, NW082R, G0017, G0044, G0045, G0080, G0095, G0100, G0101, G0102, G0103, G0104, G0105, G0106, G0107, G0111, G0115, G0116, G0117, G0120, PZ001, PZ004, PZ005, PZ007, PZ009, PZ010, PZ011, PZ012, PZ013, PZ014). Each well sample will be analyzed for explosives+MNX (Method 8330A) and MNA parameters including: TKN (351.2), NH3 (350.1), NO2/NO3 (353.2), SO4 (9056A), Alkalinity (2320B), Sulfide (9034), DOC (9060A), and Methane (RSK 175). CO2 will be back calculated from 2320B. Field water quality parameters were also measured at all wells (ORP, pH, specific conductivity, dissolved oxygen, turbidity, and ferrous iron).

-Collected groundwater samples from 2 of the 2 annual OU3-Shop Area LTM wells (SHGW02, SHGW03). Each well sample will be analyzed for VOCs (Method 8260B) and MNA parameters including: NO2/NO3 (353.2), SO4 (9056A), Alkalinity (2320B), and Methane, Ethane, Ethene (RSK 175). One well (SHGW03) was additionally sampled for DRO (Method 8015B). Field water quality parameters were also measured at all wells (ORP, pH, specific conductivity, dissolved oxygen, turbidity, and ferrous iron).

-IDW water (purge and decon) from all sample locations were containerized in an IDW-labeled poly tank located at GWTF. At the completion of Q3-LTM field activities, the IDW water will be sampled for site waste characterization analysis (Explosives+MNX and VOCs) prior to disposal or discharge to ground surface.

-All field and sampling activities were completed in accordance with the 2019 Final Addendum 3 UFP-QAPP, the 2018 Final Addendum 2 UFP-QAPP, and recommendations provided in the 2018 and 2019 Annual Groundwater Monitoring Reports and OU1 Rebound Study Letter Report - Quarter 2 Event.

-Calibration (weekly) and calibration checks (daily) of field PIDs, water level indicators, and Horiba MPS.

## **Percentage of Work Completed:**

Mobilization, 3 of 3 planned off-site DP (screen point) groundwater samples were completed, 18 of 18 temporary PM wells were installed, developed, sampled, and abandoned, site-wide water level measurement round, and 51 of 96 OU1-OU3 wells (including 36 for OU1 Rebound Study) were sampled. Approximately 62% of the Q3 OU1 Rebound Study/injection PM and 2020 annual OU1/OU3 LTM sampling field work is now complete.

# WEEKLY REPORT

COE Project Manager Jeff Gill  
 Project CHAAP - OU1 Rebound Study/  
 PMs-Quarter #3 & OU1-OU3 LTM  
 Project No. 60565355  
 Contract No. Brice W9128F-18-D-0020  
 Delivery Order No. F0041

Report No. 3  
 Date 6/8/20 to 6/12/20  
 Brice/AECOM On-site Hours 267  
 Subcontractor Hours 0

## Schedule for Next Week:

Calibration of water quality equipment, complete groundwater purge and sample collection activities at 96 OU1-OU3 monitoring wells for the 2020 annual OU1/OU3 LTM event (includes 36 OU1 Rebound Study wells), site restoration activities, and demobilize.

## Health and Safety and Activities:

- Had the initial and daily H&S meetings with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, potential exposure to explosives contamination, direct push equipment hazards and safety, cold stress, slip-trip-falls, traffic hazards, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.
- Completed equipment and vehicle safety checks.
- Completed Daily Tailgate Meeting Sheets.
- Completed Daily Task Hazard Assessment Sheets.

## Deviations from SOW and/or WP:

None.

## Problems Encountered/Corrective Action Taken:

None.

## Recommendations:

None.

## Communication Notice This Week:

None.

## Key Personnel Changes:

None.



Water level measurements at extraction well 5 observation wells (facing north).



Groundwater purge setup at OU1 off-post monitoring well NW082R (facing south).

By: Ryan Herold

Title: Field Manager

# WEEKLY REPORT

COE Project Manager	Jeff Gill	Report No.	4
Project	CHAAP - OU1 Rebound Study/ PMs-Quarter #3 & OU1-OU3 LTM	Date	6/13/20 to 6/17/20
Project No.	60565355	Brice/AECOM On-site Hours	210
Contract No.	Brice W9128F-18-D-0020	Subcontractor Hours	0
Delivery Order No.	F0041		

## AECOM/Brice Personnel on Site:

Ryan Herold, Taylor Young, Jonathan Ortiz (AECOM)

Chris Holt, Gary Carson (Brice)

## Subcontractors on Site:

None.

## Visitors on Site:

None.

## Summary of Work Performed:

### CONTINUED QUARTER #3 (Q3) OU1 REBOUND STUDY / INJECTION PERFORMANCE MONITORING, AND ANNUAL OU1-OU3 LTM SAMPLING ACTIVITIES:

-Collected groundwater samples from 45 of the 94 annual OU1 LTM wells/piezometers (NW020, NW021, NW022, G0022, G0023, G0024, G0048, G0049, G0066R, G0067, G0077, G0078, G0083, G0084, G0085, G0086, G0087, G0088, G0089, G0090, G0091, G0092, G0093, G0094, G0096, G0097, G0098, G0099, G0108, G0109, G0110, G0112, G0113, G0114, G0118, G0119, G0121, G0122, G0123, PZ015, PZ016, PZ017R, PZ018, PZ019, PZ020). Each well sample will be analyzed for explosives+MNX (Method 8330A) and MNA parameters including: TKN (351.2), NH3 (350.1), NO2/NO3 (353.2), SO4 (9056A), Alkalinity (2320B), Sulfide (9034), DOC (9060A), and Methane (RSK 175). CO2 will be back calculated from 2320B. Field water quality parameters were also measured at all wells (ORP, pH, specific conductivity, dissolved oxygen, turbidity, and ferrous iron).

