

June 8, 2020 60565355

Mr. Jeff Gill CENWO-PM-HB U.S. Army Corps of Engineers 1616 Capitol Avenue Omaha, NE 68102

Subject: Final OU1 Rebound Study Letter Report - Baseline 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 – Baseline Event summarizes the baseline field activities completed for the OU1 Rebound Study and 2019 subsurface injections including: Groundwater Treatment Facility (GWTF) OU1 operations/maintenance activities and shutdown; OU1 Rebound Study and subsurface injection performance monitoring baseline groundwater sampling; and the subsurface injection activities. The Letter Report presents the baseline 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 – Baseline 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 OUI/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 (µg/L) and 400 µg/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. 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 the area of highest RDX and TNT concentrations near the former facility boundary and are proposed in areas with remaining residual RDX and TNT concentrations 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 supplemental subsurface injection details and design are 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 for OU1.

#### 2.0 FIELD ACTIVITIES

This section summarizes the baseline OU1 Rebound Study and subsurface injection 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 Report (Brice-AECOM 2019c).

#### 2.1 OU1 REBOUND STUDY FIELD ACTIVITIES

On October 28, 2019, pumping at EW7 and operation of the GWTF was discontinued and is being maintained in a stand-by condition. Routine operation and maintenance activities such as lawn mowing, snow removal, pest control, are being continued. The GWTF process shutdown procedures are described in the GWTF O&M Manual (Brice 2019).

Prior to the shutdown of EW7, a baseline groundwater monitoring event was performed. Select off-post and on-post monitoring wells (upgradient, side-gradient, and downgradient of the former facility boundary/EW7) were sampled and off-post direct push borings (downgradient of the former facility boundary/EW7) were advanced and groundwater samples collected to establish baseline conditions for the OU1 Rebound Study.

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

A total of nine direct push groundwater samples were collected on October 14 and October 28, 2019 from three off-post locations (OS001, OS002, and OS003) as shown on Figure 2-1. Off-post direct push groundwater sampling was completed to monitor explosives concentrations only (as screening data) from select OU1 off-post locations 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 select 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) from the unconfined shallow aquifer (Grand Island Formation) to establish the vertical extent of the explosives plume. In accordance with the OU1 Rebound Study Work Plan (Brice-AECOM 2019b), off-post direct push groundwater samples were collected initially at OS001 (see Figure 2-1). Due to sample results from OS001 identifying TNT concentrations greater than (>)2 µg/L, the direct push sampling continued downgradient at OS002 and OS003 (see Section 3). Sample results at downgradient OS002 and OS003 also had TNT concentrations > 2 µg/L. In accordance with the OU1 Rebound Study Work Plan (Brice-AECOM 2019b), no additional direct push groundwater samples were collected further downgradient of OS003. Location OS001 will be the selected monitoring location to evaluate potential on-post explosives migrating off-site. At location OS001, one continuous direct push soil boring was advanced to characterize subsurface conditions and verify the depth to the Fullerton Clay aguitard. The sampling intervals were selected based on previous direct push groundwater investigation and monitoring well screen intervals between EW6 and EW7 (Final 2018 Annual Groundwater Monitoring Report [Brice-AECOM 2019c]). The vertical sampling intervals for the following seven direct push sampling events will be determined based on baseline and subsequent sampling results.

Brice-AECOM obtained utility clearances prior to the start of intrusive direct push groundwater sampling (and injection) 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.

All new direct push locations were sited using predetermined horizontal coordinates and a global positioning system (GPS) unit to ensure completion in their planned locations. At the conclusion of each sampling activity, all final sampling locations were vertically surveyed and referenced to previously surveyed locations (i.e., monitoring wells). Surveyed ground surface elevations for direct push sample locations are provided in **Table 2-1**.

All direct push groundwater sampling (and subsurface injection) locations were completed using Geoprobe<sup>®</sup> rigs (models 6620DT and/or 7822DT) 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<sup>TM</sup> 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 Baseline OU1 Monitoring Well Sampling Activities (Off-Post and On-Post)

During the baseline OU1 Rebound Study sampling event, 18 off-post and 18 on-post monitoring wells were sampled from October 21 through October 23, 2019. 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 attempted 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, conductivity, ferrous iron (Fe<sup>2+</sup>), and turbidity were measured at monitoring wells using a YSI 556 MPS water quality probe fitted with a flow-through cell. Turbidity was measured with a LaMotte 2020 turbidity meter. Fe<sup>2+</sup> 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 (CO<sub>2</sub>) 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 2019 OU1 subsurface injection activities completed in the area between EW6 and EW7. Additional subsurface injections are planned for Fall 2020 to remediate the remainder of the OU1 plumes (Brice-AECOM 2019c).

OU1 subsurface injection activities were performed to remediate the area of >20  $\mu$ g/L TNT and >2  $\mu$ g/L RDX plumes (approximately 600 feet by 800 feet total area) which is located approximately 200 feet upgradient (west) of EW7 (**Figure 2-2**). This treatment area addresses residual RDX and TNT concentrations, historically migrating east within the EW7 capture zone near the former facility boundary. A baseline performance monitoring groundwater sampling event was conducted prior to subsurface injections to establish the baseline explosives concentrations in groundwater.

#### 2.2.1 Baseline 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 October 2019, as shown on **Figure 2-2**. These performance monitoring locations were sampled to establish baseline conditions prior to implementing the OU1 subsurface injection activities. Three post-injection quarterly performance monitoring events are planned at these performance monitoring wells to gauge the effectiveness of the 2019 subsurface injection activities. The baseline performance monitoring included:

- Eighteen new temporary wells at nine locations (one shallow depth, one shallow-intermediate depth)
- Two existing monitoring wells (piezometers PZ017R and PZ018)

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 planned 2019 injection activities (**Figure 2-2**).

Groundwater Sampling from Temporary Wells

The 18 temporary monitoring wells (at nine locations) were installed, developed, purged, sampled, and abandoned from October 15 through October 20, 2019. 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 2005), temporary wells (i.e., test holes) can be used in conjunction with groundwater investigations but may be retained for no more than 10 days. Therefore, upon completion of sample collection, all temporary monitoring wells were abandoned within 10 days of installation by a Nebraska-licensed well driller.

#### Groundwater Sampling from OU1 Monitoring Wells

Two existing monitoring wells (piezometers PZ017R and PZ018) were purged and sampled on October 23, 2019. 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**.

#### 2.2.2 Subsurface Injection Design

The 2019 OU1 subsurface injection design, presented in the 2018 Annual Groundwater Monitoring Report (Brice-AECOM 2019c), followed a strategy similar to the design strategy previously implemented at the LL1 and LL2 source areas from 2012 to 2016 (the 2016 design is provided in the Final 2016 Annual Groundwater Monitoring and Subsurface Injection Report [BW-URS 2017]) and was based on the March 2018 direct push groundwater investigation results and the annual LTM sampling results (March 2018 and June 2019). The 2019 subsurface injection activities consisted of a series of closely spaced injection transects to deliver an injection amendment to the area of highest explosives concentrations in groundwater (>20  $\mu$ g/L TNT and >2  $\mu$ g/L RDX) at shallow and shallow-intermediate groundwater depths (approximately 35 to 40 feet bgs) upgradient of EW7.

Injection transects were installed perpendicular to groundwater flow direction (northeast) and were spaced approximately 50 feet apart (**Figure 2-2**). A total of 600 injection points within the transects were staggered so that injection points are oriented in a grid-type pattern to more effectively treat residual source areas that are within the saturated zone. The injection interval was 25 feet thick, with increased quantities of amendment injected within the shallower core of the explosives plume (**Table 2-5**).

Amendment selection, amendment concentrations, injection transect spacing, and injection point spacing were chosen based on the subsurface lithologic profile at CHAAP (poorly graded sand to clayey/silty sand), groundwater flow velocities, and performance monitoring data collected during previous OU1 subsurface injection events (2007 through 2016) (BW-URS 2017). These

performance monitoring data indicated that hydrodynamic dispersion (lateral and longitudinal) and diffusion will spread the amendment from the original injection locations and help form a contiguous treatment zone. Final subsurface injection locations were based on the orientation of the June 2019 EW7 capture zone and the distribution of explosives within the OU1 groundwater explosives plume.

Based on the overall success observed from injections within the LL1 and LL2 source areas, a 9.8 percent by volume mixture of Wesblend 66-10 amendment was used for the subsurface injection transects. Wesblend 66-10 is an aqueous solution of 80 percent blackstrap molasses mixed with whey, 10 percent hydrolyzed vegetable oil (soybean oil refining byproduct), and 10 percent cornsteep (a fermentation byproduct containing lactate and B vitamins). Wesblend 66-10 treatment zones are expected to maintain maximum effectiveness for up to 24 months.

#### 2.2.3 Subsurface Injection Permit

Underground injection is regulated by the Nebraska Department of Environment and Energy (NDEE). Therefore, all underground injection activities performed in Nebraska must meet the requirements of NAC Title 122, Chapter 6 (NAC 2002). Dr. Steve Fischbein, the 2006 Underground Injection Control (UIC) Program Coordinator for NDEE, was consulted in November 2006, and he indicated that an application for a Class V Injection Permit was not necessary due to the federal status of CHAAP. Although the permit was not required, the 2019 OU1 subsurface injection details were provided to NDEE in the Final 2018 Annual Groundwater Report (Brice-AECOM 2019c) before subsurface injections were completed.

#### 2.2.4 Amendment Storage and Mixing

The Wesblend 66-10 injection amendment was delivered to the site in 6,000-gallon tankers. Fourteen tankers of Wesblend 66-10 (a total of 690,440 pounds) were delivered to CHAAP during the 2019 OU1 subsurface injection activities. Bulk amendment was stored in plastic storage tanks at the GWTF until it was mixed with water for injection (generally within 1 week of delivery). According to Westway Inc., Wesblend 66-10 can be stored for several weeks.

The amendment was mixed with water using a batch mixing technique. A trash pump connected to an inline flow meter was used to transfer the desired volume of amendment from the plastic storage tanks into the water truck tank. Once the water truck tanks had the desired volume of amendment, the remaining volume was filled with water from an irrigation well, owned and operated by Panowicz Farms (PF), to achieve the desired concentration of injection solution (9.8 percent by volume Wesblend 66-10).

Mixtures of amendment and water (injection solution) were transferred to the injection sites by 4,000- and 5,000-gallon water trucks operated by PF. Injection solution was transferred from the water trucks to four 3,000-gallon plastic holding tanks at the injection sites.

#### 2.2.5 Direct Push Injection

Direct push subsurface injection locations were sited using predetermined horizontal coordinates and a GPS unit to ensure completion in their planned locations. Location accuracy was checked using measurement distances from professionally surveyed monitoring wells. Final transect locations were vertically surveyed and referenced to previously surveyed locations (i.e.,

monitoring wells). Surveyed transect ground surface elevations are provided in **Table B-1** (**Appendix B**).

The 2019 OU1 subsurface injection activities were completed from October 28 to November 25, 2019. Direct push technology was used to inject 600,610 gallons of the solution at 600 points into the subsurface via direct push points along transects, as shown on **Figure 2-2**. A summary of direct push injection locations, including transect ID numbers, amendment percentages, injection point spacing, number of injection points, injection transect lengths, injection interval thicknesses, required volume of amendment mixture per point and transect, and volume of amendment mixture per transect and interval is presented in **Table 2-5**. Injections were completed using direct push, specifically with Geoprobe® rigs (models 6620DT and 7822DT). Direct push activities were completed by PES of Salina, Kansas, with full-time oversight by Brice-AECOM. Three direct push rigs were utilized to keep pace with the high-volume pumping capacity of the injection system.

Direct push injection used 1.5-inch inner diameter direct push rods that were advanced to the target depth interval. Once this depth was reached, the rods were pulled up slightly to open the disposable injection drive tip. The direct push rig was disconnected from the rod assembly, and a delivery hose was connected from an injection manifold outlet to an adapter attached to the end of the direct push rod. After confirming that all pressurized connections were secure, a Davey<sup>®</sup> Model 5290 self-priming firefighter pump powered with a 9-horsepower Honda motor was used to pump the injection amendment from the onsite plastic holding tanks, through the metered manifold system and into the ground through the direct push drive rods. Injection pressures, flow rates, and volumes were monitored closely for each injection interval.

Two six-valve manifold systems with flow meters allowed for injection of up to 12 points simultaneously. The manifold systems with flow meters were used to ensure that accurate volumes of injection solution were injected per interval at each location.

Injections were completed from bottom of the contaminated zone (40 ft bgs) to 3-5 feet below the water table, providing a vertical distribution of approximately 25 feet. Vertical injection intervals were spaced every 5 feet, coinciding with the removal of 5-foot-long direct push rod segments. After a predetermined volume of injection solution was injected into a specific subsurface interval, the rods were raised to the next interval. The injection solution was then injected into the next interval, and the procedure was repeated until the desired volume of solution was injected throughout the entire thickness of the treatment zone. Increased quantities of amendment were injected near the water table and within the core of the explosives plume to better treat higher explosives concentrations. Volume of injection solution per vertical interval (from shallow intervals to deep intervals) were as follows: 200 gallons, 300 gallons, 300 gallons, 100 gallons, and 100 gallons (see Table 2-5). Once the direct push drive rods were removed from the ground the injection points were then sealed with bentonite pellets. Subsurface injection daily summary field sheets are provided in **Appendix B**. A summary of all 600 injection points, including transect point ID numbers, dates completed, ground surface elevations, number of injection intervals, starting and stopping injection depths, starting and stopping flow meter readings, and total volume of mixture injected (in gallons) is presented in **Table B-1** (Appendix B).

#### 2.3 INVESTIGATION-DERIVED WASTE DISPOSAL PROCEDURES

Investigation-derived waste (IDW) from the October 2019 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.).
- IDW water was containerized and discharged daily into the floor sump at the GWTF for treatment through the existing granular activated carbon (GAC) treatment system.

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

Observations and data collected during the 2019 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 baseline 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 [°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 and subsurface injection activities. 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 BASELINE RESULTS AND DATA QUALITY REVIEW

#### 3.1 BASELINE ANALYTICAL RESULTS

Groundwater samples for the baseline 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 onpost 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 baseline 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 baseline OU1 Rebound Study and subsurface injection performance monitoring sampling activities. The primary explosives compounds detected in groundwater were RDX, HMX, and TNT. Additionally, the explosives breakdown products 1,3,5-trinitrobenzene, 2,4-dinitrotoluene, 2-amino-4,6-dinitrotoluene (2-Am-DNT), and 4-amino-2,6-dinitrotoluene (4-Am-DNT) were detected. The data collected during the baseline OU1 Rebound Study and baseline subsurface injection performance monitoring were used to create a baseline explosives plume in these areas. Data for the baseline 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 baseline 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 baseline 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 baseline 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>. 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 and 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**).

General trends regarding the data validation are as follows:

- The sulfate and methane results for sample EW7-PM25B-1-35, the sulfate result for sample G0070-1, and the nitrate-nitrite result for sample PZ019-1 were qualified as estimated (**J**) due to MS/MSD recoveries above evaluation criteria.
- The sulfate result for sample G0076-1 was qualified as **J** due to analysis outside of holding time criteria.

- DOC results for samples NW082R-1, G0082-1, NW071-1, and G0076-1 were qualified as nondetect (U) due to method blank contamination.
- Some explosives compound results for 22 samples were qualified as **J** due to relative percent differences outside of evaluation criteria between the primary and confirmation columns.
- The TNT results for samples OS001-DP01-25, OS001-DP01-35, and OS001-DP01-501 were qualified as **J** due to initial calibration verification percent differences outside of evaluation criteria.
- Some explosives compound results for 20 samples were qualified as estimated/estimated nondetect (J/UJ) due to low LCS recoveries.
- Some explosives compounds, TKN, and anion results were qualified as J/UJ due to MS/MSD recoveries below evaluation criteria.
- Some explosives compound results for 29 samples were qualified as J/UJ due to surrogate recoveries below evaluation criteria.
- The following samples had some explosives compound results qualified as **J** due to surrogate recoveries above evaluation criteria:
  - o OS001-DP01-25, EW7-PM22A-1-25, OS002-DP01-25
- The following analytes were qualified as **UJ** in some samples due to continuing calibration verification percent differences outside of evaluation criteria:
  - o 2,6-trinitrotoluene, 2-nitrotoluene, 4-nitrotoluene, HMX, and tetryl

#### 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 three additional quarterly groundwater sampling events are 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

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 less than or equal ( $\leq$ ) 0	< 90% and COV greater than or equal $\geq 1$	No Trend (NT)
S ≤ 0	< 90% and COV < 1	Stable (S)
S < 0	90% to 95%	Probably Decreasing (PD)
S < 0	> 95%	Decreasing (D)
Dataset where all val	ues 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 2018 Annual Groundwater Report (Brice-AECOM 2019c). See Section 5.5 of the Final 2018 Annual Groundwater Report for additional Program Input details (e.g., Data Management, Site Details).

#### 4.2 STATISTICAL RESULTS SUMMARY

Mann-Kendall analysis was not performed for the baseline OU1 Rebound Study sampling event. Baseline RDX and TNT concentrations for OU1 Rebound Study wells were similar to the most recent annual OU1 LTM results (June 2019) with only minimal fluctuations observed. However, all monitoring wells used in the OU1 Rebound Study showed decreasing or stable RDX and TNT concentration trends in the most recent statistical trend evaluation in 2018 (Brice-AECOM 2019c). The baseline OU1 Rebound Study and June 2019 RDX and TNT results (June 2019) 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**.

Following future quarterly data collection, a qualitative analysis comparing the current RDX and TNT results to baseline will be performed until a sufficient data set is available for OU1 Rebound Study Mann-Kendall trend analysis.

#### 5.0 OU1 REBOUND STUDY AND INJECTION PERFORMANCE EVALUATION

This section presents the OU1 Rebound Study evaluation and the 2019 subsurface injection performance evaluation for the OU1 groundwater explosives plume. The OU1 Rebound Study will be evaluated based on groundwater data collected during the seven remaining quarterly groundwater monitoring events utilizing both off-post locations (monitoring wells and direct push sample locations) and on-post locations (monitoring wells). The performance of the subsurface injections will be evaluated based on groundwater data collected during the three remaining quarterly performance monitoring events from monitoring locations within the injection transect treatment zones (monitoring wells and temporary performance monitoring wells). These evaluations will be conducted upon completion of planned quarterly groundwater sampling events.

The OU1 Rebound Study evaluation will review concentrations of RDX and TNT in groundwater, key MNA parameters, and any concentration trends observed throughout the rebound study, both off-post and on-post.

The 2019 OU1 subsurface injection performance evaluation will review concentrations of RDX and TNT in groundwater, and key water quality parameters compared to baseline conditions to assess the effectiveness of the groundwater amendment at creating anaerobic conditions within the treatment area and reducing the concentrations of RDX ant TNT in groundwater. Injection of a carbon source (the Wesblend 66-10 amendment) has been proven during previous events to create an anaerobic environment within the treatment area. The anaerobic conditions can be created by introducing a carbon source into the aquifer for indigenous microbes to utilize as an energy source. The microbes couple the oxidation of organic compounds or hydrogen to the reduction of an electron receptor to generate energy in a process called microbial respiration. The reduction of oxygen is the most energetically favorable and efficient metabolic pathway, which results in

oxygen being rapidly depleted in systems with an elevated organic content (the Wesblend 66-10 amendment), rendering the environment anaerobic. An anaerobic environment is the appropriate environment for rapid and sustained cometabolic degradation of explosive compounds.

#### 5.1 OU1 REBOUND STUDY EVALUATION

#### 5.1.1 Baseline RDX and TNT Concentrations

Baseline concentrations for RDX and TNT for all OU1 Rebound Study locations are presented in Table 5-1. Of the 18 on-post wells sampled, five wells (G0077, G0086, PZ017R, PZ018, and PZ020) have TNT concentrations >2 μg/L. The highest TNT concentration in groundwater (15 µg/L) was from on-post well PZ017R. All 18 off-post wells were nondetect for TNT. All on-post and off-post wells had RDX concentrations <2 µg/L. Baseline off-post direct push groundwater sample results from OS001 through OS003 (downgradient and east of EW7 approximately 500 feet, 1,000 feet, and 2,000 feet, respectively) showed TNT concentrations >2 μg/L at shallow (approximately 25 feet bgs), shallow-intermediate (approximately 35 feet bgs), and intermediate depths (approximately 45 feet bgs) at different locations (Table 5-1). The highest TNT concentrations in off-post direct push samples were from location OS001 (12 µg/L at 25 ft bgs and 11 µg/L at 35 ft bgs). TNT concentrations from the three off-post locations generally decline farther to east and deeper into the shallow aquifer (Table 5-1). There were no detections of RDX above its HAL (2 µg/L) in any of the off-post direct push samples. Baseline data indicate that TNT concentrations >2 µg/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 Baseline MNA Parameter Measurements

Baseline MNA parameters for all OU1 Rebound Study wells (see **Table 5-2**) were collected to establish a baseline condition of key MNA parameters present. The baseline MNA parameter results for the OU1 Rebound Study wells were comparable to historically measured MNA parameters at the same off-post and on-post wells (Brice-AECOM 2019c). In general, data results indicated these OU1 Rebound Study off-post and on-post wells had higher ORP, DO, Nitrate/Nitrite, and sulfate measurements and low ammonia, TKN, DOC, CO<sup>2</sup>, methane, alkalinity, sulfide, and Fe<sup>2+</sup> measurements. Future MNA parameters will be evaluated by comparing the baseline data to follow-up OU1 Rebound Study sampling data.

#### 5.2 OU1 SUBSURFACE INJECTION PERFORMANCE MONITORING EVALUATION

#### 5.2.1 Baseline RDX and TNT Concentrations

Baseline explosives results for all OU1 subsurface injection performance monitoring locations (**Table 5-3**) indicated TNT concentrations >2  $\mu$ g/L are present at the former facility boundary and >20  $\mu$ g/L slightly upgradient of EW7. RDX concentrations were below its HAL for all performance monitoring locations. The on-post groundwater explosives plume was refined based on the baseline subsurface injection performance monitoring results as shown on **Figure 2-2**.

A total of 20 performance monitoring samples were collected from two on-post monitoring wells

(PZ017R and PZ018) and 18 temporary monitoring wells (EW7-PM21 through EW7-PM29: one shallow well and one shallow-intermediate well each at nine locations) during the baseline OU1 subsurface injection performance monitoring event. Of the 20 performance monitoring samples collected, all had TNT concentrations >2  $\mu$ g/L but no RDX concentrations above its HAL (>2  $\mu$ g/L). The maximum TNT concentration of 29  $\mu$ g/L was detected at shallow well EW7-PM21A-25. The TNT concentrations from the performance monitoring wells generally decline farther to the south and deeper into the shallow aquifer (**Figure 2-2**).

#### 5.2.2 Baseline Water Quality Parameter Measurements

Baseline water quality parameters for all OU1 subsurface injection performance monitoring locations (**Table 5-4**) were collected to establish a baseline condition of subsurface environment prior to subsurface injection activities. The baseline water quality parameters for the performance monitoring wells were similar to OU1 Rebound Study wells; however, ORP and DO measurements were generally lower and methane was generally higher in performance wells indicating the baseline aquifer conditions were slightly anaerobic and minor biodegradation may be occurring. Future water quality parameters will be evaluated by comparing the baseline data to follow-up performance monitoring data. According to the USACE Waterways Experiment Station (WES) (USACE WES 1999), ORP values <0 millivolts (mV), DO concentrations <1.0 milligrams per liter (mg/L), sulfate concentrations <20 mg/L, and DOC concentrations >20 mg/L are favorable conditions for anaerobic biodegradation.

#### 6.0 CONCLUSIONS AND RECOMMENDATIONS

This section presents the conclusions for the baseline OU1 Rebound Study and subsurface injection performance monitoring activities, and recommendations for the next sampling event (Quarter 2 – February/March 2020).

#### 6.1 CONCLUSIONS

#### 6.1.1 OU1 Rebound Study

All baseline OU1 Rebound Study sampling activities were completed successfully prior to EW7 shutdown. Baseline sample results indicate the OU1 on-post TNT plume maintains its general shape and extent within the previously interpreted capture zone (EW7 operating at 300 gpm), with detections below HALs to the north and south extent of EW7 (i.e., well cluster NW020 and PZ019). The previously interpreted TNT plume (June 2019) is additionally shown on **Figure 2-1**. All concentrations of RDX within the OU1 Rebound Study area were below the HAL (2  $\mu$ g/L).

TNT concentrations  $>2~\mu g/L$  were identified in off-post direct push samples (OS001, OS002, and OS003) downgradient and east of the former facility boundary/EW7. Based on historically identified reducing conditions and previous sample results with TNT concentrations below the HAL from within the feedlot, the TNT plume is not interpreted to extend into the feedlot. Additionally, 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. In accordance with the OU1 Rebound Study Work Plan (Brice-AECOM 2019b), all three off-post direct push locations were sampled and identified TNT concentrations above the HAL. Concentrations ranged

from 12  $\mu$ g/L at OS001 to 3  $\mu$ g/L (just slightly above the HAL) at the furthest downgradient location OS003. Although the off-post downgradient extent of the TNT plume could not be defined, it is interpreted that the plume does not extend a significant distance downgradient based on the low levels detected at OS003 and non-detections at downgradient off-post monitoring wells. Following future OU1 Rebound Study direct push groundwater sampling events (proposed at location OS001 only), concentrations and migration trends will be evaluated, and if necessary, additional off-post direct push sampling will be completed.

#### 6.1.2 OU1 Subsurface Injections and Performance Monitoring

All baseline OU1 subsurface injection performance monitoring sampling were completed successfully prior to EW7 shutdown. The performance monitoring sample results indicate TNT concentrations >2  $\mu$ g/L exist upgradient of EW7 (similarly interpreted with OU1 Rebound Study sampling results) with a narrow >20  $\mu$ g/L TNT plume parallel to groundwater flow. No RDX concentrations were detected above the HAL. Performance monitoring results from temporary wells indicate TNT concentrations >20  $\mu$ g/L are present in the shallow depths of the aquifer (i.e., between 20 to 30 feet bgs) and TNT concentrations >2  $\mu$ g/L extend to 40 feet bgs. The baseline sample results for explosives and water quality parameters at the performance monitoring wells indicate that the baseline aquifer conditions are slightly anaerobic and minor biodegradation may be occurring (e.g., explosives breakdown products, and lower ORP and DO/higher methane parameters). However, additional treatment effects from the 2019 subsurface injections are expected to enhance the anaerobic conditions and stimulate more rapid and sustained biodegradation of explosives.

The 2019 OU1 subsurface injection activities were completed successfully following the baseline performance monitoring sampling and EW7 shutdown. A total of 600,610 gallons of mixed solution at 600 points was injected into the subsurface via direct push. The injection design including point and transect spacing, horizontal placements, and vertical interval volumes is expected to establish a highly-reducing treatment area for explosives biodegradation for the interpreted higher TNT concentrations (>2  $\mu$ g/L) established during the baseline performance monitoring sampling activities.

#### 6.2 RECOMMENDATIONS

#### 6.2.1 OU1 Rebound Study

Proceed with Quarter 2 sampling event for the OU1 Rebound Study (February/March 2020) per Addendum 3, UFP-QAPP (Brice-AECOM 2019b). In accordance with the OU1 Rebound Study Work Plan, the off-post direct push location OS001 will remain as the selected location to evaluate potential explosives migration off-post. Following future OS001 data analysis, explosives concentrations and migration trends will be evaluated, and if necessary, additional off-post direct push sampling will be completed.

#### 6.2.2 OU1 Subsurface Injections and Performance Monitoring

Proceed with Quarter 2 sampling event for the OU1 subsurface injection performance monitoring (February/March 2020) per Final 2018 Annual Groundwater Monitoring Report (Brice-AECOM 2019c).

#### 7.0 REFERENCES

- Air Force Civil Engineer Center (AFCEC) 2012. Monitoring and Remediation Optimization System (MAROS) Software Version 3.0 User's Guide. Technology Transfer Division, Air Force Center for Environmental Excellence. Brooks AFB, San Antonio, TX. September.
- Bay West LLC and URS Group Inc. (BW-URS). 2014. Uniform Federal Policy Quality Assurance Project Plan. Remediation Action Operations Groundwater Treatment Facility at OU1 and Groundwater Monitoring at OU1 and OU3. Cornhusker Army Ammunition Plant, Grand Island, Nebraska. November.
- BW-URS. 2017. 2016 Annual Groundwater Monitoring and Subsurface Injection Report, Remedial Action Operations of the Groundwater Treatment Facility at OU1 and Long-Term Monitoring of OU1/OU3, Cornhusker Army Ammunition Plant, Grand Island, Nebraska. Final. November.
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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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**AECOM** 

Dean Converse

Project Manager

#### **ATTACHMENTS**

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Table 2-1	Direct Push Groundwater Samples Collected (Off-Post), OU1 Rebound Study Baseline
Table 2-2	Off-Post and On-Post Groundwater Monitoring Wells Sampled, OU1 Rebound Study, Baseline
Table 2-3	Summary of Temporary Performance Monitoring Well Construction, OU1 Subsurface Injection, Baseline
Table 2-4	Performance Monitoring Locations Sampled, OU1 Subsurface Injection, Baseline
Table 2-5	OU1 Subsurface Injection Locations, 2019 OU1 Subsurface Injection
Table 3-1	Summary of Explosives Detected, Direct Push Groundwater Locations (Off-Post) OU1 Rebound Study, Baseline
Table 3-2	Summary of Explosives Detected and Laboratory MNA Parameters, Off-Post and On-Post Monitoring Wells, OU1 Rebound Study, Baseline
Table 3-3	Summary of Explosives Detected and Laboratory MNA Parameters, Performance Monitoring Wells, OU1 Subsurface Injection, Baseline
Table 3-4	Summary of OU1 Field Duplicate Sample Pairs
Table 3-5	Field Water Quality Parameters, Off-Post and On-Post Monitoring Wells, OU1 Rebound Study, Baseline
Table 3-6	Field Water Quality Parameters, Performance Monitoring Wells, OU1 Subsurface Injection, Baseline
Table 5-1	Summary of RDX and TNT Concentrations, OU1 Rebound Study Locations
Table 5-2	Summary of MNA Parameters, Off-Post and On-Post Monitoring Wells, OU1 Rebound Study
Table 5-3	Summary of RDX and TNT Concentrations, OU1 Performance Monitoring Locations
Table 5-4	Summary of Water Quality Parameters, Performance Monitoring Locations, OU1 Subsurface Injection
List of Figures	

List of Figures	
Figure 1-1	Facility Location Map
Figure 1-2	Site Location Map
Figure 2-1	Extent of OU1 Explosives Plume, OU1 Rebound Study, Baseline (October 2019)
Figure 2-2	Extent of OU1 Explosives Plume, OU1 Subsurface Injection Performance Monitoring, Baseline (October 2019)
Figure 4-1	Mann-Kendall Analysis for TNT and RDX, Former Facility Boundary Wells (OU1)
Figure 4-2	Mann-Kendall Analysis for TNT and RDY Ungradient Wells (OUI)

#### **List of Appendices (CD Only)**

Appendix A Well Drilling Licenses

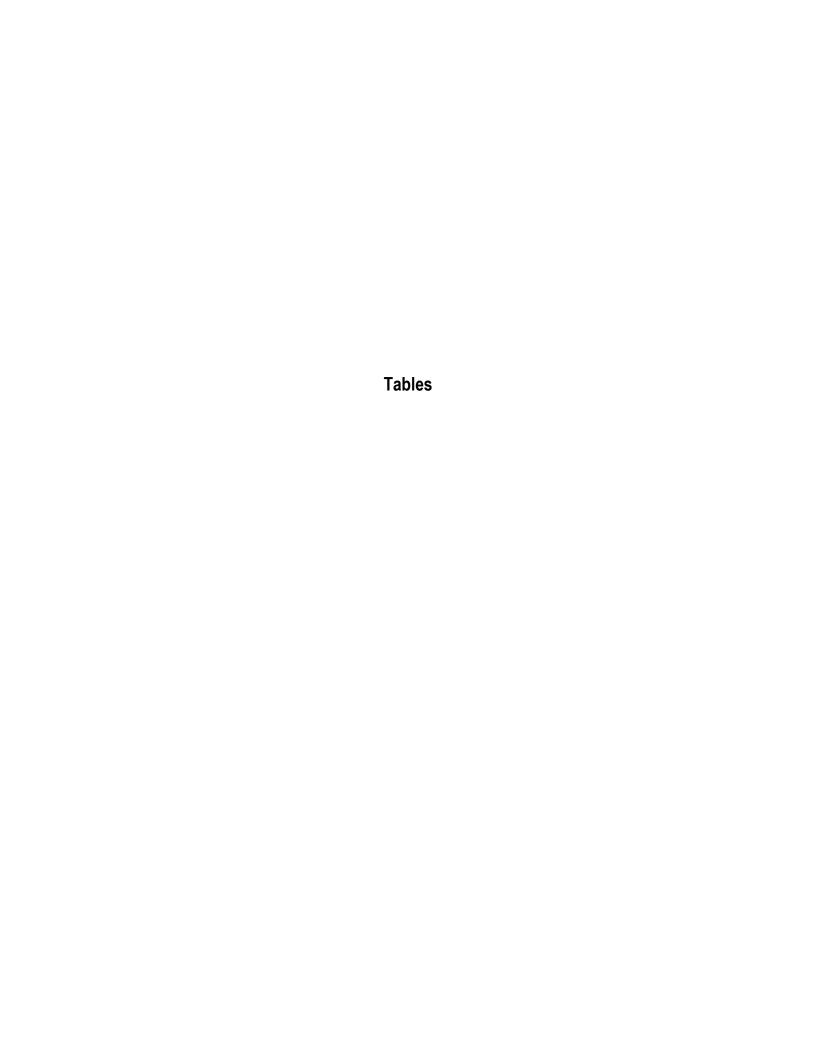
Appendix B OU1 Rebound Study and Subsurface Injection Completed Field Forms

- Direct Push Groundwater Sample Collection Field Sheets (Off-post)
- OU1 Groundwater Monitoring Well Sample Collection Field Sheets
- Performance Monitoring Well Development Logs
- Performance Monitoring Sample Collection Field Sheets
- Subsurface Injection Daily Summary Field Sheets and Summary Table
- Direct Push Groundwater Sampling (Off-post), OU1 Groundwater Monitoring Well Sampling, Subsurface Injection and Performance Monitoring DQCRs and Weekly Reports

Appendix C Photographic Log

Appendix D Analytical Data and Validation

Appendix E OU1 Statistical Trend Data Sheets



#### **TABLE 2-1** DIRECT PUSH GROUNDWATER SAMPLES COLLECTED (OFF-POST) **OU1 REBOUND STUDY, BASELINE** OU1 REBOUND STUDY LETTER REPORT - BASELINE

	Coord	inates <sup>1</sup>						Pa	ramet	ers
Sample Location ID	Northing	Easting	Ground Elevation (feet amsl) <sup>1</sup>	Screened Interval (feet bgs)	Sample Elevation (feet amsl) <sup>1</sup>	Sample ID	Sample Date	Explosives <sup>2</sup>	Field Duplicate Samples <sup>3</sup>	MS/MSD Samples <sup>4</sup>
OU1 Rebound	l Study - Off-	post Direct P	ush Samples <sup>5</sup>	5,6						
OS001	403776.40	2067811.90	1890.05	21.0 - 25.0 31.0 - 35.0	1865.05 1855.05	OS001-DP01-25 OS001-DP01-35	10/14/2019 10/14/2019	X X	X	
05001	103770.10	200/011.90	1070.03	41.0 - 45.0	1845.05	OS001-DF01-45	10/14/2019	X	Λ	X
	40.2			21.0 - 25.0	1863.07	OS002-DP01-25	10/28/2019	X		
OS002	403776.08	2068314.37	1888.07	31.0 - 35.0 41.0 - 45.0	1853.07 1843.07	OS002-DP01-35 OS002-DP01-45	10/28/2019 10/28/2019	X X		
				21.0 - 25.0	1860.95	OS003-DP01-25	10/28/2019	X		
OS003	403775.43	2069319.33	1885.95	31.0 - 35.0	1850.95	OS003-DP01-35	10/28/2019	X		
				41.0 - 45.0	1840.95	OS003-DP01-45	10/28/2019	X		
							Totals	9	1	1

#### Notes:

% = 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

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

MNX = mono-nitroso-RDX

MS/MSD = matrix spike/matrix spike duplicate

OS = off-post sample

RDX = cyclotrimethylenetrinitramine

SP = screen point

TBD = to be determined

TNT = 2,4,6-trinitrotoluene

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

<sup>&</sup>lt;sup>3</sup>Field duplicate samples were collected at a rate of 5% (1 per 20 samples collected) for explosives only. The 31-35 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>&</sup>lt;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>&</sup>lt;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 approximately quarterly frequency, over approximately 2 years. The follow-up direct push sampling events (seven events at approximately 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.

<sup>&</sup>lt;sup>6</sup>Direct push soil borings was collected at OS001 to interpret lithological data and to identify depth to water, extent of shallow aquifer, and verify the absence of lowpermeability clays and silts (Fullerton Clay unit).

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

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>
OU1 Off-Post	Monitoring Wel	ls			•	-
CA210	10/21/2019	X	X	X		
CA211	10/21/2019	X	X	X		
CA212	10/21/2019	X	X	X		
CA213	10/21/2019	X	X	X		
NW020	10/22/2019	X	X	X		
NW021	10/22/2019	X	X	X	NW023-1	
NW022	10/22/2019	X	X	X		
NW050	10/22/2019	X	X	X		
NW051	10/22/2019	X	X	X		
NW052	10/23/2019	X	X	X		
NW060	10/22/2019	X	X	X		
NW061	10/22/2019	X	X	X		
NW062	10/22/2019	X	X	X		
NW070	10/21/2019	X	X	X		
NW071	10/21/2019	X	X	X		
NW080	10/22/2019	X	X	X		
NW081R	10/22/2019	X	X	X		
NW082R	10/22/2019	X	X	X		
	Off-Post Totals	18	18	18	1	0
OU1 On-Post	Monitoring Well	s				
G0024	10/23/2019	X	X	X		
G0070	10/21/2019	X	X	X		G0070-1 MS/MSD
G0075	10/21/2019	X	X	X		
G0076	10/21/2019	X	X	X		
G0077	10/23/2019	X	X	X		
G0078	10/23/2019	X	X	X		
G0079	10/21/2019	X	X	X		
G0080	10/21/2019	X	X	X		
G0081	10/21/2019	X	X	X		
G0082	10/21/2019	X	X	X		
G0086	10/23/2019	X	X	X		
G0087	10/22/2019	X	X	X		
G0091	10/22/2019	X	X	X		
G0092	10/22/2019	X	X	X		
PZ017R	10/23/2019	X	X	X	PZ021-1	
PZ018	10/23/2019	X	X	X		
PZ019	10/22/2019	X	X	X		PZ019-1 MS/MSD
PZ020	10/23/2019	X	X	X		
	<b>On-Post Totals</b>	18	18	18	1	2
	Overall Totals	36	36	36	2	2

#### **TABLE 2-2**

## OFF-POST AND ON-POST GROUNDWATER MONITORING WELLS SAMPLED OU1 REBOUND STUDY, BASELINE OU1 REBOUND STUDY LETTER REPORT - BASELINE

		Laboratory		Field	
		MNA	Field MNA	<b>Duplicate</b>	Field MS/MSD
Well Number San	iple Date Explosives	Parameters <sup>2</sup>	Parameters <sup>3</sup>	Sample ID <sup>4</sup>	Sample ID <sup>5</sup>

#### Notes:

DUP = duplicate sample

ID = identification number

MNX = mono-nitroso-RDX

MS/MSD = matrix spike/matrix spike duplicate

MNA = monitored natural attenuation

OU = Operable Unit

PZ = piezometer

QC = quality control

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

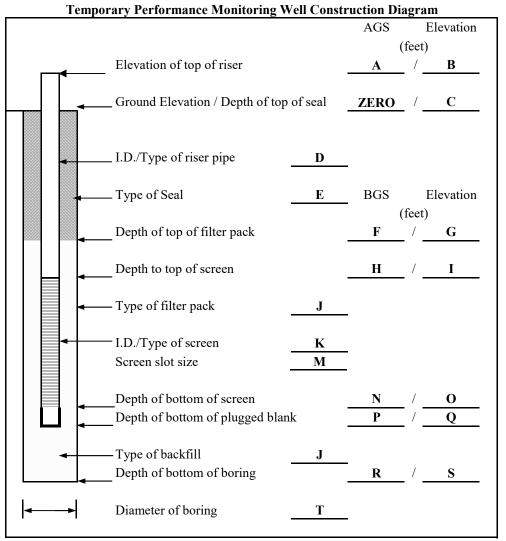
<sup>&</sup>lt;sup>2</sup>Laboratory MNA parameters for OU1 (on- and off-post) include: methane (Method RSK 175), total Kjeldahl nitrogen (Method 351.2), nitrate/nitrite (Method 353.2), sulfate (Method 9056A), sulfide (Method 9034), ammonia (Method 350.1), dissolved organic carbon (Method 9060A), alkalinity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

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

<sup>&</sup>lt;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>&</sup>lt;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.

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



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

I.D. = inside diameter

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 grount

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)

Well	Date Installed	Time	A	В	C	F	G	Н	I	N	0	P	Q	R	S
EW7-PM21A	10/16/2019	1535	2.0	1899.12	1897.12	14.1	1883.0	19.9	1877.2	29.9	1867.2	30.00	1867.1	31.00	1866.1
EW7-PM21B	10/16/2019	1655	2.0	1899.12	1897.12	27.9	1869.2	29.9	1867.2	39.9	1857.2	40.00	1857.1	41.00	1856.1
EW7-PM22A	10/16/2019	1351	2.0	1900.25	1898.25	14.2	1884.1	19.9	1878.4	29.9	1868.4	30.00	1868.3	31.00	1867.3
EW7-PM22B	10/16/2019	1446	2.0	1900.25	1898.25	27.8	1870.5	29.9	1868.4	39.9	1858.4	40.00	1858.3	41.00	1857.3
EW7-PM23A	10/15/2019	1250	2.0	1896.55	1894.55	12.1	1882.5	19.1	1875.5	29.1	1865.5	30.00	1864.6	31.00	1863.6
EW7-PM23B	10/17/2019	0955	2.0	1896.55	1894.55	27.9	1866.7	29.9	1864.7	39.9	1854.7	40.00	1854.6	41.00	1853.6
EW7-PM24A	10/16/2019	1205	2.0	1899.72	1897.72	13.1	1884.6	19.9	1877.8	29.9	1867.8	30.00	1867.7	31.00	1866.7
EW7-PM24B	10/17/2019	1100	2.0	1899.72	1897.72	27.8	1869.9	29.9	1867.8	39.9	1857.8	40.00	1857.7	41.00	1856.7
EW7-PM25A	10/16/2019	1107	2.0	1895.73	1893.73	12.6	1881.1	19.9	1873.8	29.9	1863.8	30.00	1863.7	31.00	1862.7
EW7-PM25B	10/16/2019	1315	2.0	1895.73	1893.73	27.9	1865.8	29.9	1863.8	39.9	1853.8	40.00	1853.7	41.00	1852.7
EW7-PM26A	10/17/2019	1330	2.0	1899.73	1897.73	14.2	1883.5	19.9	1877.8	29.9	1867.8	30.00	1867.7	31.00	1866.7
EW7-PM26B	10/17/2019	1255	2.0	1899.73	1897.73	27.8	1869.9	29.9	1867.8	39.9	1857.8	40.00	1857.7	41.00	1856.7
EW7-PM27A	10/17/2019	1545	2.0	1897.55	1895.55	12.1	1883.5	19.9	1875.7	29.9	1865.7	30.00	1865.6	31.00	1864.6
EW7-PM27B	10/17/2019	1437	2.0	1897.55	1895.55	27.8	1867.8	29.9	1865.7	39.9	1855.7	40.00	1855.6	41.00	1854.6
EW7-PM28A	10/18/2019	1130	2.0	1894.82	1892.82	12.0	1880.8	19.9	1872.9	29.9	1862.9	30.00	1862.8	31.00	1861.8
EW7-PM28B	10/18/2019	1053	2.0	1894.82	1892.82	27.8	1865.0	29.9	1862.9	39.9	1852.9	40.00	1852.8	41.00	1851.8
EW7-PM29A	10/18/2019	0940	2.0	1895.35	1893.35	12.0	1881.4	19.9	1873.5	29.9	1863.5	30.00	1863.4	31.00	1862.4
EW7-PM29B	10/18/2019	0920	2.0	1895.35	1893.35	27.7	1865.7	29.9	1863.5	39.9	1853.5	40.00	1853.4	41.00	1852.4

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

		Coord	inates <sup>1</sup>									Analytic	cal Par	ameters	<u>;</u>
Sample Location ID	Well Type	Northing	Easting	Top of Casing Elevation (feet amsl) <sup>1</sup>	Into	erval	Sample Depth (feet bgs)	Sample Elevation (feet amsl) <sup>1</sup>	Sample ID	Sample Date	Explosives <sup>2</sup>	Laboratory Water Quality Parameters <sup>3</sup>	Field Water Quality	Field Duplicate Samples <sup>5</sup>	MS/MSD Samples <sup>6</sup>
Between EW6	and EW7														
PZ017R	Piezometer			1895.17	10	- 30	25	1870.17	PZ017R-1	10/23/2019	X	X	X		
PZ018	Piezometer			1896.88	10	- 30	25	1871.88	PZ018-1	10/23/2019	X	X	X		
EW7-PM21A	Temp. Well	402407.45	2066429.65	1900 12	20	- 30	25	1874.12	EW7-PM21A-1-25	10/17/2019	X	X	X		
EW7-PM21B	Temp. Well	403407.43	2000429.03	1099.12	30	- 40	35	1864.12	EW7-PM21B-1-35	10/17/2019	X	X	X	X	
EW7-PM22A	Temp. Well	102162 08	2066562.14	1000.25	20	- 30	25	1875.25	EW7-PM22A-1-25	10/17/2019	X	X	X		
EW7-PM22B	Temp. Well	403403.06	2000302.14	1900.23	30	- 40	35	1865.25	EW7-PM22B-1-35	10/17/2019	X	X	X		
EW7-PM23A	Temp. Well	403578 28	2066842.98	1806 55	20	- 30	25	1871.55	EW7-PM23A-1-25	10/16/2019	X	X	X		
EW7-PM23B	Temp. Well	403376.26	2000042.90	1070.55	30	- 40	35	1861.55	EW7-PM23B-1-35	10/17/2019	X	X	X		
EW7-PM24A	Temp. Well	403412 74	2066751.85	1899 72	20	- 30	25	1874.72	EW7-PM24A-1-25	10/16/2019	X	X	X		
EW7-PM24B	Temp. Well	703712.77	2000/31.03	Casing Elevation (feet amsl) <sup>1</sup> Screened Interval (feet bgs)         Sa (feet amsl) <sup>1</sup> 1895.17         10 - 30 (feet bgs)         1896.88           10 - 30 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 - 30 (feet bgs)           30 - 40 (feet bgs)         20 -		35	1864.72	EW7-PM24B-1-35	10/19/2019	X	X	X			
EW7-PM25A	Temp. Well	403432 36	2066962.17	1895 73	20	- 30	25	1870.73	EW7-PM25A-1-25	10/16/2019	X	X	X		
EW7-PM25B	Temp. Well	403432.30	2000702.17	10/3.73	ing tion         Screened Interval Depth (feet bgs)         Sample (feet bgs)           3.17         10 - 30 25           5.88         10 - 30 25           30 - 40 35           30 - 40 35           30 - 40 35           30 - 40 35           30 - 40 35           30 - 40 35           30 - 40 35           30 - 40 35           30 - 40 35           30 - 40 35           30 - 30 25           30 - 40 35           20 - 30 25           30 - 40 35           20 - 30 25           30 - 40 35           20 - 30 25           30 - 40 35           20 - 30 25           30 - 40 35           20 - 30 25           30 - 40 35           20 - 30 25           30 - 40 35           20 - 30 25           30 - 40 35           20 - 30 25           30 - 40 35           20 - 30 25           30 - 40 35           20 - 30 25           30 - 40 35           20 - 30 25           30 - 40 35		1860.73	EW7-PM25B-1-35	10/16/2019	X	X	X		X	
EW7-PM26A	Temp. Well	403248 72	2066662.06	1899 73	Sing ation   Interval   Depth		25	1874.73	EW7-PM26A-1-25	10/18/2019	X	X	X		
EW7-PM26B	Temp. Well	403240.72	2000002.00	1077.73	30	- 40	35	1864.73	EW7-PM26B-1-35	10/18/2019	X	X	X		
EW7-PM27A	Temp. Well	403170 77	2066860.69	1897 55	20	- 30	25	1872.55	EW7-PM27A-1-25	10/18/2019	X	X	X		
EW7-PM27B	Temp. Well	403170.77	2000000.07	1077.55	30	- 40	35	1862.55	EW7-PM27B-1-35	10/18/2019	X	X	X		
EW7-PM28A	Temp. Well	403302 80	2067019.15	1894 82	20	- 30	25	1869.82	EW7-PM28A-1-25	10/19/2019	X	X	X		
EW7-PM28B	Temp. Well	103302.00	200/01/.13	1077.02	30	- 40	35	1859.82	EW7-PM28B-1-35	10/20/2019	X	X	X		
EW7-PM29A	Temp. Well	403108 54	2067050.13	30 - 40 35 185 20 - 30 25 187		1870.35	EW7-PM29A-1-25	10/19/2019	X	X	X				
EW7-PM29B	Temp. Well	TUJ 100.J4	2007030.13	10/3.33	30	- 40	35	1860.35	EW7-PM29B-1-35	10/19/2019	X	X	X		
									Between EW6 and	<b>EW7 Totals</b>	20	20	20	1	1

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

		Coord	inates <sup>1</sup>								Analytic	al Para	meters	
Sample Location ID Wo	ell Type	Northing	Easting	Top of Casing Elevation (feet amsl)	Screened Interval (feet bgs)	Sample Depth (feet bgs)	Sample Elevation (feet amsl) <sup>1</sup>	Sample ID	Sample Date	Explosives <sup>2</sup>	Laboratory Water Quality Parameters³	Field Water Quality Parameters <sup>4</sup>	Field Duplicate Samples <sup>5</sup>	MS/MSD Samples <sup>6</sup>

#### Notes:

% = 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

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

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

<sup>&</sup>lt;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>&</sup>lt;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.

**TABLE 2-5 OU1 SUBSURFACE INJECTION LOCATIONS** 2019 OU1 SUBSURFACE INJECTION **OU1 REBOUND STUDY LETTER REPORT - BASELINE** 

Injection Transect ID	Point Spacings (ft)	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>	Actual Volume of Mixture Injected Per Transect (gallons)
Between EW6 a	and EW7 Transect	ts						
EW7-T1	15	25	18	255	1000	18000	A	18000
EW7-T2	15	25	24	345	1000	24000	A	24000
EW7-T3	15	25	42	615	1000	42000	A	42000
EW7-T4	15	25	42	615	1000	42000	A	42000
EW7-T5	15	25	42	615	1000	42000	A	42000
EW7-T6	15	25	42	615	1000	42000	A	42120
EW7-T7	15	25	42	615	1000	42000	A	42000
EW7-T8	15	25	48	705	1000	48000	A	48000
EW7-T9	15	25	48	705	1000	48000	A	48000
EW7-T10	15	25	48	705	1000	48000	A	48490
EW7-T11	15	25	48	705	1000	48000	A	48000
EW7-T12	15	25	48	705	1000	48000	A	48000
EW7-T13	15	25	42	615	1000	42000	A	42000
EW7-T14	15	25	42	615	1000	42000	A	42000
EW7-T15	15	25	12	165	1000	12000	A	12000
EW7-T16	15	25	12	165	1000	12000	A	12000
Between	EW6 and EW7 T	ransect Totals	600	8760		600000		600610

bgs = below ground surface

EW = extraction well

ft = feet

ID = identification number

OU = operable unit

T = transect

WB 66-10 = Wesblend 66 with 10% oil

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

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

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

#### TABLE 3-1 SUMMARY OF EXPLOSIVES DETECTED, DIRECT PUSH GROUNDWATER LOCATIONS (OFF-POST) OU1 REBOUND STUDY, BASELINE

#### OU1 REBOUND STUDY LETTER REPORT - BASELINE

FIELD ID	СНААР			01-DP0				OS001-DP01-35 10/14/2019				1-DP01					2-DP0			OS002-DP01-35					OS002-DP01-45					OS003-DP01-25						
SAMPLE DATE	HALs		10	)/14/201	.9			10/	14/201	9			10	/14/2019	)			10	/28/201	19			10/	28/2019	)			10	/28/2019	9			10	/28/201	9	ŀ
	(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 I	OQ
EXPLOSIVES (USEPA Method 8330A) (μg/L)	•															•										•										
1,3,5-Trinitrobenzene	NA	0.4	J	0.2	0.4	1	23	J	0.2	0.4	1	17	J	0.2	0.6	1.5	0.39	J	0.19	0.38	0.96	<	U	0.19	0.39	0.97	5.8		0.2	0.4	0.99	<	UJ	0.2	0.4	1.99
1,3-Dinitrobenzene	NA	<	U	0.089	0.2	0.4	<	UJ	0.089	0.2	0.4	<	U	0.089	0.3	0.6	<	U	0.085	0.19	0.38	<	U	0.086	0.19	0.39	<	U	0.088	0.2	0.4	<	UJ	0.088	0.2	0.4
2,4,6-Trinitrotoluene	2	12	J	0.16	0.4	0.4	11	J	0.16	0.4	0.4	<	U	0.16	0.6	0.6	1.3	J	0.15	0.38	0.38	<	U	0.16	0.39	0.39	3.3		0.16	0.4	0.4	<	UJ	0.16	0.4	0.4
2,4-Dinitrotoluene	NA	<	U	0.084	0.2	0.4	<	UJ	0.084	0.2	0.4	<	U	0.084	0.3	0.6	<	U	0.08	0.19	0.38	<	U	0.082	0.19	0.39	<	U	0.083	0.2	0.4	<	UJ	0.083	0.2	0.4
2,6-Dinitrotoluene	NA	<	UJ	0.065	0.2	0.2	<	UJ	0.065	0.2	0.2	<	UJ	0.065	0.3	0.3	<	U	0.062	0.19	0.19	<	U	0.063	0.19	0.19	<	U	0.064	0.2	0.2	<	UJ	0.064	0.2	0.2
2-Amino-4,6-dinitrotoluene	NA	2.2	J	0.051	0.12	0.2	0.37	J	0.051	0.12	0.2	<	U	0.051	0.18	0.3	0.55	J	0.048	0.11	0.19	<	U	0.049	0.12	0.19	<	UJ	0.05	0.12	0.2	<	UJ	0.05	0.12	0.2
2-Nitrotoluene	NA	<	U	0.086	0.2	0.4	<	UJ	0.086	0.2	0.4	<	U	0.086	0.3	0.6	<	UJ	0.082	0.19	0.38	<	UJ	0.083	0.19	0.39	<	UJ	0.085	0.2	0.4	<	UJ	0.085	0.2	0.4
3-Nitrotoluene	NA	<	U	0.2	0.4	0.4	<	UJ	0.2	0.4	0.4	<	U	0.2	0.6	0.6	<	UJ	0.19	0.38	0.38	<	UJ	0.19	0.39	0.39	<	UJ	0.19	0.4	0.4	<	UJ	0.19	0.4	0.4
4-Amino-2,6-dinitrotoluene	NA	1.5	J	0.058	0.12	0.2	<	UJ	0.058	0.12	0.2	<	U	0.058	0.18	0.3	0.46	J	0.055	0.11	0.19	<	UJ	0.056	0.12	0.19	<	UJ	0.057	0.12	0.2	<	UJ	0.057	0.12	0.2
4-Nitrotoluene	NA	<	U	0.2	0.4	1	<	UJ	0.2	0.4	1	<	U	0.2	0.6	1.5	<	UJ	0.19	0.38	0.96	<	UJ	0.19	0.39	0.97	<	UJ	0.2	0.4	0.99	<	UJ	0.2	0.4	).99
MNX	NA	<	U	0.15	0.4	2	<	UJ	0.15	0.4	2	<	U	0.15	0.6	3	<	U	0.15	0.38	1.9	<	UJ	0.15	0.39	1.9	<	UJ	0.15	0.4	2	<	UJ	0.15	0.4	2
HMX	400	<	U	0.088	0.2	0.4	<	UJ	0.088	0.2	0.4	<	U	0.088	0.3	0.6	0.39	J	0.084	0.19	0.38	<	U	0.085	0.19	0.39	<	U	0.087	0.2	0.4	<	UJ	0.087	0.2	0.4
Nitrobenzene	NA	<	U	0.091	0.2	0.4	<	UJ	0.091	0.2	0.4	<	U	0.091	0.3	0.6	<	U	0.087	0.19	0.38	<	U	0.089	0.19	0.39	<	U	0.09	0.2	0.4	<	UJ	0.09	0.2	0.4
RDX	2	<	U	0.16	0.4	0.4	<	UJ	0.16	0.4	0.4	<	U	0.16	0.6	0.6	0.63	J	0.15	0.38	0.38	<	U	0.15	0.39	0.39	<	U	0.16	0.4	0.4	<	UJ	0.16	0.4	0.4
Tetryl	NA	<	UJ	0.079	0.2	0.24	<	UJ	0.079	0.2	0.24	<	UJ	0.079	0.3	0.36	<	U	0.076	0.19	0.23	<	UJ	0.077	0.19	0.23	<	U	0.079	0.2	0.24	<	UJ	0.079	0.2	).24

#### **Notes:**

Concentrations exceed HALs

< = less than LOQ

 $\mu g/L$  = 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

OU = operable unit

OS = off-post sample

Qual = qualifier

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

U = nondetect

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

FIELD ID	CHAAP		OS00			OS00	3-DP01	-45			
SAMPLE DATE	HALs		10/	28/2019	9			10/	/28/2019	9	
	(µg/L)	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ
EXPLOSIVES (USEPA Method 8330A) (μg/L)											
1,3,5-Trinitrobenzene	NA	9.9		0.2	0.41	1	<	U	0.2	0.39	0.98
1,3-Dinitrobenzene	NA	<	U	0.09	0.2	0.41	<	U	0.087	0.2	0.39
2,4,6-Trinitrotoluene	2	3		0.16	0.4	0.41	<	U	0.16	0.39	0.39
2,4-Dinitrotoluene	NA	<	U	0.085	0.2	0.41	<	U	0.082	0.2	0.39
2,6-Dinitrotoluene	NA	<	U	0.065	0.2	0.2	<	UJ	0.063	0.2	0.2
2-Amino-4,6-dinitrotoluene	NA	0.31	J	0.051	0.12	0.2	<	U	0.05	0.12	0.2
2-Nitrotoluene	NA	<	UJ	0.087	0.2	0.41	<	UJ	0.084	0.2	0.39
3-Nitrotoluene	NA	<	UJ	0.2	0.41	0.41	<	UJ	0.19	0.39	0.39
4-Amino-2,6-dinitrotoluene	NA	<	UJ	0.058	0.12	0.2	<	UJ	0.057	0.12	0.2
4-Nitrotoluene	NA	<	UJ	0.2	0.41	1	<	UJ	0.2	0.39	0.98
MNX	NA	<	U	0.16	0.41	2	<	UJ	0.15	0.39	2
HMX	400	<	U	0.089	0.2	0.41	<	U	0.086	0.2	0.39
Nitrobenzene	NA	<	U	0.092	0.2	0.41	<	U	0.089	0.2	0.39
RDX	2	<	U	0.16	0.41	0.41	<	U	0.15	0.39	0.39
Tetryl	NA	<	U	0.08	0.2	0.24	<	UJ	0.078	0.2	0.24

#### **Notes:**

Concentrations exceed HALs

< = less than LOQ

 $\mu g/L = micrograms per liter$ 

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

OU = operable unit

OS = off-post sample

Qual = qualifier

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

U = nondetect

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

FIELD ID SAMPLE DATE	CHAAP HALs			CA210-1 /21/201					A211-1/21/201					CA212-1 /21/2019	9				A213-1 /21/201					W020-1 22/2019					W021-1 22/2019					W022-1 22/2019		
	(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 I	L <b>OQ</b>	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ
EXPLOSIVES (USEPA Method 8330A) (μg/L)	•					•						-									•					•										
1,3,5-Trinitrobenzene	NA	<	U	0.2	0.41	1	<	U	0.21	0.41	1	<	U	0.2	0.4	1	<	U	0.21	0.41	1	<	UJ	0.2	0.39	0.98	<	U	0.19	0.39	0.96	<	U	0.19	0.38	0.95
1,3-Dinitrobenzene	NA	<	U	0.091	0.2	0.41	<	U	0.091	0.21	0.41	<	U	0.089	0.2	0.4	<	U	0.091	0.21	0.41	<	UJ	0.087	0.2	0.39	<	U	0.086	0.19	0.39	<	UJ	0.085	0.19	0.38
2,4,6-Trinitrotoluene	2	<	U	0.16	0.41	0.41	<	U	0.16	0.41	0.41	<	U	0.16	0.4	0.4	<	U	0.16	0.41	0.41	<	UJ	0.16	0.39	0.39	<	U	0.15	0.39	0.39	<	U	0.15	0.38	0.38
2,4-Dinitrotoluene	NA	<	U	0.086	0.2	0.41	<	U	0.086	0.21	0.41	<	U	0.084	0.2	0.4	<	U	0.086	0.21	0.41	<	UJ	0.082	0.2	0.39	<	U	0.081	0.19	0.39	<	UJ	0.08	0.19	0.38
2,6-Dinitrotoluene	NA	<	U	0.066	0.2	0.2	<	U	0.066	0.21	0.21	<	U	0.064	0.2	0.2	<	U	0.066	0.21	0.21	<	UJ	0.063	0.2	0.2	<	U	0.062	0.19	0.19	<	UJ	0.062	0.19	0.19
2-Amino-4,6-dinitrotoluene	NA	<	U	0.052	0.12	0.2	<	U	0.052	0.12	0.21	<	U	0.051	0.12	0.2	<	U	0.052	0.12	0.21	2.6	J	0.05	0.12	0.2	1.6		0.049	0.12	0.19	<	UJ	0.048	0.11	0.19
2-Nitrotoluene	NA	<	U	0.087	0.2	0.41	<	U	0.088	0.21	0.41	<	U	0.085	0.2	0.4	<	U	0.088	0.21	0.41	<	UJ	0.084	0.2	0.39	<	U	0.082	0.19	0.39	<	UJ	0.082	0.19	0.38
3-Nitrotoluene	NA	<	U	0.2	0.41	0.41	<	U	0.2	0.41	0.41	<	U	0.19	0.4	0.4	<	U	0.2	0.41	0.41	<	UJ	0.19	0.39	0.39	<	U	0.19	0.39	0.39	<	UJ	0.19	0.38	0.38
4-Amino-2,6-dinitrotoluene	NA	<	U	0.059	0.12	0.2	<	U	0.059	0.12	0.21	<	U	0.058	0.12	0.2	<	U	0.059	0.12	0.21	1.9	J	0.056	0.12	0.2	0.77		0.056	0.12	0.19	<	UJ	0.055	0.11	0.19
4-Nitrotoluene	NA	<	U	0.2	0.41	1	<	U	0.21	0.41	1	<	U	0.2	0.4	1	<	U	0.21	0.41	1	<	UJ	0.2	0.39	0.98	<	U	0.19	0.39	0.96	<	UJ	0.19	0.38	0.95
MNX	NA	<	U	0.16	0.41	2	<	U	0.16	0.41	2.1	<	U	0.15	0.4	2	<	U	0.16	0.41	2.1	<	UJ	0.15	0.39	2	<	U	0.15	0.39	1.9	<	UJ	0.15	0.38	1.9
HMX	400	<	U	0.089	0.2	0.41	<	U	0.09	0.21	0.41	<	U	0.088	0.2	0.4	<	U	0.09	0.21	0.41	<	UJ	0.086	0.2	0.39	<	U	0.084	0.19	0.39	<	U	0.084	0.19	0.38
Nitrobenzene	NA	<	U	0.093	0.2	0.41	<	U	0.094	0.21	0.41	<	U	0.091	0.2	0.4	<	U	0.094	0.21	0.41	<	UJ	0.089	0.2	0.39	<	U	0.088	0.19	0.39	<	UJ	0.087	0.19	0.38
RDX	2	<	U	0.16	0.41	0.41	<	U	0.16	0.41	0.41	<	U	0.16	0.4	0.4	<	U	0.16	0.41	0.41	0.2	J	0.15	0.39	0.39	<	U	0.15	0.39	0.39	<	U	0.15	0.38	0.38
Tetryl	NA	<	U	0.081	0.2	0.24	<	U	0.082	0.21	0.25	<	U	0.079	0.2	0.24	<	U	0.082	0.21	0.25	<	UJ	0.078	0.2	0.23	<	U	0.076	0.19	0.23	<	U	0.076	0.19	0.23
LABORATORY MNA PARAMETERS												•										•														
Ammonia USEPA 350.1 (mg/L)		<	U	0.022	0.05	0.1	0.11		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	3.8		0.022	0.05	0.1	0.42		0.022	0.05	0.1
Total Kjeldahl Nitrogen USEPA 351.2 (mg/L)		<	U	0.69	1	1	<	U	0.69	1	1	<	U	0.69	1	1	0.97	J	0.69	1	1	<	U	0.69	1	1	3.5		0.69	1	1	<	U	0.69	1	1
Nitrate/Nitrite USEPA 353.2 (mg/L)		22		0.19	0.5	1	30		0.19	0.5	1	14		0.095	0.25	0.5	1.3		0.019	0.05	0.1	62	J	0.19	0.5	1	0.84		0.019	0.05	0.1	53		0.19	0.5	1
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	<	U	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4
Sulfate USEPA 9056A (mg/L)		120		1	3	5	93		1	3	5	72		1	3	5	63		1	3	5	150		1	3	5	210		5.2	3	5	360		5.2	3	5
Dissolved Organic Carbon SM 9060A (mg/L)		9.7		0.35	1	1	4.3		0.35	1	1	2.6		0.35	1	1	2.2		0.35	1	1	3.6		0.35	1	1	2.9		0.35	1	1	2.9		0.35	1	1
Alkalinity SM 2320B (mg/L)		310		3.1	10	10	200		3.1	10	10	190		3.1	10	10	130		3.1	10	10	290		3.1	10	10	410		3.1	10	10	410		3.1	10	10
Methane RSK-175 (μg/L)		23		0.63	2	5	<	U	0.63	2	5	<	U	0.63	2	5	<	U	0.63	2	5	<	U	0.63	2	5	55		0.63	2	5	290		0.63	2	5
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>		138		3	10	10	89		3	10	10	84		3	10	10	58		3	10	10	129		3	10	10	182		3	10	10	182		3	10	10

Concentrations exceed HALs

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

< = less than LOQ

 $\mu g/L = micrograms per liter$ 

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

OO – operable u

Qual = qualifier

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

RSK = Robert S. Kerr Environmental Research Laboratory

SM = Standard Method

U = nondetect

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

FIELD ID SAMPLE DATE	CHAAP HALs	10/22/2019							W051-1 /22/2019					W052-1 /23/2019					W060-1 /22/201					W061-1 /22/201					W062-1 /22/2019					W070-1 /21/201		
	(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	0.41	1	<	U	0.2	0.4	1	<	U	0.2	0.4	1	<	U	0.21	0.41	1	<	U	0.2	0.41	1	<	UJ	0.2	0.41	1	<	U	0.2	0.41	1
1,3-Dinitrobenzene	NA	<	UJ	0.091	0.21	0.41	<	UJ	0.089	0.2	0.4	<	U	0.09	0.2	0.4	<	U	0.091	0.21	0.41	<	U	0.091	0.2	0.41	<	UJ	0.09	0.2	0.41	<	U	0.09	0.2	0.41
2,4,6-Trinitrotoluene	2	<	U	0.16	0.41	0.41	<	U	0.16	0.4	0.4	<	U	0.16	0.4	0.4	<	U	0.16	0.41	0.41	<	U	0.16	0.41	0.41	<	UJ	0.16	0.41	0.41	<	U	0.16	0.41	0.41
2,4-Dinitrotoluene	NA	<	UJ	0.086	0.21	0.41	<	UJ	0.084	0.2	0.4	<	UJ	0.085	0.2	0.4	<	U	0.086	0.21	0.41	<	U	0.086	0.2	0.41	<	UJ	0.085	0.2	0.41	<	U	0.085	0.2	0.41
2,6-Dinitrotoluene	NA	<	UJ	0.066	0.21	0.21	<	UJ	0.065	0.2	0.2	<	UJ	0.065	0.2	0.2	<	U	0.066	0.21	0.21	<	U	0.066	0.2	0.2	<	UJ	0.065	0.2	0.2	<	U	0.066	0.2	0.2
2-Amino-4,6-dinitrotoluene	NA	<	UJ	0.052	0.12	0.21	<	UJ	0.051	0.12	0.2	<	UJ	0.051	0.12	0.2	<	U	0.052	0.12	0.21	<	U	0.052	0.12	0.2	<	UJ	0.051	0.12	0.2	<	U	0.052	0.12	0.2
2-Nitrotoluene	NA	<	UJ	0.088	0.21	0.41	<	UJ	0.086	0.2	0.4	<	UJ	0.086	0.2	0.4	<	U	0.088	0.21	0.41	<	U	0.088	0.2	0.41	<	UJ	0.087	0.2	0.41	<	UJ	0.087	0.2	0.41
3-Nitrotoluene	NA	<	UJ	0.2	0.41	0.41	<	UJ	0.2	0.4	0.4	<	UJ	0.2	0.4	0.4	<	U	0.2	0.41	0.41	<	U	0.2	0.41	0.41	<	UJ	0.2	0.41	0.41	<	UJ	0.2	0.41	0.41
4-Amino-2,6-dinitrotoluene	NA	<	UJ	0.059	0.12	0.21	<	UJ	0.058	0.12	0.2	<	UJ	0.058	0.12	0.2	<	U	0.059	0.12	0.21	<	U	0.059	0.12	0.2	<	UJ	0.059	0.12	0.2	<	U	0.059	0.12	0.2
4-Nitrotoluene	NA	<	UJ	0.21	0.41	1	<	UJ	0.2	0.4	1	<	UJ	0.2	0.4	1	<	U	0.21	0.41	1	<	U	0.2	0.41	1	<	UJ	0.2	0.41	1	<	UJ	0.2	0.41	1
MNX	NA	<	UJ	0.16	0.41	2.1	<	UJ	0.15	0.4	2	<	U	0.16	0.4	2	<	U	0.16	0.41	2.1	<	U	0.16	0.41	2	<	UJ	0.16	0.41	2	<	U	0.16	0.41	2
HMX	400	<	U	0.09	0.21	0.41	<	U	0.088	0.2	0.4	<	U	0.089	0.2	0.4	<	U	0.09	0.21	0.41	<	U	0.09	0.2	0.41	<	UJ	0.089	0.2	0.41	<	U	0.089	0.2	0.41
Nitrobenzene	NA	<	UJ	0.093	0.21	0.41	<	UJ	0.091	0.2	0.4	<	UJ	0.092	0.2	0.4	<	U	0.094	0.21	0.41	<	U	0.093	0.2	0.41	<	UJ	0.092	0.2	0.41	<	U	0.093	0.2	0.41
RDX	2	<	U	0.16	0.41	0.41	<	U	0.16	0.4	0.4	<	U	0.16	0.4	0.4	<	U	0.16	0.41	0.41	<	U	0.16	0.41	0.41	<	UJ	0.16	0.41	0.41	<	U	0.16	0.41	0.41
Tetryl	NA	<	U	0.081	0.21	0.25	<	U	0.08	0.2	0.24	<	U	0.08	0.2	0.24	<	U	0.081	0.21	0.25	<	U	0.081	0.2	0.25	<	UJ	0.08	0.2	0.24	<	U	0.081	0.2	0.24
LABORATORY MNA PARAMETERS																	-					-									-					
Ammonia USEPA 350.1 (mg/L)		4.8		0.044	0.05	0.1	<	U	0.022	0.05	0.1	0.027	J	0.022	0.05	0.1	0.14		0.022	0.05	0.1	5.7		0.044	0.05	0.1	0.59		0.022	0.05	0.1	0.024	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	0.8	J	0.69	1	1	<	U	0.69	1	1	4.9		0.69	1	1	1	J	0.69	1	1	<	UJ	3.4	1	1
Nitrate/Nitrite USEPA 353.2 (mg/L)		62		0.19	0.5	1	27	J	0.19	0.5	1	0.12		0.019	0.05	0.1	1.8		0.019	0.05	0.1	4.6		0.019	0.05	0.1	<	U	0.019	0.05	0.1	0.03	J	0.019	0.05	0.1
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	<	U	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4
Sulfate USEPA 9056A (mg/L)		120		1	3	5	170		1	3	5	130		1	3	5	3.8	J	1	3	5	170		1	3	5	180		1	3	5	3.9	J	1	3	5
Dissolved Organic Carbon SM 9060A (mg/L)		8.1		0.35	1	1	9		0.35	1	1	6.3		0.35	1	1	1.8		0.35	1	1	4.4		0.35	1	1	2.8		0.35	1	1	7.2		0.35	1	1
Alkalinity SM 2320B (mg/L)		240		3.1	10	10	350		3.1	10	10	380		3.1	10	10	33		3.1	10	10	300		3.1	10	10	270		3.1	10	10	51		3.1	10	10
Methane RSK-175 (μg/L)		1.4	J	0.63	2	5	8.3		0.63	2	5	150		0.63	2	5	<	U	0.63	2	5	21		0.63	2	5	18	J	0.63	2	5	18		0.63	2	5
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>		107		3	10	10	156		3	10	10	169		3	10	10	15		3	10	10	133		3	10	10	120		3	10	10	23		3	10	10