-IDW water (purge and decon) from all sample locations were containerized in an IDW-labeled poly tank located at GWTF. At the completion of Q3-LTM field activities, the IDW water was sampled for site waste characterization analysis (Explosives+MNX and VOCs) prior to disposal or discharge to ground surface.

-All field and sampling activities were completed in accordance with the 2019 Final Addendum 3 UFP-QAPP, the 2018 Final Addendum 2 UFP-QAPP, and recommendations provided in the 2018 and 2019 Annual Groundwater Monitoring Reports and OU1 Rebound Study Letter Report - Quarter 2 Event.

-Calibration (weekly) and calibration checks (daily) of field PIDs, water level indicators, and Horiba MPS.

## Percentage of Work Completed:

Mobilization, 3 of 3 planned off-site DP (screen point) groundwater samples were completed, 18 of 18 temporary PM wells were installed, developed, sampled, and abandoned, site-wide water level measurement round completed, 45 of 96 OU1-OU3 wells (including 36 for OU1 Rebound Study) were sampled, purge water was sampled, completed site restoration activities, and demobilized from site. 100% of the Q3 OU1 Rebound Study/injection PM and 2020 annual OU1/OU3 LTM sampling field work is now complete.

## Schedule for Next Week:

None.

# WEEKLY REPORT

COE Project Manager Jeff Gill  
 Project CHAAP - OU1 Rebound Study/  
 PMs-Quarter #3 & OU1-OU3 LTM  
 Project No. 60565355  
 Contract No. Brice W9128F-18-D-0020  
 Delivery Order No. F0041

Report No. 4  
 Date 6/13/20 to 6/17/20  
 Brice/AECOM On-site Hours 210  
 Subcontractor Hours 0

## Health and Safety and Activities:

- Had daily H&S meetings with all personnel on site. All persons on site completed required paperwork/checklists and discussed sections of QAPP-APP/SSHP and H&S procedures including: PPE, potential exposure to explosives contamination, direct push equipment hazards and safety, cold stress, slip-trip-falls, traffic hazards, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety.
- Completed equipment and vehicle safety checks.
- Completed Daily Tailgate Meeting Sheets.
- Completed Daily Task Hazard Assessment Sheets.

## Deviations from SOW and/or WP:

None.

## Problems Encountered/Corrective Action Taken:

On 6/11/20, one Horiba U-52 multi-parameter instrument was identified giving invalid dissolved oxygen (DO) parameter readings during purging at seven monitoring wells; however, stabilizations were verified from other parameters. The unit was replaced and five OU1 wells and two OU3 wells were repurged for water quality parameters on 6/12, 6/14, and 6/16/20 (no additional samples were collected).

## Recommendations:

None.

## Communication Notice This Week:

None.

## Key Personnel Changes:

All AECOM and Brice personnel demobilized from site on 6/17/20.



Sample collection at OU1 piezometer PZ017R (facing east).



Purge and decon water transfer to IDW tank at GWTF (facing north).

By: Ryan Herold

Title: Field Manager

**Appendix C**  
**Photographic Log**

## SITE ACTIVITIES PHOTOGRAPHIC LOG

Field Activities: OU1 Rebound Study and  
Subsurface Injections – Quarter 3 Event  
Cornhusker Army Ammunition Plant, Nebraska

USACE – Omaha District

Contract No. W9128F-18-D-0020  
Delivery Order No. F0041

### Photograph No. 1

#### Description:

#### OU1 Rebound Study Q3 Sampling

Purging at off-site location  
OS001. Groundwater samples  
were collected (via Direct  
Push technology) at screen  
point depths 25 feet, 35 feet,  
and 45 feet and analyzed for  
explosives +MNX only.

Date: 11/14/2019\*

Direction: west

Photographer: RH

Location: OS001

\*OS001 photos from Q3 event  
(5/26/2020) unavailable;  
however, at same location  
shown.



### Photograph No. 2

#### Description:

#### OU1 Rebound Study Q3 Sampling

Monitoring wells were purged,  
and groundwater samples  
were collected using low-flow  
techniques with submersible  
pumps. All purging and  
sample collection were  
completed in accordance with  
UFP-QAPP.

Date: 6/2/2020

Direction: north

Photographer: RH

Location: G0082



## SITE ACTIVITIES PHOTOGRAPHIC LOG

Field Activities: OU1 Rebound Study and  
Subsurface Injections – Quarter 3 Event  
Cornhusker Army Ammunition Plant, Nebraska

USACE – Omaha District

Contract No. W9128F-18-D-0020  
Delivery Order No. F0041

### Photograph No. 3

#### Description:

#### OU1 Rebound Study Q3 Sampling

Groundwater samples were collected in laboratory-provided containers and analyzed for explosives +MNX and laboratory MNA parameters by TestAmerica laboratory.

Date: 6/16/2020  
Direction: east  
Photographer: TY  
Location: PZ017R



### Photograph No. 4

#### Description:

#### OU1 Rebound Study Q3 Sampling

The pump and water level meter were decontaminated after every well.

Date: 6/2/2020  
Direction: -  
Photographer: RH  
Location: G0070



## SITE ACTIVITIES PHOTOGRAPHIC LOG

**Field Activities: OU1 Rebound Study and  
Subsurface Injections – Quarter 3 Event  
Cornhusker Army Ammunition Plant, Nebraska**

**USACE – Omaha District**

**Contract No. W9128F-18-D-0020  
Delivery Order No. F0041**

### Photograph No. 5

#### Description:

#### OU1 Q3 Performance Monitoring

For Q3 subsurface injection performance monitoring, 1" PVC temporary wells were installed (via Direct Push technology). Two nested temporary wells (one shallow, one shallow-intermediate depths) were each installed at 9 locations.

Date: 5/29/2020

Direction: south

Photographer: RH

Location: EW7-PM26



### Photograph No. 6

#### Description:

#### OU1 Q3 Performance Monitoring

All performance monitoring wells were developed, purged, and sampled for explosives + MNX and laboratory water quality parameters analysis.

Date: 5/29/2020

Direction: west

Photographer: RH

Location: EW7-PM24A



## SITE ACTIVITIES PHOTOGRAPHIC LOG

**Field Activities: OU1 Rebound Study and  
Subsurface Injections – Quarter 3 Event  
Cornhusker Army Ammunition Plant, Nebraska**

**USACE – Omaha District**

**Contract No. W9128F-18-D-0020  
Delivery Order No. F0041**

### Photograph No. 7

#### Description:

#### OU1 Q3 Performance Monitoring

Each temporary well PVC stickup was retracted, and the well was abandoned within 10 days of installation using time-release bentonite pellets and hydrated granular bentonite.

Date: 6/2/2020

Direction: -

Photographer: RH

Location: EW7-PM28A



### Photograph No. 8

#### Description:

#### OU1 Q3 Rebound Study and Performance Monitoring

All decontamination, development, and purge IDW water from sampling activities were collected in field poly tanks, transferred to an IDW tank at GWTF, and sampled at conclusion of event for explosives +MNX only analysis.

Date: 6/03/2020

Direction: north

Photographer: TY

Location: GWTF



## **Appendix D**

### **Analytical Data and Validation**

**Appendix E**  
**OU1 Statistical Trend Data Sheets**

**TABLE E.1**  
**FORMER FACILITY BOUNDARY WELLS**  
**CORNHUSKER ARMY AMMUNITION PLANT**  
**MAROS DATA INPUTS**

WellName	XCoord	YCoord	Constituent	SampleDate	Result	Units	DetLim	Flags
G0024	2,067,195	403,887	2,4,6-TRINITROTOLUENE	6/15/2020	0.63	µg/L	0.05	TR
G0024	2,067,195	403,887	2,4,6-TRINITROTOLUENE	3/4/2020		µg/L	0.16	ND
G0024	2,067,195	403,887	2,4,6-TRINITROTOLUENE	10/23/2019		µg/L	0.16	ND
G0024	2,067,195	403,887	2,4,6-TRINITROTOLUENE	6/10/2019		µg/L	0.16	ND
G0024	2,067,195	403,887	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/15/2020	0.59	µg/L	0.06	
G0024	2,067,195	403,887	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/4/2020		µg/L	0.15	ND
G0024	2,067,195	403,887	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/23/2019		µg/L	0.15	ND
G0024	2,067,195	403,887	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/10/2019		µg/L	0.16	ND
G0077	2,067,218	403,894	2,4,6-TRINITROTOLUENE	6/15/2020	3.3	µg/L	0.05	
G0077	2,067,218	403,894	2,4,6-TRINITROTOLUENE	3/4/2020	2.7	µg/L	0.16	
G0077	2,067,218	403,894	2,4,6-TRINITROTOLUENE	10/23/2019	3.2	µg/L	0.16	
G0077	2,067,218	403,894	2,4,6-TRINITROTOLUENE	6/10/2019	2.2	µg/L	0.15	
G0077	2,067,218	403,894	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/15/2020	0.46	µg/L	0.05	
G0077	2,067,218	403,894	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/4/2020	0.19	µg/L	0.16	TR
G0077	2,067,218	403,894	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/23/2019	0.91	µg/L	0.15	
G0077	2,067,218	403,894	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/10/2019	0.53	µg/L	0.15	
G0078	2,067,199	403,930	2,4,6-TRINITROTOLUENE	6/15/2020		µg/L	0.05	ND
G0078	2,067,199	403,930	2,4,6-TRINITROTOLUENE	3/4/2020		µg/L	0.16	ND
G0078	2,067,199	403,930	2,4,6-TRINITROTOLUENE	10/23/2019		µg/L	0.15	ND
G0078	2,067,199	403,930	2,4,6-TRINITROTOLUENE	6/10/2019		µg/L	0.16	ND
G0078	2,067,199	403,930	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/15/2020		µg/L	0.05	ND
G0078	2,067,199	403,930	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/4/2020		µg/L	0.15	ND
G0078	2,067,199	403,930	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/23/2019		µg/L	0.15	ND
G0078	2,067,199	403,930	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/10/2019		µg/L	0.16	ND
G0091	2,067,221	405,336	2,4,6-TRINITROTOLUENE	6/16/2020		µg/L	0.05	ND
G0091	2,067,221	405,336	2,4,6-TRINITROTOLUENE	3/2/2020		µg/L	0.16	ND
G0091	2,067,221	405,336	2,4,6-TRINITROTOLUENE	10/22/2019		µg/L	0.15	ND
G0091	2,067,221	405,336	2,4,6-TRINITROTOLUENE	6/11/2019		µg/L	0.16	ND
G0091	2,067,221	405,336	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/16/2020	0.59	µg/L	0.06	
G0091	2,067,221	405,336	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/2/2020	0.83	µg/L	0.16	
G0091	2,067,221	405,336	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/22/2019	0.81	µg/L	0.15	
G0091	2,067,221	405,336	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/11/2019	1.2	µg/L	0.15	TR
G0092	2,067,222	405,350	2,4,6-TRINITROTOLUENE	6/16/2020		µg/L	0.05	ND