Concentrations exceed HALs

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

< = less than LOQ

 $\mu g/L = micrograms per liter$ 

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

Qual = qualifier

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

RSK = Robert S. Kerr Environmental Research Laboratory

SM = Standard Method

U = nondetect

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

FIELD ID SAMPLE DATE	CHAAP HALs	IALs 10/21/2019							W080-1 /22/201					W081R- /22/2019					W082R- /22/2019				_	0024-1 23/2019	)			_	0070-1 21/2019	)			_	0075-1 21/2019	,	
	(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 I	.oq	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD I	.OQ
EXPLOSIVES (USEPA Method 8330A) (μg/L)						•																									•					
1,3,5-Trinitrobenzene	NA	<	U	0.2	0.4	1	<	U	0.2	0.4	0.99	<	U	0.2	0.4	1	<	U	0.2	0.4	1	<	U	0.19	0.39 (	0.97	<	U	0.2	0.38	0.95	<	U	0.19	0.38	).95
1,3-Dinitrobenzene	NA	<	U	0.089	0.2	0.4	<	U	0.088	0.2	0.4	<	U	0.089	0.2	0.4	<	U	0.089	0.2	0.4	<	UJ	0.086	0.19	0.39	<	U	0.09	0.19	0.38	<	U	0.084	0.19	).38
2,4,6-Trinitrotoluene	2	<	U	0.16	0.4	0.4	<	U	0.16	0.4	0.4	<	U	0.16	0.4	0.4	<	U	0.16	0.4	0.4	<	UJ	0.16	0.39	0.39	<	U	0.16	0.38	0.38	<	U	0.15	0.38	).38
2,4-Dinitrotoluene	NA	<	U	0.084	0.2	0.4	<	U	0.083	0.2	0.4	<	U	0.084	0.2	0.4	<	U	0.084	0.2	0.4	<	UJ	0.082	0.19	0.39	<	U	0.085	0.19	0.38	<	U	0.079	0.19	).38
2,6-Dinitrotoluene	NA	<	U	0.065	0.2	0.2	<	U	0.064	0.2	0.2	<	U	0.064	0.2	0.2	<	U	0.065	0.2	0.2	<	UJ	0.063	0.19	0.19	<	U	0.066	0.19	0.19	<	U	0.061	0.19	).19
2-Amino-4,6-dinitrotoluene	NA	<	U	0.051	0.12	0.2	<	U	0.05	0.12	0.2	<	U	0.051	0.12	0.2	<	U	0.051	0.12	0.2	0.56	J	0.049	0.12	0.19	<	U	0.052	0.11	0.19	<	U	0.048	0.11	).19
2-Nitrotoluene	NA	<	U	0.086	0.2	0.4	<	U	0.084	0.2	0.4	<	U	0.085	0.2	0.4	<	U	0.086	0.2	0.4	<	UJ	0.083	0.19	0.39	<	UJ	0.087	0.19	0.38	<	UJ	0.081	0.19	).38
3-Nitrotoluene	NA	<	U	0.2	0.4	0.4	<	U	0.19	0.4	0.4	<	U	0.19	0.4	0.4	<	U	0.2	0.4	0.4	<	UJ	0.19	0.39	0.39	<	UJ	0.2	0.38	0.38	<	U	0.18	0.38	).38
4-Amino-2,6-dinitrotoluene	NA	<	U	0.058	0.12	0.2	<	U	0.057	0.12	0.2	<	U	0.058	0.12	0.2	<	U	0.058	0.12	0.2	<	UJ	0.056	0.12	0.19	<	U	0.059	0.11	0.19	0.085	J	0.055	0.11	).19
4-Nitrotoluene	NA	<	U	0.2	0.4	1	<	U	0.2	0.4	0.99	<	U	0.2	0.4	1	<	U	0.2	0.4	1	<	UJ	0.19	0.39	0.97	<	UJ	0.2	0.38	0.95	<	UJ	0.19	0.38	).95
MNX	NA	<	U	0.15	0.4	2	<	U	0.15	0.4	2	<	U	0.15	0.4	2	<	U	0.15	0.4	2	<	U	0.15	0.39	1.9	<	U	0.16	0.38	1.9	<	U	0.15	0.38	1.9
HMX	400	<	U	0.088	0.2	0.4	<	U	0.087	0.2	0.4	<	U	0.087	0.2	0.4	<	U	0.088	0.2	0.4	<	U	0.085	0.19	0.39	<	U	0.089	0.19	0.38	<	U	0.083	0.19	).38
Nitrobenzene	NA	<	U	0.092	0.2	0.4	<	U	0.09	0.2	0.4	<	U	0.091	0.2	0.4	<	U	0.092	0.2	0.4	<	UJ	0.089	0.19	0.39	<	U	0.093	0.19	0.38	<	U	0.086	0.19	).38
RDX	2	<	U	0.16	0.4	0.4	<	U	0.16	0.4	0.4	<	U	0.16	0.4	0.4	<	U	0.16	0.4	0.4	<	U	0.15	0.39	0.39	<	U	0.16	0.38	0.38	<	U	0.15	0.38	).38
Tetryl	NA	<	U	0.08	0.2	0.24	<	U	0.078	0.2	0.24	<	U	0.079	0.2	0.24	<	U	0.08	0.2	0.24	<	UJ	0.077	0.19	0.23	<	U	0.081	0.19	0.23	<	U	0.075	0.19	).23
LABORATORY MNA PARAMETERS																															-					
Ammonia USEPA 350.1 (mg/L)		<	U	0.022	0.05	0.1	0.029	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	0.056	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	<	U	0.69	1	1	<	U	0.69	1	1	<	U	0.69	1	1	<	UJ	3.4	1	1	0.92	J	0.69	1	1
Nitrate/Nitrite USEPA 353.2 (mg/L)		2.9		0.019	0.05	0.1	47		0.19	0.5	1	29		0.19	0.5	1	20		0.19	0.5	1	40		0.19	0.5	1	0.025	J	0.019	0.05	0.1	1.2		0.019	0.05	0.1
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	<	U	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4
Sulfate USEPA 9056A (mg/L)		60		1	3	5	200		1	3	5	98		1	3	5	86		1	3	5	50		1	3	5	34	J	1	3	5	150		1	3	5
Dissolved Organic Carbon SM 9060A (mg/L)		<	U	0.35	1	1	4.7		0.35	1	1	4.5		0.35	1	1	<	U	0.35	1	1	4.9		0.35	1	1	1		0.35	1	1	3.4		0.35	1	1
Alkalinity SM 2320B (mg/L)		110		3.1	10	10	250		3.1	10	10	250		3.1	10	10	240		3.1	10	10	110		3.1	10	10	220		3.1	10	10	390		3.1	10	10
Methane RSK-175 (μg/L)		<	U	0.63	2	5	<	U	0.63	2	5	<	U	0.63	2	5	<	U	0.63	2	5	<	U	0.63	2	5	<	U	0.63	2	5	12		0.63	2	5
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>		49		3	10	10	111		3	10	10	111		3	10	10	107		3	10	10	49		3	10	10	98		3	10	10	173		3	10	10

Concentrations exceed HALs

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

< = less than LOQ

 $\mu g/L = micrograms per liter$ 

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

Qual = qualifier

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

RSK = Robert S. Kerr Environmental Research Laboratory

SM = Standard Method

U = nondetect

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

FIELD ID SAMPLE DATE	CHAAP HALs			30076-1 /21/201	9		_	0077-1 /23/2019	9				30078-1 /23/2019	9				G0079-1 /21/201				_	0080-1 21/201	9			_	0081-1 21/2019	)				0082-1 /21/2019	9		
		Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD 1	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ
EXPLOSIVES (USEPA Method 8330A) (μg/L)						•																														
1,3,5-Trinitrobenzene	NA	<	UJ	0.19	9.90	25.0	2.2		0.19	0.38	0.96	<	U	0.19	0.38	0.96	<	U	0.19	0.38	0.96	<	U	0.19	0.38	0.95	1.1		0.2	0.39	0.98	<	UJ	0.19	0.39	0.97
1,3-Dinitrobenzene	NA	<	UJ	0.08	0.20	0.39	<	U	0.085	0.19	0.38	<	U	0.085	0.19	0.38	<	U	0.085	0.19	0.38	<	U	0.084	0.19	0.38	<	U	0.087	0.2	0.39	<	UJ	0.086	0.19	0.39
2,4,6-Trinitrotoluene	2	<	UJ	0.15	9.90	9.90	3.2		0.15	0.38	0.38	<	U	0.15	0.38	0.38	<	U	0.15	0.38	0.38	<	U	0.15	0.38	0.38	0.29	J	0.16	0.39	0.39	<	UJ	0.15	0.39	0.39
2,4-Dinitrotoluene	NA	<	UJ	0.08	0.20	0.39	<	UJ	0.081	0.19	0.38	<	UJ	0.08	0.19	0.38	<	U	0.081	0.19	0.38	<	U	0.079	0.19	0.38	<	U	0.082	0.2	0.39	<	UJ	0.081	0.19	0.39
2,6-Dinitrotoluene	NA	<	UJ	0.06	0.20	0.20	<	UJ	0.062	0.19	0.19	<	UJ	0.062	0.19	0.19	<	U	0.062	0.19	0.19	<	U	0.061	0.19	0.19	<	U	0.063	0.2	0.2	<	UJ	0.062	0.19	0.19
2-Amino-4,6-dinitrotoluene	NA	<	UJ	0.05	0.12	0.20	2.8	J	0.049	0.12	0.19	<	UJ	0.049	0.11	0.19	<	U	0.049	0.12	0.19	0.096	J	0.048	0.11	0.19	0.2	J	0.05	0.12	0.2	0.21	J	0.049	0.12	0.19
2-Nitrotoluene	NA	<	UJ	0.08	0.20	0.39	<	UJ	0.082	0.19	0.38	<	UJ	0.082	0.19	0.38	<	UJ	0.082	0.19	0.38	<	UJ	0.081	0.19	0.38	<	UJ	0.084	0.2	0.39	<	UJ	0.083	0.19	0.39
3-Nitrotoluene	NA	<	UJ	0.19	0.39	0.39	<	UJ	0.19	0.38	0.38	<	UJ	0.19	0.38	0.38	<	U	0.19	0.38	0.38	<	U	0.18	0.38	0.38	<	U	0.19	0.39	0.39	<	UJ	0.19	0.39	0.39
4-Amino-2,6-dinitrotoluene	NA	<	UJ	0.06	0.12	0.20	3	J	0.056	0.12	0.19	<	UJ	0.055	0.11	0.19	<	U	0.055	0.12	0.19	<	UJ	0.055	0.11	0.19	0.15	J	0.056	0.12	0.2	0.16	J	0.056	0.12	0.19
4-Nitrotoluene	NA	<	UJ	0.19	0.39	0.99	<	UJ	0.19	0.38	0.96	<	UJ	0.19	0.38	0.96	<	UJ	0.19	0.38	0.96	<	UJ	0.19	0.38	0.95	<	UJ	0.2	0.39	0.98	<	UJ	0.19	0.39	0.97
MNX	NA	<	UJ	0.08	0.20	0.39	<	U	0.15	0.38	1.9	<	U	0.15	0.38	1.9	<	U	0.15	0.38	1.9	<	U	0.15	0.38	1.9	<	U	0.15	0.39	2	<	UJ	0.15	0.39	1.9
HMX	400	<	UJ	0.15	0.39	2.00	0.69		0.084	0.19	0.38	<	U	0.084	0.19	0.38	<	U	0.084	0.19	0.38	0.18	J	0.083	0.19	0.38	<	U	0.086	0.2	0.39	0.33	J	0.085	0.19	0.39
Nitrobenzene	NA	<	UJ	0.09	0.20	0.39	<	UJ	0.088	0.19	0.38	<	UJ	0.087	0.19	0.38	<	U	0.088	0.19	0.38	<	U	0.086	0.19	0.38	<	U	0.089	0.2	0.39	<	UJ	0.088	0.19	0.39
RDX	2	<	UJ	0.15	0.39	0.39	0.91		0.15	0.38	0.38	<	U	0.15	0.38	0.38	<	U	0.15	0.38	0.38	<	U	0.15	0.38	0.38	<	U	0.15	0.39	0.39	0.63	J	0.15	0.39	0.39
Tetryl	NA	<	UJ	0.08	0.20	0.24	<	U	0.076	0.19	0.23	<	U	0.076	0.19	0.23	<	U	0.076	0.19	0.23	<	U	0.075	0.19	0.23	<	U	0.078	0.2	0.23	<	UJ	0.077	0.19	0.23
LABORATORY MNA PARAMETERS		•															•					•				-					-					
Ammonia USEPA 350.1 (mg/L)		1.1		0.022	0.05	0.1	<	U	0.022	0.05	0.1	0.53		0.022	0.05	0.1	<	U	0.022	0.05	0.1	0.064	J	0.022	0.05	0.1	0.26		0.022	0.05	0.1	<	U	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	0.76	J	0.69	1	1	<	U	0.69	1	1	<	U	3.4	1	1	<	U	0.69	1	1
Nitrate/Nitrite USEPA 353.2 (mg/L)		<	U	0.019	0.05	0.1	20		0.095	0.25	0.5	<	U	0.019	0.05	0.1	0.21		0.019	0.05	0.1	2.7		0.019	0.05	0.1	0.36		0.019	0.05	0.1	3.4		0.019	0.05	0.1
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	2.9		0.35	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4
Sulfate USEPA 9056A (mg/L)		280	J	5.2	3	5	150		1	3	5	250		5.2	3	5	17		1	3	5	<	U	0.79	3	5	120		1	3	5	76		1	3	5
Dissolved Organic Carbon SM 9060A (mg/L)		<	U	0.35	1	1	4.5		0.35	1	1	2.8		0.35	1	1	3.2		0.35	1	1	2.9		0.35	1	1	7.8		0.35	1	1	<	U	0.35	1	1
Alkalinity SM 2320B (mg/L)		350		3.1	10	10	310		3.1	10	10	420		3.1	10	10	130		3.1	10	10	350		3.1	10	10	370		3.1	10	10	250		3.1	10	10
Methane RSK-175 (μg/L)		330		0.63	2	5	26		0.63	2	5	350		0.63	2	5	<	U	0.63	2	5	1.1	J	0.63	2	5	3500		0.63	2	5	1100		0.63	2	5
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>		156		3	10	10	138		3	10	10	187		3	10	10	58		3	10	10	156		3	10	10	164		3	10	10	111		3	10	10

Concentrations exceed HALs

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

< = less than LOQ

 $\mu g/L = micrograms per liter$ 

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

Qual = qualifier

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

RSK = Robert S. Kerr Environmental Research Laboratory

SM = Standard Method

U = nondetect

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

FIELD ID SAMPLE DATE	CHAAP HALs								50087-1 /22/201				_	60091-1 /22/201					G0092-1 )/22/201					Z017R-1 /23/2019					Z018-1 /23/201	)				Z019-1 22/2019		
	(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	10		0.2	0.4	1	<	U	0.19	0.38	0.94	<	U	0.19	0.38	0.96	<	U	0.19	0.38	0.96	7.2		0.2	0.4	1	11	J	0.2	0.39	0.98	<	UJ	0.2	0.39	0.98
1,3-Dinitrobenzene	NA	<	U	0.09	0.2	0.4	<	U	0.084	0.19	0.38	<	U	0.085	0.19	0.38	<	U	0.085	0.19	0.38	<	U	0.088	0.2	0.4	<	UJ	0.087	0.2	0.39	<	UJ	0.087	0.2	0.39
2,4,6-Trinitrotoluene	2	3.8		0.16	0.4	0.4	<	U	0.15	0.38	0.38	<	U	0.15	0.38	0.38	<	U	0.15	0.38	0.38	15		0.16	0.4	0.4	8	J	0.16	0.39	0.39	<	UJ	0.16	0.39	0.39
2,4-Dinitrotoluene	NA	<	UJ	0.085	0.2	0.4	<	U	0.079	0.19	0.38	<	U	0.08	0.19	0.38	<	U	0.081	0.19	0.38	<	UJ	0.084	0.2	0.4	<	UJ	0.083	0.2	0.39	<	UJ	0.082	0.2	0.39
2,6-Dinitrotoluene	NA	<	UJ	0.065	0.2	0.2	<	U	0.061	0.19	0.19	<	U	0.062	0.19	0.19	<	U	0.062	0.19	0.19	<	UJ	0.064	0.2	0.2	<	UJ	0.064	0.2	0.2	<	UJ	0.063	0.2	0.2
2-Amino-4,6-dinitrotoluene	NA	1.6	J	0.051	0.12	0.2	<	U	0.048	0.11	0.19	0.16	J	0.049	0.12	0.19	<	U	0.049	0.12	0.19	4.1	J	0.051	0.12	0.2	2	J	0.05	0.12	0.2	<	UJ	0.05	0.12	0.2
2-Nitrotoluene	NA	<	UJ	0.087	0.2	0.4	<	U	0.081	0.19	0.38	<	U	0.082	0.19	0.38	<	U	0.082	0.19	0.38	<	UJ	0.085	0.2	0.4	<	UJ	0.084	0.2	0.39	<	UJ	0.084	0.2	0.39
3-Nitrotoluene	NA	<	UJ	0.2	0.4	0.4	<	U	0.18	0.38	0.38	<	U	0.19	0.38	0.38	<	U	0.19	0.38	0.38	<	UJ	0.19	0.4	0.4	<	UJ	0.19	0.39	0.39	<	UJ	0.19	0.39	0.39
4-Amino-2,6-dinitrotoluene	NA	1	J	0.058	0.12	0.2	<	U	0.054	0.11	0.19	0.12	J	0.055	0.12	0.19	<	U	0.055	0.12	0.19	3.5	J	0.058	0.12	0.2	1.8	J	0.057	0.12	0.2	<	UJ	0.057	0.12	0.2
4-Nitrotoluene	NA	<	UJ	0.2	0.4	1	<	U	0.19	0.38	0.94	<	U	0.19	0.38	0.96	<	U	0.19	0.38	0.96	<	UJ	0.2	0.4	1	<	UJ	0.2	0.39	0.98	<	UJ	0.2	0.39	0.98
MNX	NA	<	U	0.16	0.4	2	<	U	0.15	0.38	1.9	<	U	0.15	0.38	1.9	<	U	0.15	0.38	1.9	<	U	0.15	0.4	2	<	UJ	0.15	0.39	2	<	UJ	0.15	0.39	2
HMX	400	<	U	0.089	0.2	0.4	0.32	J	0.083	0.19	0.38	0.39		0.084	0.19	0.38	<	U	0.084	0.19	0.38	0.59	J	0.087	0.2	0.4	0.59	J	0.086	0.2	0.39	<	UJ	0.086	0.2	0.39
Nitrobenzene	NA	<	UJ	0.092	0.2	0.4	<	U	0.086	0.19	0.38	<	U	0.087	0.19	0.38	<	UJ	0.088	0.19	0.38	<	UJ	0.091	0.2	0.4	<	UJ	0.09	0.2	0.39	<	UJ	0.089	0.2	0.39
RDX	2	<	U	0.16	0.4	0.4	<	U	0.15	0.38	0.38	0.81		0.15	0.38	0.38	<	U	0.15	0.38	0.38	0.87		0.16	0.4	0.4	0.88	J	0.16	0.39	0.39	<	UJ	0.16	0.39	0.39
Tetryl	NA	<	U	0.08	0.2	0.24	<	U	0.075	0.19	0.23	<	U	0.076	0.19	0.23	<	U	0.076	0.19	0.23	<	U	0.079	0.2	0.24	<	UJ	0.078	0.2	0.24	<	U	0.078	0.2	0.24
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	<	U	0.022	0.05	0.1	0.06	J	0.022	0.05	0.1	0.21		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	<	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)		4.8		0.019	0.05	0.1	1.3		0.019	0.05	0.1	32		0.095	0.25	0.5	0.45		0.019	0.05	0.1	41		0.19	0.5	1	24		0.19	0.5	1	34	J	0.48	1.3	2.5
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	<	U	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4
Sulfate USEPA 9056A (mg/L)		140		1	3	5	120		1	3	5	190		5.2	3	5	300		5.2	3	5	74		1	3	5	100		1	3	5	67		1	3	5
Dissolved Organic Carbon SM 9060A (mg/L)		2.6		0.35	1	1	2.9		0.35	1	1	3.6		0.35	1	1	2.9		0.35	1	1	3.5		0.35	1	1	3.3		0.35	1	1	2.2		0.35	1	1
Alkalinity SM 2320B (mg/L)		310		3.1	10	10	310		3.1	10	10	360		3.1	10	10	410		3.1	10	10	140		3.1	10	10	200		3.1	10	10	88		3.1	10	10
Methane RSK-175 (μg/L)		110		0.63	2	5	<	U	0.63	2	5	<	U	0.63	2	5	1.1	J	0.63	2	5	140		0.63	2	5	240		0.63	2	5	<	U	0.63	2	5
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>		138		3	10	10	138		3	10	10	160		3	10	10	182		3	10	10	62		3	10	10	89		3	10	10	39		3	10	10

Concentrations exceed HALs

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

< = less than LOQ

 $\mu g/L = micrograms per liter$ 

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

Qual = qualifier

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

RSK = Robert S. Kerr Environmental Research Laboratory

SM = Standard Method

U = nondetect

TABLE 3-2 SUMMARY OF EXPLOSIVES DETECTED AND LABORATORY MNA PARAMETERS, OFF-POST AND ON-POST MONITORING WELLS

## OU1 REBOUND STUDY, BASELINE

### OU1 REBOUND STUDY LETTER REPORT - BASELINE

FIELD ID SAMPLE DATE	CHAAP HALs			Z020-1 /23/201	9	
SAME DATE	(μg/L)	Result			LOD	LOQ
EXPLOSIVES (USEPA Method 8330A) (µg/L)		<u> </u>				
1,3,5-Trinitrobenzene	NA	2.4		0.19	0.38	0.96
1,3-Dinitrobenzene	NA	<	U	0.085	0.19	0.38
2,4,6-Trinitrotoluene	2	3.7		0.15	0.38	0.38
2,4-Dinitrotoluene	NA	<	UJ	0.081	0.19	0.38
2,6-Dinitrotoluene	NA	<	UJ	0.062	0.19	0.19
2-Amino-4,6-dinitrotoluene	NA	2.5	J	0.049	0.12	0.19
2-Nitrotoluene	NA	<	UJ	0.082	0.19	0.38
3-Nitrotoluene	NA	<	UJ	0.19	0.38	0.38
4-Amino-2,6-dinitrotoluene	NA	2.8	J	0.055	0.12	0.19
4-Nitrotoluene	NA	<	UJ	0.19	0.38	0.90
MNX	NA	<	U	0.15	0.38	1.9
HMX	400	0.39	J	0.084	0.19	0.38
Nitrobenzene	NA	<	UJ	0.087	0.19	0.38
RDX	2	0.42		0.15	0.38	0.33
Tetryl	NA	<	U	0.076	0.19	0.2
LABORATORY MNA PARAMETERS	•	•				
Ammonia USEPA 350.1 (mg/L)		<	U	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)		29		0.095	0.25	0.5
Sulfide SM 9034 (mg/L)		<	U	0.79	1.9	4
Sulfate USEPA 9056A (mg/L)		160		1	3	5
Dissolved Organic Carbon SM 9060A (mg/L)		3.8		0.35	1	1
Alkalinity SM 2320B (mg/L)		280		3.1	10	10
Methane RSK-175 (μg/L)		<	U	0.63	2	5
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>		124		3	10	10

#### **Notes:**

Concentrations exceed HALs

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

< = less than LOQ

 $\mu g/L = micrograms per liter$ 

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

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, BASELINE** OU1 REBOUND STUDY LETTER REPORT - BASELINE

FIELD ID	СНААР		EW7-F	PM21A-	-1-25			EW7-I	PM21B-	1-35		]	EW7-I	PM22A	-1-25			EW7-l	PM22B	-1-35			EW7-l	PM23A	-1-25			EW7-l	PM23B-	1-35			EW7-I	M24A	-1-25	
SAMPLE DATE	HALs		10/	/17/2019	9			10/	17/2019	9			10/	/17/2019	9			10	/17/201	9			10	/16/2019	9			10	/17/2019	)			10	16/201	.9	
	(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	100	J	9.7	19	49	29		2	3.9	9.8	110	J	10	20	51	39	J	9.6	19	48	70		4.9	9.9	25	22		0.2	0.39	0.98	6.3	J	0.19	0.39	0.97
1,3-Dinitrobenzene	NA	<	UJ	0.086	0.19	0.39	<	U	0.087	0.2	0.39	<	U	0.09	0.2	0.41	<	UJ	0.085	0.19	0.38	<	UJ	0.088	0.2	0.39	<	U	0.087	0.2	0.39	<	UJ	0.086	0.19	0.39
2,4,6-Trinitrotoluene	2	29	J	7.8	19	19	5.7		0.16	0.39	0.39	27	J	8.1	20	20	5.7	J	0.15	0.38	0.38	28		3.9	9.9	9.9	5.2		0.16	0.39	0.39	9.8	J	0.15	0.39	0.39
2,4-Dinitrotoluene	NA	0.2	J	0.082	0.19	0.39	0.15	J	0.082	0.2	0.39	0.41	J	0.085	0.2	0.41	0.15	J	0.08	0.19	0.38	0.24	J	0.083	0.2	0.39	<	U	0.083	0.2	0.39	<	UJ	0.081	0.19	0.39
2,6-Dinitrotoluene	NA	<	UJ	0.063	0.19	0.19	<	U	0.063	0.2	0.2	<	U	0.065	0.2	0.2	<	UJ	0.062	0.19	0.19	<	UJ	0.064	0.2	0.2	<	U	0.064	0.2	0.2	<	UJ	0.062	0.19	0.19
2-Amino-4,6-dinitrotoluene	NA	3.8	J	0.049	0.12	0.19	1.4		0.05	0.12	0.2	4.1	J	0.051	0.12	0.2	1.7	J	0.048	0.11	0.19	3.3	J	0.05	0.12	0.2	0.97		0.05	0.12	0.2	2.8	J	0.049	0.12	0.19
2-Nitrotoluene	NA	<	UJ	0.083	0.19	0.39	<	UJ	0.084	0.2	0.39	<	U	0.087	0.2	0.41	<	UJ	0.082	0.19	0.38	<	UJ	0.084	0.2	0.39	<	UJ	0.084	0.2	0.39	<	UJ	0.083	0.19	0.39
3-Nitrotoluene	NA	<	UJ	0.19	0.39	0.39	<	U	0.19	0.39	0.39	<	U	0.2	0.41	0.41	<	UJ	0.19	0.38	0.38	<	UJ	0.19	0.39	0.39	<	U	0.19	0.39	0.39	<	UJ	0.19	0.39	0.39
4-Amino-2,6-dinitrotoluene	NA	<	UJ	0.056	0.12	0.19	<	U	0.056	0.12	0.2	<	U	0.059	0.12	0.2	1.1	J	0.055	0.11	0.19	<	UJ	0.057	0.12	0.2	<	U	0.057	0.12	0.2	2.1	J	0.056	0.12	0.19
4-Nitrotoluene	NA	<	UJ	0.19	0.39	0.97	<	U	0.2	0.39	0.98	<	U	0.2	0.41	1	<	UJ	0.19	0.38	0.96	<	UJ	0.2	0.39	0.99	<	U	0.2	0.39	0.98	<	UJ	0.19	0.39	0.97
MNX	NA	<	UJ	0.15	0.39	1.9	<	U	0.15	0.39	2	<	U	0.16	0.41	2	<	UJ	0.15	0.38	1.9	<	U	0.15	0.39	2	<	U	0.15	0.39	2	<	UJ	0.15	0.39	1.9
HMX	400	0.63	J	0.085	0.19	0.39	<	U	0.086	0.2	0.39	<	U	0.089	0.2	0.41	<	UJ	0.084	0.19	0.38	0.93	J	0.086	0.2	0.39	0.32	J	0.086	0.2	0.39	1.2	J	0.085	0.19	0.39
Nitrobenzene	NA	<	UJ	0.089	0.19	0.39	<	U	0.089	0.2	0.39	<	U	0.092	0.2	0.41	<	UJ	0.087	0.19	0.38	<	UJ	0.09	0.2	0.39	<	U	0.09	0.2	0.39	<	UJ	0.088	0.19	0.39
RDX	2	1	J	0.15	0.39	0.39	0.39	J	0.15	0.39	0.39	0.47	J	0.16	0.41	0.41	0.28	J	0.15	0.38	0.38	1	J	0.16	0.39	0.39	0.32	J	0.16	0.39	0.39	1.4	J	0.15	0.39	0.39
Tetryl	NA	<	UJ	0.077	0.19	0.23	<	U	0.078	0.2	0.23	<	U	0.081	0.2	0.24	<	UJ	0.076	0.19	0.23	<	UJ	0.078	0.2	0.24	<	U	0.078	0.2	0.24	<	UJ	0.077	0.19	0.23
LABORATORY WATER QUALITY PARAMETEI	RS																																			
Ammonia USEPA 350.1 (mg/L)		1.1		0.022	0.05	0.1	1.5		0.022	0.05	0.1	1.8		0.022	0.05	0.1	1.3		0.022	0.05	0.1	1.8		0.022	0.05	0.1	1.2		0.022	0.05	0.1	0.33		0.022	0.05	0.1
Total Kjeldahl Nitrogen USEPA 351.2 (mg/L)		<	U	0.69	1	1	1.4		0.69	1	1	<	U	0.69	1	1	1.2		0.69	1	1	<	U	0.69	1	1	1.6		0.69	1	1	<	U	0.69	1	1
Nitrate/Nitrite USEPA 353.2 (mg/L)		23		0.19	0.5	1	2.5		0.019	0.05	0.1	13		0.095	0.25	0.5	1.9		0.019	0.05	0.1	24		0.095	0.25	0.5	4.4	J	0.019	0.05	0.1	51	J	0.95	2.5	5
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	<	U	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4
Sulfate USEPA 9056A (mg/L)		84		1	3	5	150		1	3	5	85		1	3	5	160		1	3	5	90		1	3	5	150		1	3	5	84		1	3	5
Dissolved Organic Carbon SM 9060A (mg/L)		3.7		0.35	1	1	3.2		0.35	1	1	3.5		0.35	1	1	3.3		0.35	1	1	3.6		0.35	1	1	3.2		0.35	1	1	3.8		0.35	1	1
Alkalinity SM 2320B (mg/L)		320		3.1	10	10	300		3.1	10	10	330		3.1	10	10	300		3.1	10	10	330		3.1	10	10	310		3.1	10	10	340		3.1	10	10
Methane RSK-175 (μg/L)		340		0.63	2	5	770		0.63	2	5	800		0.63	2	5	690		0.63	2	5	420	0	0.63	2	5	620		0.63	2	5	380		0.63	2	5
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>		142		3	10	10	133		3	10	10	147		3	10	10	133		3	10	10	147		3	10	10	138		3	10	10	151		3		10

Concentrations exceed PALs

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

< = less than LOQ

SM = Standard Method U = nondetect

 $\mu g/L = micrograms per liter$ 

CHAAP = Cornhusker Army Ammunition Plant

USEPA = United States Environmental Protection Agency

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

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

FIELD ID	СНААР		EW7-F	PM24B-	1-35			EW7-F	M25A	-1-25			EW7-l	PM25B-	-1-35			EW7-I	PM26A	-1-25			EW7-	PM26B	-1-35			EW7-l	PM27A-	1-25			EW7-F	M27B-	1-35	
SAMPLE DATE	HALs		10/	19/2019	)			10/	16/2019	9			10	/16/2019	9			10	/18/201	9			10	/18/201	9			10	/18/2019	)			10/	18/2019	)	
	(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 1	LOQ
EXPLOSIVES (USEPA Method 8330A) (µg/L)		•				-																•				•										
1,3,5-Trinitrobenzene	NA	38	J	3.8	7.6	19	1.9	J	0.19	0.39	0.96	20	J	0.19	0.38	0.95	15		0.2	0.41	1	25		2	4	10	10	J	0.2	0.4	0.99	17		0.2	0.4	0.99
1,3-Dinitrobenzene	NA	<	U	0.084	0.19	0.38	<	UJ	0.086	0.19	0.39	<	U	0.085	0.19	0.38	<	U	0.09	0.2	0.41	<	U	0.089	0.2	0.4	<	UJ	0.088	0.2	0.4	<	U	0.088	0.2	0.4
2,4,6-Trinitrotoluene	2	11	J	0.15	0.38	0.38	13	J	0.15	0.39	0.39	4.1		0.15	0.38	0.38	14		0.16	0.41	0.41	7.2	J	0.16	0.4	0.4	9.5	J	0.16	0.4	0.4	4.9		0.16	0.4	0.4
2,4-Dinitrotoluene	NA	<	U	0.079	0.19	0.38	<	UJ	0.081	0.19	0.39	<	U	0.08	0.19	0.38	<	U	0.085	0.2	0.41	<	U	0.084	0.2	0.4	<	UJ	0.083	0.2	0.4	<	U	0.083	0.2	0.4
2,6-Dinitrotoluene	NA	<	U	0.061	0.19	0.19	<	UJ	0.062	0.19	0.19	<	U	0.062	0.19	0.19	<	U	0.066	0.2	0.2	<	U	0.064	0.2	0.2	<	UJ	0.064	0.2	0.2	<	U	0.064	0.2	0.2
2-Amino-4,6-dinitrotoluene	NA	2.2		0.048	0.11	0.19	2.4	J	0.049	0.12	0.19	1.5		0.048	0.11	0.19	3.4		0.052	0.12	0.2	1.8	J	0.051	0.12	0.2	3.5	J	0.05	0.12	0.2	1.8		0.05	0.12	0.2
2-Nitrotoluene	NA	<	UJ	0.081	0.19	0.38	<	UJ	0.082	0.19	0.39	<	UJ	0.082	0.19	0.38	<	U	0.087	0.2	0.41	<	UJ	0.085	0.2	0.4	<	UJ	0.085	0.2	0.4	<	U	0.085	0.2	0.4
3-Nitrotoluene	NA	<	U	0.18	0.38	0.38	<	UJ	0.19	0.39	0.39	<	UJ	0.19	0.38	0.38	<	U	0.2	0.41	0.41	<	U	0.19	0.4	0.4	<	UJ	0.19	0.4	0.4	<	U	0.19	0.4	0.4
4-Amino-2,6-dinitrotoluene	NA	1.9		0.054	0.11	0.19	2.4	J	0.056	0.12	0.19	1.1		0.055	0.11	0.19	3.2		0.059	0.12	0.2	1.6		0.058	0.12	0.2	2.7	J	0.057	0.12	0.2	1.8		0.057	0.12	0.2
4-Nitrotoluene	NA	<	U	0.19	0.38	0.94	<	UJ	0.19	0.39	0.96	<	U	0.19	0.38	0.95	<	U	0.2	0.41	1	<	U	0.2	0.4	1	<	UJ	0.2	0.4	0.99	<	U	0.2	0.4	0.99
MNX	NA	<	U	0.15	0.38	1.9	<	UJ	0.15	0.39	1.9	<	U	0.15	0.38	1.9	<	U	0.16	0.41	2	<	U	0.15	0.4	2	<	UJ	0.15	0.4	2	<	U	0.15	0.4	2
HMX	400	0.37	J	0.083	0.19	0.38	1.6	J	0.084	0.19	0.39	<	U	0.084	0.19	0.38	0.91		0.089	0.2	0.41	<	U	0.088	0.2	0.4	1.8	J	0.087	0.2	0.4	0.48		0.087	0.2	0.4
Nitrobenzene	NA	<	U	0.086	0.19	0.38	<	UJ	0.088	0.19	0.39	<	U	0.087	0.19	0.38	<	U	0.092	0.2	0.41	<	U	0.091	0.2	0.4	<	UJ	0.09	0.2	0.4	<	U	0.09	0.2	0.4
RDX	2	0.41		0.15	0.38	0.38	1.6	J	0.15	0.39	0.39	<	U	0.15	0.38	0.38	0.97		0.16	0.41	0.41	0.38	J	0.16	0.4	0.4	1.7	J	0.16	0.4	0.4	0.62		0.16	0.4	0.4
Tetryl	NA	<	U	0.075	0.19	0.23	<	UJ	0.076	0.19	0.23	<	U	0.076	0.19	0.23	<	U	0.081	0.2	0.24	<	U	0.079	0.2	0.24	<	UJ	0.078	0.2	0.24	<	U	0.079	0.2	0.24
LABORATORY WATER QUALITY PARAMETER	RS																																			
Ammonia USEPA 350.1 (mg/L)		1.3		0.022	0.05	0.1	0.13		0.022	0.05	0.1	1.5		0.022	0.05	0.1	0.086	J	0.022	0.05	0.1	0.57		0.022	0.05	0.1	0.15		0.022	0.05	0.1	1.1		0.022	0.05	0.1
Total Kjeldahl Nitrogen USEPA 351.2 (mg/L)		<	U	0.69	1	1	<	U	0.69	1	1	1.5	J	0.69	1	1	<	UJ	0.69	1	1	0.7	J	0.69	1	1	<	U	0.69	1	1	1.1		0.69	1	1
Nitrate/Nitrite USEPA 353.2 (mg/L)		11		0.038	0.1	0.2	25		0.095	0.25	0.5	1.7	J	0.019	0.25	0.5	11		0.038	0.1	0.2	7.5		0.019	0.05	0.1	26		0.19	0.5	1	8.3		0.019	0.05	0.1
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	<	U	0.79	1.9	4	<	U	0.79	1.9	4	<	U	0.79	1.9	4
Sulfate USEPA 9056A (mg/L)		110		1	3	5	87		1	3	5	110	J	1	3	5	73		1	3	5	79		1	3	5	120		1	3	5	90		1	3	5
Dissolved Organic Carbon SM 9060A (mg/L)		3.8		0.35	1	1	4.4		0.35	1	1	4.8		0.35	1	1	3.9		0.35	1	1	4.7		0.35	1	1	4.2		0.35	1	1	5.1		0.35	1	1
Alkalinity SM 2320B (mg/L)		330		3.1	10	10	320		3.1	10	10	410		3.1	10	10	330		3.1	10	10	390		3.1	10	10	280		3.1	10	10	390		3.1	10	10
Methane RSK-175 (μg/L)		1300		0.63	2	5	590		0.63	2	5	3900	J	0.63	2	5	1600		0.63	2	5	2900		0.63	2	5	610		0.63	2	5	1700		0.63	2	5
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>		147		3	10	10	142		3	10	10	182		3	10	10	147		3	10	10	173		3	10	10	124		3	10	10	173		3	10	10

Concentrations exceed PALs

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

< = less than LOQ

U = nondetect

CHAAP = Cornhusker Army Ammunition Plant

USEPA = United States Environmental Protection Agency

SM = Standard Method

DL = detection limit

EW = extraction well

HAL = health advisory level

 $\mu g/L = micrograms per liter$ 

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

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

FIELD ID	СНААР			M28A-					PM28B-					PM29A-					PM29B		
SAMPLE DATE	HALs		10/	19/2019	)			10	20/2019	9			10	/19/2019	9			10	/19/201	.9	
	(µg/L)	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOC
EXPLOSIVES (USEPA Method 8330A) (μg/L)																					
1,3,5-Trinitrobenzene	NA	23		0.2	0.4	1	42	J	3.9	7.8	19	11		0.2	0.39	0.98	13	J	0.19	0.39	0.97
1,3-Dinitrobenzene	NA	<	U	0.089	0.2	0.4	<	UJ	0.086	0.19	0.39	<	U	0.087	0.2	0.39	<	UJ	0.086	0.19	0.39
2,4,6-Trinitrotoluene	2	13		0.16	0.4	0.4	5.6	J	0.16	0.39	0.39	5.9		0.16	0.39	0.39	3.6	J	0.15	0.39	0.39
2,4-Dinitrotoluene	NA	<	U	0.084	0.2	0.4	<	UJ	0.082	0.19	0.39	<	U	0.082	0.2	0.39	<	UJ	0.081	0.19	0.39
2,6-Dinitrotoluene	NA	<	U	0.065	0.2	0.2	<	UJ	0.063	0.19	0.19	<	U	0.063	0.2	0.2	<	UJ	0.062	0.19	0.19
2-Amino-4,6-dinitrotoluene	NA	3.8		0.051	0.12	0.2	2.2	J	0.049	0.12	0.19	1.5		0.05	0.12	0.2	1.3	J	0.049	0.12	0.19
2-Nitrotoluene	NA	<	UJ	0.086	0.2	0.4	<	UJJ	0.083	0.19	0.39	<	UJ	0.084	0.2	0.39	<	UJJ	0.083	0.19	0.39
3-Nitrotoluene	NA	<	U	0.2	0.4	0.4	<	UJ	0.19	0.39	0.39	<	U	0.19	0.39	0.39	<	UJ	0.19	0.39	0.39
4-Amino-2,6-dinitrotoluene	NA	3.8		0.058	0.12	0.2	2.3	J	0.056	0.12	0.19	1.6	J	0.057	0.12	0.2	0.98	J	0.056	0.12	0.19
4-Nitrotoluene	NA	<	U	0.2	0.4	1	<	UJ	0.19	0.39	0.97	<	U	0.2	0.39	0.98	<	UJ	0.19	0.39	0.97
MNX	NA	<	U	0.15	0.4	2	<	UJ	0.15	0.39	1.9	<	U	0.15	0.39	2	<	UJ	0.15	0.39	1.9
HMX	400	0.87		0.088	0.2	0.4	<	UJ	0.085	0.19	0.39	0.62		0.086	0.2	0.39	0.32	J	0.085	0.19	0.39
Nitrobenzene	NA	<	U	0.091	0.2	0.4	<	UJ	0.089	0.19	0.39	<	U	0.089	0.2	0.39	<	UJ	0.088	0.19	0.39
RDX	2	1.1		0.16	0.4	0.4	0.22	J	0.15	0.39	0.39	1.2		0.15	0.39	0.39	<	UJ	0.15	0.39	0.39
Tetryl	NA	<	U	0.08	0.2	0.24	<	UJ	0.077	0.19	0.23	<	U	0.078	0.2	0.24	<	UJ	0.077	0.19	0.23
LABORATORY WATER QUALITY PARAMETI	ERS																				
Ammonia USEPA 350.1 (mg/L)		0.53		0.022	0.05	0.1	1		0.044	0.05	0.1	0.12		0.022	0.05	0.1	2.4		0.022	0.05	0.1
Total Kjeldahl Nitrogen USEPA 351.2 (mg/L)		<	U	0.69	1	1	5.2		0.69	1	1	<	U	0.69	1	1	2.4		0.69	1	1
Nitrate/Nitrite USEPA 353.2 (mg/L)		16		0.038	0.1	0.2	2.7		0.019	0.05	0.1	12		0.038	0.1	0.2	2.5		0.019	0.05	0.1
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)		80		1	3	5	71		1	3	5	97		1	3	5	140		1	3	5
Dissolved Organic Carbon SM 9060A (mg/L)		4.8		0.35	1	1	6.5		0.35	1	1	3.1		0.35	1	1	3.7		0.35	1	1
Alkalinity SM 2320B (mg/L)		370		3.1	10	10	450		3.1	10	10	230		3.1	10	10	350		3.1	10	10
Methane RSK-175 (μg/L)		1600		0.63	2	5	3500		0.63	2	5	450		0.63	2	5	750		0.63	2	5
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>		164		3	10	10	200		3	10	10	102		3	10	10	156		3	10	10

SM = Standard Method

USEPA = United States Environmental Protection Agency

U = nondetect

### **Notes:**

Concentrations exceed PALs

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

< = less than LOQ

 $\mu$ g/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

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

WELL NUMBER					OS0	01-DP01	1-35									]	NW021					
FIELD ID		OS0	01-DP0	1-35			OS5	01-DP0	1-35				N	W021-	1			N	W023-	1		
SAMPLE DATE		10	0/14/201	9			10	)/14/201	9				10	/22/201	9			10	/22/201	9		
	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	RPD	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	RPD
EXPLOSIVES (USEPA Method 8330A) (µg/L)																						
1,3,5-Trinitrobenzene	23	J	0.2	0.4	1	18	J	0.2	0.41	1	24	<	U	0.19	0.39	0.96	<	UJ	0.19	0.38	0.96	
1,3-Dinitrobenzene	<	UJ	0.089	0.2	0.4	<	UJ	0.089	0.2	0.41		<	U	0.086	0.19	0.39	<	UJ	0.085	0.19	0.38	
2,4,6-Trinitrotoluene	11	J	0.16	0.4	0.4	9.1	J	0.16	0.41	0.41	19	<	U	0.15	0.39	0.39	<	UJ	0.15	0.38	0.38	
2,4-Dinitrotoluene	<	UJ	0.084	0.2	0.4	<	UJ	0.084	0.2	0.41		<	U	0.081	0.19	0.39	<	UJ	0.08	0.19	0.38	
2,6-Dinitrotoluene	<	UJ	0.065	0.2	0.2	<	UJ	0.065	0.2	0.2		<	U	0.062	0.19	0.19	<	UJ	0.062	0.19	0.19	
2-Amino-4,6-dinitrotoluene	0.37	J	0.051	0.12	0.2	0.28	J	0.051	0.12	0.2	<2x	1.6		0.049	0.12	0.19	1.5	J	0.048	0.11	0.19	6
2-Nitrotoluene	<	UJ	0.086	0.2	0.4	<	UJ	0.086	0.2	0.41		<	U	0.082	0.19	0.39	<	UJ	0.082	0.19	0.38	
3-Nitrotoluene	<	UJ	0.2	0.4	0.4	<	UJ	0.2	0.41	0.41		<	U	0.19	0.39	0.39	<	UJ	0.19	0.38	0.38	
4-Amino-2,6-dinitrotoluene	<	UJ	0.058	0.12	0.2	<	UJ	0.058	0.12	0.2		0.77		0.056	0.12	0.19	0.71	J	0.055	0.11	0.19	<2x
4-Nitrotoluene	<	UJ	0.2	0.4	1	<	UJ	0.2	0.41	1		<	U	0.19	0.39	0.96	<	UJ	0.19	0.38	0.96	
MNX	<	UJ	0.15	0.4	2	<	UJ	0.15	0.41	2		<	U	0.15	0.39	1.9	<	UJ	0.15	0.38	1.9	
HMX	<	UJ	0.088	0.2	0.4	<	UJ	0.088	0.2	0.41		<	U	0.084	0.19	0.39	<	UJ	0.084	0.19	0.38	
Nitrobenzene	<	UJ	0.091	0.2	0.4	<	UJ	0.091	0.2	0.41		<	U	0.088	0.19	0.39	<	UJ	0.087	0.19	0.38	
RDX	<	UJ	0.16	0.4	0.4	<	UJ	0.16	0.41	0.41		<	U	0.15	0.39	0.39	<	UJ	0.15	0.38	0.38	
Tetryl	<	UJ	0.079	0.2	0.24	<	UJ	0.079	0.2	0.25		<	U	0.076	0.19	0.23	<	UJ	0.076	0.19	0.23	
LABORATORY MNA PARAMETERS																						
Ammonia USEPA 350.1 (mg/L)												3.8		0.022	0.05	0.1	3.7		0.022	0.05	0.1	3
Total Kjeldahl Nitrogen USEPA 351.2 (mg/L)												3.5		0.69	1	1	3.5	J	0.69	1	1	<2x
Nitrate/Nitrite USEPA 353.2 (mg/L)												0.84		0.019	0.05	0.1	0.88		0.019	0.05	0.1	<2x
Sulfide SM 9034 (mg/L)		No	o Analys	is			No	o Analys	is			<	U	0.79	1.9	4	<	U	0.79	1.9	4	
Sulfate USEPA 9056A (mg/L)												210		5.2	3	5	210		5.2	3	5	0
Dissolved Organic Carbon SM 9060A (mg/L)												2.9		0.35	1	1	2.8		0.35	1	1	<2x
Alkalinity SM 2320B (mg/L)												410		3.1	10	10	410		3.1	10	10	0
Methane RSK-175 (μg/L)												55		0.63	2	5	51		0.63	2	5	8
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>												182		3.1	10	10	182		3.1	10	10	0

DL = detection limit

OU = Operable Unit <sup>1</sup>Carbon dioxide back calculated from alkalinity SM 2320. ID = identification number USEPA = United States Environmental Protection Agency field duplicate RPD > 30 or >2X the LOQ J = estimatedPM = performance monitoring X = times< = less than LOQ LOD = limit of detection Qual = qualifier  $\mu g/L = micrograms \ per \ liter$ LOQ = limit of quantification RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine DP = direct push mg/L = milligrams per liter RPD = relative percent difference

MNA = monitored natural attenuation

RSK = Robert S. Kerr Environmental Research Laboratory EW = extraction well MNX = mono-nitroso-RDXSM = Standard Method HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine OS = off-post sampleU = nondetect

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

WELL NUMBER					I	PZ017R										EW7	-PM21I	3-35				
FIELD ID		P	Z017R-	1			]	PZ021-1					EW7-	PM21B	-1-35			EW7-I	PM521I	3-1-35		
SAMPLE DATE		10	)/23/201	9			10	)/23/201	9				10	/17/201	9			10	/17/201	9		1
	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	RPD	Result	Qual	DL	LOD	LOQ	Result	Qual	DL	LOD	LOQ	RPD
EXPLOSIVES (USEPA Method 8330A) (µg/L)																						
1,3,5-Trinitrobenzene	7.2		0.2	0.4	1	7.2	J	0.2	0.4	1	0	29		2	3.9	9.8	29	J	1.9	3.9	9.7	<2x
1,3-Dinitrobenzene	<	U	0.088	0.2	0.4	0.3	J	0.089	0.2	0.4	<2x	<	U	0.087	0.2	0.39	<	UJ	0.086	0.19	0.39	1
2,4,6-Trinitrotoluene	15		0.16	0.4	0.4	15	J	0.16	0.4	0.4	0	5.7		0.16	0.39	0.39	5.1	J	0.16	0.39	0.39	<2x
2,4-Dinitrotoluene	<	UJ	0.084	0.2	0.4	<	UJ	0.084	0.2	0.4		0.15	J	0.082	0.2	0.39	<	UJ	0.081	0.19	0.39	<2x
2,6-Dinitrotoluene	<	UJ	0.064	0.2	0.2	<	UJ	0.065	0.2	0.2		<	U	0.063	0.2	0.2	<	UJ	0.063	0.19	0.19	1
2-Amino-4,6-dinitrotoluene	4.1	J	0.051	0.12	0.2	4	J	0.051	0.12	0.2	2	1.4		0.05	0.12	0.2	1.4	J	0.049	0.12	0.19	<2x
2-Nitrotoluene	<	UJ	0.085	0.2	0.4	<	UJ	0.086	0.2	0.4		<	UJ	0.084	0.2	0.39	<	UJ	0.083	0.19	0.39	1
3-Nitrotoluene	<	UJ	0.19	0.4	0.4	<	UJ	0.2	0.4	0.4		<	U	0.19	0.39	0.39	<	UJ	0.19	0.39	0.39	1
4-Amino-2,6-dinitrotoluene	3.5	J	0.058	0.12	0.2	3.6	J	0.058	0.12	0.2	3	<	U	0.056	0.12	0.2	1.1	J	0.056	0.12	0.19	<2x
4-Nitrotoluene	<	UJ	0.2	0.4	1	<	UJ	0.2	0.4	1		<	U	0.2	0.39	0.98	<	UJ	0.19	0.39	0.97	1
MNX	<	U	0.15	0.4	2	<	UJ	0.15	0.4	2		<	U	0.15	0.39	2	<	UJ	0.15	0.39	1.9	1
HMX	0.59	J	0.087	0.2	0.4	0.57	J	0.088	0.2	0.4	3	<	U	0.086	0.2	0.39	0.22	J	0.085	0.19	0.39	<2x
Nitrobenzene	<	UJ	0.091	0.2	0.4	<	UJ	0.091	0.2	0.4		<	U	0.089	0.2	0.39	<	UJ	0.088	0.19	0.39	1
RDX	0.87		0.16	0.4	0.4	0.88	J	0.16	0.4	0.4	1	0.39	J	0.15	0.39	0.39	0.34	J	0.15	0.39	0.39	<2x
Tetryl	<	U	0.079	0.2	0.24	<	UJ	0.08	0.2	0.24		<	U	0.078	0.2	0.23	<	UJ	0.077	0.19	0.23	
LABORATORY MNA PARAMETERS																						
Ammonia USEPA 350.1 (mg/L)	0.06	J	0.022	0.05	0.1	0.06	J	0.022	0.05	0.1	0	1.5		0.022	0.05	0.1	1.5		0.022	0.05	0.1	0
Total Kjeldahl Nitrogen USEPA 351.2 (mg/L)	<	U	0.69	1	1	<	U	0.69	1	1		1.4		0.69	1	1	1.4	J	0.69	1	1	0
Nitrate/Nitrite USEPA 353.2 (mg/L)	41		0.19	0.5	1	40		0.19	0.5	1	2	2.5		0.019	0.05	0.1	2.5		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	1
Sulfate USEPA 9056A (mg/L)	74		1	3	5	74		1	3	5	0	150		1	3	5	150		1	3	5	0
Dissolved Organic Carbon SM 9060A (mg/L)	3.5		0.35	1	1	3.6		0.35	1	1	3	3.2		0.35	1	1	3.2		0.35	1	1	<2x
Alkalinity SM 2320B (mg/L)	140		3.1	10	10	150		3.1	10	10	7	300		3.1	10	10	300		3.1	10	10	0
Methane RSK-175 (μg/L)	140		0.63	2	5	99		0.63	2	5	34	770		0.63	2	5	910		0.63	2	5	17
Carbon Dioxide SM 2320B (mg/L) <sup>1</sup>	62		3.1	10	10	67		3.1	10	10	7	133		3.1	10	10	133		3.1	10	10	0

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

field duplicate RPD > 30 or >2X the LOQ

< = less than LOQ

 $\mu g/L = micrograms \ per \ liter$ 

DP = direct push

DL = detection limit

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-RDXOS = 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, BASELINE
OU1 REBOUND STUDY LETTER REPORT - BASELINE

				Specific				Ferrous
Well	Sample		Temperature	Conductance	DO	ORP	Turbidity	Iron
Number	Date	pН	(°C)	(mS/cm)	(mg/L)	(mV)	(NTU)	(mg/L)
OU1 Off-Post	t Monitoring W	'ells	, ,					
CA210	10/21/2019	6.55	14.12	0.977	0.45	165.5	4.09	0.00
CA211	10/21/2019	6.49	11.58	0.662	0.44	161.2	4.33	0.00
CA212	10/21/2019	6.70	12.37	0.496	0.46	149.6	3.64	0.00
CA213	10/21/2019	7.47	12.23	0.373	0.22	118.3	5.47	0.00
NW020	10/22/2019	6.53	14.17	1.118	3.30	113.9	0.05	0.07
NW021	10/22/2019	6.77	12.88	1.154	0.26	112.2	0.02	0.00
NW022	10/22/2019	6.96	13.27	1.270	0.19	26.7	0.19	0.27
NW050	10/22/2019	6.71	16.89	1.178	0.24	112.8	4.93	0.00
NW051	10/22/2019	6.47	12.99	1.088	0.32	132.3	7.54	0.00
NW052	10/23/2019	7.24	9.80	0.738	0.66	134.5	10.28	0.00
NW060	10/22/2019	6.01	16.16	0.075	10.75	171.6	6.06	0.00
NW061	10/22/2019	7.00	13.80	0.790	0.18	137.4	4.42	0.00
NW062	10/22/2019	8.11	14.04	0.701	0.26	38.6	6.68	0.18
NW070	10/21/2019	7.10	17.09	0.096	0.38	127.0	38.70	0.00
NW071	10/21/2019	6.32	15.36	0.563	2.18	158.1	4.65	0.00
NW080	10/22/2019	6.23	12.61	1.161	7.28	197.0	4.91	0.00
NW081R	10/22/2019	6.51	12.45	0.797	0.65	171.2	6.23	0.00
NW082R	10/22/2019	6.84	13.00	0.687	0.50	153.8	5.96	0.34
	t Monitoring W							
G0024	10/23/2019	6.36	12.53	0.670	4.88	156.5	0.39	0.00
G0070	10/21/2019	7.12	11.60	0.461	3.29	16.5	0.15	0.00
G0075	10/21/2019	6.57	12.07	0.995	6.86	132.7	0.02	0.00
G0076	10/21/2019	6.66	11.68	1.189	1.91	-36.2	0.07	1.68
G0077	10/23/2019	6.63	12.92	1.012	1.86	144.8	0.06	0.00
G0078	10/23/2019	6.90	13.36	1.213	0.25	28.1	0.10	0.48
G0079	10/21/2019	6.34	12.71	0.278	3.82	144.0	0.17	0.06
G0080	10/21/2019	6.64	12.04	0.795	1.23	-16.4	0.27	0.45
G0081	10/21/2019	6.19	11.99	0.910	0.18	14.9	0.86	0.68
G0082	10/21/2019	6.28	11.93	0.652	0.20	32.9	0.43	0.04
G0086	10/23/2019	6.84	12.55	0.684	0.52	156.2	3.25	0.00
G0087	10/22/2019	6.70	10.89	0.808	0.39	164.9	0.59	0.06
G0091	10/22/2019	6.83	11.70	1.325	2.79	156.8	0.40	0.00
G0092	10/22/2019	7.14	11.96	1.269	0.26	122.9	0.15	0.00
PZ017R	10/23/2019	6.34	14.63	0.652	5.68	173.9	4.60	0.00
PZ018	10/23/2019	6.57	14.72	0.664	1.34	167.4	3.38	0.00
PZ019	10/22/2019	6.16	14.75	0.602	6.44	77.3	0.44	0.07
PZ020	10/23/2019	6.67	11.98	1.061	2.54	160.2	0.29	0.11

Field water quality parameters for all wells were measured using a YSI 556 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).