**TABLE E.1**  
**FORMER FACILITY BOUNDARY WELLS**  
**CORNHUSKER ARMY AMMUNITION PLANT**  
**MAROS DATA INPUTS**

WellName	XCoord	YCoord	Constituent	SampleDate	Result	Units	DetLim	Flags
G0092	2,067,222	405,350	2,4,6-TRINITROTOLUENE	3/2/2020		µg/L	0.15	ND
G0092	2,067,222	405,350	2,4,6-TRINITROTOLUENE	10/22/2019		µg/L	0.15	ND
G0092	2,067,222	405,350	2,4,6-TRINITROTOLUENE	6/11/2019		µg/L	0.15	ND
G0092	2,067,222	405,350	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/16/2020		µg/L	0.05	ND
G0092	2,067,222	405,350	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/2/2020		µg/L	0.15	ND
G0092	2,067,222	405,350	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/22/2019		µg/L	0.20	ND
G0092	2,067,222	405,350	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/11/2019		µg/L	0.15	ND
NW020	2,067,328	404,441	2,4,6-TRINITROTOLUENE	6/15/2020	0.59	µg/L	0.05	
NW020	2,067,328	404,441	2,4,6-TRINITROTOLUENE	3/4/2020	0.6	µg/L	0.16	
NW020	2,067,328	404,441	2,4,6-TRINITROTOLUENE	10/22/2019		µg/L	0.16	ND
NW020	2,067,328	404,441	2,4,6-TRINITROTOLUENE	6/10/2019	0.33	µg/L	0.16	TR
NW020	2,067,328	404,441	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/15/2020	1.5	µg/L	0.05	
NW020	2,067,328	404,441	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/4/2020	0.94	µg/L	0.15	
NW020	2,067,328	404,441	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/22/2019	0.2	µg/L	0.15	TR
NW020	2,067,328	404,441	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/10/2019	0.17	µg/L	0.15	TR
NW021	2,067,301	404,393	2,4,6-TRINITROTOLUENE	6/15/2020		µg/L	0.05	ND
NW021	2,067,301	404,393	2,4,6-TRINITROTOLUENE	3/4/2020		µg/L	0.15	ND
NW021	2,067,301	404,393	2,4,6-TRINITROTOLUENE	10/22/2019		µg/L	0.15	ND
NW021	2,067,301	404,393	2,4,6-TRINITROTOLUENE	6/10/2019		µg/L	0.15	ND
NW021	2,067,301	404,393	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/15/2020		µg/L	0.06	ND
NW021	2,067,301	404,393	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/4/2020		µg/L	0.15	ND
NW021	2,067,301	404,393	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/22/2019		µg/L	0.15	ND
NW021	2,067,301	404,393	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/10/2019		µg/L	0.15	ND
NW022	2,067,310	404,436	2,4,6-TRINITROTOLUENE	6/15/2020		µg/L	0.05	ND
NW022	2,067,310	404,436	2,4,6-TRINITROTOLUENE	3/4/2020		µg/L	0.16	ND
NW022	2,067,310	404,436	2,4,6-TRINITROTOLUENE	10/22/2019		µg/L	0.15	ND
NW022	2,067,310	404,436	2,4,6-TRINITROTOLUENE	6/10/2019		µg/L	0.16	ND
NW022	2,067,310	404,436	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/15/2020		µg/L	0.05	ND
NW022	2,067,310	404,436	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/4/2020		µg/L	0.15	ND
NW022	2,067,310	404,436	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/22/2019		µg/L	0.15	ND

**TABLE E.1**  
**FORMER FACILITY BOUNDARY WELLS**  
**CORNHUSKER ARMY AMMUNITION PLANT**  
**MAROS DATA INPUTS**

WellName	XCoord	YCoord	Constituent	SampleDate	Result	Units	DetLim	Flags
NW022	2,067,310	404,436	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/10/2019		µg/L	0.16	ND
PZ017R	2,067,255	403,469	2,4,6-TRINITROTOLUENE	6/16/2020	11	µg/L	0.05	
PZ017R	2,067,255	403,469	2,4,6-TRINITROTOLUENE	3/4/2020	17	µg/L	0.15	
PZ017R	2,067,255	403,469	2,4,6-TRINITROTOLUENE	10/23/2019	15	µg/L	0.16	
PZ017R	2,067,255	403,469	2,4,6-TRINITROTOLUENE	6/11/2019	19	µg/L	0.16	TR
PZ017R	2,067,255	403,469	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/16/2020	1.4	µg/L	0.06	
PZ017R	2,067,255	403,469	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3//42020	1.4	µg/L	0.15	
PZ017R	2,067,255	403,469	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/23/2019	0.87	µg/L	0.16	
PZ017R	2,067,255	403,469	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/11/2019	1	µg/L	0.16	TR
PZ018	2,067,257	403,293	2,4,6-TRINITROTOLUENE	6/16/2020		µg/L	0.05	ND
PZ018	2,067,257	403,293	2,4,6-TRINITROTOLUENE	3/4/2020	19	µg/L	0.16	
PZ018	2,067,257	403,293	2,4,6-TRINITROTOLUENE	10/23/2019	8	µg/L	0.16	TR
PZ018	2,067,257	403,293	2,4,6-TRINITROTOLUENE	6/11/2019	6.3	µg/L	0.16	TR
PZ018	2,067,257	403,293	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/16/2020	1	µg/L	0.06	
PZ018	2,067,257	403,293	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/4/2020		µg/L	0.16	ND
PZ018	2,067,257	403,293	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/23/2019	0.88	µg/L	0.16	TR
PZ018	2,067,257	403,293	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/11/2019	1.1	µg/L	0.16	TR
PZ019	2,067,268	402,887	2,4,6-TRINITROTOLUENE	6/16/2020		µg/L	0.05	ND
PZ019	2,067,268	402,887	2,4,6-TRINITROTOLUENE	3/2/2020		µg/L	0.16	ND
PZ019	2,067,268	402,887	2,4,6-TRINITROTOLUENE	10/22/2019		µg/L	0.16	ND
PZ019	2,067,268	402,887	2,4,6-TRINITROTOLUENE	6/10/2019		µg/L	0.16	ND
PZ019	2,067,268	402,887	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/16/2020		µg/L	0.05	ND
PZ019	2,067,268	402,887	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/2/2020		µg/L	0.16	ND
PZ019	2,067,268	402,887	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/22/2019		µg/L	0.16	ND
PZ019	2,067,268	402,887	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/10/2019		µg/L	0.16	ND
PZ020	2,067,224	404,088	2,4,6-TRINITROTOLUENE	6/15/2020	2.2	µg/L	0.05	
PZ020	2,067,224	404,088	2,4,6-TRINITROTOLUENE	3/4/2020	3.2	µg/L	0.15	
PZ020	2,067,224	404,088	2,4,6-TRINITROTOLUENE	10/23/2019	3.7	µg/L	0.15	
PZ020	2,067,224	404,088	2,4,6-TRINITROTOLUENE	6/10/2019	3	µg/L	0.16	
PZ020	2,067,224	404,088	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/15/2020	0.58	µg/L	0.05	
PZ020	2,067,224	404,088	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/4/2020	0.62	µg/L	0.15	
PZ020	2,067,224	404,088	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/23/2019	0.42	µg/L	0.15	
PZ020	2,067,224	404,088	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/10/2019	0.37	µg/L	0.15	TR

**TABLE E.2**  
**UPGRADIENT WELLS**  
**CORNHUSKER ARMY AMMUNITION PLANT**  
**MAROS DATA INPUTS**

WellName	XCoord	YCoord	Constituent	SampleDate	Result	Units	DetLim	Flags
G0070	2,065,484	403,541	2,4,6-TRINITROTOLUENE	6/2/2020		µg/L	0.05	ND
G0070	2,065,484	403,541	2,4,6-TRINITROTOLUENE	3/1/2020		µg/L	0.15	ND
G0070	2,065,484	403,541	2,4,6-TRINITROTOLUENE	10/21/2019		µg/L	0.16	ND
G0070	2,065,484	403,541	2,4,6-TRINITROTOLUENE	6/9/2019		µg/L	0.16	ND
G0070	2,065,484	403,541	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/2/2020		µg/L	0.06	ND
G0070	2,065,484	403,541	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/1/2020		µg/L	0.15	ND
G0070	2,065,484	403,541	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/21/2019		µg/L	0.16	ND
G0070	2,065,484	403,541	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/9/2019		µg/L	0.15	ND
G0075	2,065,479	403,559	2,4,6-TRINITROTOLUENE	6/1/2020		µg/L	0.05	ND
G0075	2,065,479	403,559	2,4,6-TRINITROTOLUENE	3/1/2020		µg/L	0.16	ND
G0075	2,065,479	403,559	2,4,6-TRINITROTOLUENE	10/21/2019		µg/L	0.15	ND
G0075	2,065,479	403,559	2,4,6-TRINITROTOLUENE	6/9/2019		µg/L	0.16	ND
G0075	2,065,479	403,559	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/1/2020		µg/L	0.05	ND
G0075	2,065,479	403,559	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/1/2020		µg/L	0.16	ND
G0075	2,065,479	403,559	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/21/2019		µg/L	0.15	ND
G0075	2,065,479	403,559	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/9/2019		µg/L	0.16	ND
G0076	2,065,469	403,583	2,4,6-TRINITROTOLUENE	6/1/2020		µg/L	0.05	ND
G0076	2,065,469	403,583	2,4,6-TRINITROTOLUENE	3/1/2020		µg/L	0.16	ND
G0076	2,065,469	403,583	2,4,6-TRINITROTOLUENE	10/21/2019		µg/L	0.15	ND
G0076	2,065,469	403,583	2,4,6-TRINITROTOLUENE	6/9/2019		µg/L	0.16	ND
G0076	2,065,469	403,583	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/1/2020	0.2	µg/L	0.06	TR
G0076	2,065,469	403,583	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/1/2020		µg/L	0.16	ND
G0076	2,065,469	403,583	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/21/2019		µg/L	0.15	ND
G0076	2,065,469	403,583	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/9/2019		µg/L	0.15	ND
G0079	2,065,479	403,553	2,4,6-TRINITROTOLUENE	6/1/2020		µg/L	0.05	ND
G0079	2,065,479	403,553	2,4,6-TRINITROTOLUENE	3/1/2020		µg/L	0.16	ND
G0079	2,065,479	403,553	2,4,6-TRINITROTOLUENE	10/21/2019		µg/L	0.15	ND
G0079	2,065,479	403,553	2,4,6-TRINITROTOLUENE	6/9/2019		µg/L	0.16	ND
G0079	2,065,479	403,553	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/1/2020		µg/L	0.06	ND
G0079	2,065,479	403,553	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/1/2020		µg/L	0.16	ND
G0079	2,065,479	403,553	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/21/2019		µg/L	0.15	ND
G0079	2,065,479	403,553	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/9/2019		µg/L	0.15	ND