 $^{\circ}$ C = degrees Celsius MPS = multiprobe system NTU = nephelometric turbidity units DO = dissolved oxygen mS/cm = milliSiemens per centimeter ORP = oxidation/reduction potential mg/L = milligrams per liter mV = millivolts OU = Operable Unit

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

Well Number	Sample Date	рН	Temperature (°C)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Ferrous Iron (mg/L)
Between EW6	and EW7							
EW7-PM21A	10/17/19	7.66	11.77	0.724	0.57	-36.9	9.61	0.99
EW7-PM21B	10/17/19	9.46	12.64	0.697	0.16	-121.5	4.14	2.89
EW7-PM22A	10/17/19	7.05	13.01	0.673	0.32	-10.3	4.18	2.89
EW7-PM22B	10/17/19	7.64	13.93	0.734	0.20	-36.6	7.22	2.89
EW7-PM23A	10/16/19	8.21	11.89	0.740	0.36	-26.7	4.94	2.73
EW7-PM23B	10/17/19	7.98	14.16	0.750	0.18	-51.6	7.95	2.89
EW7-PM24A	10/16/19	7.56	12.83	0.903	1.49	-28.7	3.38	2.62
EW7-PM24B	10/19/19	8.84	11.58	0.707	0.30	-92.2	51.00	3.30
EW7-PM25A	10/16/19	7.23	13.55	0.794	3.48	17.9	12.00	1.56
EW7-PM25B	10/16/19	7.11	13.24	0.791	0.15	4.6	1.27	0.72
EW7-PM26A	10/18/19	7.69	13.23	0.684	0.83	-39	5.42	2.89
EW7-PM26B	10/18/19	9.22	15.38	0.792	0.28	-108.3	7.87	2.780
EW7-PM27A	10/18/19	7.01	13.86	0.771	2.02	-6.6	6.25	2.89
EW7-PM27B	10/18/19	8.70	14.25	0.798	0.24	-86.3	5.70	2.89
EW7-PM28A	10/19/19	7.45	15.04	0.797	0.12	-28.2	6.10	3.30
EW7-PM28B	10/20/19	7.09	12.96	0.802	0.23	-12.2	4.80	3.30
EW7-PM29A	10/19/19	7.29	14.46	0.600	0.35	-20.7	4.68	3.30
EW7-PM29B	10/19/19	8.07	12.91	0.769	0.20	-55.6	7.69	3.30

Field water quality parameters for all wells were measured using a YSI 556 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

DO = dissolved oxygen

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

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

W II N 1 / C 1	BASE	CLINE
Well Number / Sample Interval	RDX (μg/L)	TNT (µg/L)
OU1 Off-Post Wells		
CA210	ND	ND
CA211	ND	ND
CA212	ND	ND
CA213	ND	ND
NW020	0.2	ND
NW021	ND	ND
NW022	ND	ND
NW050	ND	ND
NW051	ND	ND
NW052	ND	ND
NW060	ND	ND
NW061	ND	ND
NW062	ND	ND
NW070	ND	ND
NW071	ND	ND
NW080	ND	ND
NW081R	ND	ND
NW082R	ND	ND
OU1 On-Post Wells		
G0024	ND	ND
G0070	ND	ND
G0075	ND	ND
G0076	ND	ND
G0077	0.91	3.2
G0078	ND	ND
G0079	ND	ND
G0080	ND	ND
G0081	ND	0.29
G0082	0.63	ND
G0086	ND	3.8
G0087	ND	ND
G0091	0.81	ND
G0092	ND	ND
PZ017R	0.87	15
PZ018	0.88	8
PZ019	ND	ND
PZ020	0.42	3.7
Direct Push Samples (Off-Pos	it)	
OS001-25	ND	12
OS001-35	ND	11
OS001-45	ND	ND
OS002-25	0.63	1.3

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

W.II Namel and Commit	BASE	ELINE
Well Number / Sample Interval	RDX (μg/L)	TNT (µg/L)
OS002-35	ND	ND
OS002-45	ND	3.3
OS003-25	ND	ND
OS003-35	ND	3
OS003-45	ND	ND

#### Notes:

 $\mu g/L = micrograms \ per \ liter$ 

ND = nondetect

OU = Operable Unit

OS = off-post sample

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 - BASELINE** 

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	Oct-19	Oct-19	Oct-19	Oct-19	Oct-19	Oct-19
Shallow Wells				_			
CA210	165.5	0.45	22	ND	ND	9.7	138
NW020	113.9	3.30	62	0.458	ND	3.6	129
NW050	112.8	0.24	62	4.8	ND	8.1	107
NW060	171.6	10.75	1.8	0.14	ND	1.8	15
NW070	127.0	0.38	0.03	0.024	ND	7.2	23
NW080	197.0	7.28	47	0.029	ND	4.7	111
G0024	156.5	4.88	40	ND	ND	4.9	49
G0079	144.0	3.82	0.21	ND	0.76	3.2	58
G0091	156.8	2.79	32	ND	ND	3.6	160
PZ017R	173.9	5.68	41	0.06	ND	3.5	62
PZ018	167.4	1.34	24	0.21	ND	3.3	89
PZ019	77.3	6.44	34	ND	ND	2.2	39
PZ020	160.2	2.54	29	ND	ND	3.8	124
Shallow-Intermediate Wells							
CA211	161.2	0.44	30	0.1	ND	4.3	89
NW021	112.2	0.26	0.84	3.8	3.5	2.9	182
NW051	132.3	0.32	27	ND	ND	9.0	156
NW061	137.4	0.18	4.6	5.7	4.90	4.4	133
NW071	158.1	2.18	2.9	ND	ND	ND	49
NW081R	171.2	0.65	29	ND	ND	4.5	111
G0075	132.7	6.86	1.2	0.06	0.920	3.4	173
G0077	144.8	1.86	20	ND	ND	4.5	138
G0080	-16.4	1.23	2.7	0.1	ND	2.9	156
G0081	14.9	0.18	0.36	0.260	ND	7.8	164
G0082	32.9	0.20	3.4	ND	ND	ND	111
G0086	156.2	0.52	4.8	ND	ND	2.6	138
G0087	164.9	0.39	1.3	ND	ND	2.9	138
G0092	122.9	0.26	0.45	ND	ND	2.9	182
ntermediate Wells							
CA212	149.6	0.46	14	ND	ND	2.6	84
NW022	26.7	0.19	53	0.42	ND	2.9	182
NW052	134.5	0.66	0.12	0.03	0.80	6.3	169
NW062	38.6	0.26	ND	0.59	1.00	2.8	120
NW082R	153.8	0.50	20	ND	ND	ND	107
G0076	-36.2	1.91	ND	1.1	1.30	ND	156

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

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	Oct-19	Oct-19	Oct-19	Oct-19	Oct-19	Oct-19
G0078	28.1	0.25	ND	0.53	ND	2.8	187
Deep Wells							
CA213	118.3	0.22	1.3	ND	0.97	2.2	58
G0070	16.5	3.29	0.025	ND	ND	1.0	98

#### **Notes:**

 $\mu$ g/L = micrograms per liter

Avg = average

CO<sub>2</sub>= dissolved oxygen

DO = dissolved oxygen

DOC = dissolved organic carbon

mg/L = milligrams per liter

MNA = monitored natural attenuation

mS/cm = milliSiemens per centimeter

mV = millivolts

ND = nondetect

ORP = oxidation/reduction potential

OU = Operable Unit

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 - BASELINE** 

Well Number	Methane (μg/L)	Alkalinity (mg/L)	Ferrous Iron (mg/L)	Sulfate (mg/L)	Sulfide (mg/L)	pН	Conductance (mS/cm)
	Oct-19	Oct-19	Oct-19	Oct-19	Oct-19	Oct-19	Oct-19
Shallow Wells							
CA210	23	310	ND	120	ND	6.55	0.977
NW020	ND	290	0.07	150	ND	6.53	1.118
NW050	1.4	240	ND	120	ND	6.71	1.178
NW060	ND	33	ND	3.8	ND	6.01	0.075
NW070	18	51	ND	3.9	ND	7.10	0.096
NW080	ND	250	ND	200	ND	6.23	1.161
G0024	ND	110	ND	50	ND	6.36	0.670
G0079	ND	130	0.06	17	ND	6.34	0.278
G0091	ND	360	ND	190	ND	6.83	1.325
PZ017R	140	140	ND	74	ND	6.34	0.652
PZ018	240	200	ND	100	ND	6.57	0.664
PZ019	ND	88	0.07	67	ND	6.16	0.602
PZ020	ND	280	0.11	160	ND	6.67	1.061
Shallow-Intermediate Wells							
CA211	ND	200	ND	93	ND	6.49	0.662
NW021	55	410	ND	210	ND	6.77	1.154
NW051	8.3	350	ND	170	ND	6.47	1.088
NW061	21	300	ND	170	ND	7.00	0.790
NW071	ND	110	ND	60	ND	6.32	0.563
NW081R	ND	250	ND	98	ND	6.51	0.797
G0075	12	390	ND	150	ND	6.57	0.995
G0077	26	310	ND	150	ND	6.63	1.012
G0080	1.1	350	0.45	ND	2.9	6.64	0.795
G0081	3500	370	0.68	120	ND	6.19	0.910
G0082	1100	250	0.04	76	ND	6.28	0.652
G0086	110	310	ND	140	ND	6.84	0.684
G0087	ND	310	0.06	120	ND	6.70	0.808
G0092	1.1	410	ND	300	ND	7.14	1.269
Intermediate Wells							
CA212	ND	190	ND	72.0	ND	6.70	0.496
NW022	290	410	0.27	360	ND	6.96	1.270
NW052	150	380	ND	130	ND	7.24	0.738
NW062	18	270	0.18	180	ND	8.11	0.701
NW082R	ND	240	0.34	86	ND	6.84	0.687
G0076	330	350	1.68	280	ND	6.66	1.189

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

Well Number	Methane (μg/L)	Alkalinity (mg/L)	Ferrous Iron (mg/L)	Sulfate (mg/L)	Sulfide (mg/L)	pН	Conductance (mS/cm)
	Oct-19	Oct-19	Oct-19	Oct-19	Oct-19	Oct-19	Oct-19
G0078	350	420	0.48	250	ND	6.90	1.213
Deep Wells							
CA213	ND	130	ND	63	ND	7.47	0.373
G0070	ND	220	ND	34	ND	7.12	0.461

#### **Notes:**

 $\mu$ g/L = micrograms per liter

Avg = average

CO<sub>2</sub>= dissolved oxygen

DO = dissolved oxygen

DOC = dissolved organic carbon

mg/L = milligrams per liter

MNA = monitored natural attenuation

mS/cm = milliSiemens per centimeter

mV = millivolts

ND = nondetect

ORP = oxidation/reduction potential

OU = Operable Unit

TKN = total Kjeldahl nitrogen

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

Performance Monitoring	BASE	LINE
Location <sup>1</sup>	RDX (µg/L)	TNT (µg/L)
Between EW6 and EW7		
PZ017R	0.87	15
PZ018	0.88	8
EW7-PM21A-25	1	29
EW7-PM21B-35	0.39	5.7
EW7-PM22A-25	0.47	27
EW7-PM22B-35	0.28	5.7
EW7-PM23A-25	1	28
EW7-PM23B-35	0.32	5.2
EW7-PM24A-25	1.4	9.8
EW7-PM24B-35	0.41	11
EW7-PM25A-25	1.6	13
EW7-PM25B-35	ND	4.1
EW7-PM26A-25	0.97	14
EW7-PM26B-35	0.38	7.2
EW7-PM27A-25	1.7	9.5
EW7-PM27B-35	0.62	4.9
EW7-PM28A-25	1.1	13
EW7-PM28B-35	0.22	5.6
EW7-PM29A-25	1.2	5.9
EW7-PM29B-35	ND	3.6

 $\mu g/L$  = micrograms per liter

EW = extraction well

ND = nondetect

OU = Operable Unit

PM = performance monitoring

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 - BASELINE** 

Performance Monitroing	ORP (mV)	DO (mg/L)	Nitrate/Nitrite (mg/L)	Ammonia (mg/L)	TKN (mg/L)	DOC (mg/L)	CO <sub>2</sub> (mg/L)
Well Number	Oct-19	Oct-19	Oct-19	Oct-19	Oct-19	Oct-19	Oct-19
Shallow Wells							
PZ017R	173.9	5.68	41	0.06	ND	3.5	62
PZ018	167.4	1.34	24	0.21	ND	3.3	89
EW7-PM21A	-36.9	0.57	23	1.1	ND	3.7	142
EW7-PM22A	-10.3	0.32	13	1.8	ND	3.5	147
EW7-PM23A	-26.7	0.36	24	1.8	ND	3.6	147
EW7-PM24A	-28.7	1.49	51	0.33	ND	3.8	151
EW7-PM25A	17.9	3.48	25	0.13	ND	4.4	142
EW7-PM26A	-39.0	0.83	11	0.086	ND	3.9	147
EW7-PM27A	-6.6	2.02	26	0.15	ND	4.2	124
EW7-PM28A	-28.2	0.12	16	0.53	ND	4.8	164
EW7-PM29A	-20.7	0.35	12	0.12	ND	3.1	102
Shallow-Intermediate Wells							
EW7-PM21B	-121.5	0.16	2.5	1.5	1.4	3.2	133
EW7-PM22B	-36.6	0.20	1.9	1.3	1.2	3.3	133
EW7-PM23B	-51.6	0.18	4.4	1.2	1.6	3.2	138
EW7-PM24B	-92.2	0.30	11.0	1.3	ND	3.8	147
EW7-PM25B	4.6	0.15	1.7	1.5	1.5	4.8	182
EW7-PM26B	-108.3	0.28	7.5	0.57	0.70	4.7	173
EW7-PM27B	-86.3	0.24	8.3	1.1	1.1	5.1	173
EW7-PM28B	-12.2	0.23	2.7	1.0	5.2	6.5	200
EW7-PM29B	-55.6	0.20	2.5	2.4	2.4	3.7	156

 $\mu g/L = micrograms per liter$ 

Avg = average

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

TKN = total Kjeldahl nitrogen

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

Performance Monitroing	Methane (μg/L)	Alkalinity (mg/L)	Ferrous Iron (mg/L)	Sulfate (mg/L)	Sulfide (mg/L)	pН	Conductance (mS/cm)
Well Number	Oct-19	Oct-19	Oct-19	Oct-19	Oct-19	Oct-19	Oct-19
Shallow Wells							
PZ017R	140	140	ND	74	ND	6.34	0.652
PZ018	240	200	ND	100	ND	6.57	0.664
EW7-PM21A	340	320	0.99	84	ND	7.66	0.724
EW7-PM22A	800	330	2.89	85	ND	7.05	0.673
EW7-PM23A	420	330	2.73	90	ND	8.21	0.740
EW7-PM24A	380	340	2.62	84	ND	7.56	0.903
EW7-PM25A	590	320	1.56	87	ND	7.23	0.794
EW7-PM26A	1600	330	2.89	73	ND	7.69	0.684
EW7-PM27A	610	280	2.89	120	ND	7.01	0.771
EW7-PM28A	1600	370	3.30	80	ND	7.45	0.797
EW7-PM29A	450	230	3.30	97	ND	7.29	0.600
Shallow-Intermediate Wells							
EW7-PM21B	770	300	2.89	150	ND	9.46	0.697
EW7-PM22B	690	300	2.89	160	ND	7.64	0.734
EW7-PM23B	620	310	2.89	150	ND	7.98	0.750
EW7-PM24B	1300	330	3.30	110	ND	8.84	0.707
EW7-PM25B	3900	410	0.72	110	ND	7.11	0.791
EW7-PM26B	2900	390	2.78	79	ND	9.22	0.792
EW7-PM27B	1700	390	2.89	90	ND	8.70	0.798
EW7-PM28B	3500	450	3.30	71	ND	7.09	0.802
EW7-PM29B	750	350	3.30	140	ND	8.07	0.769

 $\mu g/L = micrograms per liter$ 

Avg = average

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

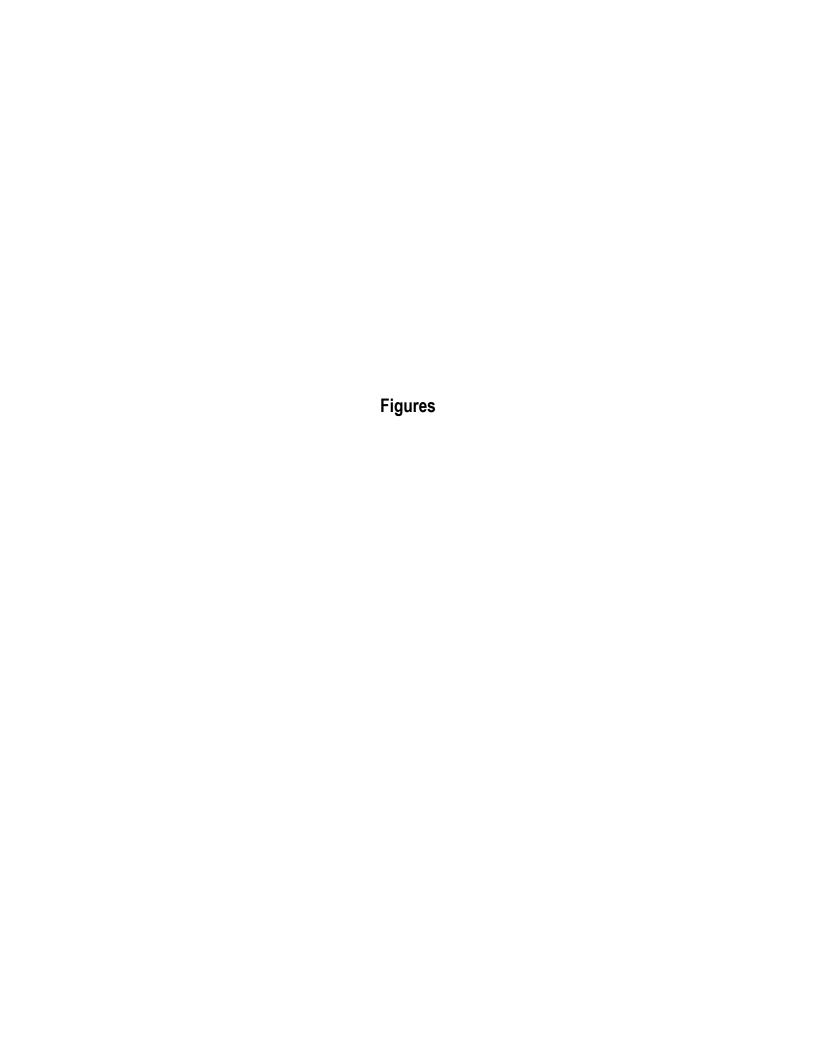
ND = nondetect

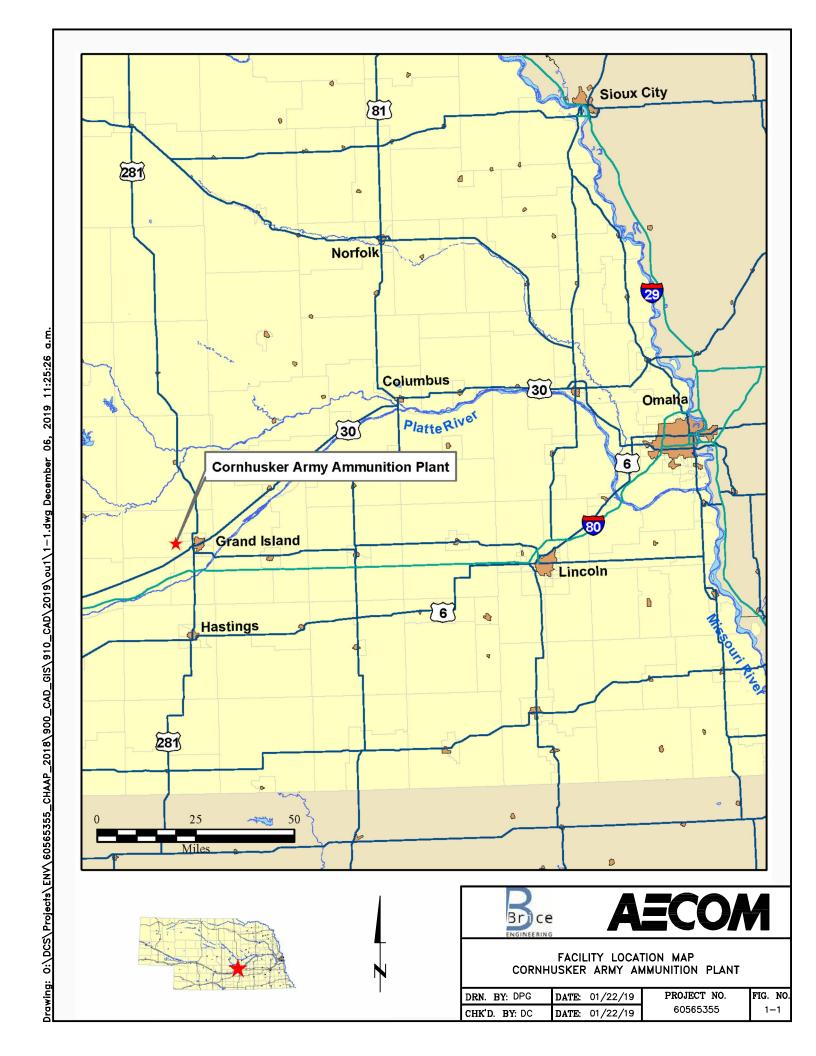
ORP = oxidation/reduction potential

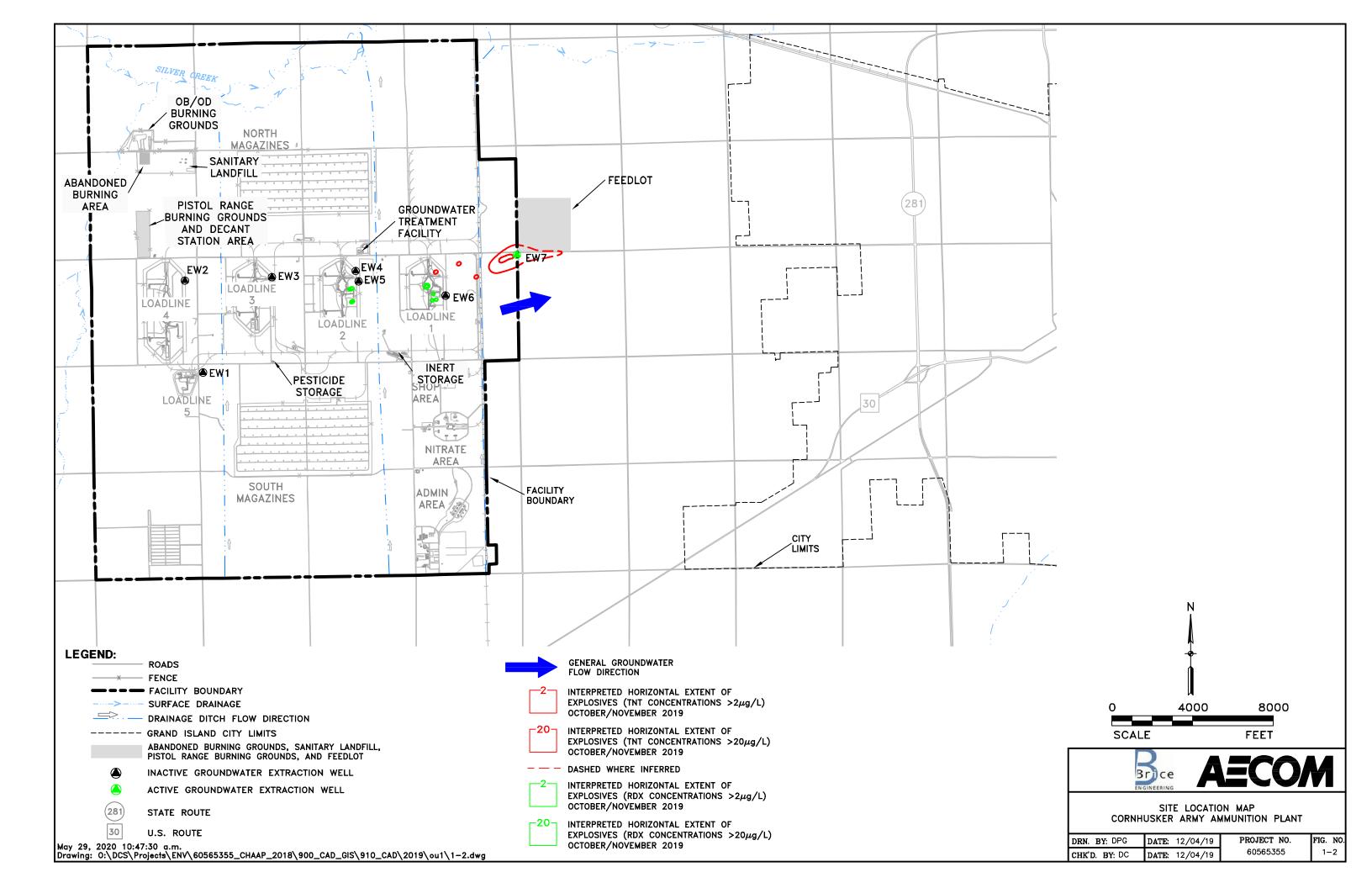
OU = Operable Unit

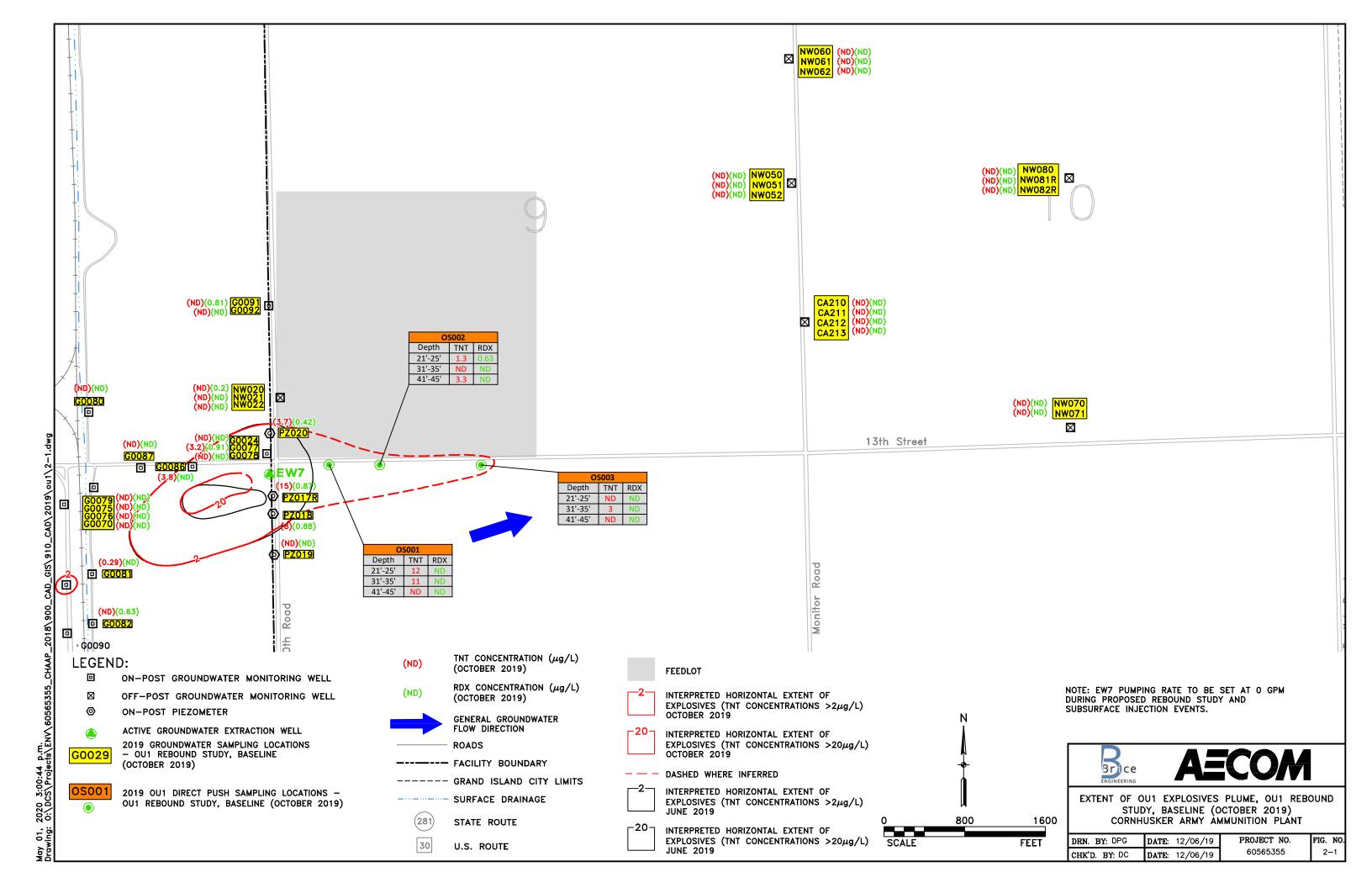
PM = performance monitoring

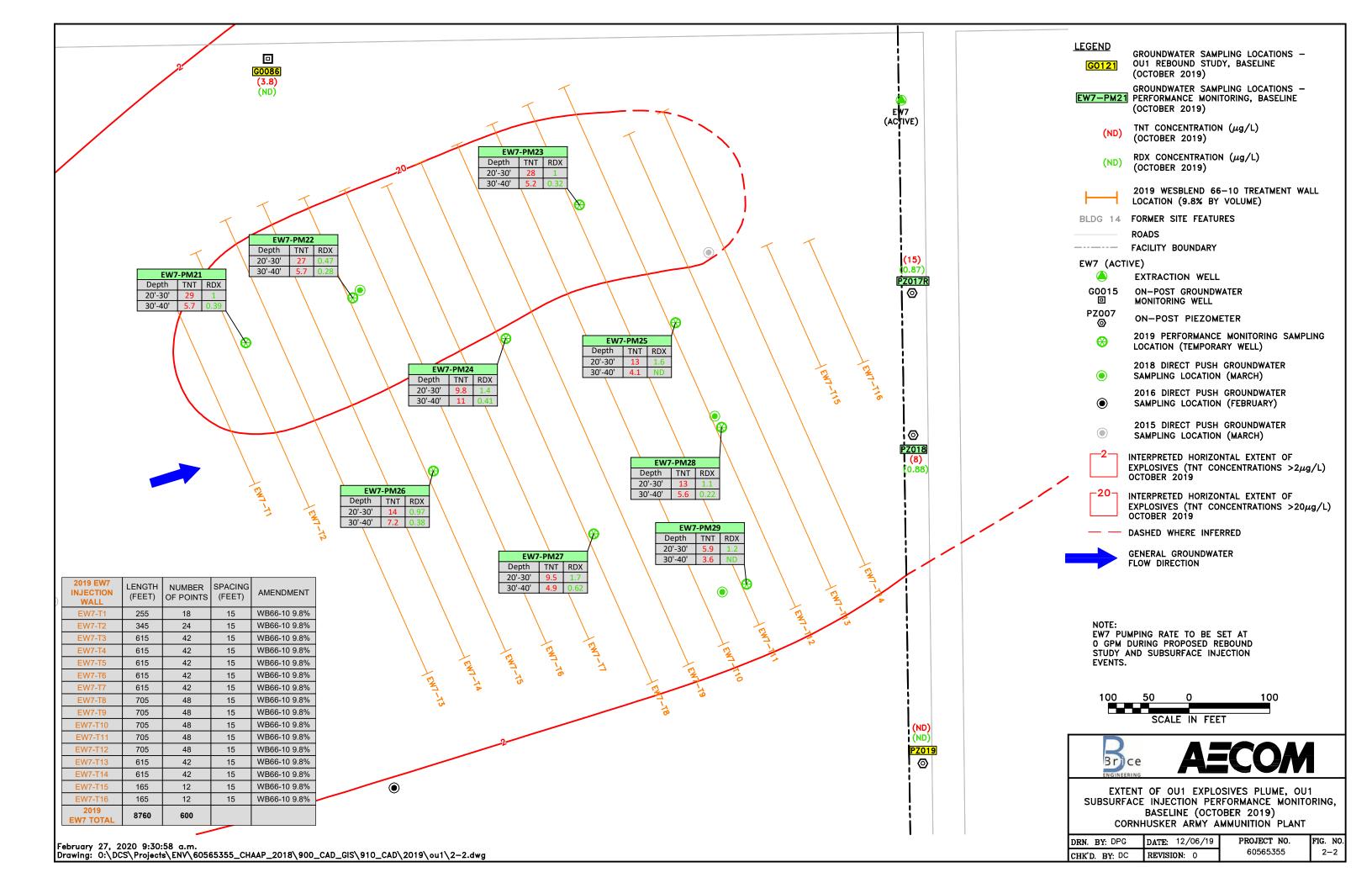
TKN = total Kjeldahl nitrogen

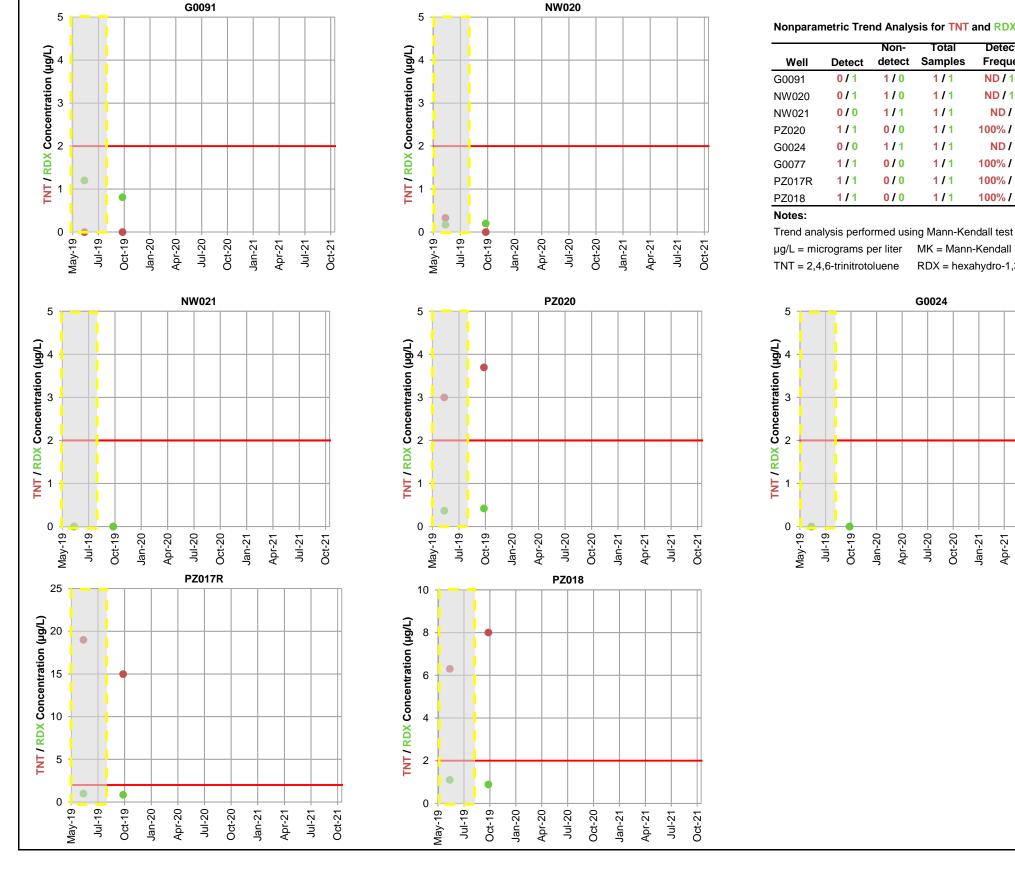












Nonparametric Trend Analysis for TNT and RDX (OU1 Rebound Study)

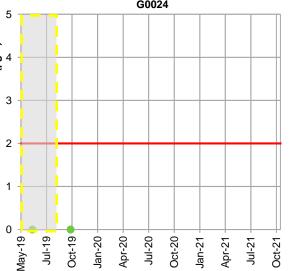
		Non-	Total	Detection	Min	Max	Mean	Median	MK	
Well	Detect	detect	Samples	Frequency	(µg/L)	(µg/L)	(µg/L)	(µg/L)	Result	Trend
G0091	0/1	1/0	1/1	ND / 100%	ND / 0.81	ND / 0.81	ND / 0.81	ND / 0.81	NA/NA	NA/NA
NW020	0/1	1/0	1/1	ND / 100%	ND / 0.20	ND / 0.20	ND / 0.20	ND / 0.20	NA/NA	NA/NA
NW021	0/0	1/1	1/1	ND / ND	NA/NA	NA/NA				
PZ020	1/1	0/0	1/1	100% / 100%	3.70 / 0.42	3.70 / 0.42	3.70 / 0.42	3.70 / 0.42	NA/NA	NA/NA
G0024	0/0	1/1	1/1	ND / ND	NA/NA	NA/NA				
G0077	1/1	0/0	1/1	100% / 100%	3.20 / 0.91	3.20 / 0.91	3.20 / 0.91	3.20 / 0.91	NA/NA	NA/NA
PZ017R	1/1	0/0	1/1	100% / 100%	15.0 / 0.87	15.0 / 0.87	15.0 / 0.87	15.0 / 0.87	NA/NA	NA/NA
PZ018	1/1	0/0	1/1	100% / 100%	8.00 / 0.88	8.00 / 0.88	8.00 / 0.88	8.00 / 0.88	NA/NA	NA/NA

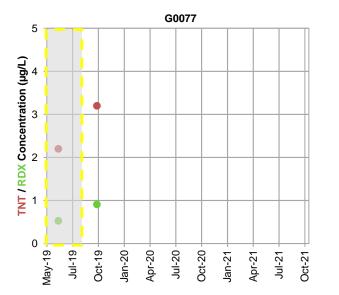
Trend analysis performed using Mann-Kendall test at 0.05 significance level.

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





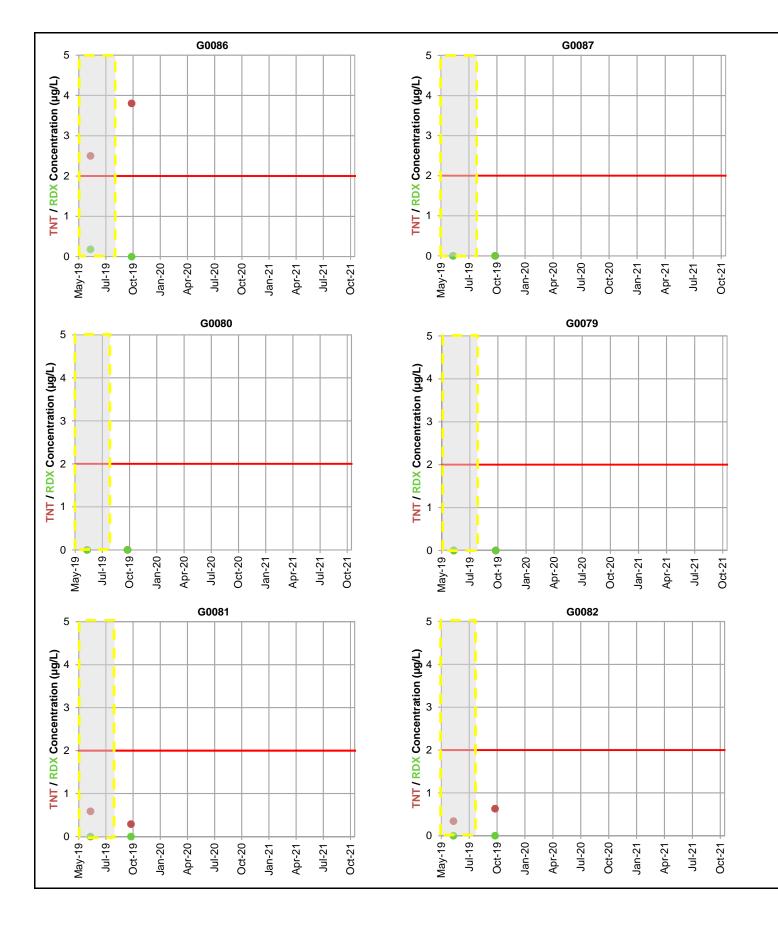


**AECOM** 

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

Drawn By:	Date:
KW	12/30/2019
Checked By:	Project No.:
DC	60565355

Figure 4-1



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

-		Non-	Total	Detection	Min	Max	Mean	Median	MK	
Well	Detect	detect	Samples	Frequency	(µg/L)	(µg/L)	(µg/L)	(µg/L)	Result	Trend
G0086	1/0	0/1	1/1	100% / ND	3.8 / ND	3.8 / ND	3.8 / ND	3.8 / ND	NA / NA	NA / NA
G0087	0/0	1/1	1/1	ND / ND	NA / NA	NA / NA				
G0080	0/0	1/1	1/1	ND / ND	NA / NA	NA / NA				
G0079	0/0	1/1	1/1	ND / ND	NA / NA	NA / NA				
G0075	0/0	1/1	1/1	ND / ND	NA / NA	NA / NA				
G0081	1/0	0/1	1/1	100% / ND	0.29 / ND	0.29 / ND	0.29 / ND	0.29 / ND	NA / NA	NA / NA
G0082	0/1	1/0	1/1	ND / 100%	ND / 0.63	ND / 0.63	ND / 0.63	ND / 0.63	NA/NA	NA/NA

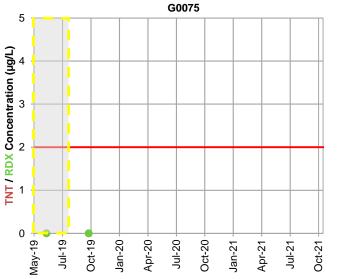
#### Notes:

Trend analysis performed using Mann-Kendall test at 0.05 significance level.  $\mu g/L = \text{micrograms per liter} \qquad \text{MK} = \text{Mann-Kendall}$ 

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

= 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:	Date:
KW	12/31/2019
Checked By:	Project No.:
DC	60565355

Figure 4-2

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.





# 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.

Appendix B
OU1 Rebound Study and Subsurface Injection Completed Field Forms

Direct Push Groundwater Sample Collection Field Sheets (Off-post)	

SITE NAME	CHAAP 2019	OU1 Rebound Stud	dy- Direct Push (SP	PROJECT NO.	60565355
SAMPLE NO.	050	01-121	001-25	SAMPLE DEPTH.	21-25
DATE/TIME COL SAMPLE METHO		10 - 14 - 1 Peristaltic Pump v	9 / 122 C w/Tubing	PERSONNEL	AB
SAMPLE MEDIA: SAMPLE QA SPL: SAMPLE QC DUP MS/MSD REQUE:	TT: PLICATE:	Groundwater YES YES YES	NO NO NO	SPLIT SAMPLE NO. DUPLICATE SAMPLE NO. MS/MSD SAMPLE NO.	NA
SAMPLE CONTA	AINERS, PRESE	RVATIVES, ANA	LYSIS	<del></del>	
Sample C 2 - 500m			Preservati	ve	Analysis Requested Explosives + MNX (8330A)
ñ	2			m	
WELL PURGING	DATA				
Date Time Started Time Completed Purge Volume (gal) Sample Turbidity Depth to Water (ft		10-14- 1157 1220 3 1206 7.15	7-	PID Measurements  Background  Breathing Zone  Well Head  Purge Water	No.
GENERAL COM	MENTS				

SITE NAME	CHAAP 2019	OU1 Rebound Stu	) PROJECT NO.	60565355	
SAMPLE NO.	0500	-DPOI	-35	SAMPLE DEPTH.	31-34
DATE/TIME COLL SAMPLE METHOI		10-14-19 Peristaltic Pump	/ 1255 w/ Tubing	PERSONNEL	AR
SAMPLE MEDIA: SAMPLE QA SPLI SAMPLE QC DUPI MS/MSD REQUES	LICATE:	Groundwater YES YES YES	© 20 20 20	SPLIT SAMPLE NO. DUPLICATE SAMPLE NO. MS/MSD SAMPLE NO.	NA 05501-0901-3: NA
SAMPLE CONTA	INERS, PRESE	RVATIVES, ANA	ALYSIS		
Sample Co			Preservati 6°C	ve	Analysis Requested Explosives + MNX (8330A)
WELL PURGING	DATA				
Date Time Started Time Completed Purge Volume (gal) Sample Turbidity Depth to Water (ft b	gs)	10-14 123 125 3 840 7.4	5	PID Measurements  Background  Breathing Zone  Well Head  Purge Water	NA
GENERAL COMN	MENTS	· · · · · · · · · · · · · · · · · · ·	<del>, , , , , , , , , , , , , , , , , , , </del>		

[1300]

SITE NAME	<b>CHAAP 2019</b>	OU1 Rebound Stud	y- Direct Push (SP	PROJECT NO.	60565355
SAMPLE NO.	0500	1-0701	-45	SAMPLE DEPTH.	41-45
DATE/TIME COLI SAMPLE METHO		10-14-19 Peristaltic Pump w	// 1415 Tubing	PERSONNEL	MR
SAMPLE MEDIA: SAMPLE QA SPLI SAMPLE QC DUP MS/MSD REQUES	LICATE:	Groundwater YES YES (ES)	NO NO	SPLIT SAMPLE NO. DUPLICATE SAMPLE NO. MS/MSD SAMPLE NO.	NA NA Some
SAMPLE CONTA	INERS, PRESI	ERVATIVES, ANAI	LYSIS		187 gg
. —	Sample Container  Sample Container  Freservative  6°C				Analysis Requested Explosives + MNX (8330A)
WELL PURGING	DATA				
Date Time Started Time Completed Purge Volume (gal) Sample Turbidity Depth to Water (ft b		10-14- 1347 1415 3' 49 7.5'	-19	PID Measurements  Background  Breathing Zone  Well Head  Purge Water	No
GENERAL COM	MENTS				

SITE NAME	CHAAP 201	9 OU1 Rebound Study- D	Direct Push (S	SP) PROJECT NO.	60565355
SAMPLE NO.		102 - DP01 -		SAMPLE DEPTH.	25'
DATE/TIME COL SAMPLE METHO	LECTED	10-28-19 Peristaltic Pump w/ Ty	1 14	700 PERSONNEL	DK
SAMPLE MEDIA SAMPLE QA SPL SAMPLE QC DUI MS/MSD REQUE	JIT: PLICATE: STED	Groundwater YES YES YES	NO NO	SPLIT SAMPLE NO. DUPLICATE SAMPLE NO. MS/MSD SAMPLE NO.	Ø
Sample (	AINERS, PRE Container IL Amber	SERVATIVĖS, ANALYS	Preserve 6°C		Analysis Requested Explosives + MNX (8330A)
WELL PURGING	G DATA				
Date Time Started Time Completed Purge Volume (ga Sample Turbidity Depth to Water (ft		1335 1355 1355 5 ga/la 190 5.72		PID Measurements  Background  Breathing Zone  Well Head  Purge Water	√0 ~0 ~0 ~0
GENERAL COM	Jubid.				

SITE NAME CHAAP	2019 OU1 Rebound Study- Direct Push (SP)	PROJECT NO.	60565355
SAMPLE NO. 05	1062-0901-35	SAMPLE DEPTH.	351
DATE/TIME COLLECTED SAMPLE METHOD	/6-28-19 / 1430 Peristaltic Pump w/ Tubing	PERSONNEL	DC
SAMPLE MEDIA: SAMPLE QA SPLIT: SAMPLE QC DUPLICATE: MS/MSD REQUESTED	YES NO	SPLIT SAMPLE NO DUPLICATE SAMPLE NO MS/MSD SAMPLE NO	0
SAMPLE CONTAINERS,	PRESERVATIVES, ANALYSIS		•
Sample Container 2 - 500mL Amber	Preservative 6°C	2	Analysis Requested Explosives + MNX (8330A)
WELL PURGING DATA			
Date		PID Measurements	
Time Started	DC 440-1410	Background	$\sim$
Time Completed	OL 1430-1425	Breathing Zone	
Purge Volume (gal)	5 94	Well Head	
Sample Turbidity	210	Purge Water	/
Depth to Water (ft bgs)	5.61		
GENERAL COMMENTS VEY TUB	٠.٩		

	CHAAP 2019	OU1 Rebound St	udy- Direct Push (SP	) PROJECT NO.	60565355
SAMPLE NO.	05	002 -D	101-45	SAMPLE DEPTH.	45
DATE/TIME COL SAMPLE METHO	LECTED	Peristaltic Pump	19 / 1	520 PERSONNEL	DC
SAMPLE MEDIA SAMPLE QA SPL SAMPLE QC DUI MS/MSD REQUE	LIT: PLICATE:	Groundwater YES YES YES	NO NO NO	SPLIT SAMPLE NO. DUPLICATE SAMPLE NO. MS/MSD SAMPLE NO.	8
SAMPLE CONT.	AINERS, PRES	SERVATIVES, AN	ALYSIS		
	Container nL Amber		Preservati 6°C	<u>ve</u>	Analysis Requeste Explosives + MNX (83
WELL PURGING	G DATA				
WELL PURGING	G DATA	11-28	-19	PID Measurements	
WELL PURGING  Date  Time Started	G DATA	16-28		PID Measurements  Background	
Date		1443	-1515		
Date Time Started	<b>V</b>	1443		Background	
Date Time Started Time Completed	<b>V</b>	1443		Background Breathing Zone	

SITE NAME	CHAAP 2019	OU1 Rebound Stu	dy- Direct Push (	(SP) PROJECT NO	60565355
SAMPLE NO.		13-0PC		SAMPLE DEPTH	25
DATE/TIME COLI SAMPLE METHO		Peristaltic Pump		705 PERSONNE	DC
SAMPLE MEDIA: SAMPLE QA SPLI SAMPLE QC DUP MS/MSD REQUES	LICATE: STED	Groundwater YES YES YES	NO NO NO	SPLIT SAMPLE NO DUPLICATE SAMPLE NO MS/MSD SAMPLE NO	
Sample Conta	ontainer	ERVATIVES, ANA	Preserv 6%		Analysis Requested Explosives + MNX (8330A)
WELL PURGING	DATA	10.28	2-19	PID Measurement	<u>s</u>
Time Started Time Completed Purge Volume (gal)	)	1700	,	Backgroun Breathing Zon Well Hea	e NO A
Sample Turbidity Depth to Water (ft		275 4.81	1	Purge Wate	r ND
Very to	rby 2	.49			

SITE NAME	CHAAP 2019	OU1 Rebound Stu	dy- Direct Push (SP	P) PROJECT NO.	60565355
SAMPLE NO.	050	003 - DP01	1-35	SAMPLE DEPTH.	35
DATE/TIME COL SAMPLE METHO		Peristaltic Pump		950 PERSONNEL	De
SAMPLE MEDIA SAMPLE QA SPL SAMPLE QC DU MS/MSD REQUE	LIT: PLICATE: ESTED	Groundwater YES YES YES	NO NO NO	SPLIT SAMPLE NO. DUPLICATE SAMPLE NO. MS/MSD SAMPLE NO.	
SAMPLE CONT	AINERS, PRES	SERVATIVES, ANA	LYSIS		
	Container nL Amber		Preservati 6°C	<u>ve</u>	Analysis Requested Explosives + MNX (8330A)
WELL PURGING	G DATA				
Date		10-28	7-19	PID Measurements	
Time Started		1730	4955	Background_	ND
Time Completed		1745		Breathing Zone	ND
Purge Volume (ga	1)	- Byn	7	Well Head	ND
Sample Turbidity			96	Purge Water_	ND
Depth to Water (ft	bgs)	4.45	<del></del>		
GENERAL COM	MENTS Furbid	***			



SITE NAME	CHAAP 2019	OU1 Rebound Stu	ndy- Direct Push (	SP) PRO	DJECT NO.	60565355
SAMPLE NO.	050c	3 -DP01	- 45	SAMPI	LE DEPTH.	45
DATE/TIME COLI SAMPLE METHO		10 - 28 Peristaltic Pump		820 PE	RSONNEL_	DC
SAMPLE MEDIA: SAMPLE QA SPLI SAMPLE QC DUP MS/MSD REQUES	T: LICATE:	Groundwater YES YES YES	NO NO NO	SPLIT SA DUPLICATE SA MS/MSD SA		0
SAMPLE CONTA	INERS, PRESE	ERVATIVES, ANA	ALLYSIS			
<u>Sample C</u> 2 - 500ml			Preserv 6°C			Analysis Requested Explosives + MNX (8330A)
WELL PURGING	G DATA				5 <u>-</u>	
Date Time Started Time Completed Purge Volume (gal) Sample Turbidity Depth to Water (ft)		10-28 1755 1815 4 ge	-19 221	Brea	Background	ND ND ND
GENERAL COM	MENTS.					

HTRW DRILLING LOG	DISTRICT USACE - Omah	a	HOLE NUMBER		
1, COMPANY NAME	2. DRILLING SUBCO	NTRACTOR	SHEET		
AECOM	Plains Environm	nmental Services (PES)			
3. PROJECT		4.LOCATION	PIR		
2019 OU1 Rebound Study_Direct Push		Grand Island, Nebraska			
5. NAME OF DRILLER		6. MANUFACTURE'S DESIGNATION OF DI	RILL _		
7. SIZES AND TYPES OF DRILLING Soil - 2-inch Marco Core S	ampler	8. HOLE LOCATION	F of FWZ		
Water - Screen Point Sample	<u>тег</u>	9. SURFACE ELEVATION	E. of EW7		
4		$\mathcal{T}\mathcal{B}\mathcal{V}$			
m	***	10. DATE STARTED 11	DATE COMPLETED		
12. OVERBURDEN THICKNESS		15. DEPTH GROUNDWATER ENCOUNTER			
13. DEPTH DRILLED INTO ROCK		9 / 16. DEPTH TO WATER AND ELAPSED TIM	AF AFTER DRILLING		
NA		NA			
13. DEPTH DRILLED INTO ROCK  NA  14. TOTAL DEPTH OF HOLE  ANGEL 60		17. OTHER WATER LEVEL MEASUREMEN	TS (SPECIFY)		
18. GEOTECHNICAL SAMPLES DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOX	ES		
20. SAMPLES FOR CHEMICAL VOC META	• •	R (SPECIFY) OTHER (SPECIFY)	OTHER (SPECIEY) 21. TOTAL CORE		
None			RECOVERY %		
22. DISPOSITION OF HOLE BACKFILLED MONITORIN	NG WELL OTHE	R (SPECIFY) 23. SIGNATURE OF INSPE	ECTOR		
LOCATION SKETCH/COMMENTS		SCALE:			
LOCATION SKETCH/COMMENTS		SCALE:			
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	.   -				
PROJECT	1 1 1 1		HOLE		
CHAAP 2019 OU1 Rebound Study			05001		

HTRW DRILLING LOG  PROJECT INSPECTOR  HOLE NO.  OSOO I										
	9 OU1 Rebound Study	INSPECTOR								
V DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING	GEOTECH SAMPLE		BLOW	SHEET AND PREMARKS				
b	c.	RESULTS	OR CORE BOX NO.	SAMPLE NO.	COUNTS	h.				
-	Clayer silt (ML), med Stiff,	ppm								
-	moist, Brn									
-						1/				
11-										
]										
_	41									
]										
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1 ‡	SAND (SP), LOOSE, gong, moist, fine to mad grained									
4	moist, fine to mad chained	,								
177	Jumin-a									
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10 ]					HOLENC	<u></u>				
	PROJECT CHAAP 2019 OU1 Rebound Study				HOLE NO.	05001				

RECEIVED OUT Rebound Study  REMARK 2019 OUT REBOUND OUT REBOUN	HTRW DRILLI	NG LOG				HOLE NO.		
DOTH DESCRIPTION OF MATERIALS  PRILID STRENGT GOVERN AMARTICA BOOK NAMED OF COUNTS  SAND (SIT), LOOSE, SYNTY I FILL THE AMARTICA BOOK NAMED OF COUNTS  INTEL AND TO COMPSE SYNING  INTEL AND TO COUNTS  INTEL	PROJECT	INSPECTOR	FYCH					
Smaller, Loose, gray, wet hed to coarse grain  11-  12-  Become fine grained Whittle med graind soul And trace of coarse Grainal sand  13-  14-  14-  15-  Becoming med to coarse Grained whisome fine grained Sand  14-  17-  18-  18-  18-  18-  18-  18-  18	ELEV DEPTH DESCRIPTION OF MATERIALS	DEPTH DESCRIPTION OF MATERIALS FIELD SCREENING GEOTECH SAM						
12 0.0 P-60 " 18 18 20 STOPPEN 10-41-1	12—Becomy fine grained W/ Little mud graind soul And Trace of coarse  Graind Sand		P-60" A-58"					
	SVANIE SANIE   12-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-		P-60" R-51"			STOPPW 10-44-19		
	PROJECT CHAAP 2019 OU1 Rebound Study				HOLE NO.	CAAL		

HTRW DRILLI	NG LOG				HOLE NO.	
ROJECT HAAP 2019 OU1 Rebound Study	INSPECTOR A E	XLEEY		SHEET 40 F STA		
LEV DEPTH DESCRIPTION OF MATERIALS	DESCRIPTION OF MATERIALS FIELD SCREENING GEOTECH SAMPLE ANALYTICAL					
SAND (SP), Dense, wet, gray  Med grained w/ some  Fine grained sand And  few coarse grained sand  And trace fine gravel  22-		17-60 <sup>4</sup> A-46 <sup>41</sup>	05001- DP01- 25 Screen 21-25	COUNTS	Resumed 10-15-19	
25	0.0	12-60" A-41"				
30						

HTRW DRILLIN	NG LOG				HOLE NO.   0900
PROJECT CHAAP 2019 OU1 Rebound Study	INSPECTOR A	Exce	-		SHEET 5 - 877
ELEV DEPTH DESCRIPTION OF MATERIALS	FIELD SCREENING	T	<del>- `-</del>	BLOW	REMARKS
Smed (51P), Dense, wet, Gray  med Graind, W/ Few  Corrse graind Sand and  Some Pine Trace Sand and  trace fine gravel  Becomy Fire to Med  Grained W/ Corrs e gramed  32- Sand and Pine gravel gradinout  out  Becoming AR  Mu	,	12-860° M-54"		COUNTS	h.
Becomy Fine to Med  grained Wifew Coarse  graind sand and Trace  fine to comse gravel  39  40  PROJECT	0.0	P-60" A-50"		HOLE NO.	5 601

	HTRW DRILLI	NG LOG		9		HOLE NO. 5001
PROJECT CHAAP 20	19 OU1 Rebound Study	INSPECTOR	R. Exc	227		SHEET 6 OF & 7
ELEV DEPTH		FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.		BLOW COUNTS	REMARKS h.
42-	SAND (SP), Dense, wet,  Gray, med to coarse  Svained w/Little fine  Grained Sand and trace  fine to coarse grave!	0.0	P-6011 R-3211	05001- 1)P01- 45 45/1151) 500001 41-45		
46	Becomy fine to Med graind W/few coarse graind sand asl trace fine grave!		P-60" R-30"			
48	Become Med to Como e graind W/Fe Little Fine grain 5 md  PROJECT CHAAP 2019 OUI Rebound Study	0.0			HOLE NO.	5001

HTRW DRILLING LOG  PROJECT INSPECTOR SHEET AN										
PROJECT CHAAP 2019 OU1 Rebound Study	INSPECTOR R. EXCERY SHEET									
ELEV DEPTH DESCRIPTION OF MATERIALS c.	FIELD SCREENING RESULTS	l .	ANALYTICAL	BLOW COUNTS	REMARKS h.					
Smd (SP), Dense, wet, gong med to Comse grained w/ Little fine grained smd w/ Trace fine grained smd		P-60" R-30"								
Becomed fine to Med  Becomed fine to Med  grained sand med Little fin  summed sand and types fin  gravel.	0.0									
56- 58- 58- 58- 58- 58- 58- 58- 58- 58- 58	0.0	P-60" A-54"								
				ł	1 1					

OU1 Groundwater Monitoring Well Sample Collection Field Sheets



SITE NAME		CH	AAP		PROJECT NO.	JECT NO. 60565355			
SAMPLE NO.		CA2	210-1		WELL NO.		CA	1210	
DATE/TIME C		10/21/19 (PRO-A	2 <i>0950</i> CTIVE SS MON	NSOON	PERSONNEL	R. Re	yes		
CAMBLEMED	NIA.	Groundwater			-		J		
SAMPLE MED SAMPLE QA S		YES	NO	TI IQ2	SAMPLE NO.				
SAMPLE QC I		YES	NO		SAMPLE NO.				
MS/MSD REQ		YES	NO		SAMPLE NO.				
					= =====================================				
		RS, PRESE					-		
Sample Co			Preservativ	e e	Analysis Re		20.4.		
2 - 500 mL			6°C 6°C, HCI		Methane (F	+ MNX (833	SUA)		
3 - 40 mL \ 1 - 500 mL			6°C, HCl 6°C, H₂S0₄			2), NH <sub>3</sub> (350.1)	NO./NO. (3:	53.2)	
1 - 250 mL			6°C			Alkalinity (2320		J.J.L)	
1 - 250 mL			6°C, ZnOA	c/NaOH	Sulfide (90				
1 - 250 mL			6°C	0,110011	DOC (9060				
WELL PURG					` :				
		, /			Well De	epth (ft BTOC)		-14.68- PC	16.85
Date		10/21/1	<b>ት</b>		Depth to W	ater (ft BTOC)		8.4	
Time Started		0	354		Water	Column Length		8,45	
Time Complete	ed.	/c	02		_	Volume (per ft)		2,47	
PID Measurem	<u>ents</u>					ter in Well (L)		0,9	
Background			VD	27.993	_	olumes to Purge		_	
Breathing Zo	one		'D		-	ım to Purge (L)		.0	
Well Head			Ď	- XI-3	Α.	ctual Purge (L)	٠٠ ٢	-5	
Purge Water			<i>p</i>		-				
FIELD MEAS	UREMENTS							· · · · · · · · · · · · · · · · · · ·	
Time	Amount Purged (L)	pН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV) ORP	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
0859	2,5	6,30	13,22	0,680	1.19	18.9 mV	4.67	8.4	0.5
0904	5.0	6.40	13,36	0.750	0.83	184,2 000	3.71	8,4	0,5
0909	7.5	6.45	13,39	0.773	0,74	182,8 DA	4,93	8,4	0.5
0914	10	6.44	13:42	0.815	0.67	19,2 mV	5,27	8,4	0,5
0919	12.5	6.46	13,63	0.870	0.63	177.3	3,98	8.4	0.5
0924	15	6,48	13,74	0.894	0.61	17514	5/12	8.4	015
09 29	17.5	6,49	/3,99	0.925	0,55	173.0	5,17	8.4	0.5
0934	20	4.51	14.17	0.951	0,49	169.8	4,53	8,4	0.5
0939	22,5	6.55	14,04	0.963	0,47	168./	4.74	8.4	0,5
0944	25	6.55	14.12	0.977	0.45	165.5	4.09	8.4	0.5
					_				
FIELD EQUI	PMENT AND	CALIBRATIO	N		Calibratic				
Water Lauri D	b-	Model			Calibration Chasked Assis	at Calibrated La	n orth		
		Solinst 102	-Parameter Prob	- e	Checked Against Calibrated Length Twice Daily Calibration Verification also Calibrated Weekly				
- Quality	MCC	131330 Multi	-i arameter i tob		Twice Daily Co	inoration verme	ation also car	orated weekly	
GENERAL C									
Ferrous Iron =	O, 00 mg								
Multi-Paramete		- 10							
244		Flow-Through (	Cell						
Pump Placeme		215 ft							D.13\
Pump Rate =	0,54/min							h / 2013 / Avg in	
Well Diameter					ORP	13.7	150.1	Dry	97.3 0.78
Screen Interva	1 = 1.9 - 11.9				DO PH	6.08	7.23	Dry Dry	6.52
-					Cond.	1.245	1.469	Dry	1.395



SITE NAME		СНААР			PROJECT NO.		605	65355	
SAMPLE NO.		CA2	211-1		WELL NO.		CA	<b>\211</b>	
DATE/TIME CO		1 - 1/1	Q 1/25 CTIVE SS MO	NSOON	PERSONNEL	R. Exc R. Ruy	een		
SAMPLE QC DUPLICATE: YES MS/MSD REQUESTED YES  DUPLICATE MS/MSD MS/MS			DUPLICATE MS/MSE	SAMPLE NO. SAMPLE NO. SAMPLE NO.					
SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS Sample Container 2 - 500 mL Amber 3 - 40 mL VOA 1 - 500 mL HDPE 1 - 250 mL HDPE 1 - 250 mL HDPE 1 - 250 mL HDPE 6°C, ZnOAc/NaOH 1 - 250 mL Amber 6°C WELL PURGING DATA			Analysis Re Explosives Methane (F TKN (351.2 SO <sub>4</sub> (9056A), Sulfide (900 DOC (9060	+ MNX (833 RSK 175) 2), NH <sub>3</sub> (350.1) Alkalinity (2320 34)	), NO <sub>2</sub> /NO <sub>3</sub> (35				
Date Time Started Time Completed PID Measurements Background Breathing Zone Well Head Purge Water		10-21-19 1026 1129 ND ND ND			Well Depth (ft BTOC)  Depth to Water (ft BTOC)  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)				
Time	UREMENTS Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
102631 1034 1041 1046 1051 1056 1101 1106 1111 1116	2.5 5.0 7.5 10 12.5 15 17.5 20 22.5 25 27.5	6.67 6.69 6.58 6.56 6.56 6.51 6.51 6.50 6.50 6.49	10.00 11.15 11.29 11.35 11.36 11.31 11.47 11.36 11.47 11.67	0.649 0.660 0.663 0.663 0.662 0.662 0.662 0.663 0.662	3.99 1.66 1.07 0.96 0.72 0.62 0.59 0.51 0.48 0.44	156.2 157.7 159.3 159.6 161.4 161.6 161.3 161.7 161.7	4,67 3,94 3,63 5,27 3,67 5,37 3,57 4,50 3,91 4,33	8,5 6,5 8,5 8,5 8,5 8,5 8,5 8,5 8,5	0,5 0,5 0,5 0,5 0,5 0,5 0,5 0,5
FIELD EQUIP Water Level Pro	be	Model Solinst 102	N Parameter Prob	e		st Calibrated Ler		brated Weekly	
GENERAL CO Ferrous Iron = Multi-Parameter Field Parameter Pump Placemen Pump Rate = Well Diameter = Screen Interval	Probe Unit # s Measured in t Depth = 3 0,5 L/m = 4"	24698 Flow-Through C	ell		Histor ORP DO PH	ic (7-year average 23.2 0.09 5.58	ge low and high 184.7 1.91 6.93	h / 2013 / Avg in ) 177.2 0.73 5.58	Bold) 120.6 0.75 6.42
					Cond	0.880	1.370	1.067	1.094



SITE NAME		СН	AAP		PROJECT NO.	NO. <b>60565355</b>			
SAMPLE NO.		CA	212-1	7	WELL NO.		C	A212	
DATE/TIME C		10/21/19 PRO-A	Q 1250 CTIVE SS MOR		PERSONNEL	P. E	xceen yes		
SAMPLE MED SAMPLE QA S SAMPLE QC I MS/MSD REQ	SPLIT: DUPLICATE:	Groundwater YES YES YES	NO NO	DUPLICATE	T SAMPLE NO. E SAMPLE NO. O SAMPLE NO.				
SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS           Sample Container         Preservative           2 - 500 mL Amber         6°C           3 - 40 mL VOA         6°C, HCI           1 - 500 mL HDPE         6°C, H <sub>2</sub> SO <sub>4</sub> 1 - 250 mL HDPE         6°C           1 - 250 mL HDPE         6°C, ZnOAc/NaOH           1 - 250 mL Amber         6°C						NX (8330A)			4
Date Time Started Time Complete PID Measurem Background Breathing Zo Well Head Purge Water	d ents one	PR - 1410	11-19 - 1156 1254 ND ND ND		Depth to W Water ( Well Casing Volume of Wa Casing Vo	epth (ft BTOC) /ater (ft BTOC) Column Length Volume (per ft) ater in Well (L) clumes to Purge um to Purge (L) cctual Purge (L)	67.12 8.46 58.66 2.47 /44.9		
FIELD MEAS Time	UREMENTS Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV) FR	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1213 1218 1223 1228 1228 1233 1238 1243		7,13 6,67 6,60 6,61 6,67 6,67 6,67 6,73	11.76 11.95 12.01 12.101 12.11 12.12 12.12(6) 12.32 12.33	0,490 0,489 0,492 0,492 0,493 0,493 0,495 0,496	5,73 1,73 1,02 0,70 0,59 0,55 0,50 0,48 0,44	142,3 152,7 150,9 152,2 151,3 151,2 150,4 148,0 149,6	5.05 4,79 3.64 4.59 4.38 4.97 3.79 3.61 3.64	8.46 8.46 8.46 8.46 8.46 8.46 8.46 8.46	0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
Water Level Probe Solinst 102						st Calibrated Ler	<u> </u>	brated Weekly	
Pump Placemer Pump Rate = Well Diameter	r Probe Unit # rs Measured in at Depth = 6 0.5 L	24698 Flow-Through C	i'ell		ORP	22.9	187.4	h / 2013 / Avg in I 187.4	104.2
Screen Interval	= 57.0 - 67.0				PH Cond	0.08 5.93	7.09	0.16 5.93	0.35 6.79



#### **GENERAL INFORMATION**

SITE NAME		СН	AAP		PROJECT NO.		605	65355	
SAMPLE NO.		CA2	213-1		WELL NO.		C	A213	
DATE/TIME C SAMPLE MET		10/21/10 PRØ-A	9 @ 14 CTIVE SS MO	25 NSOON	PERSONNEL	P. Ex	ceey		
SAMPLE MED SAMPLE QA S SAMPLE QC I MS/MSD REQ	SPLIT: DUPLICATE:	Groundwater YES YES YES	NO NO NO	DUPLICATI	F SAMPLE NO. E SAMPLE NO. D SAMPLE NO.		1125		
		RESERVATIV		S	A l . l . D				
Sample Contain 2 - 500 mL Am			Preservative 6°C		Analysis Reque Explosives + M				
3 - 40 mL VOA			6°C, HCI		Methane (RSK				
1 - 500 mL HD	PE		6°C, H <sub>2</sub> SO <sub>4</sub>			NH <sub>3</sub> (350.1), NO	<sub>2</sub> /NO <sub>3</sub> (353.2)		
1 - 250 mL HD	PE		6°C		SO <sub>4</sub> (9056A), A	Alkalinity (2320I	3)		
1 - 250 mL HD			6°C, ZnOAc/N	аОН	Sulfide (9034)		1.011		
1 - 250 mL Am			6°C		DOC (9060A)		<u>'''</u>	<del></del>	
Date Time Started Time Complete PID Measureme Background Breathing Zo Well Head Purge Water	d ents	10-21 132 143 ND	0		Well Depth (ft BTOC)  Depth to Water (ft BTOC)  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)				
Turge water		N P					_		
FIELD MEAS Time	UREMENTS Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox .(mV)- PO ORP	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1325	2,5	8,06	11.96	0,339	4.88	97.8	11.9	9.15	0.5
1330	5	7,52	12,05	0,371	1.42	120.9	12,1	9.15	0,5
1335	7.5	7.41	12.17	0,381	0.82	124.0	12,05	9.15	0,5
13 40	10	7.42	12,34	0,381	0,60	123,5	12,03	9,15	0,5
1345	12.5	7.42	12.36	0,381	0.45	121,5	11,3/	9,15	0,5
1350	15	7.41	12,30	0,379	0,35	122,2	7.94	9.15	0,5
1355	17.5	7.44	12,20	0.377	0.31	121,4	8,91	9,15	0,5
1400	20_	7.45	12,38	0,378	0,27	120,4	8.94	9.15	0,5
1405	22,5	7.48	12,35	0.376	0,25	119.5	5.60	9,15	0,5
1410	25 21.5	7,45	12.36	0.375	0,24	119.0	5,23	9.15	0,5
1420	30	7,47	12,25	0.373	0,22	118.3	5.44	9.15	0,5
			10/00	-1373	4120	11 013	5.47	7.13	015
FIELD EQUIP	MENT AND	CALIBRATION	ł		·	<del></del>		<del></del>	
Water Level Probe Solinst 102 Checked Against Calibrated Length Water Quality Meter YSI 556 Multi-Parameter Probe Twice Daily Calibration Verification also Calibrated Weekly									
GENERAL CO									
Ferrous Iron =									
Multi-Paramete							70		
		Flow-Through Co	ell						
Pump Pate -					11:	io (7 voc	na laure e a let d	h / 2012 / h · · ·	)-14\
Pump Rate = Well Diameter =	0,5 L/M	<u>ı</u> n			ORP	<u>-44.6</u>	ge low and hig 183.9	h / 2013 / Avg in I 183.9	37.2
Screen Interval					DO	0.10	0.28	0.22	0.19
				2 2	PH	6.63	7.80	6.63	7.46

Cond.