**TABLE E.2**  
**UPGRADIENT WELLS**  
**CORNHUSKER ARMY AMMUNITION PLANT**  
**MAROS DATA INPUTS**

WellName	XCoord	YCoord	Constituent	SampleDate	Result	Units	DetLim	Flags
G0080	2,065,443	404,329	2,4,6-TRINITROTOLUENE	6/11/2020		µg/L	0.05	ND
G0080	2,065,443	404,329	2,4,6-TRINITROTOLUENE	3/2/2020		µg/L	0.16	ND
G0080	2,065,443	404,329	2,4,6-TRINITROTOLUENE	10/21/2019		µg/L	0.15	ND
G0080	2,065,443	404,329	2,4,6-TRINITROTOLUENE	6/9/2019		µg/L	0.16	ND
G0080	2,065,443	404,329	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/11/2020		µg/L	0.05	ND
G0080	2,065,443	404,329	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/2/2020		µg/L	0.16	ND
G0080	2,065,443	404,329	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/21/2019		µg/L	0.15	ND
G0080	2,065,443	404,329	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/9/2019		µg/L	0.16	ND
G0081	2,065,490	402,722	2,4,6-TRINITROTOLUENE	6/2/2020		µg/L	0.05	ND
G0081	2,065,490	402,722	2,4,6-TRINITROTOLUENE	3/2/2020		µg/L	0.18	ND
G0081	2,065,490	402,722	2,4,6-TRINITROTOLUENE	10/21/2019	0.29	µg/L	0.16	TR
G0081	2,065,490	402,722	2,4,6-TRINITROTOLUENE	6/9/2019	0.59	µg/L	0.16	TR
G0081	2,065,490	402,722	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/2/2020		µg/L	0.05	ND
G0081	2,065,490	402,722	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/2/2020		µg/L	0.17	ND
G0081	2,065,490	402,722	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/21/2019		µg/L	0.15	ND
G0081	2,065,490	402,722	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/9/2019		µg/L	0.16	ND
G0082	2,065,493	402,207	2,4,6-TRINITROTOLUENE	6/2/2020		µg/L	0.05	ND
G0082	2,065,493	402,207	2,4,6-TRINITROTOLUENE	3/2/2020		µg/L	0.16	ND
G0082	2,065,493	402,207	2,4,6-TRINITROTOLUENE	10/21/2019		µg/L	0.15	ND
G0082	2,065,493	402,207	2,4,6-TRINITROTOLUENE	6/9/2019		µg/L	0.16	ND
G0082	2,065,493	402,207	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/2/2020	0.68	µg/L	0.06	TR
G0082	2,065,493	402,207	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/2/2020		µg/L	0.16	ND
G0082	2,065,493	402,207	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/21/2019	0.63	µg/L	0.15	TR
G0082	2,065,493	402,207	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/9/2019	0.34	µg/L	0.15	TR
G0086	2,066,457	403,759	2,4,6-TRINITROTOLUENE	6/16/2020	3.6	µg/L	0.05	
G0086	2,066,457	403,759	2,4,6-TRINITROTOLUENE	3/3/2020	5.9	µg/L	0.16	TR
G0086	2,066,457	403,759	2,4,6-TRINITROTOLUENE	10/23/2019	3.8	µg/L	0.16	
G0086	2,066,457	403,759	2,4,6-TRINITROTOLUENE	6/9/2019	2.5	µg/L	0.16	
G0086	2,066,457	403,759	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/16/2020	0.21	µg/L	0.05	TR
G0086	2,066,457	403,759	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/3/2020		µg/L	0.15	ND
G0086	2,066,457	403,759	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/23/2019		µg/L	0.16	ND
G0086	2,066,457	403,759	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/9/2019	0.18	µg/L	0.16	TR

**TABLE E.2**  
**UPGRADIENT WELLS**  
**CORNHUSKER ARMY AMMUNITION PLANT**  
**MAROS DATA INPUTS**

WellName	XCoord	YCoord	Constituent	SampleDate	Result	Units	DetLim	Flags
G0087	2,065,944	403,749	2,4,6-TRINITROTOLUENE	6/15/2020		µg/L	0.05	ND
G0087	2,065,944	403,749	2,4,6-TRINITROTOLUENE	3/3/2020		µg/L	0.15	ND
G0087	2,065,944	403,749	2,4,6-TRINITROTOLUENE	10/22/2019		µg/L	0.15	ND
G0087	2,065,944	403,749	2,4,6-TRINITROTOLUENE	6/9/2019		µg/L	0.16	ND
G0087	2,065,944	403,749	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/15/2020	0.15	µg/L	0.06	TR
G0087	2,065,944	403,749	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/3/2020		µg/L	0.15	ND
G0087	2,065,944	403,749	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/22/2019		µg/L	0.15	ND
G0087	2,065,944	403,749	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/9/2019		µg/L	0.16	ND

**TABLE E.3**  
**DOWNGRADIENT WELLS**  
**CORNHUSKER ARMY AMMUNITION PLANT**  
**MAROS DATA INPUTS**

WellName	XCoord	YCoord	Constituent	SampleDate	Result	Units	DetLim	Flags
CA210	2,072,527	405,191	2,4,6-TRINITROTOLUENE	6/9/2020		µg/L	0.05	ND
CA210	2,072,527	405,191	2,4,6-TRINITROTOLUENE	3/3/2020		µg/L	0.15	ND
CA210	2,072,527	405,191	2,4,6-TRINITROTOLUENE	10/21/2019		µg/L	0.16	ND
CA210	2,072,527	405,191	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/9/2020		µg/L	0.06	ND
CA210	2,072,527	405,191	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/3/2020		µg/L	0.15	ND
CA210	2,072,527	405,191	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/21/2019		µg/L	0.16	ND
CA211	2,072,573	405,210	2,4,6-TRINITROTOLUENE	6/9/2020		µg/L	0.05	ND
CA211	2,072,573	405,210	2,4,6-TRINITROTOLUENE	3/3/2020		µg/L	0.16	ND
CA211	2,072,573	405,210	2,4,6-TRINITROTOLUENE	10/21/2019		µg/L	0.16	ND
CA211	2,072,573	405,210	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/9/2020		µg/L	0.06	ND
CA211	2,072,573	405,210	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/3/2020		µg/L	0.16	ND
CA211	2,072,573	405,210	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/21/2019		µg/L	0.16	ND
CA212	2,072,578	405,192	2,4,6-TRINITROTOLUENE	6/9/2020		µg/L	0.05	ND
CA212	2,072,578	405,192	2,4,6-TRINITROTOLUENE	3/3/2020		µg/L	0.16	ND
CA212	2,072,578	405,192	2,4,6-TRINITROTOLUENE	10/21/2019		µg/L	0.16	ND
CA212	2,072,578	405,192	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/9/2020		µg/L	0.06	ND
CA212	2,072,578	405,192	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/3/2020		µg/L	0.15	ND
CA212	2,072,578	405,192	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/21/2019		µg/L	0.16	ND
CA213	2,072,600	405,217	2,4,6-TRINITROTOLUENE	6/10/2020		µg/L	0.05	ND
CA213	2,072,600	405,217	2,4,6-TRINITROTOLUENE	3/3/2020		µg/L	0.16	ND
CA213	2,072,600	405,217	2,4,6-TRINITROTOLUENE	10/21/2019		µg/L	0.16	ND
CA213	2,072,600	405,217	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/10/2020		µg/L	0.05	ND
CA213	2,072,600	405,217	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/3/2020		µg/L	0.15	ND
CA213	2,072,600	405,217	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/21/2019		µg/L	0.16	ND
NW050	2,072,396	406,567	2,4,6-TRINITROTOLUENE	6/10/2020		µg/L	0.05	ND
NW050	2,072,396	406,567	2,4,6-TRINITROTOLUENE	3/3/2020		µg/L	0.16	ND
NW050	2,072,396	406,567	2,4,6-TRINITROTOLUENE	10/22/2019		µg/L	0.16	ND
NW050	2,072,396	406,567	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/10/2020		µg/L	0.05	ND
NW050	2,072,396	406,567	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/3/2020		µg/L	0.16	ND
NW050	2,072,396	406,567	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/22/2019		µg/L	0.16	ND
NW051	2,072,401	406,543	2,4,6-TRINITROTOLUENE	6/10/2020		µg/L	0.05	ND
NW051	2,072,401	406,543	2,4,6-TRINITROTOLUENE	3/3/2020		µg/L	0.16	ND
NW051	2,072,401	406,543	2,4,6-TRINITROTOLUENE	10/22/2019		µg/L	0.16	ND