0.368

0.705

0.467

0.481

SITE NAME	_	СН	AAP		PROJECT NO.		605	65355	
SAMPLE NO.		NW	020-1		WELL NO.	72	N	W020	
DATE/TIME O		10-22- PRO-A	19 / 12 CTIVE SS MO	135 NSOON	PERSONNEL	CH			
SAMPLE MEI SAMPLE QA SAMPLE QC MS/MSD REQ	SPLIT: DUPLICATE: QUESTED:	Groundwater YES YES YES	NO NO NO	DUPLICATE MS/MSD	F SAMPLE NO. E SAMPLE NO. D SAMPLE NO.				
SAMPLE CONTAINERS, PRESERVATIVES, Sample Container  2 - 500 mL Amber  3 - 40 mL VOA  1 - 500 mL HDPE  1 - 250 mL Amber  WELL PURGING DATA				ve	Explosives + MNX (8330A) Methane (RSK 175) TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2) SO <sub>4</sub> (9056A), Alkalinity (2320B) NaOH Sulfide (9034) DOC (9060A)				
Date  Time Started  Time Completed  PID Measurements  Background  Breathing Zone  Well Head  Purge Water  ID-22-19  ID-0  ID-0					Depth to W Water ( Well Casing Volume of Wa Casing Vo	epth (ft BTOC) /ater (ft BTOC) Column Length Volume (per ft) ater in Well (L) olumes to Purge um to Purge (L) actual Purge (L)	14.51 15.41 2.47 38.04		
FIELD MEAS	SUREMENTS Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1155 1200 1205 1210 1216 1226 1325 1330	35 5.0 7.5 10.0 12.5 16.0 17.6 20.0	(6.42 (6.51 (6.53 (6.53 (6.53 (6.53	14.17 13.89 14.04 14.04 13.95 14.11 14.11	1.109		1262 1189 1172 1162 1167 1148 114.4	0.21 0.14 0.34 0.19 0.05 0.04 0.02	14.51 14.51 14.51 14.51 14.51 14.51 14.51 14.51	0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
FIELD EQUIPMENT AND CALIBRATION  Model  Water Level Probe Heron  Water Quality Meter  YSI 556 Multi-Parameter Probe  Water Quality Meter  Twice Daily Calibration Verification also Calibrated Weekly									
Pump Placeme	O 7 mg er Probe Unit # rs Measured in nt Depth = 2	Flow-Through (	Cell						
Pump Rate =		in						h / 2018 / Avg in	
Well Diameter = 4"  Screen Interval = 15-25					ORP DO	65.1 2.54	195.7 5.29	2.72	130.9
Screen interval = 15-25					PH	6.11	6.75	6.19	3.53 6.46
					Cond.	0.617	1.032	0.852	0.834

SITE NAME	СНААР		PROJECT NO.		6050	65355	
SAMPLE NO.	NW021-1		WELL NO.		NV	V021	
DATE/TIME COLLECTED SAMPLE METHOD		355 ss monsoon	_ PERSONNEL	CH			
SAMPLE MEDIA: SAMPLE QA SPLIT: SAMPLE QC DUPLICATE: MS/MSD REQUESTED  SAMPLE CONTAINE	YES N	O DUPLICATE  MS/MSE			NW	023-1 0	800
Sample Container 2 - 500 mL Amber 3 - 40 mL VOA 1 - 500 mL HDPE 1 - 250 mL HDPE 1 - 250 mL HDPE 1 - 250 mL Amber WELL PURGING DATA	6°C 6°C, 6°C, 6°C, 6°C,	Methane (F TKN (351.2 SO <sub>4</sub> (9056A), Sulfide (90 DOC (9060	+ MNX (83 RSK 175) 2), NH <sub>3</sub> (350.1 Alkalinity (232 34)	), NO <sub>2</sub> /NO <sub>3</sub> (3			
Date Time Started Time Completed PID Measurements Background Breathing Zone Well Head Purge Water	10-22-19 1300 1370 NU NU NU			ater (ft BTOC) ater (ft BTOC) Column Length Volume (per ft) ter in Well (L) lumes to Purge m to Purge (L) ctual Purge (L)	14. 31. 2.47. 76.5 201 251	7	
FIELD MEASUREMENTS Time Amount Purged (L)	pH Temp	erature Conductivity sius) (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1305 2.5 1310 5.0 1315 7.5 1320 100 1325 12.5 1330 15.0 1335 17.5 1340 20.0 1345 22.5 1350 30.0	(0.74 12.5 (0.76 13 (0.76 13 (0.70 12.6 (0.70 12.6 (0.77 13.6 (0.77 12.6	-64 1163 12 1158 79 1159	0.95 0.30 0.49 0.40 0.60 0.39 0.27 0.27	123.9 120.7 119.0 117.2 116.2 115.4 114.3 113.9 113.4 112.2	0.45 0.39 0.28 0.51 0.11 0.01 0.07 0.04 0.04 0.04	14.76 14.75 14.75 14.75 14.75 14.75 14.75 14.75 14.75	05 05 05 05 05 05 05 05 05 05 05
FIELD EQUIPMENT AND Water Level Probe Water Quality Meter	CALIBRATION  Model Heron YSI 556 Multi-Parame	ter Probe	Calibration Checked Again Twice Daily Ca			ibrated Weekly	
GENERAL COMMENTS Ferrous Iron = O · O O my Multi-Parameter Probe Unit # Field Parameters Measured in Pump Placement Depth = '5' Pump Rate = O PT L/W Well Diameter = 4" Screen Interval = 37-42	Flow-Through Cell	Histori ORP DO PH	c (7-year average 44.2 0.06 6.53	ge low and high 182.3 0.38 6.99	1/2018 / Avg in 109.7 0.06 6.53	Bold) 103.1 0.26 6.84	

SAMPLE NO.   NW022-1   WELL NO.   NW022-1   WELL NO.   NW022-1   WELL NO.   NW022-1   WELL NO.   NW023-1   WELL NO.   NW024-1   WELL NO.   NW025-1   WELL NO.   WEL	SITE NAME	CHAAP PROJECT NO. 6						605	65355	
PRO-ACTIVE SS MONSOON	SAMPLE NO.		NW	022-1		WELL NO.		NV	V022	
SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS						PERSONNEL	TY			
SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS   Sample Container   2 - 500 mL Amber   6°C   Explosives + MMX (8330A)	SAMPLE MEI	DIA:								
MS/MSD REQUESTED   YES   No   MS/MSD SAMPLE NO.	-					23				
Sample Container	=			_		8.				
Sample Container								115	100	
2 - 500 mL Amber 3 - 40 mL VOA 6°C, HCI 1 - 500 mL HDPE 6°C, HS0, 1 - 500 mL HDPE 6°C, HS0, 1 - 500 mL HDPE 6°C, HS0, 1 - 500 mL HDPE 6°C, SO, (9056A), Attaininty (2320B)			RS, PRESE							
3 - 40 mL VOA										
1 - 500 mL HDPE 6°C, H,Sol, TKN (351.2), NH,G50.1, NO,NO, (353.2) 1 - 250 mL HDPE 6°C, ZnOAc/NaOH 6°C SOL, (9056A) Alkalinity (2320B) 1 - 250 mL HDPE 6°C, ZnOAc/NaOH 6°C SOL, (9056A) Alkalinity (2320B) 1 - 250 mL Amber Well PURGING DATA  Date 10 - 22 - 19 Well Depth (# BTOC)								JUAJ		
1 - 250 mL HDPE		00 mL HDPE $6^{\circ}$ C, $H_2$ S0 <sub>4</sub>						), NO <sub>2</sub> /NO <sub>3</sub> (3	353.2)	
1-25 ml Amber   6°C   DOC (9060A)										
Date										
Date							)A)			
Depth to Water (in BTOC)   14   5   5   14   5   5   14   5   5   14   5   5   5   14   5   5   5   5   5   5   5   5   5	WELL PURG	ING DATA				Wall D	anth (ft DTOO)		66.60	
Time Campleted   1430   Water Column Length   71.4   7   7   7   7   7   7   7   7   7	Date 10-22-19						•	1/1/		
Time Completed   1	Time Started 1430							51.95	<u> </u>	
Volume of Water in Well (L) 12 3 3   Casing Volumes to Purge Breathing Zone   Minimum to Purge (L)   20   Casing Volumes (L)   20	Time Completed 1715									
Casing Volumes to Purge   Minimum to Purge (L)   2CL   Actual Purge (L)   Actual Purge	PID Measurements								2	
Note   Purge Water   Note   Purge (L)   Purge (R)   Purge (L)   Purge (R)										
FIELD MEASUREMENTS   Time   Amount   PH   Temperature   Conductivity   Dissolved   Redox   Turbidity   Depth to Water   Purge Rate   (Celsius)   (mS/cm)   Oxygen (mg/L)   (NTU)   (ft BTOC)   (L/min)	Breathing Zone									
FIELD MEASUREMENTS   Time	Well Head					A	ctual Purge (L)	201		
Time	Purge Water			ND						
Purged (L)   (Celsius)   (mS/cm)   Oxygen (mg/L)   (mV)   (NTU)   (fi BTOC)   (L/min)	FIELD MEAS	UREMENTS								
1440   5 0   6 92   12 99   1.278   0.36   88.3   0.60   14 65   0.5     1445   7.5   (6.92   12.82   1.279   0.25   73.7   0.67   14.65   0.5     1450   10 0   6.94   13.03   1.279   0.32   5.97   0.49   14.65   0.5     1450   15 0   6.95   13.31   1.271   0.29   17.7   0.66   14.65   0.5     1500   15 0   6.96   13.39   1.276   0.20   37.4   0.52   14.65   0.5     1505   13.5   (6.96   12.82   1.274   0.20   27.1   0.20   14.65   0.5     1507   13.5   (6.96   12.82   1.274   0.20   27.1   0.20   14.65   0.5     1510   20 0   6.96   13.27   1270   0.19   14.65   0.5     1510   20 0   6.96   13.27   1270   0.19   14.65   0.5     1510   20 0   6.96   13.27   1270   0.19   14.65   0.5     1510   20 0   6.96   13.27   1270   0.19   14.65   0.5     1510   20 0   6.96   13.27   1270   0.19   14.65   0.5     1510   20 0   6.96   13.27   1270   0.19   14.65   0.5     1510   20 0   6.96   13.27   1270   0.19   14.65   0.5     1510   20 0   6.96   13.27   1270   0.19   14.65   0.5     1510   20 0   6.96   13.27   1270   0.19   14.65   0.5     1510   20 0   6.96   14.65	Time		рН	•	•			•	•	•
1440   5 0   6 92   12 99   1.278   0.36   88.3   0.60   14.65   0.5     1445   7.5   (6.92   12.82   1.279   0.25   73.7   0.67   14.65   0.5     1450   16 0   6 94   13.03   1.279   0.32   57.7   0.49   14.65   0.5     1455   12.5   6 945   13.3   1.277   0.29   47.7   0.66   14.65   0.5     1500   15.0   6 96   13.3   1.276   0.20   37.4   0.32   14.65   0.5     1505   13.5   6 96   12.82   1.274   0.20   37.4   0.32   14.65   0.5     1510   20 0   6 96   13.27   1.270   0.19   20.7   0.19   14.65   0.5     1510   20 0   6 96   13.27   1.270   0.19   20.7   0.19   14.65   0.5     1510   20 0   6 96   13.27   1.270   0.19   20.7   0.19   14.65   0.5     1510   20 0   6 96   13.27   1.270   0.19   20.7   0.19   14.65   0.5     1510   20 0   6 96   13.27   1.270   0.19   20.7   0.19   14.65   0.5     1510   20 0   6 96   13.27   1.270   0.19   20.7   0.19   14.65   0.5     1510   20 0   6 96   13.27   1.270   0.19   20.7   0.19   14.65   0.5     1510   20 0   6 96   13.27   1.270   0.19   20.7   0.19   14.65   0.5     1510   20 0   6 96   13.27   1.270   0.19   20.7   0.19   14.65   0.5     1510   20 0   6 96   13.27   1.270   0.19   14.65   0.5     1510   20 0   6 96   1.2	1435	2.5	(0.9F	13.07	1.172	2.04	105.1	1.04	14.65	0.5
1445	1440	5.0	6.92	12.99	1.278	0.36		060		
1455   125   695   1331   277   0.29   47.7   0.66   14.65   0.5     1500   15.0   696   1339   1.276   0.20   37.4   0.32   14.65   0.5     1505   135   696   12.82   1.274   0.20   27.1   0.2   74.66   0.5     1510   200   696   13.27   1.270   0.19   36.7   0.19   14.65   0.5     1510   200   696   13.27   1.270   0.19   36.7   0.19   14.65   0.5     1510   200   696   13.27   1.270   0.19   36.7   0.19   14.65   0.5     1510   200   696   13.27   1.270   0.19   36.7   0.19   14.65   0.5     1510   200   696   13.27   1.270   0.19   36.7   0.19   14.65   0.5     1510   200   696   14.65   0.5     1510   200   696   696   696   696   696   696     1510   696   696   696   696   696   696     1510   696   696   696   696   696     1510   696   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696   696     1510   696   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696   696     1510   696   696   696     1510   696   696   696     1510   696   696   696     1510   696   696   696     1510   696   696   696     1510   696   696   696     1510   696   696   696     1510   696   696   696     1510   696   696     1510   696   696     1510   696   696     1510   696   696     1510   696   696     1510	1445	7.5	(0.92	12.82			73.7			0.5
15.00				13-03		0.32	F9.7		14.65	0.5
IFO		12.5	6.95	13.31	1.277		47.7	0.66	14.65	6.5
FIELD EQUIPMENT AND CALIBRATION   Mode    Calibration   Checked Against Calibrated Length		15.0	6.96						14.65	0.5
FIELD EQUIPMENT AND CALIBRATION  Model  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 = D 37 mg/L  Multi-Parameter Probe Unit # Q  Field Parameters Measured in Flow-Through Cell  Pump Placement Depth = O 5 ft  Pump Rate = O 5 L /m in  Well Diameter = 4"  ORP -55.1 77.7 77.7 2.7  Screen Interval = 59 - 64  DO 0.08 0.48 0.08 0.26  PH 6.77 7.35 6.77 7.16		17.5						0 0	14.65	
Water Level Probe Water Quality Meter  Water Quality Meter  Water Quality Meter  YSI 556 Multi-Parameter Probe Twice Daily Calibration Verification also Calibrated Weekly  GENERAL COMMENTS Ferrous Iron = 0 27 mg/L  Multi-Parameter Probe Unit # 2  Field Parameters Measured in Flow-Through Cell  Pump Placement Depth = 0 1 1 ft  Pump Rate = 0 6 1 min  Well Diameter = 4"  ORP -55.1 77.7 77.7 2.7  Screen Interval = 59 - 64  DO 0.08 0.48 0.08 0.26  PH 6.77 7.35 6.77 7.16	1510	20.0	6.96	13.27	1.270	0.19	20.7	0.19	14.65	0.5
Water Level Probe Water Quality Meter  Water Quality Meter  Water Quality Meter  YSI 556 Multi-Parameter Probe Twice Daily Calibration Verification also Calibrated Weekly  GENERAL COMMENTS Ferrous Iron = 0 27 mg/L  Multi-Parameter Probe Unit # 2  Field Parameters Measured in Flow-Through Cell  Pump Placement Depth = 0 1 1 ft  Pump Rate = 0 6 1 min  Well Diameter = 4"  ORP -55.1 77.7 77.7 2.7  Screen Interval = 59 - 64  DO 0.08 0.48 0.08 0.26  PH 6.77 7.35 6.77 7.16										
Water Level Probe Water Quality Meter  Water Quality Meter  Water Quality Meter  YSI 556 Multi-Parameter Probe Twice Daily Calibration Verification also Calibrated Weekly  GENERAL COMMENTS Ferrous Iron = 0 27 mg/L  Multi-Parameter Probe Unit # 2  Field Parameters Measured in Flow-Through Cell  Pump Placement Depth = 0 1 1 ft  Pump Rate = 0 6 1 min  Well Diameter = 4"  ORP -55.1 77.7 77.7 2.7  Screen Interval = 59 - 64  DO 0.08 0.48 0.08 0.26  PH 6.77 7.35 6.77 7.16										
Water Level Probe Water Quality Meter  Water Quality Meter  Water Quality Meter  YSI 556 Multi-Parameter Probe Twice Daily Calibration Verification also Calibrated Weekly  GENERAL COMMENTS Ferrous Iron = 0 27 mg/L  Multi-Parameter Probe Unit # 2  Field Parameters Measured in Flow-Through Cell  Pump Placement Depth = 0 1 1 ft  Pump Rate = 0 6 1 min  Well Diameter = 4"  ORP -55.1 77.7 77.7 2.7  Screen Interval = 59 - 64  DO 0.08 0.48 0.08 0.26  PH 6.77 7.35 6.77 7.16										
Water Level Probe Water Quality Meter  Water Quality Meter  Water Quality Meter  YSI 556 Multi-Parameter Probe Twice Daily Calibration Verification also Calibrated Weekly  GENERAL COMMENTS Ferrous Iron = 0 27 mg/L  Multi-Parameter Probe Unit # 2  Field Parameters Measured in Flow-Through Cell  Pump Placement Depth = 0 1 1 ft  Pump Rate = 0 6 1 min  Well Diameter = 4"  ORP -55.1 77.7 77.7 2.7  Screen Interval = 59 - 64  DO 0.08 0.48 0.08 0.26  PH 6.77 7.35 6.77 7.16										
Water Level Probe Water Quality Meter  YSI 556 Multi-Parameter Probe Twice Daily Calibrated Length  Twice Daily Calibration Verification also Calibrated Weekly  GENERAL COMMENTS  Ferrous Iron = 7 mg/L  Multi-Parameter Probe Unit # 2  Field Parameters Measured in Flow-Through Cell  Pump Placement Depth = 10   1 ft  Pump Rate = 0	FIELD EQUI	PMENT AND		ON						
Water Quality Meter  YSI 556 Multi-Parameter Probe  Twice Daily Calibration Verification also Calibrated Weekly  GENERAL COMMENTS  Ferrous Iron = 7 mg/L  Multi-Parameter Probe Unit # 2  Field Parameters Measured in Flow-Through Cell  Pump Placement Depth = 6 ft  Pump Rate = 0 ft  Min Historic (7-year average low and high / 2018 / Avg in Bold)  Well Diameter = 4"  ORP -55.1 77.7 77.7 2.7  Screen Interval = 59 - 64  DO 0.08 0.48 0.08 0.26  PH 6.77 7.35 6.77 7.16	Water Level D.	nhe					or Calibaria de	anath		
GENERAL COMMENTS         Ferrous Iron = □ → 7 mg/L         Multi-Parameter Probe Unit # Q         Field Parameters Measured in Flow-Through Cell         Pump Placement Depth = □ ↑ ft         Pump Rate = ○ □ / m in       Historic (7-year average low and high / 2018 / Avg in Bold)         Well Diameter = 4"       ORP -55.1 77.7 77.7 2.7         Screen Interval = 59 - 64       DO 0.08 0.48 0.08 0.26         PH 6.77 7.35 6.77 7.16				-Parameter Prob	ne e				librated Weekly	
Ferrous Iron = 0 27 mg/L  Multi-Parameter Probe Unit # 2  Field Parameters Measured in Flow-Through Cell  Pump Placement Depth = 0 1 5 ft  Pump Rate = 0 5 L/min Historic (7-year average low and high / 2018 / Avg in Bold)  Well Diameter = 4" ORP -55.1 77.7 77.7 2.7  Screen Interval = 59 - 64 DO 0.08 0.48 0.08 0.26  PH 6.77 7.35 6.77 7.16			550 11101(1					uioo Ca		6
Multi-Parameter Probe Unit # Q         Field Parameters Measured in Flow-Through Cell         Pump Placement Depth = 6   5   6   7   6         Historic (7-year average low and high / 2018 / Avg in Bold)         Well Diameter = 4"       ORP										
Field Parameters Measured in Flow-Through Cell         Pump Placement Depth = 6   5   6   7   6         Historic (7-year average low and high / 2018 / Avg in Bold)         Pump Rate = 0   6   7   7.7   77.7   77.7   77.7   2.7         Screen Interval = 59 - 64       DO 0.08 0.48 0.08 0.26         PH 6.77 7.35 6.77 7.16										
Pump Placement Depth = 6   5   ft           Pump Rate = 0				Cell						
Pump Rate = O				COII						
Well Diameter = 4"         ORP         -55.1         77.7         77.7         2.7           Screen Interval = 59 - 64         DO         0.08         0.48         0.08         0.26           PH         6.77         7.35         6.77         7.16				-		Histori	ic (7-year average	ge low and hig	h / 2018 / Ave ir	Bold)
Screen Interval = 59 - 64         DO         0.08         0.48         0.08         0.26           PH         6.77         7.35         6.77         7.16										
PH 6.77 7.35 6.77 <b>7.16</b>		- 4								
Cond. 0.962 1.212 0.964 <b>1.048</b>	Well Diameter			3=25 = 26		DO	0.08	0.48	0.08	0.26
	Well Diameter									

SITE NAME		СН	AAP		PROJECT NO. 60565355				
SAMPLE NO.		NW	050-1		WELL NO.		N	W050	
DATE/TIME C		10/22 PRGA	A @ 17 CTIVE SS MON	05 NSOON	PERSONNEL	R.E.	Leyes		
SAMPLE MED SAMPLE QA S SAMPLE QC I MS/MSD REQ	SPLIT: DUPLICATE: UESTED	Groundwater YES YES YES	NO NO NO	DUPLICATE MS/MSE	F SAMPLE NO. E SAMPLE NO. D SAMPLE NO.				
Sample Co 2 - 500 mL 3 - 40 mL \ 1 - 500 mL 1 - 250 mL 1 - 250 mL 1 - 250 mL	SAMPLE CONTAINERS, PRESERVATIVES, ANALYSI Sample Container Preservative 2 - 500 mL Amber 6°C 3 - 40 mL VOA 6°C, HCI 1 - 500 mL HDPE 6°C, H <sub>2</sub> S0 <sub>4</sub> 1 - 250 mL HDPE 6°C 1 - 250 mL HDPE 6°C, ZnOAc/NaOH 2 - 250 mL Amber 6°C  VELL PURGING DATA				Analysis Re Explosives Methane (F TKN (351.2 SO <sub>4</sub> (9056A), Sulfide (900 DOC (9060	+ MNX (83 RSK 175) 2), NH <sub>3</sub> (350. Alkalinity (232 34)	), NO <sub>2</sub> /NO <sub>3</sub> (3		
Background Breathing Zo Well Head Purge Water	ime Started  ime Completed  ID Measurements  Background  Breathing Zone  Well Head  IG17  IG17				Depth to W Water ( Well Casing Volume of Wa Casing Vo	epth (ft BTOC) /ater (ft BTOC) /ater (ft BTOC) Column Length Volume (per ft) atter in Well (L) olumes to Purge am to Purge (L) actual Purge (L)		20.11 7,78 12,33 2,47 30,46 20 20	
Time	Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redex (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
\(\psi 22 \)  \(\psi 27 \)  \(\psi 32 \)  \(\psi 31 \)  \(\psi 42 \)  \(\psi 47 \)  \(\psi 62 \)  \(\psi 67 \)  \(\psi 67 \)	2.5 5 7.5 10 (2.5 13 17.5	7.04 4.86 6.80 6.79 6.75 6.73 6.71	15.48 15.82 16.85 16.85 16.88 16.88 16.91	1.163 1.174 1.194 1.192 1.186 1.183	0.50 0.35 0.24 0.22 0.23 0.23	72.7 86.8 94.4 100.3 104.8 108.0 109.7 112.8	5.79 5.63 5.39 5.01 6.14 4.93 4.98 4.93	7.80 7.80 7.80 7.80 7.80 7.80 7.80 7.80	0,5 0,5 0,5 0,5 0,5 0,5 0,5 0,5
FIELD EQUIPMENT AND CALIBRATION  Model  Water Level Probe  Water Quality Meter  Water Quality Meter  Water Quality Meter  Water Quality Meter					Calibration Checked Again: Twice Daily Ca			brated Weekly	
GENERAL CO Ferrous Iron = Multi-Parameter Field Parameter Pump Placemer Pump Rate = Well Diameter Screen Interval	o o o mg r Probe Unit # rs Measured in ht Depth = 1 o 5 L/	24698 Flow-Through C 5 ft	'ell		Histor ORP DO	ic (7-year avera 116.2 4.31	nge low and hig 257.0 10.19	h / 2013 / Avg in I 166.4 4.31	3old) 153.9 6.72
					PH	6.35	6.75	6.46	6.59



SITE NAME		СН	AAP	605	65355					
SAMPLE NO.		NW	051-1		WELL NO.		N	W051		
DATE/TIME C		10/22 PRO-A	CTIVE SS MOI	815 NSOON	PERSONNEL	P. Exc P. Re	een yes			
SAMPLE MED	DIA:	Groundwater		_		- 4				
SAMPLE QA S SAMPLE QC E MS/MSD REQ	OUPLICATE:	YES YES YES	NO NO	DUPLICATI	F SAMPLE NO. E SAMPLE NO. D SAMPLE NO.					
SAMPLE C	ONTAINE	RS, PRESE	RVATIVES	. ANALYSI	S					
SAMPLE CONTAINERS, PRESERVATIVES, ANALYSI Sample Container Preservative  2 - 500 mL Amber 6°C  3 - 40 mL VOA 6°C, HCI  1 - 500 mL HDPE 6°C, H <sub>2</sub> SO <sub>4</sub> 1 - 250 mL HDPE 6°C  1 - 250 mL HDPE 6°C, ZnOAc/NaOH  1 - 250 mL Amber 6°C  WELL PURGING DATA					Analysis Requested Explosives + MNX (8330A) Methane (RSK 175) TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2) SO <sub>4</sub> (9056A), Alkalinity (2320B) Sulfide (9034) DOC (9060A)					
WEEL CRO		,			Well D	epth (ft BTOC)		34.53		
Date         10 ~ 2 ~ 19           Time Started         1719           Time Completed         18 20           PID Measurements					Water Well Casing Volume of Wa	Vater (ft BTOC) Column Length Volume (per ft) Atter in Well (L)		1.99 24.54 47 45.55		
Background Breathing Zo	ne.		nd		Casing Volumes to Purge Minimum to Purge (L)					
Well Head	iii.	·	~d.			actual Purge (L)	25			
Purge Water										
FIELD MEAS Time	UREMENTS Amount Purged (L)	pН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)	
1724	2.5	6.64	14.17	1,132	096	122.4	5.64	8.02	0.5	
1729	5	6.59	14.51	1,140	0.76	155.5	6.43	8.02	a 5	
1734	7.5	6.55	14.80	1.151	0.55	125.1	6,58	8:02	0,5	
1739	10	4.66	14.80	1.154	0.46	123.1	8.01.	8.02	0.5	
1744	12.5	6.66	14.62	1.149	0.41	122.3	7.25	8.02	0,5	
1749	15	6.60	14.53	1.148	0.37	124.0	7.94	8.02	0.5	
1754	(7.5	6.61	14,34	1.142	0.36	125.1	8,29	8.02	0.5	
1759	20	6.59	13.94	1.131	0.32	126.5	7.72	8.02	0.5	
1904	22.5	6.52	13:02	1.110	0.31	129.3	7.68	8.02	0.5	
1809	25	6.47	12,99	1.088	0.32	132.3	7.54	8.02	0.9	
	-									
FIELD EQUIP	MENT AND	CALIBRATIO	N		SERVE NO					
		Model			Calibration					
Water Level Pro	obe	Heron				st Calibrated Ler	ngth			
Water Quality N	Meter	YSI 556 Multi	-Parameter Probe	e	Twice Daily Ca	libration Verific	ation also Cali	brated Weekly		
GENERAL CO Ferrous Iron = Multi-Paramete Field Parameter	O-00 mg r Probe Unit #	24698	Cell							
Pump Placemen										
Pump Rate =	0.5 L/m	М						h / 2013 / Avg in		
Well Diameter	= 4"				ORP	64.2	179.4	179.4	122.7	
Screen Interval	= 29.5 - 34.5				DO	0.10	1.29	0.35	0.51	
					PH Cond.	6.52 1.106	1.431	1.231	6.63 1.290	
					Cond.	1.100	1.731	1.401	A + 4+ フリ	

### URS

SITE NAME	CI	HAAP		PROJECT NO.		605	665355	
SAMPLE NO.	NV	V052-1		WELL NO.			W052	
DATE/TIME COLLECTE SAMPLE METHOD	711	Q 09 ACTIVE SS MO		PERSONNEL	R. 6, R.	ceen eyes		
SAMPLE MEDIA: SAMPLE QA SPLIT: SAMPLE QC DUPLICATI MS/MSD REQUESTED	Groundwater YES E: YES YES	NO NO NO	DUPLICATI	T SAMPLE NO. E SAMPLE NO. D SAMPLE NO.		J-		
SAMPLE CONTAIN Sample Container 2 - 500 mL Amber 3 - 40 mL VOA 1 - 500 mL HDPE 1 - 250 mL HDPE 1 - 250 mL HDPE 1 - 250 mL Amber WELL PURGING DATA		FRVATIVES Preservativ 6°C 6°C, HCI 6°C, H <sub>2</sub> S0 <sub>4</sub> 6°C 6°C, ZnOA	ve	Analysis Re Explosives Methane (F TKN (351.2	+ MNX (833 RSK 175) 2), NH <sub>3</sub> (350.1) Alkalinity (2320 34)	), NO <sub>2</sub> /NO <sub>3</sub> (3	53.2)	
Date Time Started Time Completed PID Measurements Background Breathing Zone Well Head Purge Water	1 10		Well Depth (ft BTOC) Depth to Water (ft BTOC) 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)			60.95 PC <del>8.0</del> PC <del>52.96</del> 2.47 130.70 20	7,35 53.60	
FIELD MEASUREMENT Time Amount Purged (I	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	OPP Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
0830 2.5 0835 5 0840 7.5 0845 10 0850 12.5 0855 15 0900 175	6,65 6,83 6,94 6,98 6,97 7,05	10.64 10.32 9.86 9.22 9.11 9.34 9.63	0.744 0.748 0.741 0.728 0.725 0.728 0.733	9.82 1.69 1.20 0.90 0.75 0.70	181.4 167.5 159.1 154.3 152.2 146.3 140.8	5,15 7,33 7,66 8.06 7,05 10.95	7.35 7.35 7.35 7.35 7.35 7.35 7.35	0,5 0,5 0,5 0,5 0,5 0,5
0905 20	7,24	9.80	0,738	0.166	134,5	10,28	7.35	0 (5
FIELD EQUIPMENT AN Water Level Probe Water Quality Meter		st Calibrated Ler		brated Weekly				
Multi-Parameter Probe Unit Field Parameters Measured	ng/L # <b>24698</b> in Flow-Through (	Cell						
Pump Page = 50 5' 1	58 ft			FTint -	40 (7 mes	.a. 1a e 4 1. 1	h /2012 / h · · · * ·	0 - 1.1)
Pump Rate = 0,5 L/W				h / 2013 / Avg in I				
Screen Interval = 55.6 -60.6				ORP	-80.1	-25.1	-34.5	-41.1
Screen Interval = 55.6 -60.6				DO	0.08	0.36	0.36	0.20
				PH Cond.	6.78 0.875	7.00 1.370	7.00	6.87
				COIId.	0.673	1.570	1.061	1.107



SITE NAME	CHAAP PROJECT NO. 60565355							
SAMPLE NO.	NW	060-1		WELL NO.		N	W060	
DATE/TIME COLLECTED SAMPLE METHOD		@ 131		PERSONNEL	R. Ex	ceen		
SAMPLE MEDIA: SAMPLE QA SPLIT: SAMPLE QC DUPLICATE: MS/MSD REQUESTED	Groundwater YES YES YES	NO NO NO	DUPLICATI	T SAMPLE NO. E SAMPLE NO. D SAMPLE NO.				
SAMPLE CONTAINE	RS. PRESE	BVATIVES	ANALYSI	S .			_	
SAMPLE CONTAINERS, PRESERVATIVES, ANALYS Sample Container Preservative 2 - 500 mL Amber 6°C 3 - 40 mL VOA 6°C, HCI 1 - 500 mL HDPE 6°C, H <sub>2</sub> SO <sub>4</sub> 1 - 250 mL HDPE 6°C 1 - 250 mL HDPE 6°C, ZnOAc/NaOH 1 - 250 mL Amber 6°C WELL PURGING DATA				Analysis Requested Explosives + MNX (8330A) Methane (RSK 175) TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2) SO <sub>4</sub> (9056A), Alkalinity (2320B) Sulfide (9034) DOC (9060A)				
Date			epth (ft BTOC)  /ater (ft BTOC)		20.15			
Time Started		-	Column Length		10			
Time Completed		_	Volume (per ft)		2,47			
PID Measurements  Background					ater in Well (L)		24.7	
Breathing Zone	- Nd				olumes to Purge um to Purge (L)		20	
Well Head	No			-	actual Purge (L)		20	
Purge Water	Nd							
					<del></del>			
FIELD MEASUREMENTS Time Amount Purged (L)	pН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1227 2,5	6,49	15.15	0.079	12.27	155.3	5.05	10,15	0,5
1232 5	6,28	15,57	0.076	10.74	160.5	5.93	10.15	0,5
12 37 7.5	6.22	15.80	0.076	10,57	14514	4,09	10.15	0.5
1242 10	6.16	15,79	0,075	10,54	166,9	5,04	10.15	0.5
1247 12.5	6,19	16,24	0.075	10.73	165,3	5,40	10.15	0.5
1252 15	6.20	16,33	0.075	10.72	164.1	6.29	10.15	0.5
1257 17.5	4.06	16,19	0.075	10.75	170.4	5.75	10.15	0.5
1302 20	6.01	16.16	0075	10.75	171.6	6.06	10.15	0,5
		1.4.10			111.4	410	70.73	
						£ 5=5		
FIELD EQUIPMENT AND  Water Level Probe  Water Quality Meter	Model Solinst 102	N Parameter Prob	e		st Calibrated Le		brated Weekly	
GENERAL COMMENTS								-
Ferrous Iron = 0.00 mg								
Multi-Parameter Probe Unit #						900		
Field Parameters Measured in		ell	_				70270	
Duma Data	5 ft			711	·	1 111	1 (0010 : : : :	D. 11)
Pump Rate = 0.5 L/m Well Diameter = 4"			<u> </u>	h / 2013 / Avg in I				
Screen Interval = 10.0 - 20.0	DO	111.9	200.5	200.5	143.4			
Screen interval = 10.0 - 20.0				PH	5.47	6.50	9.09 5.47	9.45 6.25
				Cond.	0.157	0.396	0.239	0.226



CITE MANAGE					N					
SITE NAME			IAAP		PROJECT NO.					
SAMPLE NO.		NW	7061-1	-	WELL NO.		N	W061		
DATE/TIME O			TIVE SS MOI	435 NSOON	PERSONNEL	P.E.	Leyes	1		
SAMPLE MEI SAMPLE QA S SAMPLE QC I MS/MSD REQ	SPLIT: DUPLICATE:	Groundwater YES YES YES	NO NO	DUPLICATI	SPLIT SAMPLE NO.  CATE SAMPLE NO.  //MSD SAMPLE NO.					
SAMPLE C Sample Cc 2 - 500 mL 3 - 40 mL 1 - 500 mL 1 - 250 mL 1 - 250 mL 1 - 250 mL WELL PURG	Amber 6°C Explosives + MNX (8330A)  OA 6°C, HCl Methane (RSK 175)  HDPE 6°C, H <sub>2</sub> S0 <sub>4</sub> TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)  HDPE 6°C SO <sub>4</sub> (9056A), Alkalinity (2320B)  HDPE 6°C, ZnOAc/NaOH Sulfide (9034)  Amber 6°C DOC (9060A)					53.2)				
Date Time Started Time Complete PID Measurem Background Breathing Zo Well Head	Well De					epth (ft BTOC) /ater (ft BTOC) Column Length Volume (per ft) tter in Well (L) clumes to Purge um to Purge (L) ctual Purge (L)	2	44.90 9.92 34.98 47 86.40 0		
FIELD MEAS Time	Amount Purged (L)	pН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	OP Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)	
1342 1347 1352 1357 1902 4507 4512 4522 46327	2.5 5 1.5 10 12.5 15 17.5 20 22.5 25	6.64 6.79 6.80 6.82 6.95 7.02 6.94 7.01 7.03 7.00	13.73 13.68 13.54 13.57 14.61 14.61 14.12 14.12 14.13 84.413.80	0.787 0.788 0.784 0.781 0.804 0.807 0.793 0.199 0.803 0.790	1,2 6 0,57 0,40 0,33 0,30 0,27 0,22 0,20 0,19	155.0 150.1 149.1 147.7 141.6 (38.7 141.9 (38.4 138.4 137.4	4.31 6.12 5.07 4.24 4.40 4.18 4.47 4.48 4.39 4.42	9.92 9.92 9.92 9.92 9.92 9.92 9.92 9.92	0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	
FIELD EQUII Water Level Pr Water Quality	obe	CALIBRATIO Model Solinst 102 YSI 556 Multi	N -Parameter Probe			st Calibrated Le	<del>-</del>	brated Weekly		
Water Level Pr Water Quality I GENERAL CO Ferrous Iron = Multi-Paramete Field Parameter Pump Placemen	OMMENTS (), () O mg er Probe Unit # rs Measured in nt Depth = .4	Model Solinst 102 YSI 556 Multi  /L 24698 Flow-Through (Ca.55) ft	-Parameter Probe		Checked Again Twice Daily Ca	libration Verific	ation also Cali		Rold	
Water Level Pr Water Quality I GENERAL CO Ferrous Iron = Multi-Paramete Field Parameter	OMMENTS  OMMENTS  OMMENTS  omman  omman  mg  re Probe Unit #  rs Measured in  nt Depth = 4	Model Solinst 102 YSI 556 Multi  /L 24698 Flow-Through (Ca.55) ft	-Parameter Probe		Checked Again Twice Daily Ca	libration Verific	ation also Cali	brated Weekly  h / 2013 / Avg in  151.1	Bold) 126.7	



SITE NAME		СН	IAAP		PROJECT NO. 60565355				
SAMPLE NO.		NW	062-1		WELL NO.		N	W062	
DATE/TIME ( SAMPLE MET			CTIVE SS MO		PERSONNEL	R. E.	ceen eyes		
SAMPLE MEI	DIA:	Groundwater					J		
SAMPLE QA	SPLIT:	YES	NO	SPLI	Γ SAMPLE NO.				
SAMPLE QC I	DUPLICATE:	YES	NO	DUPLICATI	E SAMPLE NO.				
MS/MSD REQ	UESTED	YES	NO	MS/MSI	SAMPLE NO.				
SAMDLE	ONTAINE	DO DDEGE	RVATIVES	ANIAI VOI	<u> </u>				
Sample Co		io, Fricol	Preservativ		Analysis R	equested			
2 - 500 mL			6°C	, ,	Explosives		30A)		
3 - 40 mL VOA 6°C, HCI					Methane (F				
1 - 500 mL HDPE 6°C, H <sub>2</sub> SO <sub>4</sub>					TKN (351.2			53.2)	
1 - 250 mL HDPE 6°C 7nOAc/NaOH				SO <sub>4</sub> (9056A),		0B)			
1 - 250 mL HDPE 6°C, ZnOAc/NaOH 1 - 250 mL Amber 6°C				Sulfide (90 DOC (9060					
WELL PURGING DATA					DOC (9060	)A)	** -		
WELL PURG	ING DATA				Wall D	epth (ft BTOC)		63.45	
Date		10-2	2-19			ater (ft BTOC)		10.04	
Time Started		10-22-19				Column Length		53.41	
Time Complete	ed	1457			-	Volume (per ft)		2.47	
PID Measurem	<u>ients</u>				Volume of Wa	iter in Well (L)	10	131.92	
Background		N	.4		-	olumes to Purge			
Breathing Zo	one		۱٩		-	um to Purge (L)	-	20	
Well Head Purge Water			٧d		A	ctual Purge (L)		20	
rurge water	•		Nd		-				
FIELD MEAS	UREMENTS		-			ORP			
Time	Amount	рН	Temperature	Conductivity	Dissolved	Redox	Turbidity	Depth to Water	Purge Rate
	Purged (L)		(Celsius)	(mS/cm)	Oxygen (mg/L)	(mV)	(NTU)	(ft BTOC)	(L/min)
1502	2.5	7.95	i3.55	0.057	2.18	76,0	1.70	10.02	0 =
1507	5	8.06	13.09	0.687	0.54	60,0	7.24	10.02	0.5
1512	7.5	8.06	13,89	0,696	0.33	52,5	7.55	10.03	0.5
15 17	10	8,13	14.01	0,702	0,30	421	5.78	10.03	0, 5
1522	12.5	8,12	14.14	0.703	0.30	406	4,77	10.03	0.5
1927	15	8,08	14.10	0,702	0,28	39,4	7.30	10.03	0.5
1532	175	8:11	13.87	0.699	0.28	36.9	6,57	10.03	0,5
1537	20	8,11	14.04	0.701	0,26	38,6	4168	10.03	0,5
		<u> </u>	<u> </u>						
FIELD FOLID	PMENT AND	CALIRDATIO	N .			<u></u>	<u> </u>		
TIEED EQUI	INDIAN AND	Model			Calibration				
Water Level Pr	obe	Solinst 102			Checked Again	st Calibrated Le	ngth		
Water Quality	Meter	YSI 556 Multi	-Parameter Probe	e	Twice Daily Ca			brated Weekly	
GENERAL Co		1							
Multi-Paramete		24698							
	rs Measured in		Cell						
	nt Depth =,					-2			
Pump Rate = 0,5 L/Min					Histor	ic (7-year avera	ge low and hig	h / 2013 / Avg in I	Bold)
Well Diameter = 4"				ORP	-123.8	133.1	133.1	-32.7	
Screen Interval = 58.1 - 63.1				DO	0.01	0.34	0.17	0.19	
					PH	5.95	7.11	5.95	6.85
					Cond	0.401	0.870	0.654	0.637



SITE NAME		СН	AAP		PROJECT NO. 60565355				
SAMPLE NO.		NW	070-1		WELL NO.		NV	V070	
DATE/TIME CO		10.21-1 PRO-A	CTIVE SS MOR	0 15 NSOON	PERSONNEL	R. E R. R	xceen eyes		
SAMPLE MED SAMPLE QA S SAMPLE QC D MS/MSD REQU	PLIT: DUPLICATE: UESTED	Groundwater YES YES YES	NO NO NO	DUPLICATE MS/MSE	F SAMPLE NO. E SAMPLE NO. O SAMPLE NO.	) (	7	-	
2 - 500 mL Amber 6°C 3 - 40 mL VOA 6°C, HC 1 - 500 mL HDPE 6°C, H <sub>2</sub> S 1 - 250 mL HDPE 6°C 1 - 250 mL HDPE 6°C, ZnG 1 - 250 mL Amber 6°C  WELL PURGING DATA			Preservative 6°C 6°C, HCl 6°C, H <sub>2</sub> SO <sub>4</sub> 6°C 6°C, ZnOA	ve	Analysis Re Explosives Methane (F TKN (351.2 SO <sub>4</sub> (9056A), Sulfide (905) DOC (9060)	+ MNX (83 RSK 175) (1), NH <sub>3</sub> (350.1 Alkalinity (2320 34)	), NO <sub>2</sub> /NO <sub>3</sub> (3:		
Date         10 · 21 · 19           Time Started         1520           Time Completed         16 2.5           PID Measurements         N D           Background         N D           Breathing Zone         N D           Well Head         N D           Purge Water         N D					Depth to W Water ( Well Casing V Volume of Wa Casing Vo	epth (ft BTOC) ater (ft BTOC) Column Length Volume (per ft) ter in Well (L) lumes to Purge im to Purge (L) ctual Purge (L)			
FIELD MEAS	UREMENTS Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV) qu ORP	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1525 1530 1535 1540 1545 1550 1555 1600 1605 1610	2,5 5 7.5 10 12.5 15 17.5 20 22.5 25	7.55 7.28 7.26 7.25 7.18 7.18 7.18 7.12 7.13 7.13	15.34 15.57 16.88 17.13 16.91 16.93 16.81 17.12 17.13	0.092 0.095 0.095 0.095 0.095 0.095 0.096 0.096	3.80 1.21 0.77 0.60 0.54 0.49 0.45 0.42 0.39	110,4 119,9 118,6 120,1 121,9 124,2 126,0 126,2 125,9 127,0	43,2 44,4 42,1 42,0 42,2 40.0 39,5 38,8 39,4 38,7	7.31 7.31 7.31 7.31 7.31 7.31 7.31 7.31	0,5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.
FIELD EQUIPMENT AND CALIBRATION  Model  Water Level Probe Water Quality Meter  Water Quality Meter  Solinst 102  YSI 556 Multi-Parameter Probe					Calibration Checked Again: Twice Daily Ca			brated Weekly	
GENERAL CO Ferrous Iron = Multi-Parameter Field Parameter Pump Placemen Pump Rate = Well Diameter =	DMMENTS O O mg r Probe Unit # s Measured in at Depth = /4	/L 24698 Flow-Through C			Histor ORP	ic (7-year avera 50.3	ge low and hig 142.3	h / 2013 / Avg in 142.3	85.8
Screen Interval	= 10.6 - 20.6				DO PH Cond.	0.05 6.88 0.306	0.90 7.43 1.221	0.35 7.43 0.726	0.43 7.19 0.763

### URS

SITE NAME		CHAAP PROJECT NO. 60565355							
SAMPLE NO.		NW	/071-1		WELL NO.		N	W071	
DATE/TIME C			21-19 @ ACTIVE SS MO		PERSONNEL	2.6	xceen		
		-		NSOON	-	K1	keyes		
SAMPLE MED		Groundwater		en r	r cambi e Mo	_	•		
-				1				-93000	
-		YES	NO	1					-W
			<u> </u>						
		RS, PRESE							
				/ <del>C</del>			30A)		
					Methane (F	3SK 175)	30A)		
			6°C, H <sub>2</sub> S0 <sub>4</sub>				), NO <sub>2</sub> /NO <sub>3</sub> (3	53.2)	
	NO								
	250 mL Amber 6°C  CLL PURGING DATA  e								
			6°C		DOC (9060	)A)			
WELL PURG	ING DATA				Wall D	enth (ft DTOC)		60.42	
Date		10 -	21-19						
Time Started					_				
Time Complete	e Completed 17 40				-				
PID Measureme	<u>ents</u>				Volume of Wa	iter in Well (L)			
Background					_	- 1			
•					-			- 20	
					_ A	ctual Purge (L)			
- urge water		/V.	D		-				
FIELD MEAS	UREMENTS								
Time		рН	-	•		(mV) CC	•	Depth to Water (ft BTOC)	Purge Rate (L/min)
1645	2.5	6.38	14.28	0,540	3.79		7.31		0.5
1650	_ 5			0,550				1	0.5
1655						1			0.5
1700						158,5			0.5
1705	125	6,28	15,32	0,559	1.97	158.9	4.40	7,13	0.5
1710	15	6,23	15,28	0.559	2,00	159.6	4.79	7.13	0.5
1715	17.5	6.32	15.31	0.561	2,06	157.7	4.89	7.13	0.5
1720	22,5	4.32	15.29	0,561	2,16	157.9	5.01	7.13	0,5
1730	25	6,32	15,36	0.563	2,18	157.9	4.65	7.13	0,5
1,130			73.50	3 43	-110	3011	hws	1115	01)
			J				117:		
FIELD EQUIP	PMENT AND	CALIBRATIO Model	)N		Calibration				
Water Level Pro	ohe	Solinst 102				st Calibrated Le	noth		
Water Quality N			i-Parameter Prob	e e		libration Verific		ibrated Weekly	
	<del></del>			·					
GENERAL CO Ferrous Iron =		п							
Multi-Paramete									
Field Parameter			Cell		-				
Pump Placemen		-	- 120						
Pump Rate =	0.5 4/1	ín			Histor	ric (7-year avera	ge low and hig	h / 2013 / Avg in	Bold)
Well Diameter					ORP	-57.1	172.1	157.6	97.9
Screen Interval	= 55.2 - 60.2	_			DO	0.57	2.11	1.42	1.25
					PH	6.48	6.98	6.98	6.66
					Cond.	0.609	1.055	0.609	0.703



SITE NAME		СН	AAP		PROJECT NO. 60565355				
SAMPLE NO.	=	NW	080-1		WELL NO.		N	W080	
DATE/TIME C			CTIVE SS MOI		PERSONNEL	R. Excel	ups		
SAMPLE MED	)IA·	Groundwater				le	J		
SAMPLE QA S		YES	NO	SPLIT	Γ SAMPLE NO.				
SAMPLE QC I		YES	NO		E SAMPLE NO.			El William	
MS/MSD REQ	UESTED	YES	NO	MS/MSI	SAMPLE NO.				
SAMPLE C	ONTAINE	RS, PRESE	RVATIVES	ANALYSIS	3				
Sample Co	ntainer	,	Preservativ		Analysis Re				
2 - 500 mL			6°C		Explosives + MNX (8330A)				
3 - 40 mL \ 1 - 500 mL			6°C, HCl		Methane (F		110 010 (0		
1 - 300 mL			6°C, H₂S0₄ 6°C			2), NH <sub>3</sub> (350.1 Alkalinity (2320		53.2)	
1 - 250 mL			6°C, ZnOA	c/NaOH	Sulfide (90		JD)		
1 - 250 mL			6°C	0/140/1	DOC (9060		4.7		
WELL PURG	ING DATA				` ;	<del>'</del>			
Data		10-22-	10			epth (ft BTOC)		21.06	
Date Time Started					*	ater (ft BTOC)		8.73	-
Time Complete	d		2		Water Column Length 12,33 Well Casing Volume (per ft) 2,47				
PID Measurements					_	iter in Well (L)		30.46	
Background			J		Casing Vo	olumes to Purge			
Breathing Zo	Breathing Zone nd				Minimum to Purge (L)				
Well Head			nd		Α	ctual Purge (L)		20	
Purge Water			nd						
FIELD MEAS	UREMENTS					OPP			
Time	Amount Purged (L)	pН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
0813	2,5	6,15	12,52	1,173	15,03	208,5	3,47	8,78	0.5
0818	5	6,07	11.03	1,124	8,52	209.4	4,05	8,78	0.5
0823	7.5	6.11	11,31	1,128	7.88	207,7	3.99	8.78	0,5
0828	10	6,12	11,52	1,134	7.68	205.2	4.68	8,78	0,5
0633	12.5	6,15	11.78	1,140	7,53	202.9	4.74	8.78	0,5
0838	15	6118	11.98	1.148	7,38	200,3	4.46	8,78	0,5
0843	17.5	6.20	11.97	1.146	7.38	198.9	4.66	8,78	0,5
0848	20	6.23	12.61	1.161	7,28	197.0	4.41	8,78	0.5
						_			
FIELD EQUIP	PMENT AND	CALIBRATIO	N					<u> </u>	
		Model			Calibration				
Water Level Pro Water Quality N		Heron YSI 556 Multi-	Parameter Probe			st Calibrated Les libration Verific		hrated Weekly	
							allon ulbo cull		
GENERAL CO Ferrous Iron =		п							
		24698		-					
		Flow-Through C							
Pump Placemen							Marine C	1020 2	
	0.5 4m				<u>Histor</u>	ic (7-year avera	ge low and hig	h / 2016 / Avg in	Bold)
Well Diameter = 4"					ORP	103.0	181.7	173.9	156.7
Screen Interval	= 8 - 18				DO	7.55	11.38	9.72	9.07
<u> </u>					PH	6.29	6.53	6.35	6.41



SITE NAME		СН	AAP		PROJECT NO.		605	665355	
SAMPLE NO.		NW0	81R-1	200	WELL NO.		NV	V081R	
DATE/TIME O		10 · 22-1 PRO-A	9 6 /02 CTIVE SS MO		PERSONNEL	R. Ex	reen yes		
SAMPLE MEI SAMPLE QC I MS/MSD REQ	SPLIT: DUPLICATE: DUESTED	Groundwater YES YES YES	NO NO NO	DUPLICATE MS/MSI	F SAMPLE NO. E SAMPLE NO. D SAMPLE NO.				
SAMPLE ( Sample Co 2 - 500 mL 3 - 40 mL 1 - 500 mL 1 - 250 mL 1 - 250 mL 1 - 250 mL WELL PURG	ontainer Amber VOA HDPE HDPE HDPE Amber	RS, PRESE	RVATIVES Preservativ 6°C 6°C, HCI 6°C, H <sub>2</sub> s0 <sub>4</sub> 6°C 6°C, ZnOA 6°C	ve	Analysis Requested Explosives + MNX (8330A) Methane (RSK 175) TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2) SO <sub>4</sub> (9056A), Alkalinity (2320B) Sulfide (9034) DOC (9060A)				
Date Time Started Time Complete PID Measurem Background Breathing Zo Well Head Purge Water	ents one	10-22- 0932 1028	) ) ?		Depth to W Water Well Casing Volume of Wa Casing Vo	Well Depth (ft BTOC)  Depth to Water (ft BTOC)  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)  20			39.44 , z 4.45
FIELD MEAS Time	UREMENTS Amount Purged (L)	pН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
937 942 947 952 957 1002 1007 1012	2. S S 1. S 10 12. S 15 17. S 20	6.63 6.52 6.50 6.48 6.49 6.39 6.51	11.34 11.76 11.89 12.09 12.17 12.43 12.45	0,784 0,792 0,792 0,793 0,793 0,795 0,798	3.97 1,30 0.93 0.81 0.72 0.68 0.66 0.65	167.6 174.2 173.8 174.1 173.5 173.3 172.3 172.3	12.9 7.32 5.89 4.89 6.72 6.79 5.91 6.23	8,29 . 11 . 11 . 11	0,5 0,5 0,5 0,5 0,5 0,5 0,5
FIELD EQUII Water Level Pr Water Quality I	obe	CALIBRATION Model Heron YSI 556 Multi-	N Parameter Probe	2	Calibration Checked Again Twice Daily Ca			brated Weekly	
Pump Placemen	r Probe Unit # rs Measured in Int Depth = 4	L 24698 Flow-Through C O ft bg	ell /	STOC	<u>Histor</u>	ic (7-year avera 61.2	ge low and hig	h / 2016 / Avg in I 173.9	Bold) 133.6
Screen Interval					DO	1.75	2.35	2.35	1.99
					PH	6.45	6.71	6.53	6.57
					Cond	0.893	1 244	0.893	1 046



SITE NAME		СН	AAP		PROJECT NO.		60565355			
SAMPLE NO.		NWO	W082R-1 WELL NO. NW082R				V082R			
DATE/TIME C		10/22/1 PRO-A	Q 114 CTIVE SS MO		PERSONNEL	P.	Exceen Peyes			
AMPLE MEI AMPLE QA S AMPLE QC I 1S/MSD REQ	SPLIT: DUPLICATE:	Groundwater YES YES YES YES	NO NO	DUPLICATI	F SAMPLE NO. E SAMPLE NO. D SAMPLE NO.		<b>V</b>			
AMPLE Comple Com	ontainer Amber VOA HDPE HDPE HDPE Amber	RS, PRESE	RVATIVES Preservativ 6°C 6°C, HCI 6°C, H <sub>2</sub> S0 <sub>4</sub> 6°C 6°C, ZnOA 6°C	/e	Analysis Re Explosives Methane (F TKN (351.2	+ MNX (833 RSK 175) 2), NH <sub>3</sub> (350.1) Alkalinity (2320 34)	), NO <sub>2</sub> /NO <sub>3</sub> (3	353.2)		
ate me Started me Complete D Measurem Background Breathing Zo Well Head Purge Water	ed ents one		-22-19 1047 1152 1d nd		Depth to W Water ( Well Casing Volume of Wa Casing Vo Minimu	epth (ft BTOC)  later (ft BTOC)  Column Length  Volume (per ft)  Iter in Well (L)  Jolumes to Purge  Im to Purge (L)  ctual Purge (L)		59.49 8.34 57.15 0.62 31,71 20 25		
TELD MEAS	Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)	
1052 1057 1102 1107 1112 1117 1122 1127 1132	2:5 5 7:5 10 12:5 15 17:5 20 22:5 25	6.69 6.69 6.50 6.50 6.50 6.44 6.84	12.87 13.49 13.80 13.43 12.40 12.54 13.13 13.21	0.686 0.696 0.700 0.699 0.699 0.617 0.687 0.687 0.687	4.52 2.09 1.15 0.87 0.73 0.64 0.59 0.55 0.52	162.8 159.9 155.7 154.4 154.8 159.1 156.5 155.1 154.1	7.34 4.82 6.48 7.34 6.72 6.22 5.90 5.54 6.02 5.96	8.35 8.34 8.34 8.34 8.34 8.34 8.34 8.34 8.34	0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	
/ater Level Pro/ater Quality N	obe Meter OMMENTS O. 34 mg		N Parameter Prob			st Calibrated Ler libration Verific		ibrated Weekly		
ield Parameter ump Placemer	O.5 L		ell		Histor ORP	ic (7-year averag 82.0	ge low and hig 166.8	th / 2016 / Avg in 151.9	Bold) 132.4	
	= 46 - 56				DO	0.18	0.41	0.29	0.28	

SITE NAME		СН	AAP		PROJECT NO.		605	65355			
SAMPLE NO.		G00	24-1		WELL NO.		G	0024			
DATE/TIME C	COLLECTED	10-23-	-19/100	20	PERSONNEL	TY					
SAMPLE MET			CTIVE SS MO		LICKSONNEE	CH					
SAMPLE MED	DIA:	Groundwater		_							
SAMPLE QA S		YES	NO		SAMPLE NO.						
SAMPLE QC I		YES	NO	999	SAMPLE NO.						
MS/MSD REQ	UESTED	YES	NO	MS/MSD	SAMPLE NO.			-			
		PRESERVATIV		IS							
<u>Sample Contair</u> 2 - 500 mL Am			Preservative 6°C		Analysis Requ						
2 - 300 mL Am 3 - 40 mL VOA			6°C, HCl		Explosives + M						
1 - 500 mL HD			6°C, H <sub>2</sub> SO <sub>4</sub>		Methane (RSK	. 173) NH <sub>3</sub> (350.1), NO	NO (353.2	,			
- 250 mL HD			6°C			Alkalinity (2320		,			
- 250 mL HD				aOH	Sulfide (9034)		,,,				
- 250 mL Am	50 mL Amber 6°C				DOC (9060A)		1		THE		
WELL PURG	ING DATA				Wall D			22.20	-		
Date		10-23-19	9	Well Depth (ft BTOC) 33.28  Depth to Water (ft BTOC) 12.50							
Γime Started		0915	•		_	Column Length					
Γime Complete	ed	0955			Water Column Length 20.78 Well Casing Volume (per ft) 2.47						
PID Measureme					Volume of Water in Well (L) 51.33						
Background			ND		Casing Vo	lumes to Purge					
Breathing Zo			ND			ım to Purge (L)					
Well Head						ctual Purge (L)					
Purge Water			ND								
FIELD MEAS	UREMENTS	<u></u>					<del></del> :-		_		
Time	Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)		
0920	2.5	653	12.72	0.651	5.14	158.60	086	12.68	0.5		
0925	50	6.43	12.60	0.667		159.0	1.02		0.5		
0930	75	640	1254			158.9	0.48	12.68	0.5		
0935	100	638	12.47	0.669	502	158.9		12.68	0.5		
0940	12.5	10.38	12.47		4.95	158.2	0.53	12.68	05		
0945	15.0	W 37	12.45	0670	490		0.58				
0950	17.5	(0.37	12 65	(2 ( 70	// 10	157.0	0.10	12.68	0.5		
0955	20.0	1.21	12.55	0.610	9.71			12.68	0.5		
ממףט	120.0	6.30	17.5	0.610	9 4 88	15Ce.5	0.39	12.68	0.5		
						1					
FIELD EQUIP	PMENT AND	CALIBRATIC	N		0.11	-					
Water Level Pro	obe	Model Heron			Calibration Checked Again	nst Calibrated L	ength				
Water Quality N			-Parameter Prob	e				librated Weekly			
GENERAL CO	OMMENTS										
errous Iron = 6	O 00 1	ng/L									
	er Probe Unit #		0 11								
		Flow-Through	Cell								
Yump Placemer	nt Depth = る? クーラレア	5. FT ft	P11		Histori	ic (7-veer ever	re low and hi=	h / 2019 / Avg in	Rold		
Vell Diameter	= 4"	71 (7)			ORP	56.8	ge low and hig 197.9				
creen Interval					DO	4.70	9.01	101.8	122.2		
oreen merval	10-21				PH	6.19	6.93	8.09 6.42	6.59		
					Cond.	0.226	1.201	0.42	0.788		

SITE NAME		CHAAP PROJECT NO. 60565355					65355			
SAMPLE NO.		G00	070-1		WELL NO.		G	0070		
DATE/TIME	COLLECTED	10-21-1	a /144	15	DEDCONNEL		/			
SAMPLE ME			CTIVE SS MO		PERSONNEL	CH				
SAMI EE ME	.11100	TRO-7	CTIVE 33 MO	1130011		Cri				
SAMPLE ME		Groundwater								
SAMPLE QA		YES	NO		SAMPLE NO.					
_	DUPLICATE:	YES	NO	1	SAMPLE NO.					
MS/MSD REC	QUESTED	YES	NO	MS/MSD	SAMPLE NO.		G0070-1	MS/MSD	-5456	
SAMPLE CO	ONTAINERS, P	PRESERVATI	VES, ANALYS	SIS						
Sample Conta	iner		<b>Preservative</b>		Analysis Requ	<u>ested</u>				
2 - 500 mL Ar	mber		6°C		Explosives + N	1NX (8330A)				
3 - 40 mL VO			6°C, HCl		Methane (RSK					
1 - 500 mL HI		6°C, H <sub>2</sub> SO <sub>4</sub>			TKN (351.2), 1					
1 - 250 mL HI			6°C		SO <sub>4</sub> (9056A), A		)B)			
1 - 250 mL HI	250 mL HDPE         6°C, ZnOAc/NaOH           250 mL Amber         6°C				Sulfide (9034) DOC (9060A)					
WELL PURC			J U		DOC (7000A)					
LLL I OIL	Ditti				Well De	epth (ft BTOC)		82.65		
Date		10-2	1-19			ater (ft BTOC)				
Time Started		1400			Water Column Length 67.75					
Time Complet		144	0			Volume (per ft)				
PID Measuren					Volume of Wa	1				
Background			かり		-	lumes to Purge				
Breathing Z	Cone		NP			im to Purge (L)				
Purge Water	Well Head			A	ctual Purge (L)	201				
- ruige wate			ND							
FIELD MEA	SUREMENTS		<del>.</del>							
Time	Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)	
1405	2.5	7.11	1152	0.463	3.80	166	0.32	15.10	0.5	
1410	5.0	7.13	11.71	0.461	3.79	12.5	0 20	19.15	0.5	
1415	7.5	715	11.64	0.461	382	11.9	0.33	15.15	0 5	
1420	100	714	11.67	0.460	367	12.6	043	15.15	0. h	
1425	12.5	7.14	11.63	0460	3.73	14.0	0.34	15.15	0.5	
1430	15.0	714	11.48	0.460	3 66	14.7	042	15.15		
1435	17.5	713	11.70	0.401		15.2	0.15	15-15		
1440	200	7.13	11 60	0.461	3 29	16.5	0.15	15.15	0.5	
FIELD EQUI	IPMENT AND	CALIBRATIO	ON .						:	
		Model			Calibration					
Water Level P		Heron		100000	Checked Again					
Water Quality	Meter	YSI 556 Multi	-Parameter Prob	be	Twice Daily Ca	alibration Verifi	ication also Ca	librated Weekly		
GENERAL C	COMMENTS	<del></del>			<del></del>	<del></del>				
Ferrous Iron =	0.00 1	ng/L								
	ter Probe Unit #									
	ers Measured in		Cell							
	ent Depth = 🗡									
	OTLIN	rin						h / 2019 / Avg in		
Well Diameter					ORP	6.3	138.1	114.4	61.1	
Screen Interva	11 = 75-80				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	

SITE NAME		СН	AAP		PROJECT NO.		665355			
SAMPLE NO.		G00	75-1		WELL NO.		G	0075		
DATE/TIME ( SAMPLE ME		10-21- PRO-A	19 /12 ( CTIVE SS MO		PERSONNEL	TT/ CMH			W-8 -	
SAMPLE MEI SAMPLE QA SAMPLE QC MS/MSD REQ	SPLIT: DUPLICATE:	Groundwater YES YES YES	NO NO NO	DUPLICATE	SAMPLE NO. SAMPLE NO. SAMPLE NO.					
Sample Contai 2 - 500 mL An 3 - 40 mL VO/ 1 - 500 mL HE 1 - 250 mL HE 1 - 250 mL HE I - 250 mL An	- 500 mL HDPE       6°C, H <sub>2</sub> S0         - 250 mL HDPE       6°C         - 250 mL HDPE       6°C, ZnO         - 250 mL Amber       6°C				Explosives + MNX (8330A)  Methane (RSK 175)  TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2)  SO <sub>4</sub> (9056A), Alkalinity (2320B)					
WELL PURGING DATA  Date Time Started Time Completed PID Measurements Background Breathing Zone Well Head Purge Water		10-21-19\$ 1115 1155 NA NO			Depth to Wa Water C Well Casing V Volume of Wat Casing Vol Minimu	pth (ft BTOC) ater (ft BTOC) column Length (olume (per ft) er in Well (L) umes to Purge m to Purge (L) tual Purge (L)	14.85 32.86 247L 56.46 20L			
FIELD MEAS Time	SUREMENTS Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)	
1180 1125 1130 1135 1140 1145 1150 1195	3 F 5.0 7.5 10.0 12.5 15.0 17.5 20.0	660 660 660 660 660 660 660 660 660 660	11.83 11.89 11.95 12.06 11.98 12.03 12.03	0.993	826 797 760 738 722 702	143 1 141 9 140 5 139 0 137 7 136 1 134 2 132 7	0.26 0.06 0.05 0.05 0.05 0.03 0.03	1487 1485 1486 1486 1486 1486 1486	0000000000	
FIELD EQUI Water Level Pr Water Quality	robe	CALIBRATIO Model Heron YSI 556 Multi-		ne	Calibration Checked Agains Twice Daily Ca			llibrated Weekly		
Field Paramete Pump Placeme Pump Rate = 7	er Probe Unit # ers Measured in ent Depth = 3 0.5 L/m	Flow-Through (	Cell			: (7-year averag	te low and hig	h/2019/Avg ir	ı Bold)	
Well Diameter Screen Interval		- 80			ORP DO PH	36.8 0.35 6.10	143.0 1.51 6.86	36.8 1.51 6.52	107.4 0.76 6.52	

SITE NAME		CHA	AAP PROJECT NO. 60565355			PROJECT NO. 60565355					
SAMPLE NO.		G00	76-1		WELL NO.		G	0076			
DATE/TIME (	COLLECTED	10-21-	19/13	NF	PERSONNEL	TY					
SAMPLE ME			CTIVE SS MO			CH			i i		
					-						
AMPLE ME		Groundwater	N/O								
SAMPLE QA		YES	NO		SAMPLE NO.						
	DUPLICATE:	YES	NO		SAMPLE NO.						
AS/MSD REC	(OE21ED	YES	NO	MS/MSL	SAMPLE NO.						
		PRESERVATIV	VES, ANALYS	IS							
Sample Contai			Preservative		Analysis Reque						
- 500 mL An			6°C		Explosives + M						
- 40 mL VO			6°C, HCl		Methane (RSK						
- 500 mL HE			6°C, H₂SO₄		TKN (351.2), N			)			
- 250 mL HE			6°C		SO <sub>4</sub> (9056A), A	Alkalinity (2320	B)				
- 250 mL HE			6°C, ZnOAc/N	аОН	Sulfide (9034)						
- 250 mL Amber 6°C VELL PURGING DATA					DOC (9060A)	:					
· ELL FUNG	ING DATA				Well De	pth (ft BTOC)		65.20			
Date		10-21-				ater (ft BTOC)	14.(				
ime Started		1230			Water Column Length 50.75						
ime Complet	ed	1310			Well Casing Volume (per ft) 2.47 L Volume of Water in Well (L) 124 男は Casing Volumes to Purge						
ID Measurem	nents										
Background	l		NB								
Breathing Z	one	ND				m to Purge (L)	201				
Well Head			NJ		Ac	ctual Purge (L)	201	_			
Purge Water	r III		ND		_						
TELD MEAS	SUREMENTS	<u></u>		<del></del>	·						
Time	Amount	pН	Temperature	Conductivity	Dissolved	Redox	Turbidity	Depth to Water	Purge Rate		
	Purged (L)		(Celsius)	(mS/cm)	Oxygen (mg/L)	(mV)	(NTU)	(ft BTOC)	(L/min)		
1235	25	Le 72	11.42	1.086	4.43	109.5	0.84	1465	05		
1240	5.0		11.54	1170	3.67	788	0.8-1				
	7.5	665						14.65	0.5		
1245		664		1-174	2.93	47.7	0.57		0.5		
1250	100	6.65	11.77	1.187	2.86	24.9	0.59	1465	0.5		
1255	12.5	6.64	11.68	1.187	2.32	4.7	0.61	14.65	05		
1300	15.0		11.64	1.188	233	-82	026	14.65	0.5		
1305	17.5	6.05	11.50	1.187	207	-23.0	0.15	14.65	0.5		
1310	20.0	le le le	11-68	1.189	1.91	-362	007	14.65	05		
									7-7-7-10-10-1		
								dia .			
									- :		
TELD FOU	PMENT AND	CALIBRATIO	N								
TELD EQUI	PMENT AND	CALIBRATIO Model	N	_	Calibration						
			N	_	Calibration Checked Against	st Calibrated Lo	ength				
FIELD EQUI Vater Level Pr Vater Quality	robe	Model		ne e	Checked Agains			librated Weekly			
Vater Level Provalety	robe Meter	Model Heron		oe .	Checked Agains			llibrated Weekly			
Vater Level Pr	robe Meter  OMMENTS	Model Heron		е	Checked Agains			ilibrated Weekly			
Vater Level Provider Quality  GENERAL Control  Gerrous Iron =	robe Meter  OMMENTS	Model Heron YSI 556 Multi- mg/L		ie e	Checked Agains			ilibrated Weekly			
Vater Level Pt Vater Quality SENERAL C errous Iron = Iulti-Paramete	OMMENTS    ·     0   0   er Probe Unit #	Model Heron YSI 556 Multi- mg/L	Parameter Prob	ne .	Checked Agains			ilibrated Weekly			
/ater Level Pr /ater Quality ENERAL C errous Iron = Iulti-Paramete	OMMENTS    ·   / 0    er Probe Unit # ers Measured in	Model Heron YSI 556 Multi- mg/L	Parameter Prob	ne	Checked Agains			llibrated Weekly			
/ater Level Provider Quality  ENERAL Control  From Items Iron = In Items Iron  In	OMMENTS    ·   / 0    er Probe Unit # ers Measured in	Model Heron YSI 556 Multi- mg/L  Flow-Through (	Parameter Prob	De	Checked Agains Twice Daily Ca	libration Verifi	cation also Ca	llibrated Weekly	Bold)		
Vater Level Provider Quality  ENERAL Coerrous Iron = Iulti-Paramete Iump Placeme Imp Placeme Imp Rate = Iump Placeme Imp Rate = Iump Placeme Imp Rate = Iump Placeme Imp Placeme Imp Rate = Iump Placeme Imp Placeme Imp Rate = Iump Placeme Imp	OMMENTS  I.U.O  er Probe Unit # ers Measured in ent Depth = F  O, F L/W	Model Heron YSI 556 Multi- mg/L  Flow-Through (	Parameter Prob	e	Checked Agains Twice Daily Ca	libration Verifi	cation also Ca		Bold)		
Vater Level Provater Quality  GENERAL Common from =  Multi-Parameter  General Parameter  Multi-Parameter  Multi-Parameter  Multi-Parameter  Multi-Parameter  Multi-Parameter  Multi-Parameter  Multi-Parameter	OMMENTS  I.U.O  er Probe Unit # ers Measured in ent Depth = F  O, T, L/W  = 4"	Model Heron YSI 556 Multi- mg/L  Flow-Through (	Parameter Prob	e	Checked Agains Twice Daily Ca  Historic	libration Verifi	cation also Ca	h/2019/Avg in			
Vater Level Pr Vater Quality GENERAL C ferrous Iron = Multi-Paramete field Paramete fump Placeme	OMMENTS  I.U.O  er Probe Unit # ers Measured in ent Depth = F  O, T, L/W  = 4"	Model Heron YSI 556 Multi- mg/L  Flow-Through (	Parameter Prob	pe	Checked Again: Twice Daily Ca  Historic ORP	libration Verifi  c (7-year averages)	cation also Ca	h / 2019 / Avg in 31.1	17.7		

SITE NAME	СНААР	PROJECT NO.	60	0565355
SAMPLE NO.	G0077-1	WELL NO.		G0077
DATE/TIME COLLECTED SAMPLE METHOD	10-23-19 / 11 PRO-ACTIVE SS MO	DNSOON PERSONNEL	TV CH	
SAMPLE MEDIA: SAMPLE QA SPLIT: SAMPLE QC DUPLICATE: MS/MSD REQUESTED	Groundwater YES NO YES NO YES NO	SPLIT SAMPLE NO. DUPLICATE SAMPLE NO. MS/MSD SAMPLE NO.		
SAMPLE CONTAINERS, Sample Container 2 - 500 mL Amber 3 - 40 mL VOA 1 - 500 mL HDPE 1 - 250 mL HDPE 1 - 250 mL HDPE 1 - 250 mL Amber WELL PURGING DATA	PRESERVATIVES, ANALY Preservative 6°C 6°C, HCI 6°C, H <sub>2</sub> SO <sub>4</sub> 6°C 6°C, ZnOAc/6°C	Analysis Requ Explosives + M Methane (RSK TKN (351.2), 1 SO <sub>4</sub> (9056A), A NaOH Sulfide (9034) DOC (9060A)	MNX (8330A) . 175) NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353. Alkalinity (2320B)	.2)
Date Time Started Time Completed PID Measurements Background Breathing Zone Well Head Purge Water	10-23-19 1025 1125 NB NO NO	Depth to W Water ( Well Casing V Volume of Wa Casing Vo Minimu	epth (ft BTOC) later (ft BTOC) Column Length Volume (per ft) der in Well (L) lumes to Purge um to Purge (L) ctual Purge (L) 30L	3
FIELD MEASUREMENT: Time Amount Purged (L)	pH Temperature	e Conductivity Dissolved (mS/cm) Oxygen (mg/L)	Redox Turbidity (mV) (NTU)	Depth to Water Purge Rate (ft BTOC) (L/min)
1030 2.5 1035 5.0 1040 7.5 1045 10.0 1050 12 5 1055 15.0 1100 17 5 1105 20.0 1106 25.0 1110 25.0 1125 30.0	662 12.85	3 0.733 5.55 0.835 432 8 0912 3.22	103.7 6.26 160 F 0.26 158.6 0.20 157.2 0.15 155.8 0.06 153.3 0.08 151.3 0.08 149.6 0.07 148.3 0.12 147.2 0.08 144.8 0.06	1286 OF 1286 OF 1286 OF 1 1286 OF
FIELD EQUIPMENT ANI Water Level Probe Water Quality Meter	D CALIBRATION  Model  Heron  YSI 556 Multi-Parameter Pro		nst Calibrated Length alibration Verification also (	Calibrated Weekly
GENERAL COMMENTS Ferrous Iron = (2) (3) Multi-Parameter Probe Unit Field Parameters Measured i Pump Placement Depth = Pump Rate = (3) FL 1 w	# 2 n Flow-Through Cell 30 ft	Uima	c (7-year average low and h	igh / 2019 / Ave in Pold)
Well Diameter = 4"	MIT.	ORP	48.3 187.5	73.2 <b>106.2</b>
Screen Interval = 25-35		DO PH Cond.	0.95     3.63       6.35     6.94       0.716     1.006	3.63 1.79 6.75 6.72 0.835 0.857

SITE NAME		СН	AAP		PROJECT NO.		60565355				
SAMPLE NO.		G00	78-1		WELL NO.		G	0078			
DATE/TIME (		10-23-1 PRO-A	q/12°		PERSONNEL	TY					
SAMPLE ME	DIA:	Groundwater									
SAMPLE QA		YES	NO	SPLIT	Γ SAMPLE NO.						
SAMPLE QC		YES	NO		E SAMPLE NO.						
MS/MSD REC	QUESTED	YES	NO	MS/MSI	SAMPLE NO.						
SAMPLE CO	NTAINERS, P	RESERVATI	VES, ANALYS	IS							
Sample Contai			Preservative		Analysis Reque						
2 - 500 mL An			6°C		Explosives + M						
3 - 40 mL VO			6°C, HCl		Methane (RSK		0.00. (252.2)				
1 - 500 mL HE			6°C, H <sub>2</sub> SO <sub>4</sub>			$NH_3(350.1), NO$					
1 - 250 mL HI			6°C	011		Alkalinity (2320	JB)				
	- 250 mL HDPE 6°C, ZnOAc/NaOH - 250 mL Amber 6°C				Sulfide (9034) DOC (9060A)						
WELL PURG	ING DATA										
Date		10-23-1	9			epth (ft BTOC) (ater (ft BTOC)		62.80			
Time Started		1150			-	Column Length		60			
Time Complete	eđ	1240				_		/			
PID Measurem		1290			Well Casing Volume (per ft) 2.474 Volume of Water in Well (L) 123. 万 Casing Volumes to Purge						
Background			NO								
Breathing Z			M			im to Purge (L)					
•	Well Head					ctual Purge (L)					
	Well Head VI					otuur runge (E)	- A-, L				
EIEL D MEA	OLID PAGENIZO				-			1126			
FIELD MEAS	Amount	pН	Temperature	Conductivity	Dissolved	Redox	Turbidity	Depth to Water	Purge Rate		
• • • • • • • • • • • • • • • • • • • •	Purged (L)	<b>P</b>	(Celsius)	(mS/cm)	Oxygen (mg/L)		(NTU)	(ft BTOC)	(L/min)		
1155	2.5	(0.89	13.52	1.081	2.52	147.8	080	12.70	05		
1200	50	(0.89	13.75	1140	0.72	140.8	1.07	12.79	05		
1205	7.5	10.90	13.91	1-162	0.49	133.3	0.58	12.79	0.5		
1210	10.0	6.89	13.77	1.184	0.49	116-4	0.55	12.79	0.5		
1215	12.0	6,89	13.75	1200	0.33	97.2	0.64	12.79	0.5		
1220	15.0	6.90	13.81	1.209	0.30	70,0	0.34	12.79	0.5		
1275	175	6.90	13.77	1.210	0.31	62.7	0.22	12.79	05		
1230	200	6.90	13.65		023	47.2	0.29	12.79	0.7		
1235	22.5	0.89		1.214	0,27	35.8		12.79	0.5		
1240	25.0	6.90	13 36		0.25	281	0.10	12.79	0.5		
FIELD EQUI	PMENT AND	CALIBRATIO	N			'	· · · · · · · · · · · · · · · · · · ·		======		
		Model			<b>Calibration</b>						
Water Level Pr	robe	Heron			Checked Again	nst Calibrated L	ength				
Water Quality	Meter	YSI 556 Multi	-Parameter Prob	e	Twice Daily Ca	alibration Verifi	ication also Ca	librated Weekly			
GENERAL C	OMMENTS		<del></del>				<del></del>				
Ferrous Iron =	0.48	ng/L									
	er Probe Unit#										
	rs Measured in		Cell								
	nt Depth = 9							70 25 W			
	0.5 L/m	n						h / 2019 / Avg i	n Bold)		
Well Diameter					ORP	-25.8	99.4	25.8	15.8		
Screen Interval	= 50-60				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		

SITE NAME		СН	AAP		PROJECT NO.		605	65355	
SAMPLE NO.		G00	79-1	III 12	WELL NO.		G	0079	
DATE/TIME C SAMPLE MET		10-21-1 PRO-A	9 /104 CTIVE SS MO		PERSONNEL	CMH Ty			
SAMPLE MED SAMPLE QA S SAMPLE QC D MS/MSD REQ	SPLIT: OUPLICATE:	Groundwater YES YES YES	NO NO NO	DUPLICATE	SAMPLE NO. SAMPLE NO. SAMPLE NO.				
SAMPLE CON Sample Contair 2 - 500 mL Am 3 - 40 mL VOA 1 - 500 mL HD 1 - 250 mL HD 1 - 250 mL Am WELL PURG	ner ber N PE PE PE ber		VES, ANALYS Preservative 6°C 6°C, HCl 6°C, H <sub>2</sub> SO <sub>4</sub> 6°C 6°C, ZnOAc/N 6°C	Analysis Requested Explosives + MNX (8330A) Methane (RSK 175) TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2) SO <sub>4</sub> (9056A), Alkalinity (2320B)					
Date Time Started Time Complete PID Measurems Background Breathing Zo Well Head Purge Water	e Started Completed Noulo Measurements ackground reathing Zone ell Head urge Water  No				Depth to W Water ( Well Casing Volume of Wa Casing Vo Minimu	epth (ft BTOC) /ater (ft BTOC) Column Length Volume (per ft) ater in Well (L) olumes to Purge um to Purge (L) actual Purge (L)	15.00 4.56 2.47 11.20 20 20	) L	
FIELD MEAS Time	UREMENTS Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1005 1010 1015 1020 1025 1035 1040	5.0 5.0 10.0 12.5 15.0 17.5 20.0	639 638 638 639 639 639	12.10 11.95 12.00 12.08 12.19 12.33 11.93 12.71	0265 0.268 0.272 0275 0274 0.278 0.277 0.278	5.72 4.69 4.00 3.74 3.82 3.92	-74 -2.1 -1.8 -1.5 -0.2 -0.5 2.1/149 0.5/144	0.44 0.49 0.27 0.15 0.17	15.14 15.13 15.13 15.13 15.13 15.13	
FIELD EQUIF Water Level Pro	bbe	Model Heron	Parameter Prob	pe		nst Calibrated Le alibration Verifi		librated Weekly	
GENERAL CO Ferrous Iron = ( Multi-Parameter Field Parameter Pump Placement Pump Rate = (	P. O ( 1)  r Probe Unit #  r Measured in  nt Depth = 17	Flow-Through (	Cell		Uisto	in (7-year august	to low and him	h / 2010 / A ····· :-	Pold
Well Diameter		NIVI			ORP	ic (7-year averag	ge low and hig 128.8	h / 2019 / Avg in 128.8	Bold) 128.8
Screen Interval	31 N				DO	7.99	7.99	7.99	7.99

SITE NAME		СНА	AAP		PROJECT NO.		605	65355	
SAMPLE NO.		G00	80-1		WELL NO.		G	0080	
DATE/TIME C SAMPLE MET		10-21- PRO-AG	-19 /0°	710 NSOON	PERSONNEL	TY	14		
SAMPLE MED SAMPLE QA S SAMPLE QC D MS/MSD REQ	SPLIT: OUPLICATE:	Groundwater YES YES YES	NO NO	DUPLICATE	SAMPLE NO. SAMPLE NO. SAMPLE NO.				
Sample Contair 2 - 500 mL Am 3 - 40 mL VOA 1 - 500 mL HD 1 - 250 mL HD 1 - 250 mL HD 1 - 250 mL Am	SAMPLE CONTAINERS, PRESERVATIVES, ANALYSIS           Sample Container         Preservative         Analysis Requested           2 - 500 mL Amber         6°C         Explosives + MNX (8330A)           3 - 40 mL VOA         6°C, HCI         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 10 - 21 - 19  Time Started 082 6  Time Completed 0905  PID Measurements  Background NJ  Breathing Zone NJ  Well Head NJ  Purge Water ND					Well Depth (ft BTOC)  Depth to Water (ft BTOC)  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)  37.70  37.70  13.25  24.45  0.62  15.16  20  L				
FIELD MEAS Time	UREMENTS Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
0830 0835 0840 0845 0860 0855 0900	2.5 5.0 75 100 12.5 15.0 175 20.0	(0 60 60 60 60 60 60 60 60 60 60 60 60 60	11.96 12.00 12.08 12.06 12.06 12.14 12.03 12.04	0 195 0 197 0 197 0 197 0 197 0 197 0 796 0 795	369 2.53 191 154 129 112	-168 -166 -165 -1664	2,12 0.69 1.04 0.46 0.17 0.12 0.28 0.37	13 24 13 24 13 24 13 24 13 24 13 24 13 24	000000000
FIELD EQUIF		Model	N		Calibration				
Water Level Pro Water Quality M GENERAL CO	Meter	Heron YSI 556 Multi-	Parameter Prob	e	Checked Agair Twice Daily Ca			librated Weekly	
Ferrous Iron = ( Multi-Paramete	r Probe Unit # s Measured in t Depth = 3	Flow-Through (	Cell		Histori	c (7-year avera	ge low and hig	h/2019/Avg ir	n Bold)
Well Diameter	= 2"				ORP	25.8	160.8	50.8	69.0
Screen Interval	= 25-35				DO PH Cond.	0.08 6.58 0.413	3.68 6.82 0.724	0.18 6.67 0.610	1.43 6.69 0.600

SITE NAME		СН	AAP	PROJECT NO.		PROJECT NO. 60565355				
SAMPLE NO.		G00	81-1		WELL NO.		G	0081		
DATE/TIME C		10-21-1 PRO-A	9/16 CTIVE SS MO		PERSONNEL	TY				
SAMPLE MED	DIA:	Groundwater								
SAMPLE QA S	SPLIT:	YES	NO	SPLIT	SAMPLE NO.					
SAMPLE QC I	DUPLICATE:	YES	NO		E SAMPLE NO.					
MS/MSD REQ	UESTED	YES	NO	MS/MSE	SAMPLE NO.					
	•	PRESERVATIV	•	IS					<del></del>	
Sample Contain 2 - 500 mL Am					Analysis Reque Explosives + M					
3 - 40 mL VOA					Methane (RSK					
I - 500 mL HD					TKN (351.2), N		) <sub>2</sub> /NO <sub>3</sub> (353.2)	1		
1 - 250 mL HD					SO <sub>4</sub> (9056A), A					
1 - 250 mL HD					Sulfide (9034)	•				
1 - 250 mL Am			6°C		DOC (9060A)					
WELL PURG	ING DATA				Well De	epth (ft BTOC)		41.30		
Date		10-21-19				ater (ft BTOC)	14	89		
Time Started		1530				Column Length	26.6			
Time Complete	ed .	1610			Well Casing \	/olume (per ft)	0.62	L		
PID Measurem	<u>ents</u>				Volume of Water in Well (L) 16.37					
Background			NA			lumes to Purge				
Breathing Zo	one		NJ		Minimum to Purge (L) 20L					
Well Head			N		A	ctual Purge (L)	201			
Purge Water			<i>~</i> 0							
FIELD MEAS Time	SUREMENTS Amount	рН	Temperature	Conductivity	Dissolved	Redox	Turbidity	Depth to Water	Purge Rate	
ime	Purged (L)	ρti	(Celsius)	(mS/cm)	Oxygen (mg/L)		(NTU)	(ft BTOC)	(L/min)	
1535	25	6.20	11.78	0.792	0.64	44.7	4.17	14.88	0.5	
1540	F.0	618	12.02		0.46	39.2	2 29	14.87	0.5	
1545	7.5	619		0.907	032	30.2	0.93	1487	0.5	
1550	10.0	6.20	12.03		0.28	24.3	1.54	14.87	0.5	
1555	12.5	6.19	12-05	0.912	0.24	22.1	114	1487	0.5	
1600	150	4.20	12.04	0.911	0.25	19.41	0.69	14.87		
1605	17.5	6.19	12.02	0.911	0.21		043	14.87	0.5	
1610	20.0	0.19	11.99	0.910	0.18	149	0.80	14.87	0.5	
FIELD EQUII	PMENT AND	CALIBRATIC Model	DN		Calibration					
_		CALIBRATIO Model Heron	DN		Calibration Checked Again	st Calibrated Lo	ength			
FIELD EQUII Water Level Pro Water Quality I	obe	Model Heron	<b>DN</b> -Parameter Prob	pe e	Checked Again			librated Weekly		
Water Level Pro Water Quality I	obe Meter OMMENTS	Model Heron		oe e	Checked Again			librated Weekly		
Water Level Pro Water Quality I GENERAL CO Ferrous Iron =	obe Meter OMMENTS	Model Heron YSI 556 Multi- mg/L		pe e	Checked Again			librated Weekly		
Water Level Pro Water Quality I GENERAL CO Ferrous Iron = Multi-Paramete	OMMENTS O · U % er Probe Unit #	Model Heron YSI 556 Multi mg/L	-Parameter Prob	pe e	Checked Again			librated Weekly		
Water Level Prower Quality I  GENERAL CO Ferrous Iron =  Multi-Parameter  Field Parameter	OMMENTS O . U %  Pr Probe Unit # rs Measured in	Model Heron YSI 556 Multi mg/L A Flow-Through	-Parameter Prob	oe .	Checked Again			librated Weekly		
Water Level Prower Quality I  GENERAL CO Ferrous Iron =  Multi-Parameter Field Parameter Pump Placemen	OMMENTS O . U % 1 er Probe Unit # rs Measured in nt Depth = 3	Model Heron YSI 556 Multi mg/L  Flow-Through 33 ft	-Parameter Prob	pe	Checked Again Twice Daily Ca	alibration Verifi	cation also Ca	·	Bold)	
Water Level Prowater Quality In GENERAL CONTROL For The Multi-Parameter Pump Placement Pump Rate = (	OMMENTS O · O · O · O · O · O · O · O · O · O ·	Model Heron YSI 556 Multi mg/L  Flow-Through 33 ft	-Parameter Prob	pe	Checked Again Twice Daily Ca	alibration Verifi	cation also Ca	h / 2019 / Avg in	Bold) 129.9	
Water Level Pro Water Quality I GENERAL CO Ferrous Iron = Multi-Paramete	OMMENTS O · O · O · O · I · I · I · I · I · I ·	Model Heron YSI 556 Multi mg/L  Flow-Through 33 ft	-Parameter Prob	De .	Checked Again Twice Daily Ca	alibration Verifi	cation also Ca	h / 2019 / Avg in		
Water Level Prowater Quality In GENERAL CONTROL Ferrous Iron = Multi-Parameter Pump Placement Pump Rate = (Well Diameter	OMMENTS O · O · O · O · I · I · I · I · I · I ·	Model Heron YSI 556 Multi mg/L  Flow-Through 33 ft	-Parameter Prob	De .	Checked Again Twice Daily Ca  Histori ORP	alibration Verifi c (7-year averag 43.9	cation also Ca	h / 2019 / Avg in 174.2	129.9	

SITE NAME		СН	AAP		PROJECT NO.		605	65355			
SAMPLE NO.		G00	082-1		WELL NO.		G	0082			
DATE/TIME C	COLLECTED	10-21	-19/	1730	PERSONNEL	TV					
SAMPLE MET			CTIVE SS MO		PERSONNEL	CH		7			
DI GIVII EE IVIE	ПОВ	T KO-A	ICTIVE 33 MO	1130011	-	C()					
SAMPLE MEI		Groundwater									
SAMPLE QAS		YES	NO		SAMPLE NO.						
SAMPLE QC I		YES	NO		SAMPLE NO.						
MS/MSD REQ	DESTED	YES	NO	MS/MSD	SAMPLE NO.						
SAMPLE CO	NTAINERS, F	PRESERVATI	VES, ANALYS	IS							
Sample Contain			<b>Preservative</b>		Analysis Reque	ested .					
2 - 500 mL Am			6°C		Explosives + M			-			
3 - 40 mL VO			6°C, HCl		Methane (RSK		200 (252.0				
1 - 500 mL HD 1 - 250 mL HD						NH <sub>3</sub> (350.1), NC Alkalinity (2320		)			
1 - 250 mL HD			6°C, ZnOAc/N	•OH	Sulfide (9034)	rikallility (2320	ю)	- 111-11			
1 - 250 mL Am			6°C	u-011	DOC (9060A)						
WELL PURG	:										
		16 0:	10		Well Depth (ft BTOC) 41.01						
Date		10-21				ater (ft BTOC)	14	21			
Time Started	1645					Column Length	26.9				
Time Complete		1725				/olume (per ft)	068				
Background	easurements				Volume of Water in Well (L) 16.62						
Breathing Zo			עיי או		Casing Volumes to Purge						
Well Head	Sile		J)		Minimum to Purge (L) 20L  Actual Purge (L) 20L						
Purge Water			ภ ข			ruur rungo (E)	200				
							-				
FIELD MEAS	Amount	U	Tampamtura	Conductivity	Dissolved	Dadau	Tankidia.	Donalis do Water	Dunna Data		
ime	Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)		
	r argea (2)		(Ceisius)	(mo em)	Oxygen (mg/L)	(11117)	(1110)	(RBTOC)	(Dillill)		
1650	2.5	639	11.78	0625	039	320	8.43	14 23	0.5		
1655	50	6.31	11.85	0.6860		31.5	190	14.23	0 F		
1700	7.5	6.29	11.91	0680	0.28	31.5	0.92		0.5		
1705	10.0	629	11.91	0.670	0.22	31.8	0.12	14.23	0.5		
1710	12.5	4.28	11.87	0.663	0.26	322	0.08	14.23	0.5		
1715	15.0	6.28	11.88	0.658	0.24	324	0.23	14.23	0.5		
1720	175	628	11.8/	0.655	0.24	32.7	0.16	14.23	0.5		
1725	20.0	628	11.93	0.652	0.20	32.7	043	14.23	0.5		
							***				
		1				1					
						1					
FIELD EQUI	PMENT AND	CALIBRATIO	N				·				
		Model			Calibration						
Water Level Pr		Heron	D D. 1		Checked Again			111 . 1117 . 1			
Water Quality I	Meter	YSI 556 Multi	-Parameter Prob	e	I wice Daily Ca	libration Veriti	cation also Ca	librated Weekly			
GENERAL CO			-			<del>"</del> -		<del></del>			
Ferrous Iron =		ng/L									
Multi-Paramete											
Field Parameter			Cell								
Pump Placemen					*** . *	(7.0	. 1	1 /2010 / : : :	D 119		
Pump Rate = Well Diameter		1/12						h/2019/Avg in			
Screen Interval					ORP DO	43.3	205.9	164.0	110.3		
Sciecii interval	20-30				PH	0.06 6.06	1.40 6.72	6.21	6.39		
	740		11012-2-		Cond.	0.488	0.72	0.488	0.655		
					_ 0	000	0.177	0.700	0.000		

SITE NAME		CH	IAAP		PROJECT NO. 60565355					
SAMPLE NO.	line and it	G0	086-1		WELL NO.		G	0086		
DATE/TIME O	COLLECTED	10/23/1	9 @ 104	15	PERSONNEL	R. EN	C 0 0 A			
SAMPLE MET			CTIVE SS MO			R. Ex	e yes			
SAMPLE MEI	DIA.	Groundwate					J			
SAMPLE MEI		YES	NO	SPI IT	SAMPLE NO.	-				
SAMPLE QC		YES	NO		SAMPLE NO.					
MS/MSD REQ		YES	NO		SAMPLE NO.					
SAMPLE CO	NTAINERS, P	RESERVATI	VES, ANALYS	SIS	<del></del>				170	
Sample Contai			Preservative		Analysis Requ	<u>ested</u>			100	
2 - 500 mL An	nber		6°C		Explosives + MNX (8330A)					
3 - 40 mL VO			6°C, HCl		Methane (RSK 175)					
1 - 500 mL HD			6°C, H <sub>2</sub> SO <sub>4</sub>			NH <sub>3</sub> (350.1), NO		)	- 4	
1 - 250 mL HD			6°C	011		Alkalinity (2320	В)			
1 - 250 mL HD 1 - 250 mL An			6°C, ZnOAc/N	a∪H	Sulfide (9034) DOC (9060A)					
WELL PURG					20C (3000A)					
D /		10.22	.1.04			epth (ft BTOC)	3 - 1-1-11	40.30		
Date Time Started		10-23-	•			ater (ft BTOC)		12,29		
Time Started	ed		1001			Column Length _ Volume (per ft)		28,01		
	e Completed 1050  Measurements ackground Nd reathing Zone Nd				_	volume (per 11)_ iter in Well (L)		0.62		
						lumes to Purge		17,37		
Breathing Zo					_	im to Purge (L)		20		
Well Head			Nd		Actual Purge (L) 20					
Purge Water	•		nd							
FIELD MEAS	SUREMENTS	:	<del></del>			ORP	:		<del></del>	
Time	Amount Purged (L)	Η	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)	
1006	2,5	6.82	11.59	0.685	13.48	160.1	5.67	12.29	0,5	
1011	5	6.87	12.13	0.688	1.30	156,5	4,74	12,29	0,5	
1016	7.5	6.88	12,33	0.686	0,77	156.0	3,55	12,29	0.5	
1021	10	6.88	12.51	0.086	0.61	155.5	3,4/	12.29	0,5	
1026	12.5	6.89	12.67	0.488	0,56	154,8	5.38	12.29	0.5	
1031	15	4,89	12.73	0,688	0,53	154.8	3,30	12.29	0.5	
1036	175	6.86	1236	0.687	0.52	155,0	5.00	12.29	05	
1041	260	6.84	12,55	0.684	0.52	154,2	3,25	12.29	0.5	
TELD EQUI	PMENT AND	CALIBRATI	ON		<u> </u>	= :				
FIELD EQUI	PMENT AND	CALIBRATION Model Heron	ON			nst Calibrated Le				
Water Level Pr	robe	Model Heron	ON i-Parameter Prob	pe	Checked Again	nst Calibrated Le		librated Weekly		
Water Level Pr Water Quality GENERAL C	obe Meter OMMENTS	Model Heron YSI 556 Mult		pe	Checked Again			librated Weekly		
Water Level Pr Water Quality GENERAL Co Ferrous Iron =	obe Meter OMMENTS	Model Heron YSI 556 Mult		pe	Checked Again			librated Weekly		
Water Level Pr Water Quality   GENERAL Co Ferrous Iron = Multi-Paramete	OMMENTS OOMMENTS OOMMENTS OOMMENTS	Model Heron YSI 556 Mult ng/L 24698	i-Parameter Prob	oe .	Checked Again			librated Weekly		
Water Level Pr Water Quality   GENERAL Control Ferrous Iron = Multi-Paramete	OMMENTS O O O I  The Probe Unit #  I'm Measured in	Model Heron YSI 556 Mult  mg/L 24698 Flow-Through	i-Parameter Prob	De .	Checked Again			librated Weekly		
Water Level Pr Water Quality   GENERAL Control Ferrous Iron = Multi-Parameter Field Parameter Pump Placeme	OMMENTS OOD of er Probe Unit # rs Measured in nt Depth = 3	Model Heron YSI 556 Mult  mg/L 24698 Flow-Through 3 ft	i-Parameter Prob	pe	Checked Agair Twice Daily Co	alibration Verific	cation also Ca		Dalay	
Water Level Pr Water Quality  GENERAL Co Ferrous Iron = Multi-Paramete Pump Placeme Pump Rate =	OMMENTS OOD 1 er Probe Unit # rs Measured in nt Depth = 3 O.5 L/Min	Model Heron YSI 556 Mult  mg/L 24698 Flow-Through 3 ft	i-Parameter Prob	De .	Checked Agair Twice Daily Co	alibration Verific	eation also Ca	h / 2019 / Avg in		
Water Level Pr Water Quality  GENERAL Co Ferrous Iron = Multi-Paramete Pump Placeme Pump Rate = Well Diameter	OMMENTS O O O I  er Probe Unit #  rs Measured in  nt Depth = 3 O 5 L/Min = 2"	Model Heron YSI 556 Mult  mg/L 24698 Flow-Through 3 ft	i-Parameter Prob	De .	Checked Again Twice Daily Co	alibration Verific ic (7-year averag 35.8	e low and hig	h / 2019 / Avg in 49.7	86.4	
Water Level Pr Water Quality   GENERAL Control Ferrous Iron = Multi-Paramete Pump Placeme Pump Placeme Pump Rate =	OMMENTS O O O I  er Probe Unit #  rs Measured in  nt Depth = 3 O 5 L/Min = 2"	Model Heron YSI 556 Mult  mg/L 24698 Flow-Through 3 ft	i-Parameter Prob	oe .	Checked Agair Twice Daily Co	alibration Verific	eation also Ca	h / 2019 / Avg in		

SITE NAME		СН	AAP		PROJECT NO.		605	65355	
SAMPLE NO		G00	87-1	141	WELL NO.		G	0087	
DATE/TIME ( SAMPLE ME	COLLECTED	10 - 22 · PRO-A	-19 /08 CTIVE SS MO	_	PERSONNEL	TY			
SAMPLE ME SAMPLE QA SAMPLE QC MS/MSD REG	SPLIT: DUPLICATE:	Groundwater YES YES YES	NO NO NO	DUPLICATE	SAMPLE NO. SAMPLE NO. SAMPLE NO.				
Sample Conta 2 - 500 mL Ar 3 - 40 mL VO - 500 mL HI - 250 mL HI - 250 mL Ar - 250 mL Ar	mber PA DPE DPE DPE	PRESERVATIV	Preservative 6°C 6°C, HCl 6°C, H <sub>2</sub> SO <sub>4</sub> 6°C 6°C, ZnOAc/N 6°C	0.000	D <sub>2</sub> /NO <sub>3</sub> (353.2) DB)				
Date Fime Started Fime Complet PID Measuren Background Breathing Z Well Head Purge Wate	10 22 - 19				Well Depth (ft BTOC) Depth to Water (ft BTOC) 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)  37.56  27.11  25.11				
Time	SUREMENTS Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate
0755 0800 0805 0810 0815 0820 0825 0830	25 5.0 7.5 10.0 12.5 15.0 17.5 20.0	6 66 6 71 6 71 6 72 6 71 6 71 6 70		0.820 0.817 0.814 0.811 0.809 6.809 0.808	7.75 138 0.80 0.58 0.54 0.44 0.40 0.39	181.1 177.2 174.3 171.6 169.4 168.2 166.5 164.9	431 290 241 211 119 0.18 0.59	12 44 12 44 12 44 12 44 12 44 12 44 12 44	00000000000000000000000000000000000000
<b>FIELD EQUI</b> Vater Level Parties  Vater Quality		CALIBRATIO Model Heron YSI 556 Multi-		pe e	Calibration Checked Again Twice Daily Ca			ibrated Weekly	
Ferrous Iron = Multi-Paramet Field Paramete Jump Placeme	COMMENTS O.OO inter Probe Unit # ers Measured intent Depth = 2	Flow-Through (	Cell		Histori	ic (7.vear avera	<b>V</b> e low and high	1/2019 / Ave in	Rold)
Pump Rate = Well Diameter		M (V)			ORP	37.2	ge low and high	1/2019 / Avg in 37.2	92.6
Screen Interval = 25-35				DO	0.08	0.87 6.87	0.21 6.74	0.43	

SITE NAME		СНААР				A MET	605	65355			
SAMPLE NO.		G00	91-1		WELL NO.		G	0091			
DATE/TIME O		10-22 PRO-A	- 19 /1	000 NSOON	PERSONNEL	TY					
SAMPLE MEI	DIA:	Groundwater									
SAMPLE QA		YES	NO	SPLIT	SAMPLE NO.						
SAMPLE QC I		YES	NO	DUPLICATE	SAMPLE NO.						
MS/MSD REQ	UESTED	YES	NO	MS/MSD	SAMPLE NO.						
SAMPLE CO	NTAINERS P	PRESERVATIV	VES ANALVS	212					:		
Sample Contain		RESERVATION	Preservative	15	Analysis Reque	ested					
2 - 500 mL Am			6°C		Explosives + M						
3 - 40 mL VO	4		6°C, HCl		Methane (RSK						
1 - 500 mL HD	PE		6°C, H <sub>2</sub> SO <sub>4</sub>		TKN (351.2), N	NH <sub>3</sub> (350.1), NO	O <sub>2</sub> /NO <sub>3</sub> (353.2	)			
1 - 250 mL HD	The result of the second of th				SO <sub>4</sub> (9056A), A	Alkalinity (2320	)B)				
1 - 250 mL HD					Sulfide (9034)						
1 - 250 mL Am	_ Amber 6°C				DOC (9060A)						
WELL PURG	ING DATA				<del></del>						
Date		10-23-	19			epth (ft BTOC)	10 :-	31.85	<del></del> .		
					Depth to Water (ft BTOC) 13.13  Water Column Length 19.72						
Time Started Time Complete	ad.	0915						***************************************			
PID Measurem		0115			Well Casing Volume (per ft) 0 03L  Volume of Water in Well (L) 12 23  Casing Volumes to Purge						
Background			å la								
Breathing Zo			NA		_		201				
Well Head	Sile		\v\i)		Minimum to Purge (L) 20L  Actual Purge (L) 20L						
Purge Water			ND			ctual Fulge (L)	206		771834		
- uigo irutoi											
FIELD MEAS											
Time	Amount Purged (L)	pН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)		
0920	25	689	11.07	1307	2.33	174.1	1.13	12.12	0.5		
0925	5.0	688	11-17	1319	246	168.3	1.52	12/2	0.5		
0930	7.5	687	11.34	1.318	253	166.2	1.29	12.12	0.5		
0935	100	6 86	11.45	1.319	265	163.9	0.71	12.12	0.5		
0940	12.5	4.87	11.54	1.321	2.74	161.9		1212	0.17		
0945		685				159.8	0 24	12.12	0.11		
			11.47	1 325	2.77	171.0	0.87	12.10	0.5		
0950	175		11.63	1320	277	158.3	002	1212	0.5		
०१मम	2010	W 83	11- 10	1-525	2.79	1568	0.40	12-12	05		
EIELD EOU	DATENIT AND	CALIBRATIC	N.I								
FIELD EQUI	FINIENT AND	Model	<b>/14</b>		Calibration						
Water Level Pr	obe	Heron			Checked Again	st Calibrated Le	ength				
Water Quality	Meter	YSI 556 Multi-	Parameter Prob	oe .	Twice Daily Ca	libration Verifi	cation also Ca	librated Weekly			
GENERAL C	OMMENTS	<del></del>	<del></del>	<del></del>							
Ferrous Iron =		ng/L									
Multi-Paramete					910 915-4						
		Flow-Through	Cell								
Pump Placemen						- 52					
Pump Rate =		nin						h / 2019 / Avg in			
Well Diameter					ORP	59.9	197.0	168.8	132.6		
Screen Interval	= 20-30				DO	2.11	5.57	2.11	4.27		
				val to	PH	6.15	6.94	6.92	6.76		
100000000000000000000000000000000000000					Cond.	0.847	1.362	1.362	1.088		

SITE NAME		CHAAP PROJECT NO.				605	60565355					
SAMPLE NO.		G00	92-1		WELL NO.		G	0092				
DATE/TIME C	OUECTED	10-	22-19	/1110	PERSONNEL	Ty						
SAMPLE MET			CTIVE SS MON		LICOUNTEL	CH						
0.1.404.51455						<u> </u>						
SAMPLE MEI		Groundwater	NO	CD1.17	CAMBI ENO							
SAMPLE QA S		YES YES	NO NO		SAMPLE NO.							
MS/MSD REQ		YES	NO		SAMPLE NO.							
M3 M3D KEQ	OLSTED	1 L3	NO	INISTRISE	SAMI LE NO.							
		PRESERVATIV	VES, ANALYS	IS								
Sample Contain			Preservative		Analysis Reque							
2 - 500 mL Am					Explosives + N							
3 - 40 mL VOA 1 - 500 mL HD	·				Methane (RSK	. 175) NH <sub>3</sub> (350.1), NC	NO (252.2					
1 - 250 mL HD					SO <sub>4</sub> (9056A), A			)				
1 - 250 mL HD					Sulfide (9034)	tikalility (2320	<i>D</i> )					
1 - 250 mL Am			6°C	.VII	DOC (9060A)							
WELL PURG	ING DATA											
_		10 -27	-10			epth (ft BTOC)		52.78				
Date			- 17		-	ater (ft BTOC)		1233				
Time Started	•	1025				Column Length	40.41					
Time Complete		1105				Volume (per ft)	0.65					
PID Measurem Background			416		Volume of War	` ' -	25.0	8				
Breathing Zo			<b>₩</b>			lumes to Purge	201					
Well Head	JIIC		ND)			num to Purge (L) 20 L  Actual Purge (L) 20 L						
Purge Water			NI)		roctual runge (E) _ Q O L							
FIELD MEAS		11	T	0 4 6 7	D: 1 1	D 1	T 1:15	B .1 . W .	D D .			
Time	Amount Purged (L)	pН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)			
	·g · (=)		(0010140)	(5, 5)	ON J BOIL (III B 2)	(,	(1110)	(1.2100)	(Billil)			
1030	2.5	7.17	11.69	1.254	0.67	133.5	2.81	12.33	0.5			
1035	50	7-15	11.91	1.279	0.34	129.2	182	12.32	0.5			
1040	7.5	7.14	11.87	1279	0.39	1283	022	2.32	0.5			
1045	100	715	12.00	1.280	0.35	126.8	0.21	12.32	0.5			
1050	12.5	714	12.00		0.20	126.1	015	12.32	0.5			
1055	15.0	7.14	1219		0.27	125.2	9.16	12.32	0.5			
1100	175	713	12.11	1.272	0.20	123.7	81.0	12.32	0.5			
1105	20.0	7.14	11.90	1269	020	122.9	0.15	12-32	0.5			
			<u> </u>									
FIELD EQUII	PMENT AND	CALIBRATIC	N						<del></del>			
-		Model			Calibration							
Water Level Pro		Heron			Checked Again							
Water Quality !	Meter	YSI 556 Multi-	Parameter Prob	e	Twice Daily Ca	alibration Verifi	cation also Ca	librated Weekly				
GENERAL CO	OMMENTS	<del></del>		·								
Ferrous Iron =		ng/L										
Multi-Paramete												
		Flow-Through	Cell	7-6-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-					A8			
Pump Placemer												
Pump Rate = (					Histori	c (7-year averag	e low and hig	h/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			

SITE NAME		СНААР			PROJECT NO.		605	60565355			
SAMPLE NO.		PZ0	17R-1		WELL NO.		PZ	2017R			
DATE/TIME C SAMPLE MET		10/23/10 PRO-A	9 @ 1324 CTIVE SS MO		PERSONNEL	REX	een yes				
SAMPLE MED SAMPLE QA S SAMPLE QC I MS/MSD REQ	SPLIT: DUPLICATE:	Groundwater YES YES YES	NO NO NO	DUPLICATE	F SAMPLE NO. E SAMPLE NO. D SAMPLE NO.			<sup>2021-1</sup> CO	300		
Sample Contain 2 - 500 mL Am 3 - 40 mL VOA 1 - 500 mL HD 1 - 250 mL HD 1 - 250 mL Am 1 - 250 mL Am	ner ber \ PE PE PE ber	RESERVATI	VES, ANALYS  Preservative  6°C, HCI  6°C, H <sub>2</sub> SO <sub>4</sub> 6°C  6°C, ZnOAc/N  6°C			4NX (8330A) . 175) NH <sub>3</sub> (350.1), NC Alkalinity (2320		()			
Date Time Started Time Complete PID Measureme Background Breathing Zo Well Head Purge Water	d ents one	10-23-19 1235 1335 Nd				pth (ft. BTOC) ater (ft. BTOC) Column Length Volume (per ft) ter in Well (L) dumes to Purge um to Purge (L) ctual Purge (L)		32.42 11.52 20.9 0.62 12.96 20 20			
FIELD MEAS Time	UREMENTS 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)		
1240 1245 1250 1255 1300 1305 1310 1315	2.5 7.5 10 145 175 21	6.44 6.44 6.41 6.39 6.31 6.39 6.34	15.01 14.97 14.87 14.86 14.87 14.85 14.65	0.757 0.717 0.700 0.687 0.674 0.665 0.652	5.83	167.3 169.7 170.5 171.1 172.2 172.0 171.2 173.9	5,33 3,55 5,57 4,22 4,15 4,19 4,19	11.50 11.49 11.49 11.49 11.49 11.49	055 055 055 055 055 055		
Water Level Pro	IELD EQUIPMENT AND CALIBRATION  Model  Vater Level Probe Heron  Vater Quality Meter YSI 556 Multi-Parameter Probe					nst Calibrated Le		alibrated Weekly			
Ferrous Iron = Multi-Paramete Field Parameter Pump Placemer	GENERAL COMMENTS  ferrous Iron = 000 mg/L  fulti-Parameter Probe Unit # 24698  field Parameters Measured in Flow-Through Cell  tump Placement Depth = 20 ft  tump Rate = 0.5 L/min							gh / 2019 / Avg in			
Screen Interval					ORP DO	90.5	202.6 5.92	120.9 5.92	130.8 3.03		
					PH Cond.	6.22 0.516	6.71 0.820	6.45 0.820	6.47 0.638		

SITE NAME	TE NAME CHAAP				PROJECT NO.	ki-xi	605	565355			
SAMPLE NO.	•	PZ	018-1		WELL NO.		P	Z018			
DATE/TIME	COLLECTED	10/23/19	@ 1209	5	PERSONNEL	12,	EXCOOL				
SAMPLE ME			ACTIVE SS MO				Dolaps				
					_	F-1	Pujes				
SAMPLE ME	DIA:	Groundwate	r								
SAMPLE QA	SPLIT:	YES	NO	SPLIT	Γ SAMPLE NO.		_				
SAMPLE QC	DUPLICATE:	YES	NO	DUPLICATE	E SAMPLE NO.						
MS/MSD REC	QUESTED	YES	NO	MS/MSE	SAMPLE NO.						
SAMPLE CC	NTAINERS P	DESERVAT	IVES, ANALYS	215	<del></del>			<u></u>			
ample Contai		RESERVATI	Preservative	,10	Analysis Reque	ested					
2 - 500 mL Ar			6°C								
- 40 mL VO			6°C, HCl		Explosives + MNX (8330A) Methane (RSK 175)						
- 500 mL HI			6°C, H <sub>2</sub> SO <sub>4</sub>		TKN (351.2), 1		O <sub>2</sub> /NO <sub>2</sub> (353.2	)			
- 250 mL HI			6°C		SO <sub>4</sub> (9056A),						
- 250 mL HI			6°C, ZnOAc/N	aOH	Sulfide (9034)		,				
- 250 mL Ar					DOC (9060A)						
	GING DATA				DOC (7000A)						
				Well De	pth (ft. BTOC)	)	31.90				
Date	10-23-19			Depth to Wa	ater (ft. BTOC)		12.85				
ime Started	e Started //23			77501000000	Water (	Column Length		19,05			
ime Complet					Well Casing V	Volume (per ft)	********	0.62			
ID Measurem	nents				Volume of Wa	ter in Well (L)		11.81			
Background	l	N	d		Casing Vo	lumes to Purge	1/10/				
Breathing Z	one		vd			ım to Purge (L)		20 20			
Well Head						ctual Purge (L)					
Purge Water	704				<i>6</i> · (=)		~~				
IFI D MEA	SUREMENTS				<u>.</u> .	6.00		<del>-</del> -			
Time	Amount	рН	Temperature	Conductivity		ORP Redox	Turbidity	Depth to Water	•		
	Purged (L)		(Celsius)	(mS/cm)	Oxygen (mg/L)	(mV)	(NTU)	(ft BTOC)	(L/min)		
1128	2,5	6.45	13,95	0.649	8,54	165.3	3,80	12.83	12		
1133	5				1 22	رادی ا		1202	0,3		
		6.62	14.06	0.657	1.23	16514	5.33	12.03	ر بی		
1138	7.5	6.60	14.12	0.660	1.24	166.0	5,27	12 83	0.5		
1143	10	6.57	14,23	0660	1.28	166.8	3,74	12.83	0.5		
1148	125	4.57	14.35	0661	1.29	166.6	7:11	1283	0.5		
1153	15	6.52	14.45	0.663	1.30	147.2	4.42	12,83	0.5		
1158	17.5	6.51	14,63	0.664	1.32	1671	4.56	12,83	0,5		
203	w	4.57	14.72	0.664	1134	147,4	4.56 3,38	12.83	0.5		
	DAGEROUS . S.E.	0.11.55	ON								
TELD POTT			NIN		Calibration						
TELD EQUI	D EQUIPMENT AND CALIBRATION  Model				Calibration Checked Again	net Calibrated 1	anoth				
	er Level Probe Heron			Checked Again			librated Weekly				
Vater Level Pr			er Quality Meter YSI 556 Multi-Parameter Probe			andianon veill	ivation also Ca	unnaicu weekiv			
Vater Level Pr			i-Parameter Prob	oe	Twice Daily Ca						
Vater Level Provater Quality	Meter  OMMENTS	YSI 556 Mult	i-Parameter Prob	oe	Twice Daily Ca		<u>-</u>				
Vater Level Provider Quality  GENERAL Control of the control of th	Meter  OMMENTS  n	YSI 556 Mult		oe	Twice Daily Ca		-				
Vater Level Provider Quality  SENERAL Controls Iron =  Multi-Paramet	OMMENTS ner Probe Unit #	YSI 556 Mult	ዮ	oe .	Twice Daily Ca						
Vater Level Provater Quality  GENERAL Courtous Iron = fulti-Parametrield Paramete	OMMENTS  O n er Probe Unit # ers Measured in	YSI 556 Multi ng/L 2469 Flow-Through	ዮ	oe .	Twice Daily Ca						
/ater Level Pro/ater Quality  ENERAL Common errous Iron = Iulti-Parameteield Parameteump Placeme	OMMENTS  OWNERTS  In rer Probe Unit #  ars Measured in the Depth = 2	YSI 556 Multing/L  2469 Flow-Through	ዮ	e	Twice Daily Ca						
/ater Level Pro/ater Quality  EENERAL Common of the common	OMMENTS  ner Probe Unit # ers Measured in ent Depth = 2  0.5 t / wm	YSI 556 Multing/L  2469 Flow-Through	ዮ	e				h / 2019 / Avg in	Bold)		
/ater Level Pro/ater Quality  EENERAL Common of the common	OMMENTS  ner Probe Unit # ers Measured in ent Depth = 2  0.5 t / wm	YSI 556 Multing/L  2469 Flow-Through	ዮ	De la constant de la					Bold) 124.4		
Vater Level Provider Quality  SENERAL Common = fulti-Paramete common Placeme common Placeme common Placeme common Placeme common Placeme componer Placeme compo	OMMENTS  OF Probe Unit #  Fors Measured in 15  Of Star American  O	YSI 556 Multing/L  2469 Flow-Through	ዮ	De la constant de la	Histori	c (7-year avera	ge low and hig	th / 2019 / Avg in			
Vater Level Provater Quality  GENERAL Courtous Iron = fulti-Parametrield Paramete	OMMENTS  OF Probe Unit #  Fors Measured in 15  Of Star American  O	YSI 556 Multing/L  2469 Flow-Through	ዮ	De la constant de la	Histori ORP	ic (7- <u>year avera</u> 77.0	ge low and hig 187.6	<u>th / 2019 / Avg in</u> 94.4	124.4		

SITE NAME		СНААР			PROJECT NO.		605	665355		
SAMPLE NO.	_	PZO	)19-1		WELL NO.		P	Z019		
DATE/TIME (		10-22 PRO-A	2 - 19 / .ctive ss mo	1650 NSOON	PERSONNEL	TY				
SAMPLE ME	DIA	Groundwater					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
SAMPLE QA		YES	NO	SPLIT	SAMPLE NO.					
SAMPLE QC	DUPLICATE:	YES	NO	DUPLICATE	SAMPLE NO.					
MS/MSD REC	QUESTED	YES	NO	MS/MSD	SAMPLE NO.		PZ019-	I MS/MSD		
SAMPLE CO	NTAINERS, P	RESERVATI	VES, ANALYS	SIS						
Sample Contai			Preservative		Analysis Requ	ested				
2 - 500 mL An			6°C		Explosives + MNX (8330A)					
3 - 40 mL VO			6°C, HCl 6°C, H <sub>2</sub> SO <sub>4</sub>		Methane (RSK 175) TKN (351.2) NH (350.1) NO (NO. (353.2)					
1 - 250 mL HE			6°C		TKN (351.2), NH <sub>3</sub> (350.1), NO <sub>2</sub> /NO <sub>3</sub> (353.2) SO <sub>4</sub> (9056A), Alkalinity (2320B)					
1 - 250 mL HE	PE		6°C, ZnOAc/N	laOH	Sulfide (9034)					
1 - 250 mL An			6°C		DOC (9060A)					
WELL PURG	ING DATA									
Date		10-22-19				pth (ft. BTOC)	***	32,23		
Time Started		1605			Depth to Water (ft. BTOC)  Water Column Length  Vo. 53					
Time Complete	ed					Volume (per ft)	15.53			
PID Measurem						ter in Well (L)				
Background					Casing Vo	lumes to Purge				
Breathing Z	one		ND			nimum to Purge (L) QOL				
Well Head			ND		. А	ctual Purge (L)	201			
Purge Water			44		-					
FIELD MEAS	SUREMENTS								<del></del> -	
Time	Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)	
1610	25	631	14-60	0.631	683	P8.3	1.34	16.73	0.5	
1615	5.0	10.25	1451	0621	6.63	59.9	0.99	16.73	05	
1620	7.5	6.18	14.01	0610	6.70	65.3	0.11	16.73	OF	
1625	10.0	620	1469	0.609	659	60 Co	0.14	16.73	0.5	
1630	12.5	618	14.74	0.608	663	69.1	0.45	16.73	0.5	
1635	15.0	016	14.74			71.3	0.57	16.73	05	
1640	175	616		0.603		75.1	0.46	16.73	0 5	
1645	20.0	616	14.75	0.002	6.44	77.3	0.44	16.73	0.5	
FIELD EQUI	PMENT AND	CALIBRATIC	ON		<del>_</del>					
		Model			Calibration					
Water Level Pr Water Quality		Heron YSI 556 Multi-	-Parameter Prob	oe .	<del>-</del>	ast Calibrated Le Alibration Verifi		librated Weekly		
GENERAL C	OMMENTS			-	<del></del>	*	<del></del>		=======================================	
Ferrous Iron =		ng/L								
	er Probe Unit #		Call							
	rs Measured in l nt Depth = 2, 3		Cell		-7					
Pump Rate = (		J. J. II.			Histori	c (7-vear averac	e low and hie	h / 2019 / Avg in	Bold)	
Well Diameter					ORP	112.7	287.2	287.2	169.6	
Screen Interval					DO	3.06	9.76	9.76	7.10	
					PH	5.92	6.52	5.92	6.18	
					Cond.	0.402	1.003	0.502	0.587	

		СН	AAP		PROJECT NO. 60565355							
SAMPLE NO.		PZ0	20-1		WELL NO.		PZ	2020				
DATE/TIME O		10-23 PRO-A	-19 / O CTIVE SS MO	845 NSOON	PERSONNEL	TY CH			9-4-61 (1704)			
SAMPLE MEI	DIA:	Groundwater										
SAMPLE QA		YES	NO	SPLIT	SAMPLE NO.							
SAMPLE QC I		YES	NO		SAMPLE NO.							
MS/MSD REQ		YES	NO	9.0	SAMPLE NO.			2/(4)				
SAMPLE CO.	NTAINERS I	PRESERVATI	VES ANALVS	218								
Sample Contai		RESERVATI	Preservative	,10	Analysis Requ	ested						
2 - 500 mL Am			6°C		Explosives + MNX (8330A)							
3 - 40 mL VO	4		6°C, HCl		Methane (RSK 175)							
1 - 500 mL HD			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 HD	PE		6°C			Alkalinity (2320						
1 - 250 mL HD	PE		6°C, ZnOAc/N	IaOH	Sulfide (9034)	)						
1 - 250 mL An			6°C		DOC (9060A)							
WELL PURG	ING DATA											
Data		10-02	ia			epth (ft. BTOC)		32.33				
Date		10-23-	17			ater (ft. BTOC)		7.39				
Time Started		0800				Column Length		94				
Time Complete		0940	)		Well Casing Volume (per ft)  Volume of Water in Well (L)  Casing Volumes to Purge  Minimum to Purge (L)  Actual Purge (L)							
PID Measurem			414									
Background			NA									
Breathing Zo	one		ND									
Well Head	_	ND				ctual Purge (L)	201					
Purge Water			ND									
FIELD MEAS									<del></del>			
Time	Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)			
0805	2.5	(0.6)	11.97	1.069	8.30	173.0	0.62	15.39	0.5			
	2.F	0.61		1.069	8.30	1730	0.62	15.39				
0810	5.0	0.64	1195	1.066	3.22	169.60	0.70	15.39	0.5			
0810	5.0	669	1195	1.066	3.22	169.0	0.76	15.39	0.5			
0810 081F1 0820	5.0 7.5 10.0	667	1196	1.066	322	169.60 167.0 165.0	0.76	15.39 15.39 15.39	0.5			
0810 0815 0825	5.0 2.5 10.0 12.5	667	1196 1196 1194 1195	1.066	322 279 208	169.6 167.0 165.0 163.6	0.76	15.39 15.39 15.39	0.5			
0810 0815 0820 0825 0830	5.0 2.5 10.0 12.5 17.0	667	1196 1196 1195 1197	1.066	322 293 279 208 203	169.6 167.0 165.0 163.6 162.3	0.76	15.39 15.39 15.39 15.39 15.39	000000			
0810 0817 0820 0825 0830 0837	5.0 2.5 10.0 12.5 17.5	0 6 4 6 65 6 60 6 60 6 60 6 60 6 60	1196 1196 1197 1197 1197	1.066	322 293 279 263 258	169.6 167.0 165.0 163.6 162.3 161.5	0.76 0.45 0.29 0.40 0.37 0.43	15.39 15.39 15.39 15.39 15.39 15.39	0000000			
0810 0815 0820 0825 0830	5.0 2.5 10.0 12.5 17.0	667	1196 1196 1197 1197 1197	1.066	322 293 279 208 203	169.6 167.0 165.0 163.6 162.3	0.76	15.39 15.39 15.39 15.39 15.39	000000			
0810 0815 0820 0825 0830 0835	5.0 2.5 10.0 12.5 17.5	0 6 4 6 65 6 60 6 60 6 60 6 60 6 60	1196 1196 1197 1197 1197	1.066	322 293 279 263 258	169.6 167.0 165.0 163.6 162.3 161.5	0.76 0.45 0.29 0.40 0.37 0.43	15.39 15.39 15.39 15.39 15.39 15.39	0000000			
0810 0815 0820 0825 0830 0835	5.0 2.5 10.0 12.5 17.5	0 6 4 6 65 6 60 6 60 6 60 6 60 6 60	1196 1196 1197 1197 1197	1.066	322 293 279 263 258	169.6 167.0 165.0 163.6 162.3 161.5	0.76 0.45 0.29 0.40 0.37 0.43	15.39 15.39 15.39 15.39 15.39 15.39	0000000			
0810 0817 0820 0825 0830 0837 0840	5.0 2.5 10.0 12.5 17.0 17.5 20.0	6 6 4 6 60 6 67 6 66 6 67 6 67	11.96 11.94 11.95 11.97 11.97 11.98	1.066	322 293 279 263 258	169.6 167.0 165.0 163.6 162.3 161.5	0.76 0.45 0.29 0.40 0.37 0.43	15.39 15.39 15.39 15.39 15.39 15.39	0000000			
0810 0817 0820 0825 0830 0837 0840	5.0 2.5 10.0 12.5 17.0 17.5 20.0	Co 6 4 6 6 7 6 6 6 7 6 6 7 6 7 6 6 7	11.96 11.94 11.95 11.97 11.97 11.98	1.066	3,93 2,93 2,08 2,58 2,54	169.6 167.0 165.0 163.6 162.3 161.5	0.76 0.45 0.29 0.40 0.37 0.43	15.39 15.39 15.39 15.39 15.39 15.39	0000000			
0810 0817 0820 0825 0830 0840	5.0 2.5 10.0 12.5 15.0 17.5 20.0	C 6 4 6 65 6 67 6 66 6 67 6 67 6 67	11.96 11.94 11.95 11.97 11.97 11.98	1.066	3 22 2 93 2 79 2 63 2 58 2 54	169.6 167.0 165.0 163.6 162.3 161.5 160.2	0.76 0.45 0.29 0.40 0.37 0.43 0.29	15.39 15.39 15.39 15.39 15.39 15.39	0000000			
0810 0815 0820 0825 0830 0835 0840	5.0 2.5 10.0 12.5 17.0 17.5 20.0	Color	11.96 11.94 11.95 11.97 11.97 11.98	1.066 1.058 1.058 1.058 1.001	3 22 2 93 2 79 2 63 2 58 2 54 Calibration Checked Agai	169.60 167.00 165.00 163.60 162.3 161.5 160.2	0.76 0.45 0.29 0.40 0.37 0.43 0.29	15.39 15.39 15.39 15.39 15.39 15.39	0000000			
0810 0817 0820 0825 0830 0840	5.0 2.5 10.0 12.5 17.0 17.5 20.0	Color	11.95 11.96 11.95 11.97 11.98	1.066 1.058 1.058 1.058 1.001	3 22 2 93 2 79 2 63 2 58 2 54 Calibration Checked Agai	169.6 167.0 165.0 163.6 162.3 161.5 160.2	0.76 0.45 0.29 0.40 0.37 0.43 0.29	15.39 15.39 15.39 15.39 15.39 15.39	0000000			
OBIO OBIF OBLO OB25 OB35 OB40  FIELD EQUII Water Level Pr Water Quality	5. 0 2. 5 10. 0 12. 5 17. 0 17. 5 20. 0 PMENT AND	Coloro Co	11.95 11.96 11.95 11.97 11.98	1.066 1.058 1.058 1.058 1.001	3 22 2 93 2 79 2 63 2 58 2 54 Calibration Checked Agai	169.60 167.00 165.00 163.60 162.3 161.5 160.2	0.76 0.45 0.29 0.40 0.37 0.43 0.29	15.39 15.39 15.39 15.39 15.39 15.39	0000000			
OBIO OBIF OBLO OB25 OB35 OB40  FIELD EQUII Water Level Pr Water Quality GENERAL CO Ferrous Iron =	5.0 2.5 10.0 12.5 17.0 17.5 20.0 PMENT AND	Color	11.95 11.96 11.95 11.97 11.98	1.066 1.058 1.058 1.058 1.001	3 22 2 93 2 79 2 63 2 58 2 54 Calibration Checked Agai	169.60 167.00 165.00 163.60 162.3 161.5 160.2	0.76 0.45 0.29 0.40 0.37 0.43 0.29	15.39 15.39 15.39 15.39 15.39 15.39	0000000			
OBIO OBIF OBLO OBSE OBSE OBSE OBSE OBSE OBSE OBSE OBS	5.0 2.5 10.0 12.5 17.0 17.5 20.0  PMENT AND  obe Meter  OMMENTS 0.11 er Probe Unit #	CALIBRATIO Model Heron YSI 556 Multi-	11.96 11.96 11.95 11.97 11.97 11.98	1.066 1.058 1.058 1.058 1.001	3 22 2 93 2 79 2 63 2 58 2 54 Calibration Checked Agai	169.60 167.00 165.00 163.60 162.3 161.5 160.2	0.76 0.45 0.29 0.40 0.37 0.43 0.29	15.39 15.39 15.39 15.39 15.39 15.39	0000000			
OBIO OBIF OBLO OBSF OBSO OBSF OBSF	PMENT AND  PMENTS  OMMENTS  OF Probe Unit #  rs Measured in	CALIBRATIO Model Heron YSI 556 Multi  Telegraphic  Telegr	11.96 11.96 11.95 11.97 11.97 11.98	1.066 1.058 1.058 1.058 1.001	3 22 2 93 2 79 2 63 2 58 2 54 Calibration Checked Agai	169.60 167.00 165.00 163.60 162.3 161.5 160.2	0.76 0.45 0.29 0.40 0.37 0.43 0.29	15.39 15.39 15.39 15.39 15.39 15.39	0000000			
OBIO OBIF OBCO OBSF OBSO OBSO	PMENT AND  OMMENTS OIL 1  Probe Unit #  rs Measured in  nt Depth = 28	CALIBRATIO Model Heron YSI 556 Multi  Telegraphic  Telegr	11.96 11.96 11.95 11.97 11.97 11.98	1.066 1.058 1.058 1.058 1.001	3 22 2 93 2 79 2 63 2 58 2 54 Calibration Checked Agai Twice Daily C	169.60 167.00 166.00 163.60 162.3 161.5 160.2	0.76 0.45 0.29 0.40 0.43 0.29	15.39 15.39 15.39 15.39 15.39 15.39	000000 5555555			
OBIO OBIT OBLO OBSIT OBSIT OBLO OBSIT OB	PMENT AND  OMMENTS OIL 1  Probe Unit #  rs Measured in nt Depth = 22  OF	CALIBRATIO Model Heron YSI 556 Multi  Telegraphic  Telegr	11.96 11.96 11.95 11.97 11.97 11.98	1.066 1.058 1.058 1.058 1.001	3 22 2 93 2 79 2 63 2 58 2 54 Calibration Checked Agai Twice Daily C	169.60 167.00 166.00 163.60 162.3 161.5 160.2	0.76 0.45 0.29 0.40 0.43 0.29	15.39 15.39 15.39 15.39 15.39 15.39	000000 555555			
OBIO OBIT OBLO OBSIT OBSIT OBLO OBSIT	PMENT AND  OMMENTS  O I I I  O I I  O I  O I  O I  O I  O	CALIBRATIO Model Heron YSI 556 Multi  Telegraphic  Telegr	11.96 11.96 11.95 11.97 11.97 11.98	1.066 1.058 1.058 1.058 1.001	2.79 2.08 2.63 2.54 Calibration Checked Agai Twice Daily C	169. 6 167. C 165. C 163.6 162.3 161.5 160.2 inst Calibrated L alibration Verification Verification Verification	0.76 0.45 0.47 0.40 0.40 0.43 0.29	15.39 15.39 15.39 15.39 15.39 15.39	000000 555555			
OBIO OBIF OBLO OBSIF OBLO OBSIF OBSO OBSF OBSO OBSO	PMENT AND  OMMENTS  O I I I  O I I  O I  O I  O I  O I  O	CALIBRATIO Model Heron YSI 556 Multi  Telegraphic  Telegr	11.96 11.96 11.95 11.97 11.97 11.98	1.066 1.058 1.058 1.058 1.001	2.79 2.08 2.03 2.58 2.54 Calibration Checked Agai Twice Daily C	169. 6 167. C 167. C 163.6 162.3 161.5 160.2 inst Calibrated L alibration Verification Verificat	0.76 0.45 0.29 0.40 0.43 0.29	15.39 15.39 15.39 15.39 15.39 15.39	000000 00000 Bold)			
OBIO OBIT OBLO OBSIT OBSIT OBLO OBSIT	PMENT AND  OMMENTS  O I I I  O I I  O I  O I  O I  O I  O	CALIBRATIO Model Heron YSI 556 Multi  Telegraphic  Telegr	11.96 11.96 11.95 11.97 11.97 11.98	1.066 1.058 1.058 1.058 1.001	2.79 2.08 2.63 2.54 Calibration Checked Agai Twice Daily C	169. 6 167. C 165. C 163.6 162.3 161.5 160.2 inst Calibrated L alibration Verification Verification Verification	0.76 0.45 0.47 0.40 0.40 0.43 0.29	15.39 15.39 15.39 15.39 15.39 15.39 15.39	(D)			



Project: 2019 CHAAP OU1 RAO Performance Monitoring Well No: PM - Z										
Project No: 60565355  Develo. Method Peristaltic pu	mn and tub	inα				•	Date: Samplers:		<u>-19</u> RH	
Develo. Mediod 1 cristante pu	nip and tuo.	mg	WE	TI MEAS	SUREMEN	JTC	Samplers.	_	<u> </u>	
				. 11	SUREMEN	113				
ιl	Wel		meter (in): length (ft):							
24	Depth of w	ell casing	(ft BTOC):	301 5	95					
7			(ft <del>BTOC</del> ):		142	12.2				
F	rop of luid well ca		ick-up (ft): ne (Liters):		x=10) =	2.84				
			conditions:			-				
NICOLLADOE			SAM	PLING M	EASUREM	<u>IENT</u>				
DISCHARGE			<u> </u>	I						
Гіте	0855	0900	0905	0910	0915	0926	0925	0930		
Water level (ft. BTOC)bq5	122	12.2	12.2	12.7	12.2	12.2	12.2	12.7		
Pump Placement Depth (ft <del>BTOC</del> ) \ogs	28	26	24	22	70	25	25	25		
Discharge (Liters)	5	10	15	20	25	30	35	40		
WATER QUALITY DATA									-	
ьн	6.94	7.15	7.38	7.40	7.59	7.62	7.64	7.64		
Temperature (°C)	11.33	11.39	11.27	11.42	11.572	11.60	11.72	11.68		
Conductivity (mS/cm)	0.715	0.705	0.707	0.711	0.715	0.690	0.705	0.709		
Dissolved Oxygen (mg/L)	5.14	231	24	0.95	0.83	0.70	0.67	6.62		
Redox (mV)	-5.9	-14.7	-24.4		-35.9	-36.5	-36.5	-36.6		
Furbidity (NTUs) initial/end	949	12	25.2 20.5	202/	167	8.76/	794	5 90 7 88		
Color	Clear	clear	Wear	Clear	clea	Clear	Ucar	Uear		
Odor	none	none	none	none	nent	none	none	none		
Total discharge: <u>UDL</u> Method of disposal of discharge	d water:			WW TF		Casi	ng volumes	removed:	14-08	;
section of appropriate of approximate					SSURANO	CE.				
Water Level 1	Indicator:		Solinst Ind	-	JOS CALL II	<u> </u>		Calibrated	•	V
Water Quality		١ ،	YSI 556 M	IPS, LaMo				Calibrated		V
Comments:		1 Gall	on ot i	vator	addcd =	379	(3 = 11	37L		
(30 - 12.2)	מו. x (	2.54	x10=	19.50	- +11:	37 = 3	39.77 0.89	)		

× **												
Project: 2019 CHAAP OU1 RAO Performance Monitoring Well No: PM - 2 1 B												
Project No: 60565355		•				•	Date:		7-19	·		
Develo. Method Peristaltic pu	mp and tub	ing					Samplers:	TY	RH			
			<u>WE</u>	LL MEAS	UREMEN	<u>NTS</u>						
				, 11								
	Wel		meter (in):									
	Donth of		length (ft):							,		
	Depth of w		(ft B <del>TOC)</del> :		bg 5					,		
			ick-up (ft):		2 695	•						
F	luid well ca	_	- ' '		12.02)	= 2798	X 110 =	4.48	L	•		
Weather conditions: Clear Calm												
SAMPLING MEASUREMENT												
DISCHARGE												
Гіте	1005	1010	1015	1020	1025	1030	1646	1050	1100	1110		
Water level (ft. BTOC) 695	12.02	1202	12.02	12.02	12.02	12.02	12.02	12.02		12.02		
Pump Placement Depth (ft	21	210	2.1					·				
BTOC) bas	38	36	34	32	30	35	35	35	35	35		
Discharge (Litera)						- 2 m	1110	4		7.0		
Discharge (Liters)	Б	10	15	20	25	30	40	50	60	70		
WATER QUALITY DATA										8		
ьн	8.96	9.48	9.65	9.76	9.90	10.08	10.03	10.13	10.23	10.26		
Temperature (°C)	11.80	11.59	11.59	11.62	11.59	11.63	11.71	11.80	11.92	12.05		
Conductivity (mS/cm)	0.694	0.681	0.684	0.682	0.681	0.686	0.682	0.682	0.685	0684		
Dissolved Oxygen (mg/L)	0.50	0.27	0.24	0.24	0.23	0.19	0.19	0.18	0.16	0.16		
Redox (mV)	-101.7	-102.4		-131.9	-146.8	-161.3		-153.7	-155.7	-157.0		
Curbidity (NTUs) initial/end	1417/24.48	27.9	393/	28.7	21.2	6.04	618	7.73	889/ 8.42	9.27		
Color	et. brown	Ulan	Uear	Uew	Ucar	Clear	Uear	Clear	clear	Ucar		
Odor	none	none	hene	none	none	none	none	none	none	non		
Total discharge: 70 L						Casi	ng volumes	removed:	15.6	3		
Method of disposal of discharged	d water:		W	WTF		0.001						
		•		JALITY A	SSURANC	TE.			<del></del>			
*** . * · ·					SUMM	<u> </u>		G 13		1/		
Water Level I Water Quality			Solinst Ind	icator IPS, LaMo	tta turk			Calibrated Calibrated		<del></del>		
Comments:	MICICIS:	2 000		aded =		x3 = '		Canorated	•			
Commonw.		- yuu	בעושט ע	eluco. –	/ . W <b>L</b>	70 0	74.0C	·····				

\*

(4.48LX10) + 22.8L = 67.6L

Project: 2019 CHAAP OU1 RAO Performance Monitoring  Project No: 60565355  Date: 10-17-19  Develo. Method Peristaltic pump and tubing  Well No: PM-22A  Date: 10-17-19  Samplers: TV ZH													
<u></u>	and the	<u>6</u>	WE	ELL MEAS	SUREME	- NTS	bumpiers.		10-11				
Well inside diameter (in):													
	1215	1220	me	1220	1725	12/10	12:15	1250					
Water level (ft. BTOC) 695	13.47	13.47	13.47	13.47	13.47	-	13.47	<del>                                     </del>					
Pump Placement Depth (ft BTOC) bq 5	28	26	24	22	20	25	25	25					
Discharge (Liters)	5	7 10 15 20 25 30 35 40											
WATER QUALITY DATA				<u> </u>			(6)						
pH	7.30	721	7.17	7.19	7.18	7.07	7.07	7.08					
Temperature (°C)	12.42	17.26	12.40	12.38	12.42	12-19	12.19	12.24					
Conductivity (mS/cm)	0.656	0.654	0.657	0.680	0.659	0657	Ó.658	0.6661					
Dissolved Oxygen (mg/L)	2.50	1.42	0.93	0.73	0.48	0.48	0.42	0.40					
Redox (mV)	-20.5	-16.4	-15.4	-16.0	-16.0	-10.0	-10.01	-10.9					
Turbidity (NTUs) initial/end	17.8/	9.89	11.3	8.00	863/	5.58	5.94 5.50	17.42					
Color	Clear	acew	Clear	Char	Uear	aceu	Cleux	Year					
Odor	None	none	none	none	none	hone	Mone	none					
Total discharge: 40 L Method of disposal of discharge	d water:		·	NWTF		Casii	ng volumes	removed:	15.15				
					SSURANC	<u>CE</u>							
Water Level Indicator:  Water Quality Meters:  Comments:  Solinst Indicator  YSI 556 MPS, LaMotte turb  Calibrated:  Calibrated:  Calibrated:													

(2.64 x10) + 11.37 = 37.77

Project: 2019 CHAAP OU1 RAO Performance Monitoring Project No: 60565355  Develo. Method Peristaltic pump and tubing  Well No: PM 22 B  Date: 10-17-19  Samplers: TY ZH													
						-	Date:	10-1	7-19				
Develo. Method Peristaltic pu	mp and tub	ıng				-	Samplers:	TY R	<u>H</u>				
			WE	ELL MEAS	SUREMEN	<u>NTS</u>							
	Wel	l inside dia	meter (in):	1"									
			length (ft):					_		•			
2	Depth of w				095								
		vater level (			) bas					,			
F	luid well ca	f Casing St asing volun			.47.) x	110= 4	75		<del></del>	•			
		Weather	conditions:	Oce		Calm							
	SAMPLING MEASUREMENT												
DISCHARGE													
Time	1325	1330	1335	B40	17,10	13-0	1400	1410	1420	1430			
695					1345	1350	1900	1910	1920	1930			
Water level (ft.∕BTOC)	13.42 13.42 13.42 13.42 13.42 13.42 13.42												
Pump Placement Depth (ft B <del>FOC)</del> bg 3	38												
Discharge (Liters)	5     10     15     20     25     30     40     50     60												
WATER QUALITY DATA													
рН	8.06	8.12	8.36	8.42	8.37	8.33	8.18	813	804	7.99			
			1001		100-								
Temperature (°C)	12.50	12.64	17.71	12.76	17.95	12.72	12.79	12.79	12.79	17.80			
Conductivity (mS/cm)	0.714	0.713	0.712	0.713	0715	0.721	0.714	0.715	0714	0716			
Dissolved Oxygen (mg/L)	0.29	6.29	0.20	0-24	625	0.24	0.23	0.24	0-21	0.20			
Redox (mV)	-65.4	-61.7	-71.0	-72.6	-70.7	-683	-le1.8	-68.9	-55.2	- F30			
Turbidity (NTUs) initial/end	33.9	27.2	242	195	9.95	13.6	11.53	8.01	9.63	4.79			
Color	Clear		Ucer	Ucen	Clas	Ucar	Clear		clear	Olcer			
Odor	none	none	none	none	none	neve	none	none	non	hone			
Total discharge: 70L						Casi	ng volumes	removed.	164	 7			
Method of disposal of discharge	d water:			WWT	2				, 0 == /				
		·	QU QU	JALITY A	SSURANC	CE							
Water Level 1	ndicator.		Solinst Ind	_		<del></del>		Calibrated:		1/			
Water Quality		•		IPS, LaMo	tte turb			Calibrated:		<del></del>			
Comments:		2 au1	lonus ad	leled= 7	111.83	= 72.8			-				

(4.25 × 10) + 22.8 = 65.3

Project: 2019 CHAAI	OUI RAC	O Performa	nce Monito	oring			Well No:	P	m-23	A
Project No: 60565355  Date: 10-16-19  Develo. Method Peristaltic pump and tubing  WELL MEASUREMENTS  Date: 10-16-19  Samplers: RH TY										
Develo. Method Peristaltic pu	mp and tub	ing					Samplers:	<u> </u>	T4	
			WE	ELL MEA	SUREME	NTS				
	Wal	Il incida dia	ımeter (in):	4	1/					
	WEI		length (ft):		30 60					
	Depth of w				30 63					-
			(ft BTQC)		8.68					• •
Ti Ti	-	_	ick-up (ft):		31 27	7	0 11	= 1	<del>21</del>	Ltohul
Г	luid well ca		conditions:		Clear	. CAlm	(0.76	2 - [	. 0 1 1	- 1014/
		vv camor .				•				•
DISCHARGE			SAIVI	PLING M	EASUREN	TENI				
			T	1461	10.77					
Time	0945	0952	0959	1006	1013	1020				
W1 (A ATOC)-	18.68	1010	16.00	34 264	10/0	100 0				
Water level (ft. <del>BTOC)</del> GG-S	13.60	18.68	18.68	18.68	8.08	18.68				
Pump Placement Depth (ft	28	26	24	22	20	20				
BTOC) bys	~0	20	71	~_	20	25				
Discharge (Liters)	_	10	15	20	2/	70			İ	
	)		/3		25	30	<u> </u>			
WATER QUALITY DATA										
pH	9/2	0.07		C/CZ	0 70	0.71		÷.		
pII	9.63	9.07	8.72	8,53	8.38	8,34				
Temperature (°C)	11-57	11.49	11.47	11.53	11.54	11.76				
	11001	(11.1)	11.77	11.73	11.51	11.76				
Conductivity (mS/cm)	0.760	0-735	1 776	0.737	12724	0.738				
• , , ,	7,70	0.17	0.736	0,737	0.771	01738				
Dissolved Oxygen (mg/L)	3.31	1,26	0.93	0.69	.58	.53				
4	5.51	11 800	0.13	0.01	100					
Redox (mV)	-83.6	-63.3	-47.3	-40.7	-32.4	-32,2				
	39.6	-12/		6.78/	5.88/					
Turbidity (NTUs) initial/end	6.88	12.6	//	6.79	0.00	3,66				
	.000									
Color	clear	Clear	Clear	cient	Clear	Clear				
0.1	Nove	a.								
Odor	Non	none	Nowp	Nove	NONE	None				
Total discharge:	1			<del></del>		Casi	ng volume	s removed:	17	57
Method of disposal of discharged	d water:			JWTF	<u>:</u>		voiumo		160	<i>J. T.</i>
-			OI	JALITY A	SSURANG	CE				
Water Level I	Indicator		Solinst Ind			<del></del>		Calibrated	•	
Water Quality				IPS, LaMo	tte turb			Calibrated		
Comments:	14	1		saler so	gazzy war a w	3.79	x 3	¥ 17.3	Turk 4	andre
										-