**TABLE E.3**  
**DOWNGRADIENT WELLS**  
**CORNHUSKER ARMY AMMUNITION PLANT**  
**MAROS DATA INPUTS**

WellName	XCoord	YCoord	Constituent	SampleDate	Result	Units	DetLim	Flags
NW051	2,072,401	406,543	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/10/2020		µg/L	0.05	ND
NW051	2,072,401	406,543	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/3/2020		µg/L	0.16	ND
NW051	2,072,401	406,543	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/22/2019		µg/L	0.16	ND
NW052	2,072,410	406,561	2,4,6-TRINITROTOLUENE	6/10/2020		µg/L	0.05	ND
NW052	2,072,410	406,561	2,4,6-TRINITROTOLUENE	3/3/2020		µg/L	0.16	ND
NW052	2,072,410	406,561	2,4,6-TRINITROTOLUENE	10/23/2019		µg/L	0.16	ND
NW052	2,072,410	406,561	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/10/2020		µg/L	0.05	ND
NW052	2,072,410	406,561	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/3/2020		µg/L	0.15	ND
NW052	2,072,410	406,561	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/23/2019		µg/L	0.16	ND
NW060	2,072,369	407,799	2,4,6-TRINITROTOLUENE	6/10/2020		µg/L	0.05	ND
NW060	2,072,369	407,799	2,4,6-TRINITROTOLUENE	3/2/2020		µg/L	0.16	ND
NW060	2,072,369	407,799	2,4,6-TRINITROTOLUENE	10/22/2019		µg/L	0.16	ND
NW060	2,072,369	407,799	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/10/2020		µg/L	0.05	ND
NW060	2,072,369	407,799	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/2/2020		µg/L	0.16	ND
NW060	2,072,369	407,799	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/22/2019		µg/L	0.16	ND
NW061	2,072,392	407,806	2,4,6-TRINITROTOLUENE	6/10/2020		µg/L	0.05	ND
NW061	2,072,392	407,806	2,4,6-TRINITROTOLUENE	3/2/2020		µg/L	0.15	ND
NW061	2,072,392	407,806	2,4,6-TRINITROTOLUENE	10/22/2019		µg/L	0.16	ND
NW061	2,072,392	407,806	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/10/2020		µg/L	0.05	ND
NW061	2,072,392	407,806	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/2/2020		µg/L	0.15	ND
NW061	2,072,392	407,806	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/22/2019		µg/L	0.16	ND
NW062	2,072,383	407,787	2,4,6-TRINITROTOLUENE	6/10/2020		µg/L	0.05	ND
NW062	2,072,383	407,787	2,4,6-TRINITROTOLUENE	3/2/2020		µg/L	0.15	ND
NW062	2,072,383	407,787	2,4,6-TRINITROTOLUENE	10/22/2019		µg/L	0.16	ND
NW062	2,072,383	407,787	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/10/2020		µg/L	0.06	ND
NW062	2,072,383	407,787	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/2/2020		µg/L	0.15	ND
NW062	2,072,383	407,787	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/22/2019		µg/L	0.16	ND
NW070	2,075,161	404,146	2,4,6-TRINITROTOLUENE	6/10/2020		µg/L	0.05	ND
NW070	2,075,161	404,146	2,4,6-TRINITROTOLUENE	3/2/2020		µg/L	0.16	ND
NW070	2,075,161	404,146	2,4,6-TRINITROTOLUENE	10/21/2019		µg/L	0.16	ND
NW070	2,075,161	404,146	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/10/2020		µg/L	0.06	ND
NW070	2,075,161	404,146	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/2/2020		µg/L	0.16	ND
NW070	2,075,161	404,146	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/21/2019		µg/L	0.16	ND

**TABLE E.3**  
**DOWNGRADIENT WELLS**  
**CORNHUSKER ARMY AMMUNITION PLANT**  
**MAROS DATA INPUTS**

WellName	XCoord	YCoord	Constituent	SampleDate	Result	Units	DetLim	Flags
NW071	2,075,166	404,140	2,4,6-TRINITROTOLUENE	6/9/2020		µg/L	0.05	ND
NW071	2,075,166	404,140	2,4,6-TRINITROTOLUENE	3/2/2020		µg/L	0.16	ND
NW071	2,075,166	404,140	2,4,6-TRINITROTOLUENE	10/21/2019		µg/L	0.16	ND
NW071	2,075,166	404,140	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/9/2020		µg/L	0.06	ND
NW071	2,075,166	404,140	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/2/2020		µg/L	0.16	ND
NW071	2,075,166	404,140	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/21/2019		µg/L	0.16	ND
NW080	2,075,116	406,616	2,4,6-TRINITROTOLUENE	6/8/2020		µg/L	0.05	ND
NW080	2,075,116	406,616	2,4,6-TRINITROTOLUENE	3/3/2020		µg/L	0.17	ND
NW080	2,075,116	406,616	2,4,6-TRINITROTOLUENE	10/22/2019		µg/L	0.16	ND
NW080	2,075,116	406,616	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/8/2020		µg/L	0.05	ND
NW080	2,075,116	406,616	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/3/2020		µg/L	0.17	ND
NW080	2,075,116	406,616	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/22/2019		µg/L	0.16	ND
NW081R	2,075,149	406,617	2,4,6-TRINITROTOLUENE	6/8/2020		µg/L	0.05	ND
NW081R	2,075,149	406,617	2,4,6-TRINITROTOLUENE	3/3/2020		µg/L	0.16	ND
NW081R	2,075,149	406,617	2,4,6-TRINITROTOLUENE	10/22/2019		µg/L	0.16	ND
NW081R	2,075,149	406,617	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/8/2020		µg/L	0.06	ND
NW081R	2,075,149	406,617	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/3/2020		µg/L	0.16	ND
NW081R	2,075,149	406,617	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/22/2019		µg/L	0.16	ND
NW082R	2,075,190	406,618	2,4,6-TRINITROTOLUENE	6/8/2020		µg/L	0.05	ND
NW082R	2,075,190	406,618	2,4,6-TRINITROTOLUENE	3/3/2020		µg/L	0.16	ND
NW082R	2,075,190	406,618	2,4,6-TRINITROTOLUENE	10/22/2019		µg/L	0.16	ND
NW082R	2,075,190	406,618	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	6/8/2020		µg/L	0.06	ND
NW082R	2,075,190	406,618	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	3/3/2020		µg/L	0.16	ND
NW082R	2,075,190	406,618	HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE	10/22/2019		µg/L	0.16	ND