Project: 2019 CHAA	P OU1 RAC	) Performa	nce Monito	oring			Well No:	PM.	235	3		
Project No: 60565355						• •	Date:					
Develo. Method Peristaltic pu	mp and tub	ing				-	Samplers:	TYF	2H			
			<u>WE</u>	LL MEAS	SUREMEN	NTS						
	Wel	l inside dia	meter (in):	1 "								
×		Screen	length (ft):	10'			anesu.			•		
	Depth of w			10.38								
			ick-up (ft):		20/3					•		
I	Fluid well ca						x 110=	4.74 L		•		
		Weather		clean						•		
<u>DISCHARGE</u>			SAM	PLING MI	EASUREN	<u> 1ENT</u>			· .			
Time .	1510	15715	1520	1525	1530	1535	1545	1555	1605	1615		
Water level (ft. BTOC) 693	10.38	10.38	10.38	10.38	10-38	10.38	10-38	1038	10.38	10.38		
Pump Placement Depth (ft BTOC) 693	38											
Discharge (Liters)	5	5 10 15 20 25 30 40 50 60										
WATER QUALITY DATA												
Н	8.94	9.38	9.18	897	8.63	841	8.22	8.18	8.10	7.98		
Cemperature (°C)	13.42	13.29	13.43	13.56	13.58	13.21	13.26	13.3)	1311	13.10		
Conductivity (mS/cm)	0-748	0.739	0.746	0-741	0.739	0.735	0.733	0.733	0.730	0.730		
Dissolved Oxygen (mg/L)	0-24	0.19	0-17	0.17	018	0.18	0.18	0.18	0.10	0.17		
Redox (mV)	-101.9		-1084		- 82.5	-719	-644	~02.1	-57.9	-522		
Furbidity (NTUs) initial/end	34-8	93/64	90/57	35.3 15.0	12.0	9.20	15.21	7.81	7.48	17.79 694		
Color	Ct. brwn	Lt. brwn	1+.	Nea	Clear	Clear	Clear	Clear	aew	Clear		
Odor	none	none	none	none	none	hone	hone	none	none	none		
Total discharge: 700	_			. M. T.		Casi	ng volume:	s removed:	147	7		
Method of disposal of discharge	ed water:			WTF								
			-	JALITY A	SSURAN	<u>CE</u>				1/		
Water Level Water Qualit			Solinst Inc		tte turb			Calibrated Calibrated				
Water Quality Meters: YSI 556 MPS, LaMotte turb Calibrated:												

(4-74 x10)+22.8=70

Project: 2019 CHAAI	OU1 RAC	) Performa	nce Monito	oring			Well No:		1-24A	
Project No: 60565355	1,1	•	<del></del>				Date:		<u>) - 16 - 19</u> TY	
Develo. Method Peristaltic pur	mp and tub	ing					Samplers:	RIL	1 1	
			<u>WE</u>	LL MEAS	SUREMEN	<u>(TS</u>				
	Wel	l inside dia	meter (in):		1"					
			length (ft):		10					
		vell casing ( vater level (			13.4		· C	<del></del>		
		f Casing St			13.4	<del>- 15</del> 6	<u>ي</u> ه	-	=X	
F		asing volun	ne (Liters):		2	.65	(16.5)	8' x 0.	16)=	
		Weather	conditions:		clear i	CAIM	29			
			<u>SAM</u>	PLING M	EASUREM	<u>1ENT</u>				
DISCHARGE		1								<del></del>
Гіте	1545	1550	1555	1600	1605	1610	1615.	1620		
Water level (ft. <del>BTO</del> €) <b>bq5</b>	1342	13.42	13.42	13.42	13.42	13.42	13.42	13.42		
Pump Placement Depth (ft BFOC)	28'	26'	24	22	20	25	25	25		
Discharge (Liters)	5	10	15	20	25	30	35	40		
WATER QUALITY DATA										
рН	7-81	7.88	7.89	7.83	アフフ	7.70	7.63	758		
Γemperature (°C)	12.53	12.40	12-39	12.40	12.39	1238	12.34	12.33		
Conductivity (mS/cm)	.803	0.823	0.828	0.852	0.858	0.862	0-870	0.875	,	
Dissolved Oxygen (mg/L)	0.48	0.62	0.67	0.73	0.88	1.04	1.17	1.27		
Redox (mV)	-31-6	-42.6	-44.1	-43.2	-39.6	-40.4	-36.4	-35.6		
Turbidity (NTUs) initial/end	793/838	9.45	651	9.48	6-32	6.40	5.75	5.01		
Color	Lt. Brow	Clear	Clear	cleae	Clear	Clear	Ucar	Ucar		
Odor	Nowe	Nove	Nove	None	None	none	none	none		
Total discharge:	08					Casi	ng volumes	removed:	15.0	59
Method of disposal of discharge	d water:			W	WTF					
			<u>QI</u>	J <b>ALITY</b> A	SSURAN	<u>CE</u>				
Water Level	Indicator:		Solinst Inc	licator				Calibrated	:	V
Water Quality			YSI 556 N	APS, LaMo				Calibrated		V
Comments:		16.58	1 GA	llan of	water w	AS Adde.	1 = 3.79	1 X3 =	11.37	<u> </u>

10x Well Volume + 3x water added = 37.9

Project: 2019 CHAAI	OU1 RAC	) Performa	nce Monito	oring			Well No:	PM.	-2413	3	
Project No: 60565355							Date:	10 -	19-19		
Develo. Method Peristaltic pur	mp and tub	ing				•	Samplers:		BE		
WELL MEASUREMENTS  Well inside diameter (in): Screen length (ft):  Depth of well casing (ft BTOC): Initial water level (ft BTOC): Top of Casing Stick-up (ft): Fluid well casing volume (Liters): Weather conditions:  SAMPLING MEASUREMENT  DISCHARGE  Time  O330 0337 040 0845 0850 0365 0905 0915 0925 0											
	0020	412-	RIVA	neit	60-0		• 005		+40 m	- 1000	
i inc	0830	0551	090	0845	0850	C855	0905	0915	0925	0935	
Water level (ft. BTOC)	13.40	1340	13.40	13.40	13.40	13.40	13.40	13.40	13.40	13.40	
Pump Placement Depth (ft BFOC) 1095	35	36	34	32	30	35	3Fi	35	35	35	
Discharge (Liters)	M	10	50	60	70						
WATER QUALITY DATA						- 17		j-1			
ьН	7.33	8.05	8.45	8.60	8.43	8.87	8.94	8.95	8.93	8.92	
Temperature (°C)	11.49	11.33	11.24	11.26	11.24	11.33	11.32	11.33	11.42	11.54	
Conductivity (mS/cm)	0.688	0 698	0.699	0.705	0.702	0.706	6.704	0.705	0.706	0.708	
Dissolved Oxygen (mg/L)	1.88	1.71	1.47	0.94	0.90	0.62	0.50	0.41	0.36	0.35	
Redox (mV)	-27.9	-55.4	-72.4		-83.2	-94.1	-95.1	-95.2			
Turbidity (NTUs) initial/end	7419	706/ 49.3	44.6	13.0/	53.9 61.4	82 <i>0</i> /	46.9	37.7	43.9	501	
Color	Geer	Clear	clear	clear	Cker	1+ brinn	it. briun	Clear	It bywn	Clear	
Odor	nous none none none none none none none									none	
Total discharge: 70  Method of disposal of discharge	L I water:			16.51.51.5	ww.		ng volumes	removed:	10.43		
			OI	JALITY A			· · · · · · · · · · · · · · · · · · ·				
Water Level Indicator: Water Quality Meters: Comments:  Solinst Indicator  YSI 556 MPS, LaMotte turb Calibrated:  VALUE OF A STATE O											

 $(4.26 \times 10) + 22.7 = 65.3$ 

Project: 2019 CHAA	P OU1 RAC	) Performa	nce Monito	oring			Well No:	Pm-	25A	И		
Project No: 60565355									<u> </u>			
Develo. Method Peristaltic pu	ımp and tub	ing	····		_		Samplers:	<u></u> <u>R</u>	H TY			
			WE	ELL MEAS	SUREMEN	<u>ITS</u>						
	Wel	l inside dia	meter (in):			"						
	<b>D</b> 4 0		length (ft):			0-4086						
	Depth of w		(ft BTOC): (ft BTOC):			0' B65 270						
			ick-up (ft):			ζ'						
]	Fluid well ca	_			- 1	3.40						
		weather	conditions:		Clear	CAIM	<u> </u>					
<b>DISCHARGE</b>			SAM	PLING M.	EASUREM	<u>IENT</u>	ī	<u> </u>	T	· <u> </u>		
Time	1053	1458	1203	1208	1213	1218	1223	1228	1233			
Water level (ft. <del>BTOC</del> ) b9 S	8.70	8.69	8.69	8.69	8.69	8.69	8-69	8-69	8-69			
Pump Placement Depth (ft <del>BTOC</del> )	28	28 26 29 22 20 25 25 25 25										
Discharge (Liters)	5	5 10 15 20 25 30 35 40 45										
WATER QUALITY DATA												
pH	7.78	750	7.28	7.19	7.17	7.18	7-14	2.15	7.17			
Temperature (°C)	13.0)	12.94	12.96	13.03	13.01	13.18	13.12	13.17	13.09			
Conductivity (mS/cm)	0.711	0.728	0.752	0.766	0.782	0.777	0.780	0.782	0.782			
Dissolved Oxygen (mg/L)	3.77	3.04	3.63	4.06	4-19	4.12	4.15	3.88	4.01			
Redox (mV)	-3.2	9.5	13.3	18.1	14.9	18.7	23.4	22.4	24.0			
Turbidity (NTUs) initial/end	1126	54.9	33.2	27.1	22.1	18.	15.1	11.81	8:93			
Color	LY. Lt. VLA. BROWN BROWN Clear Clear Clear Clear Clear Clear Clear											
Odor	Nove	None	Nonl	Nowl	None	None	Wore	None	Nove			
Total discharge:	45	l	· · ·			Casi	ing volume	s removed:	13.1	9		
Method of disposal of discharge	ed water:			Ų	OWTF	-		_				
			<u>Ol</u>	UALITY A	SSURANC	<u>CE</u>						
Water Level			Solinst Inc					Calibrated		<u> </u>		
	ty Meters:	4 -				-	-	Calibrated	7	V		
Water Quality Meters: YSI 556 MPS, LaMotte turb Calibrated Calibrated Comments: 1 Gallon water Added = 3.79 x 3 = 11.37												

Project: 2019 CHAA	P OU1 RA	O Performa	nce Monito	oring		_	Well No:		-25 F	}
Project No: 60565355	4 6-16					-	Date:		16-19	<del> </del>
Develo. Method Peristaltic pr	ump and tur	oing	<u> </u>			-	Samplers:	<u> </u>	TY	
			WE	ELL MEA	SUREME!	<u>NTS</u>				
	We	ll inside dia			1"					_
	Depth of v	Screen vell casing	length (ft): (ft BTOC):		10' <del>-858</del>	40	' Bes			-
		water level			8.		RES			<b>-</b> -
		of Casing St				2'		44		-
	Fluid well c		ne (Liters): conditions:		X.16 Clesa	= 5.02 CAIM	$2 \times \alpha$	vell ve	0/•	-
		***************************************			EASUREN	-				<b>-</b>
DISCHARGE			<u>DAM.</u>	LEINGW	EMSCREA	ALANI				
Гіте	1329	1334	1339	1344	1349	1359	)409	1419	14 29	1439
Water level (ft. BTOC) by s	8.58	8.58	8.58	858	8.58	8.58	8.58	8.58	8.58	828
Pump Placement Depth (ft B <del>TOC)</del> bqS	38	36	34	32	30	35	35	35	35	30
Discharge (Liters)	5	10	15	20	25	35	45	55	65	75
WATER QUALITY DATA										
рН	7-74	7.67	7.64	7.60	758	7.57	7.31	7.21	7.19	7.03
Temperature (°C)	12.94	12.78	12.61	12.76	12.70	12.78	12.56	1258	12.69	12.72
Conductivity (mS/cm)	0-767	0.771	0.773	0.772	0.772	0.774	0.773	0.773	<b>6</b> .777	0.773
Dissolved Oxygen (mg/L)	2.8	0.21	0.19	0.19	0.19	0.16	0.15	0.14	0.14	0.13
Redox (mV)	-19.1	-17.3	-20.2	-17-8	-15.7	-9.2	-5.1	0.1	1.5	6.5
Turbidity (NTUs) initial/end	35 26.1	14.7	12.0	21.1	9.77	3.8	6.12	2.77	1.93	1.27
Color	Clear	clear	Chese	clear	Clean	clear	Clear	Clean	clean	Clesp
Odor	None	wore	None	None	None	None	rxal	None	Nove	None
Fotal discharge: P Method of disposal of discharge	urge 7	75 L	(	WTF	-	Casi	ing volume	s removed:	16 (4	3x WAAe
			<u>OI</u>	UALITY A	SSURAN	<u>CE</u>				
Water Level			Solinst Inc		<u> </u>	·		Calibrated		
Water Qualic Comments:	ty Meters:	2		APS, LaMo	otte turb	0 - 1	94	Calibrated		
Comments:		2	long Add	4	5.47	<i>X</i> = 6		X 3 =	20.83	
		10 we	11 001. :	= 801	$\ell + j$	20.82	- 70,	92		

Project: 2019 CHAAP OU1 RAO Performance Monitoring Project No: 60565355  Date: 10-18-19  Develo. Method Peristaltic pump and tubing  Well No: PM - 26A  Date: 10-18-19													
	mp and tubi	ing		·		•			2H				
			WE	LL MEAS	SUREMEN	NTS	_						
Well inside diameter (in):  Screen length (ft):  Depth of well casing (ft BTOC):  Initial water level (ft BTOC):  Top of Casing Stick-up (ft):  Fluid well casing volume (Liters):  Weather conditions:  SAMPLING MEASUREMENT  DISCHARGE  Time													
DISCHARGE	man												
Гіте	0855	0900	0905	0910	0915	0970	0925	0930					
Water level (ft. BTOC) b95	12.85	12.85	12.85	12.85	12.85	12.85	1285	12.85		3			
Pump Placement Depth (ft BTOC), 695	28	26	24	22	20	25	25	25					
Discharge (Liters)	5	5     10     15     20     25     30     35     40											
WATER QUALITY DATA													
Н	7, 79	781	7.89	7.90	7.77	784	7.77	7.70					
Temperature (°C)	1250	12.39	12.49	12.55	12.52	17.49	12.56	12.65					
Conductivity (mS/cm)	0.655	0 667	0.672	0.599	0.672	0.657	0 672	0.673					
Dissolved Oxygen (mg/L)	9.27	142	1.13	136	1.08	0.96	094	0.92					
Redox (mV)	-44.7	-44.4	-46.7		-43.5	-45.3	-408	-39.4					
Turbidity (NTUs) initial/end	to.43	122/2103	187/26.4	144	13.9	9.33	13.3/	11.2/10.7					
Color	Cleav	Ucer	Clear	Ueew	Clear	diev	Clear	ictear					
Odor	none none none none none none none												
Total discharge: 40L						Casi	ng volumes	removed:	14.60	2)			
Method of disposal of discharged	l water:				NTF								
			<u>Ot</u>	JALITY A	SSURANC	<u>CE</u>				./			
Water Level Indicator:  Water Quality Meters:  Comments:  Solinst Indicator  YSI 556 MPS, LaMotte turb  Calibrated:  V  Calibrated:  V  Calibrated:  V  Calibrated:  V													

(2.74 x10) + 11.37 = 38.77

Project: 2019 CHAAP	OU1 RAC	) Performa	nce Monito	oring			Well No:	PM	-265	
Project No: 60565355					•	•	Date:	10-	18-19	
Develo. Method Peristaltic pur	np and tubi	ing					Samplers:	14	RH	
	Wel		ME meter (in): length (ft):	1,,	SUREMEN	<u>VTS</u>				
1	-	_	ft BTOC): ft BTOC):		1 bas					
77	Top of	f Casing St	ick-up (ft):	2	<u> </u>		11 2 11		-	
F	luid well ca	-	ne (Liters): conditions:		2.88) X		4.34			
			SAMI		EASUREM	/				
<u>DISCHARGE</u>										
Time	1015	1020	1025	1030	1035	1040	1050	1100	1110	1120
Water level (ft. B <del>TOC</del> ) bq5	12.88	12.88	12.88	12.88	12.88	12.88	1288	12.88	12.88	1288
Pump Placement Depth (ft <del>BTOC)</del> <b>69</b> 5	38	36	34	32	30	35	35	35	35	35
Discharge (Liters)	দ	10	15	20	25	30	40	50	CeO	70
WATER QUALITY DATA										
pH	10 77	11.14	11.43	10.94	10.40	10.22	9.80	9.73	9.45	9.33
Temperature (°C)	12.86	12.90	13-10	13.27	1334	13.25	13.45	13.43	13.74	13.78
Conductivity (mS/cm)	0.748	0.742	0.748	0.748	0.745	0.753	0.754	0.758	0-762	0.765
Dissolved Oxygen (mg/L)	0.58	0.57	6.43	0.35	0.38	0.25	0.24	028	0-20	0.26
Redox (mV)	-183.5	-202.1	-2117	-1893	-1644	-1560	-138.	-134.6	-1210	-115.5
Turbidity (NTUs) initial/end	213410	814 AU 1033	7969	F2.7/	57 42.1	67.1	1225	167/	10.3/	8.39
Color	1t. brun	1t. bywn	1+. 15 run		1t.brun	1t brwn	New	Geer	Clear	Clear
Odor	NONE	none	hove	none	none	none	none	None	none	none
Total discharge: 70 C	l water:			U	SWI		ng volumes	removed:	16.13	<u> </u>
			<u>Q</u> L		SSURANO					
Water Level Indicator:  Water Quality Meters: Comments:  Solinst Indicator  YSI 556 MPS, LaMotte turb Calibrated:  Calibrated:  Calibrated:  Calibrated:  Calibrated:								レ レ		

(434 ×10) + 22.8 = 66.2 L

Projects 2010 CUAAD	OIII DAC	) Dorforma	naa Manita				Well No:	PM-	-27A			
Project: <u>2019 CHAAP</u> Project No: 60565355	OUI KAC	Perioriia	nce Monito	or mig	_		Date:	10-18				
Develo. Method Peristaltic pun	np and tubi	ng					Samplers:	741	SH			
	Wel	l inside dia		. 11	SUREMEN	<u>ITS</u>						
1		Screen	length (ft): ft BTOC):	10,	095							
	Initial w	ater level (	ft <del>BTOC)</del> : ick-up (ft):	10.90	m95							
Fl	_	sing volun	ne (Liters):	(30-10			3.00					
Weather conditions: Clay, windy  SAMPLING MEASUREMENT  DISCHARGE												
Time	1215	1220	1225	1220	1235	1240	1245	1250	1255			
Water level (ft. <del>BTOC</del> ) <b>bq S</b>	10000			1230			•					
Pump Placement Depth (ft	10.9	10.9	10.9	10.9	10.9	10.9	109	10.9	10.9			
STOC) by s	28	20	24	22	20	25	25	25	25			
Discharge (Liters)	Я	10	15	20	25	30	35	40	45			
WATER QUALITY DATA			_									
ьн	8.47	7.69	7.58	7.50	7.08	7.38	717	7.18	7.15			
Гemperature (°C)	13.46	13.48	13.69	13.88	1504	13.80	13.81	13.85	13.89			
Conductivity (mS/cm)	0.778	0.756	0.763	6.763	0.798	6.776	0.772	0-771	0.771			
Dissolved Oxygen (mg/L)	12.57	2.67	2.18	2.67	6.39	3.68	220	1.99	1.94			
Redox (mV)	-76.6	-388	-348	-30.3	-184	-17.60	-15.0	-15.1	-13.1	į.		
Γurbidity (NTUs) initial/end	543AV	13	65/47/	307/247	23.60	35.9	23.3/	9.22/	5.29			
Color	Ct.brun	Lt. brwn	Ct. brwn	Clear		Clear	Clean	Clear	Clean			
odor none none none neme none none none none												
Total discharge: 45L Casing volumes removed: 14.71  Method of disposal of discharged water: WWTF												
or aropoon or albeital god			OI		SSURANC	CE						
Water Level In			Solinst Ind	licator				Calibrated		<u>/</u>		
Water Quality Comments:	Meters:	lga	YSI 556 M Llon a			(3=1	1.374	Calibrated		V		

(3.06 ×10) +11.37 = 42.0

								100	07P	
Project: 2019 CHAAI	OUI RAC	) Performa	nce Monito	oring			Well No:	188	27B	
Project No: 60565355  Develo. Method Peristaltic pur	mp and tub	ina				•	Date: Samplers:		8-19 2H	· · · · · · · · · · · · · · · · · · ·
Develo. Wednod 1 chistatic pa	inp and tuo	uig	WE	LL MEAS	SUREMEN	NTS	bumpiers.	<u> ( y   E</u>	. r)	
				9	JC REMIES	115				
	Wel		meter (in): length (ft):							
	Depth of w			40 1	095					
			(ft BTOC):	10.86	bgs					•
F	rop oi luid well ca		ick-up (ft): ne (Liters):		-68) X ·	10= 4.	10(0			
		Weather	conditions:	Clear	CILLIV	idy				•
			<u>SAM</u> 1	PLING M	EASUREN	<u>1ENT</u>				
DISCHARGE			<u> </u>	<u> </u>	<u> </u>					
Гіте	1335	1340	1345	1350	1355	1400	1410	1420	1430	1440
Water level (ft. BTOC) by S	10.68	10.66	10.86	10-88	10.88	10-88	16.88	10.88	10.88	10.88
Pump Placement Depth (ft 3 <del>TOC</del> ) <b>b</b> 95	38	36	34	32	30	35	35	35	35	35
Discharge (Liters)	5	10	15	20	25	30	40	50	60	70
WATER QUALITY DATA										
Н	9.71	10:41	10.53	10.15	9.68	9.81	902	9.18	9.37	9.17
Temperature (°C)	13.95	13.64	13.77	13.93	14-11	13.67	13.60	13.51	1349	13.47
Conductivity (mS/cm)	0.795	0.805	A.802	0.802	0798	0.793	0.790	0.787	0.786	0.786
Dissolved Oxygen (mg/L)	0.79	0.40	0.30	0-24	0.26	6.20	0.22	0.24	6.24	0.24
Redox (mV)	-1351.6	-167.1	-172.5	-1535	-132.7	-136.6	- 100.5	-109.5	-116.2	-108.2
Furbidity (NTUs) initial/end	2855AV 1773	830A	76.9	625/478	300/	65.4 28.3	227/152	11.38	895/ 714	678
Color	Lt. brun	Lt. brun	aces	Clear	Ueas	Uear	Heal	Clear	Clear	Cleas
Odor	None	None	none	None	Muc	none	hone	none	nove	none
Total discharge: 70 L						Casi	ng volumes	removed:	15.00	
Method of disposal of discharge	d water:			ι	NWTF					
			<u>OU</u>	JALITY A	SSURAN	<u>CE</u>				
Water Level 1 Water Quality			Solinst Inc	licator IPS, LaMo	itta turk			Calibrated Calibrated		<u></u>
Comments:	y iviciois.	2 gal	lons ac		Lex3 =	22.86		Canorated	•	=
		$\overline{U}$							· · · · · ·	
	(4.60	o ×10)-	+22.8	- G9.	4					

Project: 2019 CHAAP Project No: 60565355	OU1 RAC	Performa	nce Monito	ring			Well No: Date:	PM-	<u> </u>	<u> </u>
Develo. Method Peristaltic pur	np and tubi	ng	•				Samplers:	TY	PH	
<del></del>	_		WE	LL MEAS	UREMEN	NTS				
	Wel Depth of w	Screen	meter (in): length (ft): ft BTOC):	10,	<b>4</b> 5	•				
	Initial w	rater level ( Casing Stinsing volume	ft <del>BTOC)</del> : ick-up (ft):	8.10( 2° (30-8.0	) bgs e0) x 11		2			
		w cauler (			EASUREM	LM IENT		•		
<u>DISCHARGE</u>										
Time	1430	1440	1450	1500	1510	1520	1530	1540	1550	1600
Water level (ft. BTOC) bqS	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60
Pump Placement Depth (ft BTOC) <b>b9</b> S	28	26	24	22	20	25	25	25	25	25
Discharge (Liters)	h	10	15	20	25	30	35	40	45	50
WATER QUALITY DATA										
рН	8.85	8.02	8.02	7.95	7.87	7.78	7.69	7.63	751	7.45
Temperature (°C)	15.64	14.84	15.24	16.32	15.32	15.25	16.34	15.33	16.3	15.14
Conductivity (mS/cm)	0-791	0.793	0.800	0.799	0.796	0.797	0.797	0.797	0.799	0.792
Dissolved Oxygen (mg/L)	0-86	0.40	0.26	0.21	0.17	0.16	0.15	0.14	014	0.12
Redox (mV)	-91.6	-54.7	-55.0	-51.6		-43.5	-395	-36.1	-31.1	-27.60
Turbidity (NTUs) initial/end	59	13.0	28.9	19.4	15:3 14.7	12.01	1020	7.48	689	7.53
Color	it-brwn	Horwn	Clear	Cleu	Veax	Clear	Clea	Cleer	Clean	Cleal
Odor	none	none	none	none	none	none	none	nonc	none	none
Total discharge: 50 Method of disposal of discharged	d water:				ww-		ng volumes	s removed:	14.62	ξ
			QU	J <b>ALITY A</b>	SSURAN	CE				
Water Level I Water Quality Comments:		1 gall	Solinst Inc YSI 556 N	IPS, LaMo		= 11.37	)	Calibrated Calibrated		V
(3	.42 x1	<b>1</b> + 1	1-37=4	15.57						

Project: 2019 CHAAI Project No: 60565355	OU1 RAC	O Performa		-	Well No:	13,433	1-281	3				
Develo. Method Peristaltic pu	mp and tub	ing				-	Date: Samplers:		0-19			
			WE	ELL MEAS	SUREMEN	NTS	•		_			
F	Well inside diameter (in):  Screen length (ft):  Depth of well casing (ft BTOC):  Initial water level (ft BTOC):  Top of Casing Stick-up (ft):  Fluid well casing volume (Liters):  Weather conditions:  SAMPLING MEASUREMENT  SISCHARGE											
Гіте	930 0940 0956 1000 1010 1030 1050 1110 1130 1											
Water level (ft. <del>BTOC</del> ) bys	8.48	8.48	8.48	8.48	8.48	8.48	8.48	8.48	8.48	8.48		
Pump Placement Depth (ft BTOC) 岑 S	238	36	34	32	30	35	35	35	35	3চ		
Discharge (Liters)	h	10	15	20	25	35	45	55	65	75		
WATER QUALITY DATA								10.000		***		
ьн	6.80	7.10	7.15	7.23	7.29	7.26	3,7.23	7.25	7.19	7.14		
Temperature (°C)	12.32	12.28	12.21	12.21	12.21	12.29	12.45	12.70	12.79	12.90		
Conductivity (mS/cm)	0.795	0.791	0.789	0.789	0.789	0.791	0.794	0.798	0.800	0.801		
Dissolved Oxygen (mg/L)	2.51	0.92	0.55	0.45	0.38	6.31	6,29	0.27	0.210	0.24		
Redox (mV)	2.0	-11.7	-15.0	-17.9	-20.3			-18.	-15:3	-13.7		
Furbidity (NTUs) initial/end	15549 21.1	17.8	27.1	13.1	17.4	11.71	7.95	7.33	8.07	6.593		
Color	prinn	Clear	Clear	Clear	Uear	Cleal	Clear	Clear	Uear	Clear		
Odor	none	none	none	none	none	none	none	none	none	none		
Fotal discharge: 75 Method of disposal of discharged	l water:		OI	IAT TTW A	WW	TF	ng volumes	removed:	14.8	58		
Water Level Indicator: Water Quality Meters: Comments:  OUALITY ASSURANCE  Solinst Indicator  YSI 556 MPS, LaMotte turb Calibrated:  Calibrated:  2 quilons and ed = 7.77 x 3 = 22.7								V				

(7.04 x10) + 22.7=73.1

Project No: 60565355	2019 CHAAP OU1 RAO Performance Monitoring  Well No:     M - 29										
Develo. Method Peristaltic pu	mp and tub	ing				-	Samplers	TY	ZE		
F	Depth of w Initial w	Screen rell casing vater level f Casing St asing volume	ameter (in): length (ft): (ft BTOC): (ft BTOC): ick-up (ft): ne (Liters): conditions:	10° 30° 4.00 2° (30°	bqs bqs 1) x-16	= 3.3 alm					
DISCHARGE	CHARGE										
Time	1210	1215	1220	1255	1305	1315	1325	1335	1345		
Water level (ft. BFOC) bys	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00		
Pump Placement Depth (ft BFOC) by S	28	26	24	22	20	25	25	25	25		
Discharge (Liters)	h	10	15	20	25	30	35	40	45		
WATER QUALITY DATA											
pH	8.50	867	8.58	800	7.97	7.74	7.60	7.50	7.45		
Temperature (°C)	13:36	13.14	13.37	14.55	14.16	14,09	14.43	14.36	14.46		
Conductivity (mS/cm)	0.606	0.587	0.592	0.636	0.601	,600	0.598	0596	0.601		
Dissolved Oxygen (mg/L)	0.91	0.61	0.55	1.77	0-51	0,54	041	0.39	0.37		
Redox (mV)	-81.4	-83.1	-81.3	-54.9	-51.6		-34.7	-30.1	-28.1		
Turbidity (NTUs) initial/end	608AU 71.9	76.4	68.3/	28.1	17.3/	15.0	117/8.90	14.4	7.93	45/	
Color	it. bywn	Vicer	Neew	Clean	Uear	clem	Clear	Clear	Clear		
Odor	nome	none	none	none	none	none	none	none	none		
Total discharge: UFU Method of disposal of discharged					ww		ng volume	s removed:	12.5		
			<u>QU</u>	ALITY A	SSURANC	CE -					
Water Level I Water Quality Comments:		1	Solinst Ind YSI 556 M	IPS, LaMo		79 x 3	=11.37	Calibrated Calibrated		V	

(3.36 ×10) +11.37=44.97

Project: 2019 CHAAl	P OU1 RAC	) Performa	nce Monito	oring			Well No:		29B	<b>)</b>
Project No: 60565355  Develo. Method Peristaltic pu	mp and tub	ing			<del></del>	•	Date: Samplers:		1-19 12E	
			WE	LL MEAS	SUREMEN	NTS	<b>F</b>			
	Wel	l inside dia	meter (in):	, , ,						
		Screen	length (ft):							•
	Depth of w Initial w	_	(ft BTOC): (ft BTOC):		3.75	bas				
-	Top of	f Casing St	ick-up (ft):	2'		•	F 0.0			
F	luid well ca	-	ne (Liters): conditions:	(40 -		x.16-	5.0C	)		,
			SAMI	PLING MI	100000					
DISCHARGE				<u> </u>						<u> </u>
Гіте	1025	1030	103h	1040	1045	10hh	1105	1115	1125	1135
Water level (ft. BTOC) bg 5	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75
Pump Placement Depth (ft	38	36	34	32	30	35	35	35	35	35
Discharge (Liters)	5	10	15	20	25	35	45	55	65	75
WATER QUALITY DATA										
Н	10.74	9.43	9.10	8.88	8.72	8.61	8.52	8.38	8.32	8,23
Γemperature (°C)	12.17	12.11	12.18	12.23	12.24	12.26	12.37	12.49	12.61	12.77
Conductivity (mS/cm)	0.868	0.853	0.827	0.814	0.789	0.790	0 783	0.778	0775	6.771
Dissolved Oxygen (mg/L)	2.40	0.97	0.78	071	6.75	0.40	0.34	6.28	028	023
Redox (mV)	-174.5	-117.	- 103.3	-94.1	-86.5	-814	-75.8	-70.9	-66.8	-633
Turbidity (NTUs) initial/end	61	593/ 47.8	303/ 21.1	17.0	116/124	146/	8.73	7.76	5.0/ 8.49	7.67
Color	Lt. brwn	Lt. byun	Wear	Uca	New	Ucew	Clear	Uear	New	Clear
Odor	none	NONE	none	none	none	none	none	none	none	none
Total discharge: 75 UMethod of disposal of discharge					www		ng volumes	removed:	15	
			<u>Q</u> U	JALITY A						
Water Level 1			Solinst Ind					Calibrated		/
Water Quality Comments:	y Meters:	200	YSI 556 M Ulans	IPS, LaMo	tte turb d=フヮ	8 x 2	=22.7	Calibrated	:	
Commonio.	r									
	(5	×10	) +2	2.7 =	72	7				



SITE NAME			Performance		PROJECT NO.	0		65355	
SAMPLE NO.	EW7-	PM21A			WELL NO.	PM-2	LIA	19-21	
DATE/TIME C	OLLECTED	10-17-19	9 / 095	0	PERSONNEL	TY			
SAMPLE MET		-	altic Pump and			eH			
SAMPLE MED	DIA:	Groundwater	^						
SAMPLE QA S		YES	Xo)		SAMPLE NO.				
SAMPLE QC I	DUPLICATE:	YES	(NO)		E SAMPLE NO.				11-
MS/MSD REQ	UESTED	YES	Ma	MS/MSD	SAMPLE NO.				
		PRESERVATIV	•	IS			-		
Sample Contair			Preservative		Analysis Reque				
2 - 500 mL Am			6°C		Explosives + M				
3 - 40 mL VOA 1 - 500 mL HD			6°C, HCl 6°C, H <sub>2</sub> SO <sub>4</sub>		Methane (RSK TKN (351.2), N		(NO (252.2	<u></u>	
1 - 300 ML HD 1 - 250 mL HD			6°C, n₂sυ₄		SO <sub>4</sub> (9056A), A			,	
1 - 250 IIIL HD 1 - 250 mL HD			6°C, ZnOAc/N	aOU	Sulfide (9034)	ukaminy (2320	עט)		
1 - 250 mL HD 1 - 250 mL Am			6°C, ZnOAc/N	а∪П	DOC (9060A)				
WELL PURG			· ·			<del></del>			
WELLTUKG	ING DATA				Well De	pth (ft B <del>TO</del> C)	301		
Date		10-17-	-19			ater (ft B <del>TOC)</del>	12.21	bas	
Γime Started		0855				Column Length	17.8'		
Fime Complete	ed	0945			Well Casing \	olume (per ft)	.16L		
PID Measureme	ents				Volume of Wat		2.84		
Background		N	D		Casing Vol	lumes to Purge	3		
Breathing Zo	one	N)			Minimu	m to Purge (L)	_		
Well Head		N				ctual Purge (L)	7.5	L	
Purge Water			D			100	-		
					_				
FIFI D MEAS	HIDEMENTS		•••			<del></del>			
FIELD MEAS Time	UREMENTS Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
	Amount		(Celsius)	-			•	•	-
Time	Amount Purged (L)	рН	•	(mS/cm)	Oxygen (mg/L)	(mV)	(NTU)	(ft B <del>TOC)</del> 695	(L/min)
Time 093F	Amount Purged (L)	pH 7.58	(Celsius)	(mS/cm)	Oxygen (mg/L)  O 66  O.56	(mV) ~33.60 -36.3	(NTU) 7. 93	(ft BTOC) 695	(L/min)
Time 093FT 0940	Amount Purged (L)	7.58 7.62	(Celsius)	(mS/cm) 0.712 0.717	Oxygen (mg/L)	(mV) ~33.60	(NTU) 7.93 7.64	(fi BTOC) 695 12.2	(L/min)
Time 093F	Amount Purged (L)	7.58 7.62	(Celsius)	(mS/cm) 0.712 0.717	Oxygen (mg/L)  O 66  O.56	(mV) ~33.60 -36.3	(NTU) 7.93 7.64	(fi BTOC) 695 12.2	(L/min)
Time 093F	Amount Purged (L)	7.58 7.62	(Celsius)	(mS/cm) 0.712 0.717	Oxygen (mg/L)  O 66  O.56	(mV) ~33.60 -36.3	(NTU) 7.93 7.64	(fi BTOC) 695 12.2	(Umin)
Time 093F	Amount Purged (L)	7.58 7.62	(Celsius)	(mS/cm) 0.712 0.717	Oxygen (mg/L)  O 66  O.56	(mV) ~33.60 -36.3	(NTU) 7.93 7.64	(fi BTOC) 695 12.2	(Umin)
Time 093F	Amount Purged (L)	7.58 7.62	(Celsius)	(mS/cm) 0.712 0.717	Oxygen (mg/L)  O 66  O.56	(mV) ~33.60 -36.3	(NTU) 7.93 7.64	(fi BTOC) 695 12.2	(Umin)
Time 093F	Amount Purged (L)	7.58 7.62	(Celsius)	(mS/cm) 0.712 0.717	Oxygen (mg/L)  O 66  O.56	(mV) ~33.60 -36.3	(NTU) 7.93 7.64	(fi BTOC) 695 12.2	(L/min)
Time 093F	Amount Purged (L)	7.58 7.62	(Celsius)	(mS/cm) 0.712 0.717	Oxygen (mg/L)  O 66  O.56	(mV) ~33.60 -36.3	(NTU) 7.93 7.64	(fi BTOC) 695 12.2	(L/min)
093F	Amount Purged (L)	7.58 7.62	(Celsius)	(mS/cm) 0.712 0.717	Oxygen (mg/L)  O 66  O.56	(mV) ~33.60 -36.3	(NTU) 7.93 7.64	(fi BTOC) 695 12.2	(L/min)
71me 0935 0940 0945	Amount Purged (L)  2.5  49.5  7.5	PH  7.59  7.62  7.66  CALIBRATIO	(Celsius)  11.66  11.75  11.77	(mS/cm) 0.712 0.717	Oxygen (mg/L)  O 66  O 56  O 57	(mV) ~33.60 -36.3	(NTU) 7.93 7.64	(fi BTOC) 695 12.2	(L/min)
Time 0935 0940 0945	Amount Purged (L)  2.5  15  15  FMENT AND	PH  7.59  7.62  7.66  CALIBRATIO  Model	(Celsius)  11.66  11.75  11.77	(mS/cm) 0.712 0.717	Oxygen (mg/L)  O. 66  O. 57  O. 57	(mV) -33.10 -36.3 -3(0.9	(NTU) 7. 93 7. 64 9. 61	(fi BTOC) 695 12.2	(Umin)
Time  0935 0940 0945  FIELD EQUII	Amount Purged (L)  2.57  155  FMENT AND	PH  7.5%  7.62  7.60  CALIBRATIO  Model  Heron	(Celsius)  11.60 11.75 11.77	(mS/cm)  0.712 0.717 0.724	Oxygen (mg/L)  O 60  O F6  O 7  Calibration Checked Again	(mV) -33. to -36. 3 -36. 9	(NTU) 7. 93 7. 66 4 9. 66 1	(fi BTOC) 695 12.2 12.2 12.2	(L/min)
71me 0935 0940 0945	Amount Purged (L)  2.57  155  FMENT AND	PH  7.5%  7.62  7.60  CALIBRATIO  Model  Heron	(Celsius)  11.66  11.75  11.77	(mS/cm)  0.712 0.717 0.724	Oxygen (mg/L)  O 60  O F6  O 7  Calibration Checked Again	(mV) -33. to -36. 3 -36. 9	(NTU) 7. 93 7. 66 4 9. 66 1	(fi BTOC) 695 12.2	(L/min)
FIELD EQUII	Amount Purged (L)  2.5  10.5  TIT  PMENT AND obe Meter	PH  7.5%  7.62  7.60  CALIBRATIO  Model  Heron	(Celsius)  11.60 11.75 11.77	(mS/cm)  0.712 0.717 0.724	Oxygen (mg/L)  O 60  O F6  O 7  Calibration Checked Again	(mV) -33. to -36. 3 -36. 9	(NTU) 7. 93 7. 66 4 9. 66 1	(fi BTOC) 695 12.2 12.2 12.2	(L/min)
FIELD EQUII Water Level Prowater Quality I	Amount Purged (L)  2.57  40.57  7.57  PMENT AND  obe  Meter  OMMENTS	PH  7.5%  7.62  7.62  7.66  Model Heron YSI 556 Multi	(Celsius)  11.60 11.75 11.77	(mS/cm)  0.712 0.717 0.724	Oxygen (mg/L)  O 60  O F6  O 7  Calibration Checked Again	(mV) -33. to -36. 3 -36. 9	(NTU) 7. 93 7. 66 4 9. 66 1	(fi BTOC) 695 12.2 12.2 12.2	(Umin)
Time  0935 0940 0945  FIELD EQUII  Water Level Prewater Quality I	Amount Purged (L)  2.57  ASS  PMENT AND  Obe  Meter  OMMENTS  0.99	PH  7.5%  7.62  7.62  7.66  Model Heron YSI 556 Multi	(Celsius)  11.60 11.75 11.77	(mS/cm)  0.712 0.717 0.724	Oxygen (mg/L)  O 60  O F6  O 7  Calibration Checked Again	(mV) -33. to -36. 3 -36. 9	(NTU) 7. 93 7. 66 4 9. 66 1	(fi BTOC) 695 12.2 12.2 12.2	(Umin)
FIELD EQUID Water Level Prowater Quality is GENERAL Conferrous Iron = Multi-Parameter	Amount Purged (L)  2.57  2.57  PMENT AND  Obe Meter  OMMENTS  0.99  er Probe Unit #	PH  7.5%  7.62  7.602  7.600  Model Heron YSI 556 Multi	(Celsius)  11.60  11.75  11.77	(mS/cm)  0.712 0.717 0.724	Oxygen (mg/L)  O 60  O F6  O 7  Calibration Checked Again	(mV) -33. to -36. 3 -36. 9	(NTU) 7. 93 7. 66 4 9. 66 1	(fi BTOC) 695 12.2 12.2 12.2	(Umin)
FIELD EQUID Water Level Prowater Quality is GENERAL Conferrous Iron = Multi-Parameter Field Parameter is GENERAL Conferrous Iron = Multi-Parameter Iron = Multi-Parameter Iron = Multi-Parameter Iron = M	Amount Purged (L)  2.57  2.57  PMENT AND  Obe Meter  OMMENTS  O 99  er Probe Unit # rs Measured in	CALIBRATIO Model Heron YSI 556 Multi	(Celsius)  11.60  11.75  11.77	(mS/cm)  0.712 0.717 0.724	Oxygen (mg/L)  O 60  O F6  O 7  Calibration Checked Again	(mV) -33. to -36. 3 -36. 9	(NTU) 7. 93 7. 66 4 9. 66 1	(fi BTOC) 695 12.2 12.2 12.2	(Umin)
FIELD EQUID Water Level Prowater Quality B GENERAL CO Ferrous Iron = Multi-Parameter Sample Depth (	Amount Purged (L)  2.57  2.57  PMENT AND  Obe Meter  OMMENTS  O 99 er Probe Unit # rs Measured in (ft bgs) = 25	CALIBRATIO Model Heron YSI 556 Multi	(Celsius)  11.60  11.75  11.77	(mS/cm)  0.712 0.717 0.724	Oxygen (mg/L)  O 60  O F6  O 7  Calibration Checked Again	(mV) -33. to -36. 3 -36. 9	(NTU) 7. 93 7. 66 4 9. 66 1	(fi BTOC) 695 12.2 12.2 12.2	(Umin)
FIELD EQUID Water Level Prowater Quality is GENERAL Corporation = Multi-Parameter Sample Depth (Pump Rate =	Amount Purged (L)  2.5  PMENT AND  Obe Meter  OMMENTS  O 99  er Probe Unit # rs Measured in (ft bgs) = 25	CALIBRATIO Model Heron YSI 556 Multi	(Celsius)  11.60  11.75  11.77	(mS/cm)  0.712 0.717 0.724	Oxygen (mg/L)  O 60  O F6  O 7  Calibration Checked Again	(mV) -33. to -36. 3 -36. 9	(NTU) 7. 93 7. 66 4 9. 66 1	(fi BTOC) 695 12.2 12.2 12.2	(Umin)
FIELD EQUID Water Level Prowater Quality is GENERAL Conferrous Iron = Multi-Parameter	Amount Purged (L)  2.5  PMENT AND  Obe Meter  OMMENTS  O 99 er Probe Unit # rs Measured in (ft bgs) = 25  . 5  Inmeter = 1	CALIBRATIO Model Heron YSI 556 Multi-	(Celsius)  11.60  11.75  11.77	(mS/cm)  0.712 0.717 0.724	Oxygen (mg/L)  O 60  O F6  O 7  Calibration Checked Again	(mV) -33. to -36. 3 -36. 9	(NTU) 7. 93 7. 66 4 9. 66 1	(fi BTOC) 695 12.2 12.2 12.2	(Umin)

SITE NAME	CHAAP 2	019 OU1 RAO_	Performance	Monitoring	PROJECT NO.		605	65355	
SAMPLE NO.	EW	7-PM2	1B-1-	35	WELL NO.	PM	-21B		
DATE/TIME C			-19 / 1 altic Pump and		PERSONNEL	TY			
SAMI EL ME	ПОБ	rense	inc rump and	tuonig	=3	15 FT			
SAMPLE MED	DIA:	Groundwater							
SAMPLE QA S		YES	<b>(10)</b>		Γ SAMPLE NO.				
SAMPLE QC I		YES	NO	DUPLICATE	E SAMPLE NO.	EW7-	PM5	21B-1-	-3h
MS/MSD REQ	UESTED	YES	WD)	MS/MSE	SAMPLE NO.				
SAMPLE CO	NTAINERS, I	RESERVATIV	ES, ANALYS	IS					
Sample Contain			Preservative		Analysis Requ				
2 - 500 mL Am 3 - 40 mL VOA			6°C, HCl		Explosives + M Methane (RSK		And the second		
1 - 500 mL HD			6°C, H <sub>2</sub> SO <sub>4</sub>			NH <sub>3</sub> (350.1), NC	) <sub>2</sub> /NO <sub>2</sub> (353.2)	1	
1 - 250 mL HD			6°C			Alkalinity (2320			
1 - 250 mL HD	PE		6°C, ZnOAc/N	аОН	Sulfide (9034)				
1 - 250 mL Am			6°C		DOC (9060A)				
WELL PURG	ING DATA					695			
		in	-17-10	1		epth (ft <del>BTOC)</del>	40'		
Date		10	-17-19	1		ater (ft BTOC)		bgs	
Time Started	a	100			_	Column Length	2798		
Time Complete PID Measureme			25		_	Volume (per ft) ter in Well (L)	0-166	-	
Background	<u> </u>	10	,			lumes to Purge	4.48		
Breathing Zo	ne	NI		3272	_	im to Purge (L)			
Well Head		NE	>		_	ctual Purge (L)	7.5	-	
Purge Water		N	>		_				
FIELD MEAS	LIDEMENTO								
Time	Amount Purged (L)	pН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1110	#1-	0.20							
1115	#25 #05	979	17.46	0.695	0.17	-136.6	60.960	12.02	0.5
1125	b 1.5	9.55	12.50	0.694	0.16	-125.0 -121.5	8.32	12.02	0.F
1121		7.10	12.42	0,0 17	0.10	-121.17	7.70	12.02	
FIELD EQUIP	MENT AND	CALIBRATIO	N						
		Model			Calibration				
Water Level Pro Water Quality N		Heron YSI 556 Multi-	Donomatan Duah			st Calibrated Le		1.4 . 1.447 1.1	
water Quality is	ricici	131 330 Multi-	ratametet F100		Twice Daily Ca	alibration Verifi	cation also Ca	ilbrated weekly	
GENERAL CO		<del>-</del>							
Ferrous Iron = 4		ng/L							
Multi-Paramete									
Field Parameter			Cell						
Sample Depth ( Pump Rate =	ft bgs) = 35 ・5	•							
Temp Well Dia									
Screen Interval		2-40						3.55	

SITE NAME	CHAAP 2	019 OU1 RAO	_Performance	Monitoring	PROJECT NO.		6056	5355	
SAMPLE NO	EW7-	- PM22/	4-1-21	2	WELL NO.	PM-	22A		
DATE/TIME	COLLECTED	10-17-1	9/1310		PERSONNEL	TV			
SAMPLE ME			altic Pump and	tubing	- LKSONNEL	RH			
SAMPLE ME	DIA:	Groundwater	_						
SAMPLE QA		YES	NO		SAMPLE NO.				
-	DUPLICATE:	YES	( NO )		E SAMPLE NO.				
MS/MSD REG	QUESTED	YES	NO	MS/MSE	SAMPLE NO.				
	ONTAINERS, I	PRESERVATI		IS			<del></del>		
Sample Conta 2 - 500 mL Au			Preservative		Analysis Reque				
3 - 40 mL VO			6°C		Explosives + M				
1 - 500 mL HI			6°C, HCl 6°C, H <sub>2</sub> SO <sub>4</sub>		Methane (RSK TKN (351.2), I		NO (252.1)		
1 - 250 mL HI		52. 140	6°C	0	SO <sub>4</sub> (9056A), A				
1 - 250 mL HI			6°C, ZnOAc/N	•OU	Sulfide (9034)	rikaninty (232)	JD)		
1 - 250 mL Ai			6°C	аОП	DOC (9060A)				
WELL PURC					200 (2000A)	<del></del>		<del></del>	
Date Time Started Time Complet PID Measuren Background Breathing 2 Well Head Purge Wate	ted n <u>ents</u> d Zone	10-17- 1215 1305 MP ND ND	-19		Depth to W Water ( Well Casing V Volume of Wa Casing Vo Minimu	epth (ft BTOC) ater (ft BTOC) Column Length Volume (per ft) ter in Well (L) lumes to Purge m to Purge (L) ctual Purge (L)	16.73	45 <del>645</del> 13	47 <sup>1</sup> bys
Time	Amount Purged (L)	pН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1255	2.5	7.09	13.00	0.671	0-35	-12.0	4.80	13.47	0.17
1300	5.0	7.04	13.00	0.674	0.35	-10.6	3.47	13.47	0.5
1305	7.5	7.05	13.01	0.673	0.32	-10-3	4.18	13.47	O-FT
					-				
									_
FIELD EOU	IPMENT AND	CALIBRATIC	)N						
Water Level P		Model Heron			Calibration Checked Again	st Calibrated L	ength		
Water Quality	Meter	YSI 556 Multi	Parameter Prob	e	Twice Daily Ca		_ <del>-</del>	brated Weekly	
GENERAL C	COMMENTE								
Ferrous Iron =		ng/L							
	ter Probe Unit #			_				THE COURS	
	ers Measured in		Cell						
	(ft bgs) = $2\pi$		COII						- 2.15
Pump Rate =		1-1							
Temp Well Di	-								
	l (ft bgs) = 20	1-20					_		
Serven interva	(11 083) - 20	, ,,,							

SITE NAME	CHAAP 2	019 OU1 RAO_	_Performance N	Monitoring	PROJECT NO.		605	65355	No. of the last
SAMPLE NO.	EW	7-PMS	12B-1	-35	WELL NO.	PM-	22B		
DATE/TIME C SAMPLE MET		10-17-10 Perista	A / 145 altic Pump and t		PERSONNEL	TY			
0.11401.5.1450									
SAMPLE MED		Groundwater	(NO)	op.	T.C. 1. 1. 101 E. 1. 10				
SAMPLE QA S		YES	(NO)		T SAMPLE NO.				
SAMPLE QC D MS/MSD REQ		YES YES	NO		E SAMPLE NO.				
WIS/WISD REQU	OESTED	1 E3	446	M2/M2	D SAMPLE NO.				
SAMPLE CON	NTAINERS, I	PRESERVATIV	ES, ANALYSI	IS					
Sample Contain			Preservative		Analysis Requ				
2 - 500 mL Am			6°C		Explosives + N				
3 - 40 mL VOA 1 - 500 mL HDI			6°C, HCl		Methane (RSK		NO (252.0	-	
1 - 250 mL HD		-22-22-2	6°C, H <sub>2</sub> S0 <sub>4</sub> 6°C	50		NH <sub>3</sub> (350.1), NO Alkalinity (2320	2.53	)	
1 - 250 mL HD			6°C, ZnOAc/Na	OH.	Sulfide (9034)		, (U		
1 - 250 mL Am			6°C	1011	DOC (9060A)				
WELL PURGI	ING DATA		<del></del>						
			10		Well De	epth (ft BTOC)	40'	b95	
Date		10-17				ater (ft BTOC)	13.47	'bas	
Time Started			1325			Column Length		, ,	
Time Complete		1440	7			Volume (per ft)	مااه		
PID Measureme	<u>ents</u>	NO				ter in Well (L)			
Background Breathing Zo	na.	- NC				lumes to Purge	3		
Well Head	one	700				im to Purge (L) ctual Purge (L)			
Purge Water		NE			_ ^	ctual Tuige (L)	フケ		
FIELD MEAS							-		
Time	Amount Purged (L)	рН	Temperature (Celsius)	(mS/cm)	y Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (fLBTOC)	Purge Rate (L/min)
1435	2.5	7.91	13.83	6.731	0.20	-49-3	4.57	13.42	0.5
1440	5.0	7.78	13-91	0.734	0.21	-428	5.95	13.42	0.5
1445	7.5	764	13.93	0.73	10.20	-36.6	7.22	13.42	0.5
	· · · · · ·								
FIELD EQUIP	MENT AND		N		0.12				
Water Level Pro	sha	Model Heron			Charlest Again	ot Calibrated L			
Water Quality N			Parameter Probe			ist Calibrated L		librated Weekly	
					Twice Burry Co		- Lation disc Cu		
GENERAL CO									
Ferrous Iron =		ng/L							
Multi-Parameter									
Field Parameter			Toll						
Comel- D			Len						
Sample Depth (i	ft bgs) = 3	5	Cell						
Pump Rate = $C$	ft bgs) = 3 クーケレ/	5					,		
Pump Rate = C Temp Well Diar	ft bgs) = 3 2 - 15 L / meter = 11'	n,n	Len						
Pump Rate = $C$	ft bgs) = 3 2 - 15 L / meter = 11'	n,n	CCII						

SITE NAME	CHAAP 20	019 OU1 RAO_Performance Monitoring							
SAMPLE NO.	Eω	7- PM	23A-	1-25	WELL NO.				
DATE/TIME (	COLLECTED	10-16	-19 /	045	PERSONNEL	PI	levald		
SAMPLE MET			altic Pump and		_ I EROOMINEE		ouna		
		-			-		oana_		
SAMPLE MEI		Groundwater							
SAMPLE QA		YES	( NO	SPLI	Γ SAMPLE NO.				
SAMPLE QC		YES	NO		E SAMPLE NO.	100000			
MS/MSD REQ	QUESTED	YES	(NO)	MS/MSI	SAMPLE NO.				
SAMPLE CO	NTAINERS P	RESERVATI	VES, ANALYS	212					
Sample Contai		W	Preservative	, LD	Analysis Requ	ested			
2 - 500 mL An			6°C		Explosives + N				
3 - 40 mL VO	A		6°C, HCl		Methane (RSk				
1 - 500 mL HD			6°C, H <sub>2</sub> SO <sub>4</sub>	38.22		NH <sub>3</sub> (350.1), NO		)	
1 - 250 mL HD			6°C			Alkalinity (2320	B)		
1 - 250 mL HD			6°C, ZnOAc/N	IaOH	Sulfide (9034)				
1 - 250 mL An			6℃		DOC (9060A)				
WELL PURG	ING DATA				Wall D		2	a' Des	
Date		10-10	. 19			epth (ft BTOC) /ater (ft BTOC)		0' BGS	
Time Started		10-70	0-/7			Column Length		68 BG	
Time Complete	ed	109				Volume (per ft)		1.32	7.16
PID Measurem			/			iter in Well (L)	- 1	91 20	1016
Background		N	Λ.			olumes to Purge		×28 3	l vol-
Breathing Zo		10				um to Purge (L)		5.43	, 101-
Well Head		N				ctual Purge (L)		8.28	
Purge Water	•	n						0.20	
DVDV D MODAC	THE PARTY OF THE P								
FIELD MEAS			<b>.</b>	0 1 2 2	D: 1 1				
Time	Amount Purged (L)	pН	Temperature	Conductivity		Redox	Turbidity	Depth to Water	•
	ruigea (L)		(Celsius)	(mS/cm)	Oxygen (mg/L	) (mV)	(NTU)	(ft BTOC)	(L/min)
1027	سی	8:35	11.74	6.737	0.44	27 7	11.04	<b>A</b> (9	11: 90 sec
1034	10	8.30	12.03	0.738		-32.7	5.66	<b>3</b> .68 <b>3</b> .68 <b>3</b> .68	1) 10 Sec
1641	15	8.21	11.89	0.740	0.40	-31.0	4.94	<b>22</b> /C/	
704/		0.2	11-01	0.770	0.36	-26.7	9.99	80.02	
							_		
				-					
FIELD EQUI	PMENT AND	CALIBRATIO	ON		<del></del>				
		Model			Calibration				
Water Level Pr	robe	Heron			Checked Again	nst Calibrated Le	ength		
Water Quality l	Meter	YSI 556 Multi	-Parameter Prob	e	Twice Daily C	alibration Verifi	cation also Ca	librated Weekly	
CENEDAL	OMMENING								
GENERAL CO Ferrous Iron =		II							
Multi-Paramete		ng/L			Bulleut -				
Field Parameter		Flow-Through	Cell		(20)				
Sample Depth (		5' BG-5	CCII						
Pump Rate =	4 1	nin							
Temp Well Dia		1"						3/1	
Screen Interval		20' 06	S TO	30' B	cs .	-			
		J						100000	
					SS.				

SITE NAME CHAAP 2	019 OU1 RAO_Performance	Monitoring	PROJECT NO.		605	65355	
SAMPLE NO. EW	17-PM23B-1	-35	WELL NO.	PM	-23	13	
DATE/TIME COLLECTED SAMPLE METHOD	10-17-19 / 10:3 Peristaltic Pump and		PERSONNEL	PY			
SAMPLE MEDIA: SAMPLE QA SPLIT: SAMPLE QC DUPLICATE: MS/MSD REQUESTED	Groundwater YES YES YES YES	DUPLICAT	T SAMPLE NO. E SAMPLE NO. D SAMPLE NO.				
•	PRESERVATIVES, ANALYS	SIS					
Sample Container 2 - 500 mL Amber	<u>Preservative</u> 6°C		Analysis Reque Explosives + M				
3 - 40 mL VOA	6°C, HCl		Methane (RSK				
1 - 500 mL HDPE	6°C, H <sub>2</sub> SO <sub>4</sub>		TKN (351.2), N	,	O <sub>2</sub> /NO <sub>3</sub> (353.2)	)	
1 - 250 mL HDPE	6°C		SO <sub>4</sub> (9056A), A	Alkalinity (2320	)B)		
1 - 250 mL HDPE 1 - 250 mL Amber	6°C, ZnOAc/N	laOH	Sulfide (9034)				
WELL PURGING DATA	6°C	<del>.</del>	DOC (9060A)				
Date Time Started Time Completed PID Measurements Background Breathing Zone Well Head Purge Water	10-17-19 1510 1630 ND ND ND		Depth to W Water ( Well Casing V Volume of Wal Casing Vo Minimu	epth (ft BTOC) ater (ft BTOC) Column Length Volume (per ft) ter in Well (L) lumes to Purge m to Purge (L) ctual Purge (L)	10-38 29.6 166 4.74		
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)
1620 2.5	7.96 14.03	0.748	0.17	-51.9	0.13	10.38	0.5
1625 5.0	7-960 13.84	0.747	0.17	-51.60	796	10.38	0.5
1630 7.5	7.98 1416	0.75	0.18	-51.0	7.95	10.38	0.5
FIELD EQUIPMENT AND	CALIBRATION					1	
Water Level Probe	Model Heron		Calibration Checked Again				
	Model	be	Checked Again			librated Weekly	
Water Level Probe Water Quality Meter  GENERAL COMMENTS Ferrous Iron = 2.59 m Multi-Parameter Probe Unit # Field Parameters Measured in Sample Depth (ft bgs) = 55	Model Heron YSI 556 Multi-Parameter Prol mg/L	be	Checked Again			librated Weekly	
Water Level Probe Water Quality Meter  GENERAL COMMENTS Ferrous Iron = 2.59 r Multi-Parameter Probe Unit # Field Parameters Measured in	Model Heron YSI 556 Multi-Parameter Prol mg/L	be	Checked Again			librated Weekly	

SITE NAME _	CHAAP 2	019 OU1 RAO	_Performance	Monitoring	PROJECT NO		605	65355	
SAMPLE NO	Ew7-	Pm24	A-1-	25	WELL NO.		Pm-2	4A	
				1640	DED COLUMN		RH		
DATE/TIME CO			0 ///		PERSONNEL		K 17		
AMPLE ME I	нор	Pensi	taltic Pump and	tubing	<u>-</u> 8		/_1		
SAMPLE MEDI		Groundwater							
SAMPLE QA SI		YES	NO		T SAMPLE NO.		-		
SAMPLE QC D		YES	(NO)		E SAMPLE NO.				
MS/MSD REQU	JESTED	YES		MS/MSI	O SAMPLE NO.	<del></del>		_	
		PRESERVATI	-	SIS					
Sample Containe			Preservative 6°C		Analysis Requ				
: - 500 mL Amb : - 40 mL VOA					Explosives + I				
- 40 mL VOA - 500 mL HDF			6°C, HCl		Methane (RSk		0.00. (252.2		
- 250 mL HDF			6°C, H <sub>2</sub> SO <sub>4</sub>			NH <sub>3</sub> (350.1), N		)	
- 250 mL HDF				J-OH		Alkalinity (232	UB)		
- 250 mL Amb			6°C, ZnOAc/N	чаUП	Sulfide (9034) DOC (9060A)				
VELL PURGI			-		DUC (3000A)	· · · · · · · · · · · · · · · · · · ·		5000	
		1 -	10 10		Well D	epth ( <del>ft BTOS</del> )		-	65
Date			.16.19		Depth to W	Vater (ft <del>-DTOC)</del>		3.42 6	3 <i>65</i>
ime Started			620		Water	Column Length		16.58	
ime Completed	1		635	3, 333	Well Casing	Volume (per ft)		a16	
ID Measureme	<u>nts</u>				Volume of Wa	ater in Well (L)		1.65	
Background		/	UB		_ Casing Vo	olumes to Purge	:	3	
Breathing Zor	ne	/	UD		Minim	um to Purge (L)			
Well Head			ND			Actual Purge (L)		- 7.5	<i>L</i>
Purge Water			run_		_				
THE RAID A CH									
Time	UREMENTS Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L	Redox ) (mV)	Turbidity (NTU)	Depth to Water	Purge Rate (L/min)
	Amount		•	•		) (mV)	(NTU)	•	-
Time /625	Amount Purged (L)	pH	(Celsius)	(mS/cm)	Oxygen (mg/L	(mV)	(NTU)	(R BTOC) BGS 13.42	-
Time	Amount Purged (L)	рН	(Celsius)	(mS/cm)	Oxygen (mg/L	) (mV)	(NTU)	GGS	-
Time /625	Amount Purged (L)	pH 7.44 7.62	(Celsius)  12.81  12.82	(mS/cm)  0.901  0.902	0xygen (mg/L	(mV) -29.2 -29.9	(NTU) 5.88 G.77	(RBTOC) BGS 13.42	•
Time /625	Amount Purged (L)	pH 7.44 7.62	(Celsius)  12.81  12.82	(mS/cm)  0.901  0.902	0xygen (mg/L	(mV) -29.2 -29.9	(NTU) 5.88 G.77	(RBTOC) BGS 13.42	•
Time /625	Amount Purged (L)	pH 7.44 7.62	(Celsius)  12.81  12.82	(mS/cm)  0.901  0.902	0xygen (mg/L	(mV) -29.2 -29.9	(NTU) 5.88 G.77	(RBTOC) BGS 13.42	•
Time /625	Amount Purged (L)	pH 7.44 7.62	(Celsius)  12.81  12.82	(mS/cm)  0.901  0.902	0xygen (mg/L	(mV) -29.2 -29.9	(NTU) 5.88 G.77	(RBTOC) BGS 13.42	•
Time /625	Amount Purged (L)	pH 7.44 7.62	(Celsius)  12.81  12.82	(mS/cm)  0.901  0.902	0xygen (mg/L	(mV) -29.2 -29.9	(NTU) 5.88 G.77	(RBTOC) BGS 13.42	-
Time /625	Amount Purged (L)	pH 7.44 7.62	(Celsius)  12.81  12.82	(mS/cm)  0.901  0.902	0xygen (mg/L	(mV) -29.2 -29.9	(NTU) 5.88 G.77	(RBTOC) BGS 13.42	-
Time /625	Amount Purged (L)	pH 7.44 7.62	(Celsius)  12.81  12.82	(mS/cm)  0.901  0.902	0xygen (mg/L	(mV) -29.2 -29.9	(NTU) 5.88 G.77	(RBTOC) BGS 13.42	-
Time /625 /630 /635	Amount Purged (L)	pH 7.44 7.62 7.56	(Celsius)  12.81 12.82 12.83	(mS/cm)  0.901  0.902	0xygen (mg/L	(mV) -29.2 -29.9	(NTU) 5.88 G.77	(RBTOC) BGS 13.42	•
Time /625 /630 /635	Amount Purged (L)	pH 7.44 7.62 7.56	(Celsius)  12.81 12.82 12.83	(mS/cm)  0.901  0.902	0xygen (mg/L	(mV) -29.2 -29.9	(NTU) 5.88 G.77	(RBTOC) BGS 13.42	-
Time  /625  /630  /635  TIELD EQUIP	Amount Purged (L)  2.5  5.0  7.5  MENT AND	PH  7.44  7.62  7.56  CALIBRATIO  Model  Heron	(Celsius)  12.81  12.82  12.83  DN	(mS/cm)  0.961 0.902 0.903	Oxygen (mg/L  1.35  1.46  1.47  Calibration Checked Agai	) (mV) -29.2 -29.9 -28.7	(NTU)  5.88 6.77 3.38	(ABTOC) BGS /B-42 13.42 13.42	-
Time /625 /630 /635	Amount Purged (L)  2.5  5.0  7.5  MENT AND	PH  7.44  7.62  7.56  CALIBRATIO  Model  Heron	(Celsius)  12.81 12.82 12.83	(mS/cm)  0.961 0.902 0.903	Oxygen (mg/L  1.35  1.46  1.47  Calibration Checked Agai	) (mV) -29.2 -29.9 -28.7	(NTU)  5.88 6.77 3.38	(RBTOC) BGS 13.42	-
Time  /625 /630 /635  TELD EQUIP	Amount Purged (L)  2.5  5.0  7.5  MENT AND  be feter	PH  7.44  7.62  7.56  CALIBRATIO  Model  Heron	(Celsius)  12.81  12.82  12.83  DN	(mS/cm)  0.961 0.902 0.903	Oxygen (mg/L  1.35  1.46  1.47  Calibration Checked Agai	) (mV) -29.2 -29.9 -28.7	(NTU)  5.88 6.77 3.38	(ABTOC) BGS /B-42 13.42 13.42	•
Time  /625 /630 /635  TELD EQUIP  Vater Level Prol Vater Quality M  GENERAL CO	Amount Purged (L)  2.5  5.0  7.5  MENT AND  be feter	PH  7.44  7.62  7.56  CALIBRATIO  Model  Heron  YSI 556 Multi	(Celsius)  12.81  12.82  12.83  DN	(mS/cm)  0.961 0.902 0.903	Oxygen (mg/L  1.35  1.46  1.47  Calibration Checked Agai	) (mV) -29.2 -29.9 -28.7	(NTU)  5.88 6.77 3.38	(ABTOC) BGS /B-42 13.42 13.42	•
Time  /625 /630 /635  TELD EQUIP  Vater Level Prol Vater Quality M  GENERAL CO  errous Iron =	Amount Purged (L)  2.5  5.0  7.5  MENT AND  be feter  MMENTS  2.62	PH  7.44  7.62  7.56  CALIBRATIO  Model  Heron  YSI 556 Multi	(Celsius)  12.81  12.82  12.83  DN	(mS/cm)  0.961 0.902 0.903	Oxygen (mg/L  1.35  1.46  1.47  Calibration Checked Agai	) (mV) -29.2 -29.9 -28.7	(NTU)  5.88 6.77 3.38	(ABTOC) BGS /B-42 13.42 13.42	•
Time  /625  /630  /635  TELD EQUIP  Vater Level Prol Vater Quality M  GENERAL CO  recrous Iron = Multi-Parameter	Amount Purged (L)  2.5  7.5  MENT AND  be feter  MMENTS  2.62  Probe Unit #	PH  7.44  7.62  7.56  CALIBRATIO  Model  Heron  YSI 556 Multi	(Celsius)  12.81  12.82  12.83  12.83  Parameter Pro	(mS/cm)  0.961 0.902 0.903	Oxygen (mg/L  1.35  1.46  1.47  Calibration Checked Agai	) (mV) -29.2 -29.9 -28.7	(NTU)  5.88 6.77 3.38	(ABTOC) BGS /B-42 13.42 13.42	•
Time  /625 /630 /635  TELD EQUIP  Vater Level Prol Vater Quality M  EENERAL CO ferrous Iron = J  fulti-Parameter field Parameters	Amount Purged (L)  2.5  7.5  MENT AND  be leter  MMENTS  2.62  Probe Unit #  Measured in	PH  7.44  7.62  7.56  CALIBRATIO  Model  Heron  YSI 556 Multi  Flow-Through	(Celsius)  12.81  12.82  12.83  12.83  Parameter Pro	(mS/cm)  0.961 0.902 0.903	Oxygen (mg/L  1.35  1.46  1.47  Calibration Checked Agai	) (mV) -29.2 -29.9 -28.7	(NTU)  5.88 6.77 3.38	(ABTOC) BGS /B-42 13.42 13.42	•
Time  /625 /630 /635  TIELD EQUIP  Vater Level Prol Vater Quality M  GENERAL CO  verrous Iron = A  fulti-Parameter vield Parameters  ample Depth (f	Amount Purged (L)  2.5  5.0  7.5  MENT AND  be leter  MMENTS  2.62  Probe Unit # is Measured in it bgs) = 2	PH  7.44  7.62  7.56  CALIBRATIO  Model  Heron  YSI 556 Multi	(Celsius)  12.81  12.82  12.83  12.83  Parameter Pro	(mS/cm)  0.961 0.902 0.903	Oxygen (mg/L  1.35  1.46  1.47  Calibration Checked Agai	) (mV) -29.2 -29.9 -28.7	(NTU)  5.88 6.77 3.38	(ABTOC) BGS /B-42 13.42 13.42	•
Time  /625 /630 /635  TELD EQUIP  Vater Level Prol Vater Quality M  ENERAL CO ferrous Iron = A  fulti-Parameter ield Parameters ample Depth (fump Rate =	Amount Purged (L)  2.5  5.0  7.5  MENT AND  be leter  Probe Unit #  s Measured in it bgs) = 2  .55	PH  7.44  7.62  7.56  CALIBRATIO  Model  Heron  YSI 556 Multi  Flow-Through	(Celsius)  12.81  12.82  12.83  12.83  Parameter Pro	(mS/cm)  0.961 0.902 0.903	Oxygen (mg/L  1.35  1.46  1.47  Calibration Checked Agai	) (mV) -29.2 -29.9 -28.7	(NTU)  5.88 6.77 3.38	(ABTOC) BGS /B-42 13.42 13.42	•
Time  //625  //630  //635  TELD EQUIP  Vater Level Prol Vater Quality M  SENERAL CO errous Iron = A  fulti-Parameter ield Parameters ample Depth (f	Amount Purged (L)  2.5  7.5  MENT AND  be leter  Probe Unit # is Measured in it bgs) = 2  .5  neter = 1	CALIBRATION Model Heron YSI 556 Multi Flow-Through	(Celsius)  12.81 12.82 12.83  12-83  ON  -Parameter Pro	(mS/cm)  0.961 0.902 0.903	Oxygen (mg/L  1.35  1.46  1.47  Calibration Checked Agai	) (mV) -29.2 -29.9 -28.7	(NTU)  5.88 6.77 3.38	(ABTOC) BGS /B-42 13.42 13.42	-

SITE NAME	CHAAP 2	019 OU1 RAO	Performance	Monitoring	PROJECT NO.		605	65355	
SAMPLE NO.	EW7	- PM24	B-1-31	7	WELL NO.	PM-	24B		
DATE/TIME (	COLLECTED	10-19	-19 / C	955	PERSONNEL	TV			
SAMPLE ME			altic Pump and		_ I EKSONNEL	BE			
SAMPLE MEI		Groundwater	2						
SAMPLE QA		YES	NO/		SAMPLE NO.				
SAMPLE QC		YES	/NO \		E SAMPLE NO.				
MS/MSD REC		YES	NO		SAMPLE NO.				
		PRESERVATI	•	SIS					
Sample Contai 2 - 500 mL An			Preservative 6°C		Analysis Reque				
3 - 40 mL VO		-	6°C, HCl		Explosives + M Methane (RSK				
1 - 500 mL HE			6°C, H <sub>2</sub> SO <sub>4</sub>	3 (3)		NH <sub>3</sub> (350.1), NC	) <sub>2</sub> /NO <sub>2</sub> (353.2)		
1 - 250 mL HE			6°C			Alkalinity (2320			
1 - 250 mL HE			6°C, ZnOAc/N	aOH	Sulfide (9034)		-/		
1 - 250 mL An			6°C		DOC (9060A)				
WELL PURG		<del></del>			3 (2 3 3 3 1)	····			
Date Time Started Time Complete PID Measurem Background Breathing Z Well Head Purge Water	nents I one	16-19 0830 0950 ND ND ND	-19		Depth to W Water ( Well Casing V Volume of Wa Casing Vo Minimu	epth (ft BTOC) ater (ft BTOC) Column Length Volume (per ft) ter in Well (L) lumes to Purge m to Purge (L) ctual Purge (L)	13.40 26.6 0.16L	095	
FIELD MEAS	SUREMENTS			-				···	
Time	Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
0940	2.5	890	11.55	0707	031	-94.9	57.6	13 40	05
0946	5.0	830	11.58	6.707	0.31	-933	499	13.40	0.5
0950	7.5	8.84	11.58	0.707	0.30	-92.2	51.0	13.40	0.5
						- 3			
EIEI D EOIM	DMFNT AND	CALIBRATIC	)N		<u> </u>			<u> </u>	
FIELD EQUI	I MENT AND	Model	<b>714</b>		Calibration				
Water Level Pr	rohe	Heron				st Calibrated Le	ength		
Water Quality			-Parameter Prob	ne .		libration Verific		ibrated Weekly	
							January Car		
GENERAL Conference of the GENERAL CONFERENCE OF T		ng/L							
Ferrous Iron =									
Ferrous Iron = Multi-Paramete Field Paramete	330 i er Probe Unit # ers Measured in	Flow-Through	Cell						
Ferrous Iron = Multi-Paramete Field Paramete Sample Depth	330 i er Probe Unit # ers Measured in (ft bgs) = 35	Flow-Through	Cell						
Multi-Paramete Field Paramete Sample Depth Pump Rate = (	330 interpretation of the state	Flow-Through	Cell						41
Ferrous Iron = Multi-Paramete Field Paramete Sample Depth Pump Rate = ( Temp Well Dia	er Probe Unit # ers Measured in (ft bgs) = 35 0.5 ameter = 1"	Flow-Through	Cell						
Ferrous Iron = Multi-Paramete Field Paramete Sample Depth Pump Rate = ( Temp Well Dia	330 interpretation of the state	Flow-Through	Cell						
Ferrous Iron = Multi-Paramete Field Paramete Sample Depth Pump Rate = ( Temp Well Dia	er Probe Unit # ers Measured in (ft bgs) = 35 0.5 ameter = 1"	Flow-Through	Cell						

SITE NAME	CHAAP 2	019 OU1 RAO	_Performance	Monitoring	PROJECT NO.		605	665355	
SAMPLE NO	. Eω7-	PM25	4-1-25	>	WELL NO.	Pn	125A		2
DATE/TIME	COLLECTED		6-19 taltic Pump and		PERSONNEL	R	. <i>Η</i>		
					-7.		, ,		
SAMPLE ME		Groundwater							
SAMPLE QA		YES	(NO)		Γ SAMPLE NO.				
	DUPLICATE:	YES	Ø≥,		E SAMPLE NO.				
MS/MSD REG	QUESTED	YES	(NO)	MS/MSI	SAMPLE NO.			_	
SAMPLE CO	ONTAINERS, F	RESERVATI	VES, ANALYS	SIS		<u></u>			
Sample Conta			Preservative		Analysis Requ	<u>ested</u>			
2 - 500 mL Aı	mber		6°C		Explosives + N	MNX (8330A)			
3 - 40 mL VO	A		6°C, HCl		Methane (RSK	. 175)			
1 - 500 mL HI			6°C, H <sub>2</sub> S0 <sub>4</sub>		TKN (351.2), I	$NH_3$ (350.1), NC	0 <sub>2</sub> /NO <sub>3</sub> (353.2	)	
1 - 250 mL HI			6°C		SO <sub>4</sub> (9056A),	Alkalinity (2320	B)	34511	
1 - 250 mL HI			6°C, ZnOAc/N	laOH	Sulfide (9034)				
1 - 250 mL Aı			6°C		DOC (9060A)				
WELL PURG	GING DATA				Wall D	1365	30	, ′	
Date		10-	16-19			epth (ft BTOC) ater (ft BTOC)			55
Time Started			38 123	<b>3</b> 7	-	Column Length			3.3
Time Complet	ted	70	248	<i>'</i> >	_	Volume (per ft)		1.31	
PID Measuren		- 12	-70			ter in Well (L)		16 .41	
Background			ND			lumes to Purge		2	
Breathing Z		-	NO			ım to Purge (L)	18	.12	
Well Head			ND			ctual Purge (L)	10	15	
Purge Wate	er		ND		_	0 ( %			
								·	
Time	SUREMENTS Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1238	5	7-26	13.78	0.790	3.53	19.9	16.4 <del>\$1.69</del>	8.69	#0
1243	10	7.22	14.08	0.793	3.35	17.7	16.1		-3~
1248	15	7-23	13.55	0-794	3.48	17-9	12.0	8.69	.5
							-12.0	0.07	
								-	
							_		
FIELD EQUI	IPMENT AND	CALIBRATION Model	ON	<u> </u>	Calibration		<del></del>		
Water Level P		Heron				st Calibrated Le			
Water Quality	Meter	YSI 556 Mult	i-Parameter Prob	oe	Twice Daily Ca	alibration Verifi	cation also Ca	llibrated Weekly	
GENERAL C									
Ferrous Iron =		ng/L							
	ter Probe Unit #								
	ers Measured in		Cell						
Sample Depth		5'				110-20-			
Pump Rate =	.51/m	·n				000-00			
Temp Well Di	ameter =	1"	2-1 -						
Screen Interva	ıl (ft bgs) =	20'-	30 B	55				1164	
712									

<b></b>	P 2019 OU1 RAC			PROJECT NO.		^	665355	
	7-PM.	/	15 15	WELL NO.	/	Pm-2	<b>L F B</b>	
DATE/TIME COLLECTE			1455	_ PERSONNEL		RH		
SAMPLE METHOD	Peri	staltic Pump and	tubing	===		TY		
SAMPLE MEDIA:	Groundwate	er						
SAMPLE QA SPLIT:	YES	NO	SPLI	ΓSAMPLE NO.				
SAMPLE QC DUPLICAT		NO	DUPLICATI	E SAMPLE NO.				
MS/MSD REQUESTED	(YES)	NO	MS/MSI	SAMPLE NO.	Εω7-	PM25B	-1-35	
SAMPLE CONTAINERS	S, PRESERVAT	IVES, ANALYS	SIS			<del></del>		
Sample Container		<b>Preservative</b>		Analysis Requ	<u>ested</u>			
2 - 500 mL Amber		6°C		Explosives + N	MNX (8330A)			
3 - 40 mL VOA		6°C, HCl		Methane (RSK				
1 - 500 mL HDPE		6°C, H <sub>2</sub> SO <sub>4</sub>		TKN (351.2), I		- March	)	
1 - 250 mL HDPE		6°C		SO <sub>4</sub> (9056A),		(0B)		
1 - 250 mL HDPE		6°C, ZnOAc/N	NaOH	Sulfide (9034)				
1 - 250 mL Amber WELL PURGING DATA		6°C		DOC (9060A)				
WELL FUNGING DATA		j.		Well De	epth (ft BTOC)	)	40'	BGS
Date	10-	16-19			ater (ft BTOC)		8,58	B65
Time Started		39			Column Length		31.42	
Time Completed	V311430	54			Volume (per ft)		0.16	
PID Measurements			10 10 10	Volume of Wa			5,02	
Background		NUN			lumes to Purge		3	
Breathing Zone		NO			ım to Purge (L)			
Well Head		ND		_	ctual Purge (L)			7-5-7
Purge Water	-	ND		-0				
FIELD MEASUREMEN' Time Amount Purged (I	pН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1449 2.5	7.13	13.60	0.793	0.13	3.3	1.18	8.58	15l
1449 5.0	7.09	13.30	0-791	0.14	4.6			
1-11	7.07			001	7.6	1200	858	155
1454 7.5	7.11	13.24	0.791	0.15	46	1.08	858	.50
	7.11				46	1.27	858	.5.0
	7.11				46	1.27		.5.0
	7.11				46	1.27		.5.6
	7.11				46	1.27		.5.0
	7.11				46	1.27		.5.0
	7.11				4.6	1.27		.5.0
	7.11				46	1.27		.5.0
	7.//				4.6	1.27		.50
7.5	7.//	13.24		0.15	46	1.27		.5.0
	7-11	13.24			46	1.27		.5.0

SITE NAME	CHAAP 20	019 OU1 RAO	_Performance	Monitoring	PROJECT NO.		605	65355	
SAMPLE NO.	EW7	- PMZ6	A-1-2	25	WELL NO.	PM.	26A		
DATE/TIME ( SAMPLE ME			9/091		PERSONNEL	TY	ı.		
SAMPLE MEI SAMPLE QA SAMPLE QC MS/MSD REQ	SPLIT: DUPLICATE:	Groundwater YES YES YES	NO NO	DUPLICATE	SAMPLE NO. SAMPLE NO. SAMPLE NO.				
	NTAINERS, P	RESERVATIV	VES, ANALYS	SIS				·······	
Sample Contai			Preservative		Analysis Requ				
2 - 500 mL An			6°C		Explosives + N				
3 - 40 mL VO			6°C, HCl 6°C, H <sub>2</sub> SO <sub>4</sub>	10-	Methane (RSK TKN (351.2), I		O /NO /252 2		
1 - 250 mL HE			6°C	-	SO <sub>4</sub> (9056A),	_		)	
1 - 250 mL HE			6°C, ZnOAc/N	laOH	Sulfide (9034)		.00)		
1 - 250 mL An			6°C		DOC (9060A)				
WELL PURG	ING DATA			<del></del>					
Date Time Started Time Complete PID Measurem Background Breathing Zowell Head Purge Water	nents one	10-18- 0855 0945 ND ND ND			Depth to W Water ( Well Casing V Volume of Wa Casing Vo Minimu	ater (ft BTOC) Column Length Volume (per ft)	3		
FIELD MEAS									
Time	Amount Purged (L)	pН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved	Redox	Turbidity	Depth to Water	Purge Rate (L/min)
	r diged (L)		(Colsius)	(IIIS/CIII)	Oxygen (mg/L)	(mV)	(NTU)	(ft <del>BTOC)</del> 695	(Dillill)
0935	2.Fi	7.68	13.0Le	0.680	Oxygen (mg/L)	(mV) -39.7	(NIU) 9.56	17.85	0.57
0940	2.Fi	7.69		· · · · · ·				695	0.F
	2.5		13.0Le	0.680	0.90	-39.7	9.56	17.85	0.57
0940	2.Fi	7.69	13.06 13.18	0.680	0.90	-39.7 -39.5	9.56	17.85 12.85	0.F
0940	2.Fi	7.69	13.06 13.18	0.680	0.90	-39.7 -39.5	9.56	17.85 12.85	0.F
0940	2.Fi	7.69	13.06 13.18	0.680	0.90	-39.7 -39.5	9.56	17.85 12.85	0.F
0940	2.Fi	7.69	13.06 13.18	0.680	0.90	-39.7 -39.5	9.56	17.85 12.85	0.F
0940	2.Fi	7.69	13.06 13.18	0.680	0.90	-39.7 -39.5	9.56	17.85 12.85	0.F
0940	2.Fi	7.69	13.06 13.18	0.680	0.90	-39.7 -39.5	9.56	17.85 12.85	0.F
0940	2.5 5.0 7.5	7.69	13.06 13.18 13.23	0.680	0.90	-39.7 -39.5	9.56	17.85 12.85	0.F
0940	2.5 5.0 7.5	7.69	13.06 13.18 13.23	0.680 0.683 0.684	Calibration Checked Again	-39.7 -39.15 -39.0	9.56 9.70 5.42	17.85 12.85	0.F
FIELD EQUI	2.5 5.0 7.5 PMENT AND	7. 69 7. 69 CALIBRATIO Model Heron	13.06 13.18 13.23	0.680 0.683 0.684	Calibration Checked Again	-39.7 -39.15 -39.0	9.56 9.70 5.42	695 17.85 12.85 12.85	0.F
FIELD EQUI Water Level Pr Water Quality  GENERAL C	PMENT AND TOBE Meter  OMMENTS	CALIBRATIO Model Heron	13.06 13.18 13.23	0.680 0.683 0.684	Calibration Checked Again	-39.7 -39.15 -39.0	9.56 9.70 5.42	695 17.85 12.85 12.85	0.F
FIELD EQUI Water Level Pr Water Quality  GENERAL C Ferrous Iron =	PMENT AND  Tobe Meter  OMMENTS 2, 89 n	CALIBRATIO Model Heron YSI 556 Multi-	13.06 13.18 13.23	0.680 0.683 0.684	Calibration Checked Again	-39.7 -39.15 -39.0	9.56 9.70 5.42	695 17.85 12.85 12.85	0.F
FIELD EQUI  Water Level Pr Water Quality  GENERAL C Ferrous Iron =  Multi-Paramete	PMENT AND  robe Meter  OMMENTS 2, F 9 ner Probe Unit #	CALIBRATIO Model Heron YSI 556 Multi-	13.06 13.18 13.23	0.680 0.683 0.684	Calibration Checked Again	-39.7 -39.15 -39.0	9.56 9.70 5.42	695 17.85 12.85 12.85	0.F
FIELD EQUI  Water Level Pr Water Quality  GENERAL C Ferrous Iron =  Multi-Paramete Field Paramete	PMENT AND  Tobe Meter  OMMENTS 2. F 9 n er Probe Unit # rrs Measured in	CALIBRATIO Model Heron YSI 556 Multi- ng/L I Flow-Through 0	13.06 13.18 13.23	0.680 0.683 0.684	Calibration Checked Again	-39.7 -39.15 -39.0	9.56 9.70 5.42	695 17.85 12.85 12.85	0.F
FIELD EQUI  Water Level Pr Water Quality  GENERAL C Ferrous Iron =  Multi-Paramete Field Paramete Sample Depth	PMENT AND  Tobe Meter  OMMENTS 2. F.9 n er Probe Unit # rrs Measured in (ft bgs) = 2 F	CALIBRATIO Model Heron YSI 556 Multi- ng/L I Flow-Through 0	13.06 13.18 13.23	0.680 0.683 0.684	Calibration Checked Again	-39.7 -39.15 -39.0	9.56 9.70 5.42	695 17.85 12.85 12.85	0.F
FIELD EQUI  Water Level Pr Water Quality  GENERAL C Ferrous Iron =  Multi-Paramete Field Paramete	PMENT AND  Tobe Meter  OMMENTS  2. F. 9  In reproduct #  In seasured in (ft bgs) = 2 F  O. F.	CALIBRATIO Model Heron YSI 556 Multi- ng/L I Flow-Through 0	13.06 13.18 13.23	0.680 0.683 0.684	Calibration Checked Again	-39.7 -39.15 -39.0	9.56 9.70 5.42	695 17.85 12.85 12.85	0.F
FIELD EQUI Water Level Pr Water Quality  GENERAL C Ferrous Iron = 6 Multi-Paramete Field Paramete Sample Depth Pump Rate = Temp Well Dia	PMENT AND  Tobe Meter  OMMENTS  2. F. 9  In reproduct #  In seasured in (ft bgs) = 2 F  O. F.	CALIBRATIO Model Heron YSI 556 Multi- ng/L I Flow-Through O	13.06 13.18 13.23	0.680 0.683 0.684	Calibration Checked Again	-39.7 -39.15 -39.0	9.56 9.70 5.42	695 17.85 12.85 12.85	0.F

	CHAAP 20	019 OU1 RAO	_Performance	Monitoring	PROJECT NO.		605	65355	
SAMPLE NO.	EW7	- PMZG	B-1-	-35	WELL NO.	PM-	26B		
DATE/TIME (			19/11		PERSONNEL	TY			
SAMPLE ME	THOD	Perist	altic Pump and	tubing		RH	15/947		
SAMPLE MEI	DIA:	Groundwater							
SAMPLE QA		YES	RO	SPLIT	SAMPLE NO.				
SAMPLE QC	DUPLICATE:	YES	(NO)	DUPLICATE	SAMPLE NO.				
MS/MSD REC	QUESTED	YES	NO	MS/MSD	SAMPLE NO.				
SAMPLE CO	NTAINERS, P	RESERVATI	VES, ANALYS	IS					
Sample Contai			<b>Preservative</b>		Analysis Reque				
2 - 500 mL An			6°C	= 1 1	Explosives + M				
3 - 40 mL VO			6°C, HCl 6°C, H <sub>2</sub> SO <sub>4</sub>	-111	Methane (RSK TKN (351.2), N		) /NO (252.2)		
1 - 250 mL HE			6°C	_	SO <sub>4</sub> (9056A), A				
1 - 250 mL HE			6°C, ZnOAc/N	аОН	Sulfide (9034)		,_,		
1 - 250 mL An			6°C		DOC (9060A)				
WELL PURG	GING DATA						( ) and	Dr. 5	
Date		10-18	-19			epth (ft <del>BTOC)</del> ater (ft B <del>TOC</del> )			
Time Started		1015			שטבירוו נס W Water C	Column Length	27.121	43	-
Time Complete	ed	1135				Volume (per ft)		23/11	
PID Measurem	nents					ter in Well (L)			
Background		ND			Casing Vo	lumes to Purge	3		
Breathing Z	one	ND			- 0	m to Purge (L)			
Well Head	_	NO			- A	ctual Purge (L)	7.1	<b>ブ</b>	
Purge Water	ſ	ND							
FIELD MEAS	SUREMENTS								
Time	Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)-	Purge Rate (L/min)
1125								27-12	A-15
1130								27-17	0.5
· WITUU	1							- 13	
4311								210	0.5
1125	2.5	9.19	14.99	0.789	0.27	-108.6	6.29	12.88	0.5
41311	5	9.07	15.22	6.791	0.27	-108.6 -103.9	4.29		0.5
1125		1 20 1		6.791				12.88	
434 1125 1130	5	9.07	15.22	6.791	0.28	-103.9		12.88	0.5
434 1125 1130	5	9.07	15.22	6.791	0.28	-103.9		12.88	0.5
434 1125 1130	5	9.07	15.22	6.791	0.28	-103.9		12.88	0.5
434 1125 1130	5	9.07	15.22	6.791	0.28	-103.9		12.88	0.5
434 1125 1130	5	9.07	15.22	6.791	0.28	-103.9		12.88	0.5
#35 1125 1130 1135	7.5	9.07	15.22 15.38	6.791	0.28	-103.9		12.88	0.5
#35 1125 1130 1135	5	9.07	15.22 15.38	6.791	0.28	-103.9		12.88	0.5
#35 1125 1130 1135	ラ フ. 万 PMENT AND	9.07 9.22 CALIBRATIO	15.22 15.38	6.791	0.28	-103.9 -108.3	7.87	12.88	0.5
#35 #25 #30 #35	7. 5 PMENT AND	9.07 9.22 CALIBRATIO Model Heron	15.22 15.38	0.791	O.28 O.28  Calibration Checked Again	-\(\mathcal{O}\)3. 9 -\(\mathcal{O}\)3. 3	7. 8 7	12.88	0.5
H37 1125 1130 1135 FIELD EQUI Water Level Pr	7. 5 PMENT AND robe Meter	9.07 9.22 CALIBRATIO Model Heron	15.22 15.38	0.791	O.28 O.28  Calibration Checked Again	-\(\mathcal{O}\)3. 9 -\(\mathcal{O}\)3. 3	7. 8 7	12.88 12.88 12.88	0.5
H35 1130 1135 FIELD EQUI	PMENT AND robe Meter COMMENTS	9.07 9.22 CALIBRATIO Model Heron	15.22 15.38	0.791	O.28 O.28  Calibration Checked Again	-\(\mathcal{O}\)3. 9 -\(\mathcal{O}\)3. 3	7. 8 7	12.88 12.88 12.88	0.5
FIELD EQUI  Water Level Pr Water Quality  GENERAL C Ferrous Iron =  Multi-Paramete	PMENT AND robe Meter OMMENTS 2.78 rer Probe Unit #	Q.07 Q.22 CALIBRATIO Model Heron YSI 556 Multi	IF .22 IF .38	0.791	O.28 O.28  Calibration Checked Again	-\(\mathcal{O}\)3. 9 -\(\mathcal{O}\)3. 3	7. 8 7	12.88 12.88 12.88	0.5
FIELD EQUI  Water Level Pr Water Quality  GENERAL C Ferrous Iron =  Multi-Paramete Field Paramete	PMENT AND  robe Meter  COMMENTS  a 7 8 r  er Probe Unit # ers Measured in	Q.07 Q.22 CALIBRATIO Model Heron YSI 556 Multi Ing/L Flow-Through	IF .22 IF .38	0.791	O.28 O.28  Calibration Checked Again	-\(\mathcal{O}\)3. 9 -\(\mathcal{O}\)3. 3	7. 8 7	12.88 12.88 12.88	0.5
FIELD EQUI  Water Level Pr Water Quality  GENERAL C Ferrous Iron = Multi-Paramete Field Paramete Sample Depth	PMENT AND  robe Meter  COMMENTS  2.78 r er Probe Unit # ers Measured in (ft bgs) = 35	Q.07 Q.22 CALIBRATIO Model Heron YSI 556 Multi Ing/L Flow-Through	IF .22 IF .38	0.791	O.28 O.28  Calibration Checked Again	-\(\mathcal{O}\)3. 9 -\(\mathcal{O}\)3. 3	7. 8 7	12.88 12.88 12.88	0.5
FIELD EQUI  Water Level Pr Water Quality  GENERAL C Ferrous Iron = Multi-Paramete Field Paramete Sample Depth Pump Rate = 1	PMENT AND  robe Meter  COMMENTS  2.78 r  er Probe Unit #  ers Measured in  (ft bgs) = 35	Q.07 Q.22 CALIBRATIO Model Heron YSI 556 Multi Ing/L Flow-Through	IF .22 IF .38	0.791	O.28 O.28  Calibration Checked Again	-\(\mathcal{O}\)3. 9 -\(\mathcal{O}\)3. 3	7. 8 7	12.88 12.88 12.88	0.5
FIELD EQUI  Water Level Pr Water Quality  GENERAL C Ferrous Iron = Multi-Paramete Field Paramete Sample Depth Pump Rate = 4 Temp Well Dia	PMENT AND  robe Meter  COMMENTS  2.78 r  er Probe Unit #  ers Measured in  (ft bgs) = 35  2.5  ameter = 1"	Q.07 Q.22 CALIBRATIO Model Heron YSI 556 Multi	IF .22 IF .38	0.791	O.28 O.28  Calibration Checked Again	-\(\mathcal{O}\)3. 9 -\(\mathcal{O}\)3. 3	7. 8 7	12.88 12.88 12.88	0.5
FIELD EQUI  Water Level Pr Water Quality  GENERAL C Ferrous Iron = Multi-Paramete Field Paramete Sample Depth Pump Rate = 4 Temp Well Dia	PMENT AND  robe Meter  COMMENTS  2.78 r  er Probe Unit #  ers Measured in  (ft bgs) = 35	Q.07 Q.22 CALIBRATIO Model Heron YSI 556 Multi	IF .22 IF .38	0.791	O.28 O.28  Calibration Checked Again	-\(\mathcal{O}\)3. 9 -\(\mathcal{O}\)3. 3	7. 8 7	12.88 12.88 12.88	0.5

SITE NAME	CHAAP 2	019 OU1 RAO	_Performance	Monitoring	PROJECT NO.		605	65355	111111
SAMPLE NO	EW7-	-PM27	A-1-2	25	WELL NO.	PM-2	27A		
DATE/TIME	COLLECTED		9/131 taltic Pump and		PERSONNEL	TY		-	
			antio rump uno	tuom <sub>b</sub>	-3			100	
SAMPLE ME		Groundwater							
SAMPLE QA		YES	NO		SAMPLE NO.			2012	
	DUPLICATE:	YES	(NO)		E SAMPLE NO.				
MS/MSD RE	QUESTED	YES	CNQ	MS/MSL	SAMPLE NO.			70111 P	
SAMPLE CO	NTAINERS, I	PRESERVATI	VES, ANALYS	IS		•			
Sample Conta	<u>iner</u>		<u>Preservative</u>		Analysis Reque	<u>ested</u>			
2 - 500 mL Aı			6°C		Explosives + M	MX (8330A)			
3 - 40 mL VO			6°C, HCl		Methane (RSK				
1 - 500 mL HI			6°C, H <sub>2</sub> SO <sub>4</sub>		TKN (351.2), N			)	
1 - 250 mL HI			6°C	-011	SO <sub>4</sub> (9056A), A		OR)		
1 - 250 mL Ai			6°C, ZnOAc/N	аОн	Sulfide (9034) DOC (9060A)			100-100	
WELL PURC		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	**	200 (7000rl)				
			_		Well De	epth (ft B <del>TOC)</del>	30' k	295	
Date		10-19	8-19			ater (ft BTOC)	10.90	bas	
Time Started		1215			Water (	Column Length	19.1	,	
Time Complet		1310				Volume (per ft)			
PID Measuren		ND				ter in Well (L)			
Background						lumes to Purge		100-00	
Breathing Z Well Head	cone	ND			_	im to Purge (L) ctual Purge (L)			
Purge Wate	r	ND				ciuai ruige (L)	7.5		
	SUREMENTS								
Time	Amount Purged (L)	pН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1300	2.5	7.08	13.82	6.770	2.01	-11.0	(0.71	10 90	0.5
1305	50	7.04	13.81	0.768	2.05	-8.0	9.82	10.90	0.5
1310	ファレ	7.01	13.86	6-771	2.02	~(0.0	6.25	10.90	0.5
			10.00	V		0			
						<u> </u>			
						<u> </u>			
FIELD EQUI	IPMENT AND	CALIBRATIO	ON			·			
		Model			Calibration				
Water Level P		Heron			Checked Again				
Water Quality	meter	Y SI 556 Multi	-Parameter Prob	e	Twice Daily Ca	alibration Verif	ication also Ca	librated Weekly	
GENERAL C	COMMENTS							· <del></del>	
Ferrous Iron =		mg/L							
Multi-Paramet	ter Probe Unit #			- Annean					
	ers Measured in		Cell						
	(ft bgs) = 2F	7							
Pump Rate =									
Temp Well Di	ameter = $1^{\prime\prime}$ d (ft bgs) = $2$	12201							
SCICCH HILEIVA	u (II ogo) = X(	5.30							
and the second second						_			

		••							
SITE NAME	CHAAP 2	019 OU1 RAO	_Performance	Monitoring	PROJECT NO.		605	65355	
SAMPLE NO	D. EW7	- PM 2	1B-1-	35	WELL NO.	PM.	-27B	>	
DATECTIAL	COLLECTED	10-18-	19/15	500	DEDGOLULEI	-			
					PERSONNEL	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			
SAMPLE MI	ETHOD	Perist	altic Pump and	tubing	- 1	<u>KH</u>			
SAMPLE MI		Groundwater	<i>(</i>						
SAMPLE QA		YES	MY	SPLIT	r sample no.				
SAMPLE QO	C DUPLICATE:	YES	/ NO	DUPLICATE	E SAMPLE NO.				
MS/MSD RE	EQUESTED	YES	NØ	MS/MSE	SAMPLE NO.				
	ONTAINERS, I	PRESERVATI		IS					
Sample Conta			<u>Preservative</u>		Analysis Requ				
2 - 500 mL A			6°C		Explosives + N				
3 - 40 mL VC			6°C, HCl		Methane (RSK				
1 - 500 mL H			6°C, H <sub>2</sub> SO <sub>4</sub>			NH <sub>3</sub> (350.1), No			
I - 250 mL H			6°C			Alkalinity (232)	0B)		
1 - 250 mL H		_	6°C, ZnOAc/N	aOH	Sulfide (9034)				
1 - 250 mL A	GING DATA		6°C		DOC (9060A)				
Date Time Started Time Comple PID Measure Backgroun Breathing 2 Well Head Purge Wate	ments id Zone	10-18 1335 1455 NO ND ND	~ 9		Water ( Well Casing Volume of Wa Casing Vo	Vater (ft.BTOC) Column Length Volume (per ft) Atter in Well (L) Folumes to Purge am to Purge (L) Actual Purge (L)	1912' 0.16L 466 3	bqs	
FIELD MEA Time	ASUREMENTS Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water	Purge Rate (L/min)
1								bas	(24mm)
1445	2.5	8.70	14,20	6.799	0.24	-88.7	7.38	10.88'	0.5
1490	5.0	8.79	14.17	0.797	024	-90-8	10.25	10-88	0.5
เปรา	7.5	8.70	14.25	0.798	0.24	-86.3	5.70	10.88	0.5
				·					
FIELD EQU	IPMENT AND	CALIBRATIO	N						
		<u>Model</u>			<b>Calibration</b>				
Water Level F		Heron				st Calibrated L			
Water Quality	Meter	YSI 556 Multi-	Parameter Prob	e	Twice Daily Ca	alibration Verifi	ication also Cal	ibrated Weekly	
CENERAL (	COMMENTS								
Ferrous Iron =		ng/L							
	eter Probe Unit #								
	ers Measured in		Call						
			Cell						
	f(ft bgs) = 3 = 3 = 7	<b>8</b> 8			- 1000				
Pump Rate =	~								
	iameter =   11	-116							
creen interva									
	al (ft bgs) = $30$	90							
	al (it bgs) = $30$	)-90		- 14-12					

SITE NAME	CHAAP 2	019 OU1 RAO	_Performance	Monitoring	PROJECT NO.		605	65355	
SAMPLE NO.	EW	7- PM28	3A-1-	25	WELL NO.	PM-:	28A		
DATE/TIME C		10-19 Perist	altic Pump and	1620 tubing	PERSONNEL	TY			
CAMPLEMED	STA.	G 1 .						<u> </u>	
SAMPLE MED SAMPLE QA S		Groundwater YES	NO	CDI II	SAMPLE NO.				
SAMPLE QC D		YES	NO		SAMPLE NO.				
MS/MSD REQ		YES	(NO		SAMPLE NO.			-	
SAMPLE CON	NTAINERS, F	PRESERVATIV	VES, ANALYS	IS		186		3,00	
Sample Contain	<del></del>		<b>Preservative</b>		Analysis Reque	<u>ested</u>			
2 - 500 mL Am			6°C		Explosives + M				
3 - 40 mL VOA			6°C, HCl		Methane (RSK				
1 - 500 mL HD			6°C, H <sub>2</sub> SO <sub>4</sub>			NH <sub>3</sub> (350.1), NO		)	
1 - 250 mL HD			6°C	·OII		Alkalinity (2320	IB)		
1 - 250 mL Am			6°C, ZnOAc/N	аОН	Sulfide (9034) DOC (9060A)				
WELL PURG			00		DOC (9000A)				
WELL FUNG	ING DATA	100	<u> </u>		Wall D	epth (ft. <del>BTOC</del> )	30 1	S	
Date		10-19	9-19			ater (ft <del>-BTOC)</del>	30 k		
Time Started		1430			-	Column Length	21.14	693	
Time Complete	ed	1615	G .			Volume (per ft)	0.166		
PID Measureme		1019			Volume of Wa		3.42		
Background		110	)			lumes to Purge	3		
Breathing Zo	one	WE			_	m to Purge (L)	_		
Well Head		NE				ctual Purge (L)	7.5		
Purge Water		NI	)		4				
DIEL D. M. A. C.	T I TO THE STATE OF THE STATE O								
FIELD MEAS		pН	T	Conductivity	D: 1 1	ъ.,	m 1111	<b>5</b>	
	Amount	nH	Temperature	( 'onductivity	Dissolved	Redox	Turbidity	Danth to Water	Durga Data
Time	Purged (L)	pri	(Celsius)	(mS/cm)	Oxygen (mg/L)	(mV)	Turbidity (NTU)	(ft BTOC)	Purge Rate (L/min)
1605		7.43	•			(mV)	•	(ft <del>BTOC)</del>	•
	Purged (L)	7.43	(Celsius)	(mS/cm)	Oxygen (mg/L)	(mV) ~27.2	(NTU)	(fi BTOC) bogs	(L/min)
1605	Purged (L)		(Celsius)	(mS/cm) 0.795 6.794	Oxygen (mg/L)	(mV) ~27.2 ~28.7	(NTU) ワ·81	(ft <del>BTOC)</del>	(L/min)
1605	Purged (L)  2.5  50	7.43	(Celsius)	(mS/cm) 0.795 6.794	Oxygen (mg/L)	(mV) ~27.2	(NTU) 5.81 6.22	(fi <del>BTOC)</del> 695 8.60	(L/min)  O. 万  O. 万
1605	Purged (L)  2.5  50	7.43	(Celsius)	(mS/cm) 0.795 6.794	Oxygen (mg/L)	(mV) ~27.2 ~28.7	(NTU) 5.81 6.22	(fi <del>BTOC)</del> 695 8.60	(L/min)  O. 万  O. 万
1605	Purged (L)  2.5  50	7.43	(Celsius)	(mS/cm) 0.795 6.794	Oxygen (mg/L)	(mV) ~27.2 ~28.7	(NTU) 5.81 6.22	(fi <del>BTOC)</del> 695 8.60	(L/min)  O. 万  O. 万
1605	Purged (L)  2.5  50	7.43	(Celsius)	(mS/cm) 0.795 6.794	Oxygen (mg/L)	(mV) ~27.2 ~28.7	(NTU) 5.81 6.22	(fi <del>BTOC)</del> 695 8.60	(L/min)  O. 万  O. 万
1605	Purged (L)  2.5  50	7.43	(Celsius)	(mS/cm) 0.795 6.794	Oxygen (mg/L)	(mV) ~27.2 ~28.7	(NTU) 5.81 6.22	(fi <del>BTOC)</del> 695 8.60	(L/min)  O. 万  O. 万
1605	Purged (L)  2.5  50	7.43	(Celsius)	(mS/cm) 0.795 6.794	Oxygen (mg/L)	(mV) ~27.2 ~28.7	(NTU) 5.81 6.22	(fi <del>BTOC)</del> 695 8.60	(L/min)  O. 万  O. 万
1610	Purged (L)  2.5  50	7.43	(Celsius)	(mS/cm) 0.795 6.794	Oxygen (mg/L)	(mV) ~27.2 ~28.7	(NTU) 5.81 6.22	(fi <del>BTOC)</del> 695 8.60	(L/min)  O. 万  O. 万
1605	Purged (L)  2.5  50	7.43	(Celsius)	(mS/cm) 0.795 6.794	Oxygen (mg/L)	(mV) ~27.2 ~28.7	(NTU) 5.81 6.22	(fi <del>BTOC)</del> 695 8.60	(L/min)  O. 万  O. 万
1605	Purged (L)  2.5  50	7.43	(Celsius)	(mS/cm) 0.795 6.794	Oxygen (mg/L)	(mV) ~27.2 ~28.7	(NTU) 5.81 6.22	(fi <del>BTOC)</del> 695 8.60	(L/min)  O. 万  O. 万
1605 1610 1615	Purged (L)  2.5 50 2.6	7.43 7.40 7.45	(Celsius)  15.29  15.04	(mS/cm) 0.795 6.794	Oxygen (mg/L)	(mV) ~27.2 ~28.7	(NTU) 5.81 6.22	(fi <del>BTOC)</del> 695 8.60	(L/min)  O. 万  O. 万
1605	Purged (L)  2.5 50 2.6	7.43 7.40 7.45	(Celsius)  15.29  15.04	(mS/cm) 0.795 6.794	0.12 0.13 0.13	(mV) ~27.2 ~28.7	(NTU) 5.81 6.22	(fi <del>BTOC)</del> bogs 8.60	(L/min)  O. 万  O. 万
ILOS ILOS ILOS ILOS FIELD EQUIP	Purged (L)  2.5 50 7.5  PMENT AND	7.43 7.40 7.45 CALIBRATIO	(Celsius)  15.29  15.04	(mS/cm) 0.795 6.794	Oxygen (mg/L) O.12 O.17 O.17 Calibration	(mV) -27.2 -28.7 -28.2	(NTU)  7.81  6.32  6.10	(fi <del>BTOC)</del> bogs 8.60	(L/min)  O. 万  O. 万
FIELD EQUIP	Purged (L)  2.5 50 7.5  PMENT AND	7.43 7.40 7.45  CALIBRATIO Model Heron	(Celsius) 15 29 15 20 15 04	(mS/cm) 0.795 6.794 0.797	Oxygen (mg/L)  O 12  O 11  O 17  Calibration Checked Again	(mV) -27.2 -28.7 -28.2	(NTU)  7.81  6.22  6.10	(fi BTOC) DOS  8.40  8.60  8.60	(L/min)  O. 万  O. 万
ILOS ILOS ILOS ILOS FIELD EQUIP	Purged (L)  2.5 50 7.5  PMENT AND	7.43 7.40 7.45  CALIBRATIO Model Heron	(Celsius)  15.29  15.04	(mS/cm) 0.795 6.794 0.797	Oxygen (mg/L)  O 12  O 11  O 17  Calibration Checked Again	(mV) -27.2 -28.7 -28.2	(NTU)  7.81  6.22  6.10	(fi <del>BTOC)</del> bogs 8.60	(L/min)  O. 万  O. 万
FIELD EQUIP	Purged (L)  2.5 50 2.5  PMENT AND  bbe  Meter	7.43 7.40 7.45  CALIBRATIO Model Heron	(Celsius) 15 29 15 20 15 04	(mS/cm) 0.795 6.794 0.797	Oxygen (mg/L)  O 12  O 11  O 17  Calibration Checked Again	(mV) -27.2 -28.7 -28.2	(NTU)  7.81  6.22  6.10	(fi BTOC) DOS  8.40  8.60  8.60	(L/min)  O. 万  O. 万
FIELD EQUIP Water Level Pro	Purged (L)  2.5 50 2.5  PMENT AND  bbe  Meter  DMMENTS	7.43 7.40 7.45  CALIBRATIO Model Heron	(Celsius) 15 29 15 20 15 04	(mS/cm) 0.795 6.794 0.797	Oxygen (mg/L)  O 12  O 11  O 17  Calibration Checked Again	(mV) -27.2 -28.7 -28.2	(NTU)  7.81  6.22  6.10	(fi BTOC) DOS  8.40  8.60  8.60	(L/min)  O. 万  O. 万
FIELD EQUIP Water Level Pro Water Quality M	Purged (L)  2.5 50 7.5  PMENT AND  Obe Meter  DMMENTS 3.30	CALIBRATIO Model Heron YSI 556 Multi-	(Celsius) 15 29 15 20 15 04	(mS/cm) 0.795 6.794 0.797	Oxygen (mg/L)  O 12  O 11  O 17  Calibration Checked Again	(mV) -27.2 -28.7 -28.2	(NTU)  7.81  6.22  6.10	(fi BTOC) DOS  8.40  8.60  8.60	(L/min)  O. 万  O. 万
FIELD EQUIP Water Level Pro Water Quality M GENERAL CO Ferrous Iron =	Purged (L)  2.5 50 7.5  PMENT AND  Obe Meter  DMMENTS 3.30 r r Probe Unit #	CALIBRATIO Model Heron YSI 556 Multi-	(Celsius)  16 29  15 20  16 04	(mS/cm) 0.795 6.794 0.797	Oxygen (mg/L)  O 12  O 11  O 17  Calibration Checked Again	(mV) -27.2 -28.7 -28.2	(NTU)  7.81  6.32  6.10	(fi BTOC) DOS S.GO S.GO S.GO	(L/min)  O. 万  O. 万
FIELD EQUIP Water Level Pro Water Quality M GENERAL CO Ferrous Iron = Multi-Parameter Field Parameter Sample Depth (1)	Purged (L)  2.5 50 7.5  PMENT AND  Obe Meter  OMMENTS 3.30  If Probe Unit # s Measured in ft bgs) = 32	CALIBRATIO Model Heron YSI 556 Multi-	(Celsius)  16 29  15 20  16 04	(mS/cm) 0.795 6.794 0.797	Oxygen (mg/L)  O 12  O 11  O 17  Calibration Checked Again	(mV) -27.2 -28.7 -28.2	(NTU)  7.81  6.32  6.10	(fi BTOC) DOS S.GO S.GO S.GO	(L/min)  O. 万  O. 万
FIELD EQUIP Water Level Pro Water Quality M  GENERAL CO Ferrous Iron = Multi-Parameter Field Parameter Sample Depth ( Pump Rate =	Purged (L)  2.5 50 7.5  PMENT AND  Obe Meter  OMMENTS 3.30  If Probe Unit # is Measured in ft bgs) = 35  O.5	CALIBRATIO Model Heron YSI 556 Multi-	(Celsius)  16 29  15 20  16 04	(mS/cm) 0.795 6.794 0.797	Oxygen (mg/L)  O 12  O 11  O 17  Calibration Checked Again	(mV) -27.2 -28.7 -28.2	(NTU)  7.81  6.32  6.10	(fi BTOC) DOS S.GO S.GO S.GO	(L/min)  O. 万  O. 万
FIELD EQUIP Water Level Pro Water Quality M GENERAL CO Ferrous Iron = Multi-Parameter Field Parameter Sample Depth (i) Pump Rate = Temp Well Diar	Purged (L)  2.5 50 2.5  PMENT AND  Obe Meter  DMMENTS 3.30  Tr Probe Unit # Ts Measured in fit bgs) = 35  0.5  meter = 11	CALIBRATIO Model Heron YSI 556 Multi- Flow-Through G	(Celsius)  16.29  15.20  16.04  Parameter Prob	(mS/cm) 0.795 6.794 0.797	Oxygen (mg/L)  O 12  O 11  O 17  Calibration Checked Again	(mV) -27.2 -28.7 -28.2	(NTU)  7.81  6.32  6.10	(fi BTOC) DOS S.GO S.GO S.GO	(L/min)  O. 万  O. 万
FIELD EQUIP Water Level Pro Water Quality M  GENERAL CO Ferrous Iron = Multi-Parameter Field Parameter Sample Depth ( Pump Rate =	Purged (L)  2.5 50 2.5  PMENT AND  Obe Meter  DMMENTS 3.30  Tr Probe Unit # Ts Measured in fit bgs) = 35  0.5  meter = 11	CALIBRATIO Model Heron YSI 556 Multi- Flow-Through G	(Celsius)  16.29  15.20  16.04  Parameter Prob	(mS/cm) 0.795 6.794 0.797	Oxygen (mg/L)  O 12  O 11  O 17  Calibration Checked Again	(mV) -27.2 -28.7 -28.2	(NTU)  7.81  6.32  6.10	(fi BTOC) DOS S.GO S.GO S.GO	(L/min)  O. 万  O. 万

SITE NAME	CHAAP 2	019 OU1 RAO	_Performance :	Monitoring	PROJECT NO.		605	65355	
SAMPLE NO.	EW7	-pM2	8B-1-	35	WELL NO.	PM	-281	3	
DATE/TIME C		-	0-19/		PERSONNEL	74			
SAMIFLE ME	пор	Perisi	taltic Pump and	tubing	5				
SAMPLE MED	DIA:	Groundwater	$\cdot$ $\wedge$						
SAMPLE QA S	SPLIT:	YES	Mo	SPLIT	SAMPLE NO.				
SAMPLE QC I	DUPLICATE:	YES	NO	DUPLICATE	SAMPLE NO.	+			
MS/MSD REQ	UESTED	YES	(NO)	MS/MSE	SAMPLE NO.				
SAMPLE CO	NTAINERS, I	PRESERVATI	VES, ANALYS	IS		1			
Sample Contain	ner		Preservative		Analysis Reque	ested			
2 - 500 mL Am	nber		6°C		Explosives + M	INX (8330A)			
3 - 40 mL VOA			6℃, HCl		Methane (RSK	175)			
1 - 500 mL HD			6°C, H <sub>2</sub> SO <sub>4</sub>		TKN (351.2), N	NH <sub>3</sub> (350.1), NO	O <sub>2</sub> /NO <sub>3</sub> (353.2	)	
1 - 250 mL HD	PE		6°C		SO <sub>4</sub> (9056A), A	Alkalinity (2320	OB)		
1 - 250 mL HD			6°C, ZnOAc/N	аОН	Sulfide (9034)				
1 - 250 mL Am			6°C		DOC (9060A)				
WELL PURG	ING DATA	-					(10.1		
		10 01	10			pth (ft B <del>TOC)</del>	40°C	95	
Date		10-20	7-19			ater (ft BTQC)	8.48	bas	
Time Started		0930		3		Column Length		·	
Time Complete		1205			Well Casing \	/olume (per ft)	0.166		
PID Measureme					Volume of Wat				
Background		~ N C				lumes to Purge			
Breathing Zo	one	N				m to Purge (L)			
Well Head		N			- Ad	ctual Purge (L)	7.5		
Purge Water		N	V		-				
FIELD MEAS	UREMENTS							<del></del>	
Time	Amount	pН	Temperature	Conductivity	Dissolved	Redox	Turbidity	Danih ta Wata	Purge Rate
	Purged (L)	p.i.	(Celsius)	(mS/cm)	Oxygen (mg/L)	(mV)	(NTU)	Depth to Water (ft BTOC)	(L/min)
1155	Purged (L)	•	(Celsius)	(mS/cm)	Oxygen (mg/L)	(mV)	(NTU)	(fi.BTOC)	(L/min)
1155	Purged (L)	7.14	(Celsius)	(mS/cm)	0.33	(mV)	(NTU)	(fi.BTOC) 695	(L/min)
1200	Purged (L)	7:14	(Celsius)	(mS/cm) 0.40 0.80	0.33	(mV) -13.2 -12.2	(NTU) 4.67 5.14	(fi.BTOC) bg5 8.48 8.48	(L/min) 0.5 0.5
	Purged (L)  2.7  5.0	7.14	(Celsius)	(mS/cm)	Oxygen (mg/L)	(mV)	(NTU)	(fi.BTOC) 695	(L/min)
1200	Purged (L)  2.7  5.0	7:14	(Celsius)	(mS/cm) 0.40 0.80	0.33	(mV) -13.2 -12.2 -12.2	(NTU) 4.67 5.14	(fi.BTOC) bg5 8.48 8.48	(L/min) 0.5 0.5
1200	Purged (L)  2.7  5.0	7:14	(Celsius)	(mS/cm) 0.40 0.80	0.33	(mV) -13.2 -12.2 -12.2	(NTU) 4.67 5.14	(fi.BTOC) bg5 8.48 8.48	(L/min) 0.5 0.5
1200	Purged (L)  2.7  5.0	7:14	(Celsius)	(mS/cm) 0.40 0.80	0.33	(mV) -13.2 -12.2 -12.2	(NTU) 4.67 5.14	(fi.BTOC) bg5 8.48 8.48	(L/min) 0.5 0.5
1200	Purged (L)  2.7  5.0	7:14	(Celsius)	(mS/cm) 0.40 0.80	0.33	(mV) -13.2 -12.2 -12.2	(NTU) 4.67 5.14	(fi.BTOC) bg5 8.48 8.48	(L/min) 0.5 0.5
1200	Purged (L)  2.7  5.0	7:14	(Celsius)	(mS/cm) 0.40 0.80	0.33	(mV) -13.2 -12.2 -12.2	(NTU) 4.67 5.14	(fi.BTOC) bg5 8.48 8.48	(L/min) 0.5 0.5
1200	Purged (L)  2.7  5.0	7:14	(Celsius)	(mS/cm) 0.40 0.80	0.33	(mV) -13.2 -12.2 -12.2	(NTU) 4.67 5.14	(fi.BTOC) bg5 8.48 8.48	(L/min) 0.5 0.5
1200	Purged (L)  2.7  5.0	7:14	(Celsius)	(mS/cm) 0.40 0.80	0.33	(mV) -13.2 -12.2 -12.2	(NTU) 4.67 5.14	(fi.BTOC) bg5 8.48 8.48	(L/min) 0.5 0.5
1200	Purged (L)  2.7  5.0	7:14	(Celsius)	(mS/cm) 0.40 0.80	0.33	(mV) -13.2 -12.2 -12.2	(NTU) 4.67 5.14	(fi.BTOC) bg5 8.48 8.48	(L/min) 0.5 0.5
1200	Purged (L)  2.7  5.0	7:14	(Celsius)	(mS/cm) 0.40 0.80	0.33	(mV) -13.2 -12.2 -12.2	(NTU) 4.67 5.14	(fi.BTOC) bg5 8.48 8.48	(L/min) 0.5 0.5
1200	Purged (L)  2.7  7.7	7.14 7.11 7.09	(Celsius) 12.90 12.92 12.90	(mS/cm) 0.40 0.80	0.33	(mV) -13.2 -12.2 -12.2	(NTU) 4.67 5.14	(fi.BTOC) bg5 8.48 8.48	(L/min) 0.5 0.5
FIELD EQUI	Purged (L)  2.7  5.0  7.5	7.14 7.11 7.09	(Celsius) 12.90 12.92 12.90	(mS/cm) 0.40 0.80	Oxygen (mg/L)  0.23  0.23  Calibration	(mV) -13.2 -12.2 4.	(NTU) 4.67 5.14 4.80	(fi.BTOC) bg5 8.48 8.48	(L/min) 0.5 0.5
FIELD EQUII	Purged (L)  2.7  5.0  7.5  PMENT AND	7.14 7.11 7.09 CALIBRATIO Model Heron	(Celsius) 12.90 12.90 12.90	(mS/cm)  0.401  0.801  0.802	Oxygen (mg/L)  O.25  O.24  O.25  Calibration Checked Again	(mV)  -13.2  -12.2  -12.2  4	(NTU) 4.67 5.14 4.80	(fi.BTOC) bg5 8.48 8.48 8.48	(L/min) 0.5 0.5
FIELD EQUI	Purged (L)  2.7  5.0  7.5  PMENT AND	7.14 7.11 7.09 CALIBRATIO Model Heron	(Celsius) 12.90 12.92 12.90	(mS/cm)  0.401  0.801  0.802	Oxygen (mg/L)  O.25  O.24  O.25  Calibration Checked Again	(mV)  -13.2  -12.2  -12.2  4	(NTU) 4.67 5.14 4.80	(fi.BTOC) bg5 8.48 8.48	(L/min) 0.5 0.5
FIELD EQUII Water Level Pre Water Quality I	Purged (L)  2.7  7.7  PMENT AND  obe  Meter	7.14 7.11 7.09 CALIBRATIO Model Heron	(Celsius) 12.90 12.90 12.90	(mS/cm)  0.401  0.801  0.802	Oxygen (mg/L)  O.25  O.24  O.25  Calibration Checked Again	(mV)  -13.2  -12.2  -12.2  4	(NTU) 4.67 5.14 4.80	(fi.BTOC) bg5 8.48 8.48 8.48	(L/min) 0.5 0.5
FIELD EQUII Water Level Prowater Quality I	Purged (L)  2.7  7.7  7.7  PMENT AND  obe  Meter  OMMENTS	7.14 7.11 7.09 CALIBRATIO Model Heron YSI 556 Multi	(Celsius) 12.90 12.90 12.90	(mS/cm)  0.401  0.801  0.802	Oxygen (mg/L)  O.25  O.24  O.25  Calibration Checked Again	(mV)  -13.2  -12.2  -12.2  4	(NTU) 4.67 5.14 4.80	(fi.BTOC) bg5 8.48 8.48 8.48	(L/min) 0.5 0.5
FIELD EQUII Water Level Prowater Quality I GENERAL CO Ferrous Iron =	Purged (L)  2.7  7.7  7.7  PMENT AND  obe  Meter  OMMENTS  3.30	CALIBRATIO Model Heron YSI 556 Multi	(Celsius) 12.90 12.90 12.90	(mS/cm)  0.401  0.801  0.802	Oxygen (mg/L)  O.25  O.24  O.25  Calibration Checked Again	(mV)  -13.2  -12.2  -12.2  4	(NTU) 4.67 5.14 4.80	(fi.BTOC) bg5 8.48 8.48 8.48	(L/min) 0.5 0.5
FIELD EQUII Water Level Prowater Quality I GENERAL CO Ferrous Iron = Multi-Paramete	Purged (L)  2.7  7.7  7.7  PMENT AND  obe  Meter  OMMENTS  3.30  er Probe Unit #	CALIBRATIO Model Heron YSI 556 Multi	(Celsius)  12.90 12.90 12.90 12.90	(mS/cm)  0.401  0.801  0.802	Oxygen (mg/L)  O.25  O.24  O.25  Calibration Checked Again	(mV)  -13.2  -12.2  -12.2  4	(NTU) 4.67 5.14 4.80	(fi.BTOC) bg5 8.48 8.48 8.48	(L/min) 0.5 0.5
FIELD EQUII Water Level Prowater Quality I GENERAL CO Ferrous Iron = Multi-Parameter Field Parameter	Purged (L)  2.7  7.7  7.7  PMENT AND  obe Meter  OMMENTS 3.30  er Probe Unit # rs Measured in	CALIBRATION Model Heron YSI 556 Multi Flow-Through	(Celsius)  12.90 12.90 12.90 12.90	(mS/cm)  0.401  0.801  0.802	Oxygen (mg/L)  O.25  O.24  O.25  Calibration Checked Again	(mV)  -13.2  -12.2  -12.2  4	(NTU) 4.67 5.14 4.80	(fi.BTOC) bg5 8.48 8.48 8.48	(L/min) 0.5 0.5
FIELD EQUII  Water Level Prowater Quality I  GENERAL CO Ferrous Iron =  Multi-Parameter Field Parameter Sample Depth (	Purged (L)  2.7  7.7  7.7  PMENT AND  obe Meter  OMMENTS 3.30  er Probe Unit # rs Measured in (ft bgs) = 35	CALIBRATION Model Heron YSI 556 Multi Flow-Through	(Celsius)  12.90 12.90 12.90 12.90	(mS/cm)  0.401  0.801  0.802	Oxygen (mg/L)  O.25  O.24  O.25  Calibration Checked Again	(mV)  -13.2  -12.2  -12.2  4	(NTU) 4.67 5.14 4.80	(fi.BTOC) bg5 8.48 8.48 8.48	(L/min) 0.5 0.5
FIELD EQUII  Water Level Prowater Quality I  GENERAL CO Ferrous Iron =  Multi-Parameter Field Parameter Sample Depth ( Pump Rate =	Purged (L)  2.7  5.0  7.5  7.5  PMENT AND  obe Meter  OMMENTS 3.30  er Probe Unit # rs Measured in (ft bgs) = 35  0.5	CALIBRATION Model Heron YSI 556 Multi Flow-Through	(Celsius)  12.90 12.90 12.90 12.90	(mS/cm)  0.401  0.801  0.802	Oxygen (mg/L)  O.25  O.24  O.25  Calibration Checked Again	(mV)  -13.2  -12.2  -12.2  4	(NTU) 4.67 5.14 4.80	(fi.BTOC) bg5 8.48 8.48 8.48	(L/min) 0.5 0.5
FIELD EQUII  Water Level Prowater Quality I  GENERAL Conference of the conference of	Purged (L)  2.7  7.7  7.7  PMENT AND  obe  Meter  OMMENTS  3.30  re Probe Unit # rs Measured in  (ft bgs) = 35  0.5  uneter = 1"	CALIBRATION Model Heron YSI 556 Multi Flow-Through	(Celsius)  12.90 12.90 12.90 12.90	(mS/cm)  0.401  0.801  0.802	Oxygen (mg/L)  O.25  O.24  O.25  Calibration Checked Again	(mV)  -13.2  -12.2  -12.2  4	(NTU) 4.67 5.14 4.80	(fi.BTOC) bg5 8.48 8.48 8.48	(L/min) 0.5 0.5
FIELD EQUII  Water Level Prowater Quality I  GENERAL CO Ferrous Iron =  Multi-Parameter Field Parameter Sample Depth ( Pump Rate =	Purged (L)  2.7  7.7  7.7  PMENT AND  obe  Meter  OMMENTS  3.30  re Probe Unit # rs Measured in  (ft bgs) = 35  0.5  uneter = 1"	CALIBRATION Model Heron YSI 556 Multi Flow-Through	(Celsius)  12.90 12.90 12.90 12.90	(mS/cm)  0.401  0.801  0.802	Oxygen (mg/L)  O.25  O.24  O.25  Calibration Checked Again	(mV)  -13.2  -12.2  -12.2  4	(NTU) 4.67 5.14 4.80	(fi.BTOC) bg5 8.48 8.48 8.48	(L/min) 0.5 0.5

	SITE NAME	CHAAP 2	019 OU1 RAO_	Performance 1	Monitoring	PROJECT NO.		605	65355	12.00
	SAMPLE NO.	EW7-	PM291	4-1-2	5	WELL NO.	PM.	29A		
	DATE/TIME C		10-19- Perista	19 / 140 altic Pump and		PERSONNEL	TY BE			
	SAMPLE MED SAMPLE QA S SAMPLE QC I MS/MSD REQ	SPLIT: DUPLICATE:	Groundwater YES YES YES	NO NO NO	DUPLICATE	SAMPLE NO. ESAMPLE NO. SAMPLE NO.	PH			
	SAMPLE CO	NTAINERS, F	PRESERVATIV	VES, ANALYS	IS					
	Sample Contain 2 - 500 mL Am			Preservative 6°C		Analysis Reque Explosives + M				
	3 - 40 mL VOA			6°C, HCl		Methane (RSK				
	1 - 500 mL HD 1 - 250 mL HD			6°C, H <sub>2</sub> S0 <sub>4</sub>		TKN (351.2), N SO <sub>4</sub> (9056A), A			)	
	1 - 250 mL HD			6°C, ZnOAc/N	аОН	Sulfide (9034)	inalling (232)	,		
	1 - 250 mL Am			6°C		DOC (9060A)	2111	1.2		
	WELL PURG	ING DATA						- \		
	Date Time Started		10-10			Depth to Water C	pth (ft B <del>TOC)</del> ater (ft B <del>TOC)</del> Column Length	9' k	095	
	Time Complete PID Measurem		1400	-			olume (per ft)		1 11112	
	Background		NO			Volume of Wat	umes to Purge	3.31	9	
	Breathing Zo		10			_	m to Purge (L)			
	Well Head			D		Ac	tual Purge (L)	フ. 万		
	Purge Water		N [	2		-33				
	Time	Amount Purged (L)	рН	Temperature (Celsius)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Depth to Water (ft BTOC)	Purge Rate (L/min)
1350	1275	2.5	7.40	14.53	0.599		-25.4	6.74	9.00	0.5
1355	1300	5.0	7.31	14.16	0.597		-21.3	4.84	9.00	0.5
1400	170	7.5	7.29	14.40	0.600	0.35	-20.7	4.68	9.00	05
		<u> </u>								
	FIELD EQUI	PMENT AND	CALIBRATIO	N .						
	Water Level Pro Water Quality I		Model Heron YSI 556 Multi-	Parameter Prob	oe	Calibration Checked Again Twice Daily Ca		_	librated Weekly	
	GENERAL CO	3.30	ng/L							
	Multi-Paramete		Flow-Through	Cell						
	Sample Depth			COII						
	Pump Rate = (	5.5						100		
	Temp Well Dia	meter =   "								
	Screen Interval	(ft bgs) = 入(	2-30							
									2541	

0.000	CTT 1 1 D A	040 OTH D 4 O			DD O ID CM VIO		20 P		
SITE NAME		019 OU1 RAO			PROJECT NO.		6050	5355	
SAMPLE NO.	EW7	-PM29	B-1-3	35	WELL NO.	PM-6	29B		
DATE/TIME O	COLLECTED	10-19	1-19/1	155	PERSONNEL	TY			
SAMPLE ME	ГНОО		altic Pump and			DF			
SAMPLE MEI	DIA:	Groundwater							
SAMPLE QA		YES	NO \		SAMPLE NO.			7. 100 0 00	
SAMPLE QC		YES	NO		SAMPLE NO.			8L 7/2	
MS/MSD REC	QUESTED	YES	NO	MS/MSD	SAMPLE NO.				
SAMPLE CO	NTAINERS, I	PRESERVATI	VES, ANALYS	IS					
Sample Contai			Preservative		Analysis Reque	ested			
2 - 500 mL An	nber		6°C		Explosives + M	INX (8330A)	700		
3 - 40 mL VO	A		6°C, HCl		Methane (RSK			122 2417	
1 - 500 mL HD			6°C, H <sub>2</sub> SO <sub>4</sub>			NH <sub>3</sub> (350.1), NO			
1 - 250 mL HE			6°C			Alkalinity (2320	В)		
1 - 250 mL HI 1 - 250 mL An			6°C, ZnOAc/N	аОН	Sulfide (9034) DOC (9060A)				
WELL PURG			0.0		DOC (3000A)				
WELL PURG	ING DATA				الم/لا	epth (ft B <del>TOC)</del> -	401	oas	
Date		16-19	-19			ater (ft BTQG)	8.75		
Time Started		1025			-	Column Length	31.25		
Time Complete	ed	1155		-		Volume (per ft)	0161		
PID Measurem					Volume of Wa		F.00		
Background	l	ND			Casing Vo	lumes to Purge	3		
Breathing Z	one	NP	-3			m to Purge (L)	-		
Well Head		_ ND			A	ctual Purge (L)	7.5		
Purge Water	r	NE	2						
FIELD MEAS	SUREMENTS			<del></del>					
Time			Т	A 1					
	Amount	pН	Temperature	Conductivity	Dissolved	Redox	Turbidity	Depth to Water	Purge Rate
	Amount Purged (L)	рН	(Celsius)	(mS/cm)	Dissolved Oxygen (mg/L)		Turbidity (NTU)	(ft BTOC)	Purge Rate (L/min)
		рн	•	(mS/cm)	Oxygen (mg/L)		•	-	_
1140		8.15	(Celsius)	•	Oxygen (mg/L)		•	(ft BTOC)	_
1140	Purged (L)		(Celsius)	(mS/cm) 0 - 776	0 27 0 21	(mV)	(NTU) (0.80)	(fi BTOC) by 3 8.75 8.75	_
1140	Purged (L)	8.15	(Celsius)	(mS/cm)	0 27 0 21	(mV) -F9.7	(NTU) (0.80)	(ft BTOC) logs	(L/min)
1140	Purged (L)  2.5  5.0	8.15	(Celsius)	(mS/cm) 0 - 776	0 27 0 21	(mV) - 59.7 - 56.7	(NTU) (0.80)	(fi BTOC) by 3 8.75 8.75	(L/min)
1140	Purged (L)  2.5  5.0	8.15	(Celsius)	(mS/cm) 0 - 776	0 27 0 21	(mV) - 59.7 - 56.7	(NTU) (0.80)	(fi BTOC) by 3 8.75 8.75	(L/min)
1140	Purged (L)  2.5  5.0	8.15	(Celsius)	(mS/cm) 0 - 776	0 27 0 21	(mV) - 59.7 - 56.7	(NTU) (0.80)	(fi BTOC) by 3 8.75 8.75	(L/min)
1140	Purged (L)  2.5  5.0	8.15	(Celsius)	(mS/cm) 0 - 776	0 27 0 21	(mV) - 59.7 - 56.7	(NTU) (0.80)	(fi BTOC) by 3 8.75 8.75	(L/min)
1140	Purged (L)  2.5  5.0	8.15	(Celsius)	(mS/cm) 0 - 776	0 27 0 21	(mV) - 59.7 - 56.7	(NTU) (0.80)	(fi BTOC) by 3 8.75 8.75	(L/min)
1140	Purged (L)  2.5  5.0	8.15	(Celsius)	(mS/cm) 0 - 776	0 27 0 21	(mV) - 59.7 - 56.7	(NTU) (0.80)	(fi BTOC) by 3 8.75 8.75	(L/min)
1140	Purged (L)  2.5  5.0	8.15	(Celsius)	(mS/cm) 0 - 776	0 27 0 21	(mV) - 59.7 - 56.7	(NTU) (0.80)	(fi BTOC) by 3 8.75 8.75	(L/min)
1140	Purged (L)  2.5  5.0	8.15	(Celsius)	(mS/cm) 0 - 776	0 27 0 21	(mV) - 59.7 - 56.7	(NTU) (0.80)	(fi BTOC) by 3 8.75 8.75	(L/min)
1140	Purged (L)  2.5  5.0	8.15	(Celsius)	(mS/cm) 0 - 776	0 27 0 21	(mV) - 59.7 - 56.7	(NTU) (0.80)	(fi BTOC) by 3 8.75 8.75	(L/min)
1140 1145 1150	Purged (L)  2.5 5.0 7.5	8.15 307 3.07	(Celsius) 12.79 17.84 12.91	(mS/cm) 0 - 776	0 27 0 21	(mV) - 59.7 - 56.7	(NTU) (0.80)	(fi BTOC) by 3 8.75 8.75	(L/min)
1140 1145 1150	Purged (L)  2.5 5.0 7.5	8.15	(Celsius) 12.79 17.84 12.91	(mS/cm) 0 - 776	0 27 0 21	(mV) - 59.7 - 56.7	(NTU) (0.80)	(fi BTOC) by 3 8.75 8.75	(L/min)
1140 1145 1150	Purged (L)  25 50 7.5	8.15 3.07 3.07	(Celsius) 12.79 17.84 12.91	(mS/cm) 0 - 776	Oxygen (mg/L)  O 27  O 21  O 20  Calibration	(mV) - 59.7 - 56.7	(NTU) (0.80) (0.8) 7.69	(fi BTOC) by 3 8.75 8.75	(L/min)
FIELD EQUI	Purged (L)  25 50 7.5  PMENT AND	8.15 3.07 8.07 8.07 CALIBRATIO Model Heron	(Celsius) 12.79 17.84 12.91	(mS/cm)  0.770 0.771 0.76	Oxygen (mg/L)  O 27  O 21  O 20  Calibration Checked Again	(mV) - 59.7 - 56.7 - 55.6	(NTU) (0.80) (0.81) 7.69	(fi BTOC) by 3 8.75 8.75	(L/min)
FIELD EQUI	Purged (L)  25 5.0 7.5  PMENT AND  robe Meter	8.15 3.07 8.07 8.07 CALIBRATIO Model Heron	(Celsius) 12.79 17.84 12.91	(mS/cm)  0.770 0.771 0.76	Oxygen (mg/L)  O 27  O 21  O 20  Calibration Checked Again	(mV) - 59.7 - 56.7 - 55.6	(NTU) (0.80) (0.81) 7.69	(ft BTOC) logs 8.75 8.75 8.75	(L/min)
FIELD EQUI	Purged (L)  25 50 75 75 PMENT AND  robe Meter  COMMENTS	8.15 307 3.07 8.07 CALIBRATIO Model Heron YSI 556 Multi	(Celsius) 12.79 17.84 12.91	(mS/cm)  0.770 0.771 0.76	Oxygen (mg/L)  O 27  O 21  O 20  Calibration Checked Again	(mV) - 59.7 - 56.7 - 55.6	(NTU) (0.80) (0.81) 7.69	(ft BTOC) logs 8.75 8.75 8.75	(L/min)
FIELD EQUI Water Level P Water Quality  GENERAL C Ferrous Iron =	Purged (L)  25 50 7.5  PMENT AND  robe Meter  COMMENTS 330	8.15 3.07 8.07 8.07 Model Heron YSI 556 Multi	(Celsius) 12.79 17.84 12.91	(mS/cm)  0.770 0.771 0.76	Oxygen (mg/L)  O 27  O 21  O 20  Calibration Checked Again	(mV) - 59.7 - 56.7 - 55.6	(NTU) (0.80) (0.81) 7.69	(ft BTOC) logs 8.75 8.75 8.75	(L/min)
FIELD EQUI Water Level P Water Quality  GENERAL C Ferrous Iron = Multi-Paramet	Purged (L)  25 50 7.5  PMENT AND  robe Meter  COMMENTS 350  ter Probe Unit #	8.15 3.07 8.07 8.07 8.07 Model Heron YSI 556 Multi	(Celsius)  12.79 12.84 12.91  DN	(mS/cm)  0.770 0.771 0.76	Oxygen (mg/L)  O 27  O 21  O 20  Calibration Checked Again	(mV) - 59.7 - 56.7 - 55.6	(NTU) (0.80) (0.81) 7.69	(ft BTOC) logs 8.75 8.75 8.75	(L/min)
FIELD EQUI  Water Level P Water Quality  GENERAL C Ferrous Iron = Multi-Paramete Field Paramete	Purged (L)  25 5.0 7.5  PMENT AND  robe Meter  COMMENTS 3-50 ter Probe Unit fers Measured in	B. 15 307 8.07 8.07 8.07 8.07 Model Heron YSI 556 Multi	(Celsius)  12.79 12.84 12.91  DN	(mS/cm)  0.770 0.771 0.76	Oxygen (mg/L)  O 27  O 21  O 20  Calibration Checked Again	(mV) - 59.7 - 56.7 - 55.6	(NTU) (0.80) (0.81) 7.69	(ft BTOC) logs 8.75 8.75 8.75	(L/min)
FIELD EQUI  Water Level P Water Quality  GENERAL C Ferrous Iron = Multi-Paramete Field Paramete Sample Depth	Purged (L)  25 5.0 7.5  PMENT AND  robe Meter  COMMENTS 3-50 ter Probe Unit fers Measured ir (ft bgs) = 36	B. 15 307 8.07 8.07 8.07 8.07 Model Heron YSI 556 Multi	(Celsius)  12.79 12.84 12.91  DN	(mS/cm)  0.770 0.771 0.76	Oxygen (mg/L)  O 27  O 21  O 20  Calibration Checked Again	(mV) - 59.7 - 56.7 - 55.6	(NTU) (0.80) (0.81) 7.69	(ft BTOC) logs 8.75 8.75 8.75	(L/min)
FIELD EQUI  Water Level P Water Quality  GENERAL C Ferrous Iron = Multi-Paramete Field Paramete	Purged (L)  25 5.0 7.5  PMENT AND  robe Meter  COMMENTS 3-50  ter Probe Unit for Measured in (ft bgs) = 36	B. 15 307 8.07 8.07 8.07 8.07 Model Heron YSI 556 Multi	(Celsius)  12.79 12.84 12.91  DN	(mS/cm)  0.770 0.771 0.76	Oxygen (mg/L)  O 27  O 21  O 20  Calibration Checked Again	(mV) - 59.7 - 56.7 - 55.6	(NTU) (0.80) (0.81) 7.69	(ft BTOC) logs 8.75 8.75 8.75	(L/min)
FIELD EQUI  Water Level P Water Quality  GENERAL C Ferrous Iron = Multi-Paramete Sample Depth Pump Rate = Temp Well Di	Purged (L)  25 5.0 7.5  PMENT AND  robe Meter  COMMENTS 3-50  ter Probe Unit for Measured in (ft bgs) = 36	R. 15 8.07 8.07 8.07 8.07 8.07 Model Heron YSI 556 Multi	(Celsius)  12.79 12.84 12.91  DN	(mS/cm)  0.770 0.771 0.76	Oxygen (mg/L)  O 27  O 21  O 20  Calibration Checked Again	(mV) - 59.7 - 56.7 - 55.6	(NTU) (0.80) (0.81) 7.69	(ft BTOC) logs 8.75 8.75 8.75	(L/min)
FIELD EQUI  Water Level P Water Quality  GENERAL C Ferrous Iron = Multi-Paramete Sample Depth Pump Rate = Temp Well Di	Purged (L)  25 50 7.5  7.5  PMENT AND  robe Meter  COMMENTS 3-50  ter Probe Unit for Measured in (ft bgs) = 36 0.5  ameter = 11	R. 15 8.07 8.07 8.07 8.07 8.07 Model Heron YSI 556 Multi	(Celsius)  12.79 12.84 12.91  DN	(mS/cm)  0.770 0.771 0.76	Oxygen (mg/L)  O 27  O 21  O 20  Calibration Checked Again	(mV) - 59.7 - 56.7 - 55.6	(NTU) (0.80) (0.81) 7.69	(ft BTOC) logs 8.75 8.75 8.75	(L/min)

Subsurface Injection Daily Summary Field Sheets and Summary Table
Subsurface Injection Daily Summary Field Sheets and Summary Table

#### **GENERAL INFORMATION** CHAAP 2019 OU1 RAO Injection PROJECT NO. 60565355 SITE NAME: FW7 10-30-19 DATE: INJECTION TRANSECT PES PERSONNEL: MM DP SUBCONTRACTOR 9.8% AMENDMENT / PERCENT CONCENTRATION: SHEET NO. AUD (MM) INJECTION INTERVALS/VOLUMES 7140 Point # Time Start / Time Stop Meter (Start) Meter (End) Actual Vol. (gal) Depth (bgs) Notes 501900 100 dritted ( 100 Change noter 540 300 740 1645 500 Total Volume (gal): 090 10 2010 100 190 290 300 1630 Total Volume (gal): 300 030 Ked rilled 100 2 730 100 300 530 28 500 Total Volume (gal): 100 140 #40 ZHQ 100 540 300 840 300 800 Total Volume (gal): 040 @50 10 190 300 300 1010 GOS Total Volume (gal): 000 rednike 10 190

SHEET TOTAL (gal):

Total Volume (gal):

GENERAL NOTES:

Planned Amendment Volume (gals) (deep to shallow)

00

### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAC	O Injection		PROJECT NO.	60565355
INJECTION TRANSECT	EW7 = 7	T-16		DATE:	10-30-19
DP SUBCONTRACTOR	P	ES		PERSONNEL:	BE, RH
AMENDMENT / PERCE	ENT CONCENTRATION:	WB	9.8%	SHEET NO.	1

# INJECTION INTERVALS/VOLUMES

Point #	Time Start /	11/11/15/15/15/15	1	Ĭ ·	TT	
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	31.	38	030	130	100	×
	1348		130	230	100	
1		33 28	230	530	他200 300	
l l	100 com in	23	530	830	300	
	12000	18	830	1030	4H 3-00 200	
	15 600			Total Volume (gal):		
		38	030	442040	10	
	1349	38		230	190	
20		28	230	530	200 300	
2		23	530	830	300	
•	1604	23	830	1030	200	
				Total Volume (gal):	1000	-
		38	080	090	10	
	1357	.36 .33	090	280	190	W202
3		28	200'	500	300	
	My	28 23	580	880	300	
	1621	18	880	10811	200	*.
				Total Volume (gal):		00 1001
		38 33	030	040	10	
	1404	3 7	040	230	190	
1.	i ' I	28	230	530	300	
4	1619	28 23	530	830	300	
		18	830	1030		
7.				Total Volume (gal):	1000	•
		30	0.30	125	95	
	1409	<i>38</i> 33	125	240	115	1000
5	, ,	128	240	536	290	
		28	530	836	300	
	1542	18	830	1030	PA 300 200	
	''			Total Volume (gal):		300-
2		38	030	040	10	
	1414	33	040	040	0	
		33 28 23 18	040	530	490	
6		23	530	830	300	
	1614	18	830	1030	200	
	1 1 7 7 F					

SHEET TOTAL (gal):

GENERAL NOTES:

E NAME:	CHAAP 2019 C	OU1 RAO Inject	ion		PROJECT NO.	60565355
ECTION TRANSEC	T	T-16			DATE:	10-31-17
SUBCONTRACTO	R	PES		_	PERSONNEL:	1 . + .
			6			
IENDMENT / PERC	ENT CONCENTRATION	ON:	9.8%		SHEET NO.	_ 2 of
ECTION INTERV	ALS/VOLUMES					
Point #	Time Start /	1	T	<u> </u>		<u> </u>
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	1.101	36				Cample tel 10
$\neg$	1451	263	~			1-
+		28		Here I		
1		23	540	840	300	
	1521	18	840	1040	250	I.
			•	Total Volume (gal):	500	1000
	1	38	-		- Augustin	(con, 16 4) 10
	1449	30	_	-	-	
(T		26	Anner	(territo)		V
$\times$	1525	23	590	870	300	
U		18	810	1090	200	
3		. 0		Total Volume (gal):	500	100
	1447	36	see III		S-001777	1 cmples
6		32	( <del>1</del>		*Market	10-32-15
		29				1.2
1		<b>23</b>	530	530	300	
	1525	18	(/30	1030	200	
				Total Volume (gal):	500	1000
		38				( um, she led
	1445	32		-		10-30-10
ī		28	Transit .		34	7
16		2.	******	and the		V
10	15,00	/ <b>B</b>	845	1040	300	100 (mm)
	1100			Total Volume (gal):	30200	(0)
		38	(44)	Name of the last o	_	Completed
( )		31	****	(400)		16-34-19
		28	(#46)	assert # TO - 1	Name of T	17
		3.728			Appendix .	
		/8		-	ч.	
		- 1/-		Total Volume (gal):		
5		3 <b>@</b>				Compake 10-3
	1440	31		-		computed 10-
11	1990	20.20	240	SHID	500	· Or · Iwata /
1//		Q1 = 3	545	(1)	7(0)	

SHEET TOTAL (gal):

Total Volume (gal):

GENERAL NOTES:

Planned Amendment Volume (gals) (deep to shallow)

1000

# GENERAL INFORMATION

SITE NAME: C	HAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-15	DATE:	10-31-19
DP SUBCONTRACTOR	PES	PERSONNEL:	A R
AMENDMENT / PERCENT	concentration: 9.8%	SHEET NO.	

# INJECTION INTERVALS/VOLUMES

Point #	Time Start /			T		
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	14	38	1030	1130	100	
	1449	32 28	1130	1230	100	
1		28	1230	1530	300	
1	1	22	1530	1830	300	
	1648	18	1830	2030	200	
				Total Volume (gal):	1000	
		38	1030	1130	100	
	1453	38 32 28	1130	1230	100	
		28	1230	1530	300	
2		22	1530	1830	300	
-	1648	18	1830	2030	200	
	10.	, <del>, , , , , , , , , , , , , , , , , , </del>	•	Total Volume (gal):	1000	
		38	1080	1180	100	
	1455	.32	119,0	1280	100	
2	1777	28	12.80	1580	300	
3		22	1580	1880	300	
	1652	18	1880	2080	200	
	100		1 7 0 0 0	Total Volume (gal):	1000	
	1	38	1030	1130	100	
	1457	32	1130	1230	100	
1/	1777	28	1230	1530	300	
4	, -	22	1530	1830	300	-2,080AR
	1652	18	1530	2000 h	200	*
	Ι΄	- '0		Total Volume (gal):	1000	
	-	38	1030	1130	100	
11	1602	37	1134	1230	100	
5	1502	32 28	1230	1530	300	
~		22	1530	1830	300	
		18	1830	2080	200	
	15	<del>- '0</del>	110 75	Total Volume (gal):	1000	
		38	1030	1130	100	
1	15611		11 30	1230	100	
	1504	32 2 <b>8</b>	1230		300	
0		- <del> </del>		1530	300	
		22	1530	1830	200	
		18	1010	Total Volume (gal):		
				Total volume (gal):	1000	

SHEET TOTAL (gal): 6,000

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO. 60565355
INJECTION TRANSECT	7=15	DATE: 11-1-19
DP SUBCONTRACTOR	PES	PERSONNEL: MM/TY
AMENDMENT DERCE	NT CONCENTRATION:	/> SHEET NO / Of )

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start /					3.47
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	0000	38	1040	1290	100	
	0900	33	1190		100	
1	-	28	1240	1540	300	
	102	23 18	1540	1840	300	
	(236	18	1840	7040	200	
		_		Total Volume (gal):	100	
	KIN	38	1090	1190	100	
	0855	33	1190	1790	100	<del></del>
<b>∠</b> ≈		28	1290	1590	300	
		73	1590	1890	300	
	1237	18	1890	7090	200	
		20	1 / 5.	Total Volume (gal):	1090	
		58	1030	150	100	
	OXSO	33	1130	1230	100	
61		33	1230	1530	300	
		23	1530	1830	300	
1	1233	18	1830	2030	Deco	
	1000			Total Volume (gal):	1900	
		38 38 28	1090	1140	100	
	OX 45	33	1190	1240	100	
1 21	0 3 13	28	1240	1540	300	
		23	1540	1890	300	
	1230	18	1840	2040	200	
				Total Volume (gal):	1000	
		38	1040	1050	10	-
3	0845	33	1050	1290	190	4
/1	0840	78 73	1290	1540	300	
	1	23	1540	1840	300	
	11030	18	1840	2040	200	
				Total Volume (gal):	1000	
	Cro	38	1090	1050	10	
10	0835	33	1050	1240	190	
17		28	1240	1540	300	
		23	1540	1840	300	
	1035	18	1840	2040	200	
	100	1 <del>1 - C'</del>		Total Volume (gal):	1000	

6000 SHEET TOTAL (gal):

Planned Amendment Volume (gals) (deep to shallow)

GENERAL NOTES: 0945 - Amendment fan out

1000 - Resume fumping

100, 100, 300, 300, 200

1040 - Amendment fan out, Amendment track pump broke

1130 lesume
1240 - Amendment fan out, pump on track broke og ain

#### **GENERAL INFORMATION** CHAAP 2019 OU1 RAO Injection SITE NAME: PROJECT NO. 60565355 T- 14 11-1-19 INJECTION TRANSECT DATE: DP SUBCONTRACTOR **PES** PERSONNEL: 9.8% WB AMENDMENT / PERCENT CONCENTRATION: SHEET NO. INJECTION INTERVALS/VOLUMES Point # Time Start / Time Stop Depth (bgs) Meter (Start) Meter (End) Actual Vol. (gal) Notes 2040 38 2140 100 2140 1800 Total Volume (gal): 100 10 2100 750 2100 2750 190 2790 28 200 Total Volume (gal): C030 2044 38 10 2040 2230 33 150 2730 1608 200 Total Volume (gal): 2/40 C090 2240 2140 2240 Total Volume (gal): 200 2090 70 Make Stepped - Parli Red 2110 10 420 Total Volume (gal): 700 2090 2050 10 Neter Stepher 2050 2060 10 2540 2060 480

SHEET TOTAL (gal):

Total Volume (gal):

1000

500

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME: CH	IAAP 2019 OU1 RAO Injection	PROJECT NO. 60565355
INJECTION TRANSECT	T-14	DATE: 11-1-19
DP SUBCONTRACTOR	PES	PERSONNEL: 19 PZ
AMENDMENT / PERCENT O	CONCENTRATION: 9.890 WB	SHEET NO. 1073

### INJECTION INTERVALS/VOLUMES

854 38 2130 420130 100 0445-1000 Table 32 2130 2230 100 11237 Table 23 2230 2630 300 1220 Normal  1 239 22 2530 2630 300 1220 Normal  1 2 2830 3030 200 1240-1452  Total Volume (gal): 1000  38 2030 2130 200  1453 18 2030 3030 200  1453 18 2230 3030 200  1453 18 2230 3030 200  1454 18 2830 3030 200  1455 18 2830 3030 200  1456 18 2830 3030 200  1457 18 2830 2130 100  4 155 12 230 2530 300  1455 12 230 2530 300  1456 18 2830 2130 100  22 2130 2130 100  23 20 2130 200  Total Volume (gal): 1000  4 12 23 22 23 2530 300  1455 18 2830 2130 100  25 22 2130 2530 300  1455 18 2830 2130 100  27 28 22 2130 2530 300  1455 18 2830 3030 200  Total Volume (gal): 1000  28 20 2130 2130 100  29 21 2130 2130 100  21 22 2530 2430 300  1235 1230 200  Total Volume (gal): 1000  38 2030 2130 100  29 2130 200  Total Volume (gal): 1000  1010 1010 1010 1010 1010 1010 10	Point #	Time Start / Time Stop	Donth (has)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
32 2130 2230 100 1037 Touched 228 2230 2530 300 1220 1020 1020 1037  1239 12 2530 2530 3030 200 1220 1040-1452  Total Volume (gal): 1000 50 Touch doy  38 2030 2130 100  28 2230 2530 300  1453 18 2230 2530 300  1453 18 2230 2530 300  1453 18 2230 2530 300  1453 18 2230 2530 300  1453 19 2230 2530 300  1454 19 2230 2530 300  1454 19 2230 3030 200  1455 19 2230 3030 200  1455 12 2530 2530 300  1455 12 2530 2530 300  1455 12 2530 2530 300  1455 12 2530 2530 300  1455 12 2530 2530 300  1455 12 2530 2530 300  1455 12 2530 2530 300  1455 13 2530 3030 200  1000 1000 1000 1000  1000 1000 10		Time Stop			<u> </u>		
1239		254					
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		0,					10st Imical
1	1	(2.2.0					120 HOSMIN
Total Volume (gal)   1000   Tan L Jry	1	1/22					1240-1452
38 2030 2130 100  2		1 my	10	1 2010			<del></del>
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			2.2	1000	T		Hen / An - dry
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		101-1					-
145 3		676					
145 3	2				2530	0	
Total Volume (gal): 1000  903 32 2190 2290 100  28 2290 2520 300  28 2290 2520 300  14546 12 2830 3080 200  925 32 2130 2130 100  925 32 2130 2230 100  22 2530 2530 300  1455 18 2830 3030 200  1455 18 2830 3030 200  701 Volume (gal): 1000  38 2030 2130 100  913 32 2130 2530 300  1455 18 2830 3030 200  Total Volume (gal): 1000  29 2130 2530 300  701 Volume (gal): 1000  21 22 2530 2830 300  1235 13 2830 3030 200  Total Volume (gal): 1000  21 22 2530 2530 300  1235 13 2830 3030 200  12457 13 2830 3030 200  125 32 2030 2030 1000  21 22 2530 2830 300  22 22 2230 2530 300  22 22 2230 2530 300  22 22 2230 2530 300  22 22 2230 2530 300  22 22 2230 2830 300  22 22 2230 2830 300  22 22 2230 2830 300  22 22 2230 2830 300		1111-2			-		
38 2080 2180 100  903 32 2180 2280 100  28 2280 2580 300  14546 18 2830 3080 200  925 32 2130 2130 100  925 32 2130 2130 100  925 32 2130 2230 300  1455 18 2830 3030 200  Total Volume (gal): 1000  913 32 2130 2530 300  1455 18 2830 3030 200  Total Volume (gal): 1000  913 32 2130 2530 300  128 7230 2530 300  129 7230 2530 300  913 32 2130 2530 300  121 20 30 2230 100  913 32 2130 2530 300  1235 18 2830 3030 200  Total Volume (gal): 1000  915 32 2030 2030 200  Total Volume (gal): 1000  915 32 2030 2030 200  1015 1015 1010  915 32 2030 2030 200  1016 1010 1010  915 32 2030 2030 300  1017 1017 1010 1000  915 32 2030 2030 3000 200		145 5	10	2010			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			30	2020	,		
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$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		110-6	30				
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Total Volume (gal): 1000  915  32 2080 2230 2230 2530 300  223 2230 2530 300  1457  18 2830 3030 200		1235 18 2830 3030 200					
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$					S		
915 32 2080 2230 100 28 2230 2530 300 22 2530 2830 300 1457 18 2030 3030 200	·····		38 2030 2080 MM	ii \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			
1457 18 2830 3030 200 1457 18 2830 3030 200		915					
1457 22 2530 2830 300 1457 18 2830 3030 200	/	' ' '					
145t 18 2830 3030 200	6						
	•	11457	18				
		' ' '			Total Volume (gal):	1000	

SHEET TOTAL (gal): 600

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME: CH	AAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-14	DATE:	11-1-19
DP SUBCONTRACTOR	PES	PERSONNEL:	MR
AMENDMENT / PERCENT C	oncentration: 9.8 W13	SHEET NO.	20+2

# INJECTION INTERVALS/VOLUMES

Point #	Time Start /	D 4.4	1			
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	i en a i	38	3030	3130	100	
$\overline{}$	1521	32	3130	3230	100	
7		28				-
	1600	22				
	1600 1615 pm	18				
	m		<u>,                                      </u>	Total Volume (gal):	200	
		38	3030	3/30	100	
$\wedge$	1523	32	3130	3230	100	
0		28				
0		12				
	1615	18				
	1017			Total Volume (gal):	200	
		38	3080	3180	100	
	15 27	32	3180	3280	100	
9	1 / ~ 1	28			/	
f		22				
	1615	18				
	(61)			Total Volume (gal):	200	
		38	3030		100	
	1530	32	3130	3130	100	
1 17		28			100	
10	1610	2.2	1			
	144	22 18				
	1615 A M			Total Volume (gal):	200	
		38	3030	3130	160	
	1532	32	3130	3230	100	
		28	7770	122	700	
1 (	M -	22				
	16-15	18				
	1600	10		Total Volume (gal):	200	
	1,000	38	3030	3/30		
	-, ,-				100	
17.	1535	32	3130	3230	100	
	1, 1	28				
•	1612	22				
	m	18	L			
	1,00			Total Volume (gal):	200	

SHEET TOTAL (gal): 1,200

#### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-T14	DATE:	1-02-19
DP SUBCONTRACTOR	PES	PERSONNEL:	TY MM

AMENDMENT / PERCENT CONCENTRATION:

9.8% WB

SHEET NO. 3109 2

### **INJECTION INTERVALS/VOLUMES**

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	Time Stop	33	2140	2240	100	Notes
3126	DOMO	28	2240	2540	300	
	0910	23	2540	2840	300	<del></del>
00		18	2340	3040	200	
•	1150	. 10	3,640	3040	200	
	1100			Total Volume (gal):	900	
		28	2290	2540	300	
	6010	23	2540	2890	300	3-2-3-3-3-3-3-3-3-3-3-3-3-3-3-3-3-3-3-3
2 2 20	0912	18	2840	3010	200	
3/2/20	1152					
"	6752					
				Total Volume (gal):	800	
		28	2230	2530	300	****
. 07	0914	23	2530	2830	300	
3/3 27		18	2830	3030	200	
	1155					
	0945			l.	000000	
			- Marie	Total Volume (gal):	800	400
	0915	28	2240	2540	300	
28			2540	2840	300	
3H 28	,	18	2340	3040	200	
4	vii()					
S	1140			Total Volume (gal):	800	
strate.		35623	2540	2840	300	
	0917	18	2840	3040	200	-140
2 129	0117	1	0010	00 10	_ ~ ~ ~	
3/ 29						
	0954		- 7-20			
	,			Total Volume (gal):	500	and the Name
20		2023	2540	2840	300	
30 210	0920	18	2840	3040	200	_
			0.2 27			
00	0950					.51
	()					

SHEET TOTAL (gal):

GENERAL NOTES:

1000 Stopped Pumping , amendment can out

Planned Amendment Volume (gals) (deep to shallow)

100, 100, 300, 300, 200 38 33 25 23 18

#### **GENERAL INFORMATION**

SITE NAME: CHAAP 2019 OU1 RAO Injection PROJECT NO. 60565355

INJECTION TRANSECT EW7 - T14 DATE: 11 - 02 - 19DP SUBCONTRACTOR PES PERSONNEL: 17 / MM

AMENDMENT / PERCENT CONCENTRATION: 9.8% WB SHEET NO. 2 of 2

# INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Val. (cal)	Notes
-1	Time Stop	35	3040	3140	Actual Vol. (gal)	Notes
	1344	33	3140	3240	100	
21		28	3240	3540	300	
31		23	3540	3840	300	
	1607	18	3840	4040	200	
	1007		3010	Total Volume (gal):	1000	102
-		38	3020	3120	100	
	1340	33	3120	3220	100	
2 )	1.0.10	28	3220	3720	300	
32		23	3520	3820	300	- 10
	1605	18	3820	4020	200	WMC-
	1000			Total Volume (gal):	1000	
		38	3030	3130	100	- 1011
	1342	33	3130	3230	100	
33	1310.	28	3830	3430	300	
00		23	3530	3830	300	
	1603	18	3830	4030	200	9101
	1005			Total Volume (gal):	1060	
		38	3040	3140	100	
	1242	33	3140	3240	100	
34	120 100	28	3240	3540	300	i solveti.
24		23	3540	3840	800	
	1559	18	3840	4040	200	
	(*) * * *		and the second s	Total Volume (gal):	1000	
		38	3040	3140	100	
	1240	33	3140	3240	100	
3 -	101	28	3240	3540	300	
35		23	3540	3840	300	CC
	1557	18	3840	4040	200	The state of the s
	1000		pet and a second	Total Volume (gal):	1000	
36		38	3040	3140	100	
	1235	33	3140	3240	100	
	1	28	3240	3540	300	23
		23	37140	3840	300	
	1555	18	3840	4040	200	
				Total Volume (gal):	1000	88 III

SHEET TOTAL (gal): 6 000

GENERAL NOTES:

Planned Amendment Volume (gals) (deep to shallow)

300 Points 31,32,33,36 reduited completly, tip did not come off Stopped pumping 34+35.

100, 100, 300, 300, 200 38 33 28 23 18

### **GENERAL INFORMATION**

SITE NAME: CHA	AAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-14	DATE:	11-2-19
DP SUBCONTRACTOR	PES	PERSONNEL:	MM
AMENDMENT / PERCENT CO	oncentration: 9.8 W 13	SHEET NO.	10+23

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start /	Dord (Loc)	M. (6. 1)	W. (5.5)	A . 137.1 ( 1)	N.
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	0.211	28	3230	3530	1300	
-	924	18	3530	3830	300	-
7	-	18	3830	4030	200	
(	1150					
				Total Volume (gal):	8,00	
		28	3230	3530	300	
	925	22	3530	3830	300	
4		19	3830	4030	200	
7	1152					
	115 -			Total Volume (gal):	800	-
		28	3280	3580	300	
	926	22	3580		300	
		12	3880	3880 4080	200	
7						
(	1158					
	1170			Total Volume (gal):	800	
	1 10	28	3230	3530	300	
	933	22	3530	3830	300	
10		18	3930	4030	200	
10	1203					
	1207		Į.	Total Volume (gal):	800	
		28	3230	3530	300	Had to redrice
<i>t</i> .	1004	22	3530	3830	300	to 28° due to
11	, , ,	18	3830	4030	200	to 28° due to heaving sand
1 1	1206					,
	1200			Total Volume (gal):	860	
		28	3230	3530	300	
12	941	22	3530	3830	300	
		18	3830	4030	200	
ı	1209				2	
	1001		L	Total Volume (gal):	800	

SHEET TOTAL (gal): 4,2809

### **GENERAL INFORMATION**

SITE NAME: CHAAP 2019 OU1 RAO Injection PROJECT NO. 60565355

INJECTION TRANSECT 7-14 DATE: 11-2-19DP SUBCONTRACTOR PES PERSONNEL: 11-2-19AMENDMENT / PERCENT CONCENTRATION: 9,8WB SHEET NO. 20623

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start /	1	1	<u> </u>	· —	
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	4030	4130	100	
	1309	32	4130	4230	100	
13	7.5	28	4230	4530	300	
' /		22	4530	4830	300	
	1454	18	4830	4030	200	
				Total Volume (gal):	1000	
		38	4030	4130	100	, <del>.</del>
	1311	32	4130	4230	100	
111		28	4230	4530	300	· ·
14		22	4530	4830	300	
(	1456	18	4830	5030	200	
				Total Volume (gal):	1000	
		38	4080	4180	100	
	1212	32	4180	4280	100	
1,-	1313	28	4280	4580	300	-
15		22	4580	4880	300	
	1457	18	4880	5080	200	
				Total Volume (gal):	1000	
		38	4030	4130	100	
	1315	32	4130	4230	100	
1.7	1315	28	4230	4530	300	
16		28		4830	300	
	1506	18	4830	5030	200	
			-	Total Volume (gal):	1800	
	47	38	4030	4130	1000m	
	1319	32	4130	4230	100	
17	' /   '	28	4230	4530	300	
17	11 -	22	4530	4830	300	
/	1507	18	4430	5030	200	
				Total Volume (gal):	1000	
18		38	4030	4130	100	
	1321	32	4130	4230	100	
	1321	28	4230	4530	300	
		22	4530	4830	300	
	1509	18	4930	5030	200	
	' ' /		17.7.7.0	Total Volume (gal):	1000	-

SHEET TOTAL (gal): 6,000

### **GENERAL INFORMATION**

SITE NAME: CH	HAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-14	DATE:	11-2-19
DP SUBCONTRACTOR	PES	PERSONNEL:	AB
AMENDMENT / PERCENT C	CONCENTRATION: 9,850 WB	SHEET NO.	7 30f 3

# INJECTION INTERVALS/VOLUMES

Point #				1		
	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	-	38	5030	5130	100	
	1544	32	5130	5230	100	
19 -		38				
'	1624	22				
	1624 1547	18				
	m			Total Volume (gal):	200	
		36	5030	5130	100	
	1547	32	5130	5230	100	
20	- 1 3 7	-				
70						
	1626					
				Total Volume (gal):	200	
	-	38	5080			Tip would
		32	<u> </u>			notcomeoff
						had to
21						redvill
·						
				Total Volume (gal):	0	
	1555	38	5030	5130	100	
		32	5130	5230	100	
22 -						
	1627				2	
			<u></u>			
				Total Volume (gal):	200	
		38	503U 3130	5130	100	
	1558	32	3130	5230	100	
23	.,,0			<u> </u>	·····	
	110.	3-2-PL	10			
	1630	•	=		0.60	
			4- 30	Total Volume (gal):	200	
1211	1101	38	5030	5130	100	
	1601	32	5130	52311	100_	
L7				-	· · · · · · · · · · · · · · · · · · ·	
	144					
	1601		<u> </u>	T-4-13/-1 ( )	2 4 2	
	1631			Total Volume (gal):	200	

SHEET TOTAL (gal): 1,000

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-T14	DATE:	11-08-19
DP SUBCONTRACTOR	PES	PERSONNEL:	TY MM
AMENDMENT / PERCE	ENT CONCENTRATION: 9.8% W	SHEET NO	1043

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Doub (boo)	Matan (Start)	Mater (First)	Astrol Wall Coally	NI
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	6028	38	4150	4250	100	
	6828	33 28	4250	4550		
37		23	4550	4850	300	
	Ingil		4850	4050	300 200	
	1024	18	1000	Total Volume (gal):	1000	
		38	4050	4150	100	
	12/2	33	4150	4270	100	
	0826	28	4250	4990	300	
20		23	4550	4850	300	
38	1000	18	4850	7050	200	
	1022	L O		Total Volume (gal):	1000	
14.0 Hz		38	4050	4150	100	
	6824	33	4150	4200	100	
	0029	28	4250	4550	300	
20	1020	23	4550	4850	3∞	
39		18	4850	5050	200	
	1020	1 0	-10.10	Total Volume (gal):	1000	
		38	4030	4130	100	
	0822	33	4130	4230	100	
1 10	0022	28	4230	4530	300	•
40		23	4530	4830	300	
10	1018	18	4830	5030	200	
	1010			Total Volume (gal):	1000	
	- "	38	4030	4130	100	
	0820	33	4130	4230	100	
	0000	28	4230	4530	300	
/ 11		23	4530	4830	300	
41	1015	18	4830	5030	200	
	101.5			Total Volume (gal):	1000	
1.12		38	4040	4140	100	
	0818	33	4140	4240	100	
		28	4240	4540	300	
42		23	4540	4840	300	
	1007	18	4840	5040	200	
	1001			Total Volume (gal):	1000	_

SHEET TOTAL (gal):

6,000

GENERAL NOTES:

# **GENERAL INFORMATION**

SITE NAME: CHAAP 2019 OU1 RAO Injection PROJECT NO. 60565355

INJECTION TRANSECT EW7 - T13 DATE: 11-03-19DP SUBCONTRACTOR PES PERSONNEL: TVMM

AMENDMENT / PERCENT CONCENTRATION:

9.8% WB

SHEET NO. 2 of 3

# INJECTION INTERVALS/VOLUMES

Point #	Time Start /	2 14 3				
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	1125	38	5040	F140	100	27
	1120	33	n140	5240	100	1 1000
37	100-	23	5240	5540 540	300	
0'	1325	28 23 18	6540	7840	300	
	#125	10	5840	<u>6040</u>	1000	
		24	5035	Total Volume (gal):	The state of the s	
	1122	38 33	5030	m 130	100	
- d	1123		F136	7230	100	
38	1202	28	7230	5530	300	
	1323	10	5530 5630	7830	360	
	TIND	10	7000	6030	200	
		20	T-020	Total Volume (gal):	1000	
	1121	38 33	m030	9130	100	
- 0	1121		h130	5230	100	
39	1001	28	5230	5530	300 300	
	1321	18	7530	5830 6030		
	4171	10	M830	Total Volume (gal):	200	
		2 4	5050	Total Volume (gal):	100	7.94 (19)
	1119	38 33	5150	n100	100	
	1119	28			300	
40	1220	23	5250 5550	5550 5850	300	
	1320	18	5850	6050	200	
	7717	10	1000	Total Volume (gal):	1000	
		38	5050	5150	100	
	1117	33	5150	5250	100	
	1111.	28	5250	5550	300	
41	1317	23	5550	585O	300	
<b>V</b> - <b>V</b>	1117	18	5850	6050	200	
	1111		78.70	Total Volume (gal):	1000	-
/10		38	5050	7150	100	
	1115	38	5150	h250	100	
	] '''	28	5250	9550	300	Hiro-signatura (Alberta)
42	1315	23	5550	5850	300	
	+++	18	7850	6050	200	
	1		,,,,,	Total Volume (gal):	1000	

SHEET TOTAL (gal):

6,000

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection		PROJECT NO.	60565355
INJECTION TRANSECT	EW7- T12		DATE:	11-03-19
DP SUBCONTRACTOR	PES	¥	PERSONNEL:	MM
AMENDMENT / PERCE	ent concentration: 9.8	°/0 WB	SHEET NO.	30f3

# INJECTION INTERVALS/VOLUMES

Point #	Time Start /	···			Ι Ι	
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	6040	6140	100	
	1410	33	6140	6240	100	-
43	1110	28	4240	6540	300	_
	1515					
	, , ,			Total Volume (gal):	500	
		38	6030	6130	100	
	1408	33	6130	6230	100	
44	1100	28	6230	6530	300	
99						
	1510					
	1 1 10			Total Volume (gal):	F00	
	1.	38	6030	6130	100	
	1406	33	6130	6230	100	
45	1 10 0	28	6230	6530	300	
97						
	1508					
	11100			Total Volume (gal):	MOO	
		38	6050	6150	100	
305	1404	33	6150	6250	100	
46	, , , , ,	28	6250	6550	300	
910						
	1966					<del></del>
	100			Total Volume (gal):	500	
		38	6050	6150	100	
	1402	33	6150	6250	100	
47	' ' -	28	6250	6550	300	
-11						
	1504					
	<u>'</u>			Total Volume (gal):	500	
	111000	38	6050	6150	100	
	1400	33	6150	6250	100	
111		28	6250	6550	300	
48						
	1500					
				Total Volume (gal):	500	

SHEET TOTAL (gal): 3000

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME: CH	HAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-14	DATE:	11-3-19
DP SUBCONTRACTOR	PES	PERSONNEL:	MM
AMENDMENT / PERCENT C	CONCENTRATION: 9,890	WB SHEET NO.	10+3

# INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	13/2/11	18	5230	5530	300	HAd to pull
	0811	22	5530	5830	300	Up ast vertrill
19		18	5830	6030	200	£ 28°
l (	0011		6030			
	0932		<u> </u>			Į0
				Total Volume (gal):	800	
		28	5230	5530	300	
	0743	22	5530	5830	306	
20	0 177	18	5830	6030	200	<u> </u>
20				_		
	0919					
				Total Volume (gal):	300	ji.
		38	5080	5180	100	0
	0743	32	5180	5280	100	
01		32 2×8	5280	5580	300	
21	0	22	5580	5820	300	
	0932	18	5880	6080	200	
				Total Volume (gal):	SOOMAL	-1,000
		28	5230	5530	300	
	0744	22	5530	5830	300	
27		18	5830	6030	3200	
22						
	0916					
				Total Volume (gal):	800	
		28	5230	5530	300	
	0747	22	5530	5830	300	
02		18	5830	6030	200	
23		, ,	7 0 70		_ 200	<u> </u>
	0917					
				Total Volume (gal):	800	
	2 - 3-	28	5230	5530	300	15
	0755	22	5530	5830	300	<u> </u>
0.1/		18		6030		
14		_   ~	5630	0010	200	
•	0918			<del>                                     </del>		
	0 10		<u> </u>	Total Volume (gal):	800	
			<u> </u>	rotar volume (gal):	000	l

SHEET TOTAL (gal): 5000

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME: CHAA	P 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-13	DATE: /	1-3-19
DP SUBCONTRACTOR	PES	PERSONNEL:	An
AMENDMENT / PERCENT CONC	CENTRATION: 9.890 W 13	SHEET NO.	20f3

# INJECTION INTERVALS/VOLUMES

Point #	Time Start /	D. 1.4.	M . (2: 1)	M . (7. 1)		
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	1120	36	6030	6130	100	
	1120	32	6130	6230	100	ma.w.
,		28	6230	6530	300	
		_ 22	6530	6830	300	
(	1322	18	6830	7030	200	
		=	19	Total Volume (gal):	1000	
	1,00	38	6030	6130	100	2
	1122	32	6130	6230	100	
		28	6230	65830	300	
2	1323	22	6530	6830	300	***
	1323 H22 m	18	6830	7030	200	
	1' m			Total Volume (gal):	1000	
		38	6080	6180	100	2
	[134]	32	6180	6280	100	
_	, , ,	28	6280	6580	300	
3		22	6580	6880	300	
/	1324	18	6880	7080	200	
	' ' '			Total Volume (gal):	1000	
***		38	6030	68130	100	-
	[138]	32	6130	6230	100	
	(1)0	28	6230	6530	300	39.00
4		22	6580 M	6830	300	-
1	1324	18	68838	7030	200	
	1729		0 875	Total Volume (gal):	1000	Name and American
- SHAME		38	6030	6130	100	
	[14]	32	6130	6230	100	
8	1 1 1 1	28	6230	6530	300	
5				6830		
)	1327	18	6830	7030	200	
	1 1/21	10		Total Volume (gal):	700000	
- 10 PAR-	+	2.5	6030	A STATE OF THE PARTY OF THE PAR	1000	-0.0
	1 1120	38		6130	100	
1	1129	32	6130	6230	100	
10		28	6230	6530	300	<u> </u>
V	11110	22	6530	6830	300	
	1329	18	6830	7030	200	
				Total Volume (gal):	1000	

SHEET TOTAL (gal): 6000

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME: CHAAP 20	19 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-12	DATE:	11-3-19
DP SUBCONTRACTOR	PES	PERSONNEL:	Re
AMENDMENT / PERCENT CONCENTE	AATION: 9.890 WB	SHEET NO.	30f 3

# INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Douth (has)	Motor (Stort)	Motor (End)	Astrol Vol. (col)	Notes
	Time Stop	Depth (bgs)	Meter (Start) 7030	Meter (End)	Actual Vol. (gal)	Notes 510w Flow
	1416		70 10	1	100	710W (10W
٨	1110					
(						
1	1531					
	1	0.1		Total Volume (gal):	100	01
	1412	38	7030	7130	100	Slow flow
_	1912					
2			,			
	1531					
46-70-1	1771			Total Volume (gal):	100	
	11111	38	7080	7180	100	
	1414					
3	75300					
	1533					
ű.	1377	-	·	Total Volume (gal):	100	
		38	7030	7130	100	Slowflow
4	1417					
16			<u> </u>			
7	1535		<u> </u>			
	17/7		!	Total Volume (gal):	100	
		38	7030	7130	100	Slow flow
1/	1419					
	1 111					
9	1100		<u> </u>			
	1536		!	Total Volume (gal):	100	
	<u> </u>	38	7030	7130	100	
^	1421		1000	7170	100	
/ /	114					
	1537					
	1711				100	
				Total Volume (gal):	100	

SHEET TOTAL (gal): 600

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	on	PROJECT NO.	60565355
INJECTION TRANSECT	EW7	Γ12	DATE:	11-04-19
DP SUBCONTRACTOR	PES		PERSONNEL:	TY MM
AMENDMENT / PERCE	NT CONCENTRATION:	98% WB	SHEET NO.	1 of 4

### INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		23	6540	6840	300	
	M777	18	6840	7040	200	
43	0727					
						<u> </u>
	0810			Total Volume (gal):	400	
		23	6530	<i>6830</i>	300	
	0725	18	6830	<b>7</b> 030	200	
( ) ( )	0725					
44						
	0807	,		Total Volume (gal):	500	
		23	6530	6830	300	
	0724	18	6830	7030	200	
45	018-1					
1 - 7	06.01					
	0806			Total Volume (gal):	500	
5385 W		23 18	6550	6850	3 <i>0</i> 0	
	6722	18	6850	7050	200	
46						
90	0805					
	-00.7			Total Volume (gal):	500	
		23	6550	6850	300	
	0721	18	6850	7050	200	
47						
	0802				BASHSENEL HISKSYING	
	,	72		Total Volume (gal):	500	
	0700	23	6550	6850	300	<u> </u>
110	0720	18	6850	7050	200	
48						
, ,	0800					
				Total Volume (gal):	500	

SHEET TOTAL (gal): 3,000

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Inject	ion		PROJECT NO.	60565355
INJECTION TRANSECT	EW7-T	12		DATE:	11-04-19
DP SUBCONTRACTOR	PES			PERSONNEL:	Ty MM
AMENDMENT / PERCE	NT CONCENTRATION:	98%	WB	SHFFT NO	2084

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	7050	7150	100	
	0910	33	7150	7250	100	
		28	7250	7550	300	
42		23	7550	7850	300	
	1115	18	7850	8050	200	
	111.7		-	Total Volume (gal):	1000	
		38	7050	7150	100	
	0912	33	7250	7250	100	
	0112	28	7250	7550	300	
41	20096	23	7550	7850	300	
	1117	18	7850	8050	200	
	,,,,			Total Volume (gal):	1000	
		38	7050	7150	100	
	0914	33	7150	7250	100	
1.0	0114	28	7250	7550	30O	
40		23	7550	7850	300	
·	1119	18	7850	8050	200	
				Total Volume (gal):	1000	
		38	7030	7130	100	
	0916	33	7130	7230	100	
20	- 110	28	7230	75 <b>3</b> 0	3∞	
39	1	23	7530	7830	300	
	1121	18	7830	8030	200	
	·			Total Volume (gal):	1000	
		38	7030	7130	100	
ï	0918	33	7130	7230	100	
38		28	7230	7530	300	
	1107	28 23	7530	7830	300	
	1123	18	7830	8030	200	
				Total Volume (gal):	1000	
		35	7040	7140	100	
	0920	33	7140	7240	100	
37	0120	28	72.40	7540	300	
		23	7540	7840	300	
	1125	18	7840	8040	200	
		- //	,	Total Volume (gal):	1000	

SHEET TOTAL (gal):

GENERAL NOTES:

### **GENERAL INFORMATION**

**CHAAP 2019 OU1 RAO Injection** SITE NAME: PROJECT NO. 60565355

EW7-T13 INJECTION TRANSECT DATE:

DP SUBCONTRACTOR PERSONNEL:

98% WB AMENDMENT / PERCENT CONCENTRATION: SHEET NO.

### INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	8040	8140	100	
	1310	33	8140	8240	100	
36	1010	28	8240	8540	300	
00		23	8540	8840	300	
	1450	18	8840	9040	200	
	1-100			Total Volume (gal):	1000	
		38	8030	6130	100	
	1217	33	8130	8230	100	
0 -	1011	28	8230	8530	300	
35		23	8930	8830	300	
	1452	18	8830	9030	200	
_	1190			Total Volume (gal):	1000	
		38	8030	8130	100	
	1219	33_	8130	8230	100	
	The second secon	28	8230	8H30	300	
34		<b>a</b> 3	8530	8830	300	
0	1454	18	8830	9030	200	
				Total Volume (gal):	1000	
		30	8050	8190	100	
	1221	35 33	8150	8250	100	
22	1201	28	8250	8550	300	
33		23	8550	8850	300	
	1456	18	8850	9050	200	
200	19120			Total Volume (gal):	1000	
253000		38 33 28	8050	8150	100	
	1222	33	8150	8250	100	
20	1200		8250	8550	300	
32		23	8550	8850	300	
	1458	18	8850	9050	200	
	1 120			Total Volume (gal):	1000	
		38	8050	8150	100	
31	1224	33	8150	8250	100	
	, ,	28 23	8250	8550	300	
<b>∂</b> 1		23	8550	8850	300	
	1430	18	8850	9050	200	
				Total Volume (gal):	1000	

SHEET TOTAL (gal):

6,000

GENERAL NOTES:

1255 Rednilled pt. 36, tip would not come off.

Planned Amendment Volume (gals) (deep to shallow)

100, 100, 300, 300, 200 38332823 18

#### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Inject		PROJECT NO.	60565355 :: \\-OL - O	
INJECTION TRANSECT	EW7-	DATE	DATE:		
DP SUBCONTRACTOR	PES			PERSONNEL:	TYMM
AMENDMENT / PERCE	NT CONCENTRATION:	9.8%	WB	SHEET NO.	4 0 4 4

# INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	9050	9150	100	-
	1530					
7						
36	1610					
	梅		· .			-
				Total Volume (gal):	100	
		38	9050	9150	100	
	1532					
35						
	1, 10					*
	1612			Total Volume (gal):	100	
		38	9050	9150	100	
34	1524		10.70	1100	100	
	1534					
	1614	-				
	10			Total Volume (gal):	100	
33		38	9030	9130	100	
	1550	_				
	(1715)					
	1.0-					
	1625					
				Total Volume (gal):	100	
		38	9030	9130	100	
	1536					
32						
	1 1 1 1 1					
	1616			Total Volume (gal):	100	
		38	9040	9140	100	
	1527	J 0	10010	7170	100	
21	1537					
31					<del></del>	
	1618					
				Total Volume (gal):	100	

600 SHEET TOTAL (gal):

GENERAL NOTES:

Planned Amendment Volume (gals) (deep to shallow)
1540 Redrilled pt. 33, tip would not breath off
1545 Last attempt to remove tip was successful, pt. 33 was not
vedrilled

## **GENERAL INFORMATION**

SITE NAME: CH	AAP 2019 OU1 RAO Injection	PROJECT NO. <b>60565355</b>
INJECTION TRANSECT	T-13 PA	DATE: 11-4-19
DP SUBCONTRACTOR	PES	PERSONNEL: Ph
AMENDMENT / PERCENT C	ONCENTRATION: 9,890 W	B SHEET NO. 1 of 3

## INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	0745	32	7130	7230	100	9878
	0720	28	7230	7530	300	
{		22	7530	7830	300	
ι	00111-	14	7830	8030	200	
	0845	55000				-
				Total Volume (gal):	900	
		32	7130	7230	100	
	10720	28	7230	7530	300	
2	1	22	7530	7830	300	
	0844	18	7830	8030	200	
	10074					
				Total Volume (gal):	900	
W.U. D.G.		32	7180	7230	100	_
	0720	28	7280	7580	300	
7	0.	22	7580	7880	300	3 %
3	0845	18	7880	8080	200	30
						2.22
	,			Total Volume (gal):	900	
30-10	200	32	7130	7230	100	
	0720	28	7230	7530	300	
1.		22	7530	7830	300	
4		18	7830	8030	200	-
l	0852					
				Total Volume (gal):	900	
		32	7130	7230	100	
	0720	28	7230	7530	300	
r		22	7530	7930	300	
5	(, c) = 2	18	7830	8030	200	3021
•	0853					
				Total Volume (gal):	900	
1,		32	7130	7230	100	
	0720	28	7230	7530	300	
	UTLU	22	7530	7430	300	77.4
V		14	7830	8030	200	
	0854					
	10071			Total Volume (gal):	900	

SHEET TOTAL (gal): 5,400

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME: CHAAP 2	2019 OU1 RAO Injection	PROJECT NO. <b>60565355</b>
INJECTION TRANSECT	T-18 12	DATE: 11-4-19
DP SUBCONTRACTOR	PES AL	PERSONNEL: AR
AMENDMENT / PERCENT CONCEN	TRATION: 9,8% WB	SHEET NO. 2 of 3

## INJECTION INTERVALS/VOLUMES

Point #	Time Start /	D 444 \		1		
<del></del>	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	38	8030	8130	100	
	0934	32	8130	8230	100	
$\overline{}$		28	8230	9530	300	
7	1215	22	8530	2830	300	
	1615	18	8836	9030	200	
				Total Volume (gal):	1,000	
	00,00	38	8030	2130	100	
	0950	32	8136	8230	100	
8		28	8230	2530	300	
Õ	(96)	22	8530	2830	300	
_	1134	18	8830	9030	200	
				Total Volume (gal):	1,000	
		38	8080	8180	100	
	0938	32	8180	8280	100	
		28	8280	8580	300	-
7	1229	22	8580	8880	300	
	1229 1214 AR	18	8880	9020	200	
	' AR	-		Total Volume (gal):	1,000	
-		38	8030	8130	100	
	1941	32	8130	8230	100	
10	0940	28	8230	8530	300	
10		22	8530	8830	300	
	1225	18	8830	9030	200	
				Total Volume (gal):	1,000	<del></del>
		38	8030	8130	100	
	0942	32	8130	8230	100	
1 1	101101	28	8230	3530	300	
11		72.	8530	8830	300	
	1226	18	2830	9030	200	
	1200		10010	Total Volume (gal):	1,000	
12		38	8030	8130	100	*
	0944	32	8130	8230	100	· · · · · · · · · · · · · · · · · · ·
	10'77	28	8130	2530	300	
	_	22	8530	8830		
	1227	18	8830	9030	300	
	11-		0070	Total Volume (gal):	200	
	05 TMK Dry			Total Volume (gal):	1.000	

1134-1205 TMK Dry

SHEET TOTAL (gal): 6,000

GENERAL NOTES:

#### **GENERAL INFORMATION**

SITE NAME: CHAAP 2019 OU1 RAO Injection PROJECT NO. 60565355

INJECTION TRANSECT F-1 & 2

DATE: 11-4-19

PERSONNEL: A R.

CHAAP 2019 OU1 RAO Injection PROJECT NO. 60565355

AMENDMENT / PERCENT CONCENTRATION:

9.850 WB

SHEET NO. 3 of 3

### **INJECTION INTERVALS/VOLUMES**

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	18	38	9030	9130	100	
	1323	32	9130	9230	100	
13	, , , , , ,	28	9230	9530	300	
( )		22	9530	9830	300	
	1549	18	9830	10,030	200	
	, , , ,			Total Volume (gal):	1,000	
	1275	38	9030	9136	100	
	1325	32	9130	9230	100	
111		28	9230	9530	300	
14	, ,-,-	22	9530	9830	300	
	1552	18	9830	10,030	200	
				Total Volume (gal):	1,000	
		38	9080	9180	100	
	1327	32	9180	9280	100	1
15	'	28	9280	9580	300	
1)		22	9580	9880	300	
15	1550	18	9880	10,080	200	
	1,,,,		1 700-	Total Volume (gal):	1,000	
	0.0	38	9030	9130	100	
	1330	32	9130	9230	100	
16		28	92030	9530	300	<del></del>
.0		22	9530	9830	300	
	1557	18	9830	10,080 m	200	
			1 70 70	Total Volume (gal):	1,000	Tr.
···		38	9030	9130	100	Had to redri
	1353	32	9130	9230	100	could not rea
,	1///	28	9230	9530	300	Plug
17		22	9530	9830,3	300	prag
	1558	18	9830	10,080 AA	200	
			100	Total Volume (gal):	1,000	
		38	9030	9130	100	-
	1332	32	9130	9230	100	
18		28	9230	9530	300	
1 "		22	9530	9830	300	
	1559	18	9830			
		, ,	1770	Total Volume (gal):	200	
	onk Dry Asz			Total Volume (gal):	1,000	

H34 Tonk Dry A12

SHEET TOTAL (gal): 6,000

**GENERAL NOTES:** 

### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injec	tion	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-	T12	DATE:	11-05-10
DP SUBCONTRACTOR	PES		PERSONNEL:	TY MM
AMENDMENT / PERCE	NT CONCENTRATION:	9.8% WB	SHEET NO	1074

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	Time Stop	33	9150	92FO	100	Notes
	0720	28	9250	9550	300	
	0120	23	î e	9850		
36			9550	†	300	
20	0850	18	9850	10050	200	
	0010		l	Total Volume (gal):	900	
		33	9150	9250	100	
	0722	28	9250	9550	300	·•• · · · ·
	0722	23	9550	9850	300	
35	-	18	9850	10050	200	
5.1	4.6.40	• 0	10190	10,0 1,0		
d	0852			Total Volume (gal):	900	
		33	9150	9250	100	
	0724	28	9250	9550	300	
2	10,29	23	9550	9850	300	
34	0854	18	9850	10,050	200	
				Total Volume (gal):	900	la la
	"	33	9130	9230	100	
	0701	28	9230	9530	300	
27	0726	23	9530	9830	300	·
33		18	9830	101030	200	
	0856					<u>.</u>
	0 6110			Total Volume (gal):	900	
		<i>33</i>	9130	9230	100	
	0700	28	9230	9530	300	
	0728	23	9530	9830	300	
32		18	9830	10,030	200	
	0858				160	
				Total Volume (gal):	900	
		33	9140	9240	100	
	0730	28	9240	9540	300	
	0/30	23	9540	9840	300	
31		18	9840	10,040	200	
	0900					
	0 100			Total Volume (gal):	900	

SHEET TOTAL (gal): 5400

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-T13	DATE:	11-05-19
DP SUBCONTRACTOR	PES	PERSONNEL:	TY MM

AMENDMENT / PERCENT CONCENTRATION:

9.8% WB

SHEET NO. 2074

## INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	10,050	10,150	100	
0 6	0920	33 28	101150	101250	100	
20		28	101250	10,550	_300	
		23	10,550	10,850	300	
	1107	18	10,850	11,050	200	
	1			Total Volume (gal):	1000	
		38	10,050	10/150	100	
	0922	33	10/150	10,250	100	
00	0 12	28	10,250	10,550	300	
29		23	10,550	101850	300	
	lina	18	10,850	11,050	200	
	1109			Total Volume (gal):	1000	
		38	10,050	10,150	100	
	09211	<b>26 3</b> 3	10,150	10,250	100	
$\gamma \not \leq$	0924	28	10,250	10,550	300	
28	[]//	23	10,550	10,850	300	
		18	10,850	11,050	200	
				Total Volume (gal):	1000	
9763	0926	38	10,030	10:130	100	
		33	101130	10,230	100	
07		28	101230	10,030	300	
27	1113	23	10,530	10,830	300	
,		18	10,830	11,030	200	
				Total Volume (gal):	1000	
		38	0.030	10,130	100	
	4000	33	101130	10,230	100	·····
01.	0928	28	101230	10,530	300	
26		23	10,530	10.830	300	
ALC: NO.	1115	18	10,830	11,030	200	·······
	1115			Total Volume (gal):	1000	
		38	10,040	10,040	20	Rod pulled
	0935	33	10,040	10,240	180	ported
0 %	0 139	28		10,840	300	
25		23	10,240	101840	300	
	1117	18	10,840	ILOUO	200	
	''''/	10		Total Volume (gal):		
		<u></u>		rotar volume (gal):	1000	

SHEET TOTAL (gal): 6000

GENERAL NOTES:

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Inje	ction	PROJECT NO.	60565355
INJECTION TRANSECT	EW 7-	TI3	DATE:	11-05-19
DP SUBCONTRACTOR	PES		PERSONNEL:	TY MM
AMENDMENT / PERCE	NT CONCENTRATION:	9.8% WB	SHEET NO.	3 of 4

## INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
<del></del>	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	11,050	11:120	100	
	1205	33	111150	11,250	100	
10	·	28	11,250	11,550	300	
1 -1		23	111950	11,850	300	
•	1400	18	11,850	12,050	200	
	1900			Total Volume (gal):	1000	
		38	11,050	11,150	100	
	1203	33 28	11,150	11,250	100	
0 0	1000	28	11,250	11,550	300	_
20		23	11,550	11,850	300	
	1358	18	11,850	12,050	200	
	10.70	-		Total Volume (gal):	1000	
		38	11,050	11,150	100	
	1201	33	11,150	11,290	100	
$\alpha$	1201	28	11,250	11,550	300	
21	1356	23	11,550	11,850	300	
		18	11,850	12,050	200	
				Total Volume (gal):	1000	_
		38	11,030	11,130	100	
	1159	38 33	111130	11,230	100	
		28	11,230	111530	360	
22	1354	28 23	11,530	11,830	300	
		18	111830	12,030	200	
	101			Total Volume (gal):	1000	
		38	11,030	11,130	100	
	1157	33	11/130	11,230	100	
23	' ' '	28	11,230	11,530	300	
	and the same	28 23	11,530	111830	300	
	1352	18	111830	12,030	200	
	10.10	, , ,		Total Volume (gal):	1000	
0.41		38	11.040	11,140	100	
	11155	33	11,140	11,240	100	
	1155	28	11,240	11,540	300	
14		28 23	11,540	111840	300	
	1350	18	11.840	12,040		
	1370			Total Volume (gal):	200	
	l.,			rotar volume (gal):	1000	

SHEET TOTAL (gal): 6000

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-T12	DATE:	11-05-19
			2001207

DP SUBCONTRACTOR **PES** 9.8% WB

PERSONNEL: 4 MM SHEET NO.

AMENDMENT / PERCENT CONCENTRATION:

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
25		30	12050	12150	100	
	1415	33	12150	12250	100	
		28	12250	12550	300	
		23	12550	12850	300	
	1610	18	12850	13050	200	
	1010			Total Volume (gal):	1000	
		38	12050	12150	100	
	1417	33	12150	12250	100	
01.		28	12250	12550	360	
26		23	12550	12850	300	
	1615	18	12850	13050	200	
	10017			Total Volume (gal):	1000	
-518		38	12050	12150	100	
27	1419	33	12150	12250	100	
		28	12250	12550	300	
5	1620 33 12550 12850 360 18 12850 13050 200 Total Volume (gal): 1000	23		12850		
		200				
				Total Volume (gal):	1000	
		38	12030	12130	100	
	1421	33	12130	12230	100	
04	1-121	28	12230	12530	300	
28	1624	23	12530	12830	300	
		18	12830	13030	200	
				Total Volume (gal):	1000	
		38	12030	12130	100	
	1423	33	12130	12230	100	
29	1100	28	12230	12530	300	
_ 1		23	12530	12830	300	
	1636	18	12830	13030	200	
	1000	_		Total Volume (gal):	1000	
	1	38	12040	12140	100	
	1425	33	12140	12240	100	
20		28	12240	12540	300	
30		23	12540	12840	300	
	1630	18	12840	13040	200	
4600 ALCONO.	, 55 00			Total Volume (gal):	1000	

SHEET TOTAL (gal):

6000

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME: CHAAP 2019 OU1 RAO Injection PROJECT NO. 60565355

INJECTION TRANSECT 7-13 DATE: 1/-5-19DP SUBCONTRACTOR PES PERSONNEL: 9.89.003 SHEET NO. 10.53

## INJECTION INTERVALS/VOLUMES

Time Stop Depth (bgs) Meter (Start) Meter (End) Actual Vol. (gal) Note  38 10030 10130 100  736 32 10130 10230 100  28 10230 10530 300  22 10530 10830 300  14 10830 11,030 200	S
736 32 10130 10230 100 28 10230 10530 300 22 10530 10930 300	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
$7$ 28 10 230 10530 300 $\frac{1}{7}$ 22 10 530 10930 300	
t 943 22 10530 10830 300	
9/13	
143 18 10830 11,030 200	
Total Volume (gal): / OOO	
38 10030 10130 100	
738 32 10130 10230 100	
77 10 520 10830 300	
944 18 10830 11030 200	
Total Volume (gal): 1000	
38 10080 10180 100	
739 32 10180 10280 100	
9 28 10280 10580 300	
72 10 580 10 940 300	
0944 18 10880 11080 200	
Total Volume (gal): / 000	
38 10030 10130 100	
741 32 10130 10230 100	
28 10 220 10 530 200	
22 10530 10830 300	
1)954 18 10830 11030 200	
Total Volume (gal): 1000	
38 10030 10130 100	
7 43 32 10130 10230 100	
1 28 10230 10530 300	
955 18 10 930 11 030 200	
Total Volume (gal): 1000	
0.6 10.02 10.01 10.0	
22 10 530 10 83 0 300	
95) 18 10836 11030 200	
Total Volume (gal): / 000	

SHEET TOTAL (gal): 6,000

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME: CHAAP 2019 OU1 RAO Injection PROJECT NO. 60565355

INJECTION TRANSECT 7-12 DATE: 11-5-19DP SUBCONTRACTOR PES PERSONNEL: 11-5-19AMENDMENT/PERCENT CONCENTRATION: 11-5-19 SHEET NO. 11-5-19 SHEET NO. 11-5-19

### INJECTION INTERVALS/VOLUMES

	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	11030	11130	100	
	11211	32	11 130	11230	100	
12-AR	1024	28	11 230	11530	300	
13 AG		22	11 530	11830	300	
19	1221	18	11 830	12030	200	
. \				Total Volume (gal):	1000	
		38	11030	11130	100	
	1025	32	11 (30	11230	100	
14PE	1	28	11 230	11530	300	
1400	1221	22	11 530	11830	300	
20	12-	18	11 830	12030	200	
				Total Volume (gal):	1000	
T <sub>a</sub>	7	38	11080	11180	100	
	1027	32	11 180	11280	100	
15 Ax	, ,	28	11 280	11580	300	
$\mathcal{P}$	1220	22	11 580	11880	300	
21		18	11 880	12080	200	
				Total Volume (gal):	1000	
	- 24	38	11030	11/2030	100	
	1029	32	11 130	11 230	100	
۱۰۰۰ ۱		28	11230	11530	300	
Ltona [	1230	22	11530	11830	300	
16 mm -		18	11830	12080 30	200	<u> </u>
22		8	-	Total Volume (gal):	1000	an
	21	38	11030	11130	10004	#+ 100
	1031	32	11 130	11236	100	
17 ML	·	28	11 230	11330 AR	45300	
		22	11530	11830 AM	H 300	
23	1227	18	11830	12030 AM	12030 200	
	·			Total Volume (gal):	1000	
	110	38	11 030	11130	11 100	
O AL	1032	32	11130	11230 BK	1 100	
18 AL		28	11 230	11530	11 300	
, , , , , , , , , , , , , , , , , , ,	. 2 2 11	22	11530	11830	1 300	
24	1224	18	11830	12030	12 200	

SHEET TOTAL (gal): 6,000

### **GENERAL INFORMATION**

SITE NAME: CHAAP 2019 OU1 RAO Injection PROJECT NO. 60565355

INJECTION TRANSECT T-13 DATE: 11-5-19DP SUBCONTRACTOR PES PERSONNEL: 11-5-19AMENDMENT / PERCENT CONCENTRATION: 9.890 W 13 SHEET NO. 30+3

# INJECTION INTERVALS/VOLUMES

Point #	Time Start /		<u> </u>	Ι —		
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	1301	36	12030	12130	100	
	1401	32	12 130	12230	100	
( )	am	28	12 230	12530	300	
13		22	12 530	12 830	300	
• /	1507	18	12830	13030	200	
				Total Volume (gal):	1000	
		38	12030	12130	100	
	1302	32	12130	12230	100	
1/1		28	12230	12 530	300	
14	ر . ـــر ،	22	12530	12830	300	· -
	1514	18	12-830	13030	200	
			-	Total Volume (gal):	1000	
	2 11	38	12080	12180	100	
	1304	32	12 180	12280	100	
15		28	12280	12580	300	
15		22	12580	12 880	300	
	1507	18	12.880	13 080	200	
				Total Volume (gal):	1000	
	1305	34	12030	12 130	100	
		32	12130	12230	100	
r 1		28	12 230	12530	300	
16		22	12530	1288030	300	
	1526	18	12 88030	130830	200	
				Total Volume (gal):	1000	
-		34	12030	12130	100	
	1306	32	12130	12230	100	
17	1 1 100	28	12230	12530	300	
1 (		22	12530	12830	300	1966
	1523	18	12830	13 030	200	T.
				Total Volume (gal):	1000	13311
		38	12030	12/30	100	
	1307	32	12-130	12230	100	
14	' '	28	12.230	12530	300	
1		22	12530	12830	300	
	1523	18	12830	13 030	200	
		, , , , , , , , , , , , , , , , , , ,		Total Volume (gal):	1000	

SHEET TOTAL (gal): 6,000

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-TII	DATE:	11-06-19
DP SUBCONTRACTOR	PES	PERSONNEL:	TY MM
AMENDMENT / PERCE	NT CONCENTRATION: 9.8% W	SHEET NO.	1 of 2

### INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	13,040	13,140	100	
	0835	33	131140	13,240	100	
114	00011	28	13,240	13, 540	300	-
48	3		13,540	13,840	300	
	1030	23	13,840	14,040	200	
				Total Volume (gal):	1000	
		38	13.030	13,130	100	
	0837	33	13,130	13,230	160	
117	000,	25	13,230	13, 530	300	
47	- 0	23	13,530	13,830	306	
	1032	18	13,830	14,030	200	
				Total Volume (gal):	1000	
		38	13,030	13,130	100	
	0839	33	13,130	13,230	100	
130		28 23	13,230	13,530	300	
46	1034	23	13, 530	13,830	300	
10		18	13,830	14,030	200	
	100.			Total Volume (gal):	1000	
	4.4.1.1	36	13:050	13,150	100	
	0841	33	13,150	13, 250	100	
45		28	13,250	13,550	300	
	] .	23	13,550	13,850	300	
	1036	18	13,850	14,050	200	
			· -	Total Volume (gal):	1000	
		38	13,050	13,150	100	
1.1.1	0843	33	13,150	13,250	100	
44		28	13,250	13,550	300	
		23	13, 150	13,850	300	
	1038	18	13,850	14,050	200	
				Total Volume (gal):	1000	
	1 = = 1	38 33	13,050	13,150	100	<del>_</del>
_	0845		13,190	13,250	100	
43		28	13, 250	13,550	300	
-1)	1 10110	23	13,550	13,850	300	
	1040	18	13,850	14,050	200	
				Total Volume (gal):	1000	

SHEET TOTAL (gal): 000

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO. 60565355
INJECTION TRANSECT	EW7-T10	DATE: 11-06-19
DP SUBCONTRACTOR	PES	PERSONNEL: TY MM
AMENDMENT / PERCE	NT CONCENTRATION: 9.8% WB	SHEET NO. 2 0 F 2

### INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	, .	38	14050	14150	100	, w <sub>1</sub> 2, 22, 1
	100	33	14150	14250	100	- W 25
48		28	14250	14550	300	
70		23	14550	14850	300	
	1315	18	14850	15050	200	
	,			Total Volume (gal):	1000	
		38	14050	14150	100	
	1102	33	14150	14250	100	
117	1102	28	14250	14550	300	
47		23	14550	14850	300	
	1318	18	14850	15050	200	
	,			Total Volume (gal):	1000	
		38	14050	14150	100	
	1100	33	14150	14250	100	
110	1104	28	14250	14550	300	
46	1321	23	14550	14350	300	
		18	14850	15040	200	
				Total Volume (gal):	1000	
		38	14030	14130	100	
	1106	33	14130	14230	100	,
45	1,00	28	14230	14530	300	
1. 7	1001	23	14530	14830	300	
	1324	18	14830	17030	200	
				Total Volume (gal):	1000	
111		38 33	14040	14140	100	
44	1108	33	14140	14240	100	
WZ	1100	28	14740	14540	300	
		23	14540	14840	300	,
	1327	18	14840	14040	200	
	100.1			Total Volume (gal):	1000	
		38	14040	14140	100	
	1110	33	14140	14240	100	
117		28	14240	14540	300	
45		23	14540	14840	300	
1	1330	18	14840	15040	200	
	1000	, —		Total Volume (gal):	1000	

SHEET TOTAL (gal): (e)

GENERAL NOTES:

## **GENERAL INFORMATION**

SITE NAME: CHAAP 2019 OU	J1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-11	DATE:	11-6-19
DP SUBCONTRACTOR	PES	PERSONNEL:	BR
AMENDMENT / PERCENT CONCENTRATION	9,890 l	W13 SHEET NO.	1 of 3

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Donale (book	Martin (Charle)	Mary (E. D.		
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	727	38	13030	13 130		
•		32	13 130	13 230	100	
	_	28	13 230	13 530	300	
į.	917	22	13 530	13 830	300	
	937	18	13830	14 030	200	
				Total Volume (gal):	1000	
	224	38	13 030	13 130	1.00	
	728	32	13 130	13 230	100	
		28	13 230	13 530	300	
2		22	13 530	13830	300	
_	938	18	13 830	14030	200	
				Total Volume (gal):	1000	
		38	13080	131880	100	
	729	32	13 180	13247,0	100	
	'	28	13 280	135236	300	-
3		22	13580	138580	300	
7	940	18	143880	14,080	200	•
·	1 10		n	Total Volume (gal):	1000	
	20	38	13030	13 130	100	
	731	32	13130	13 230 m	100	
1.	( ) (	28	13 230	13 53030	300	
Ц		22	13 5 48 30	13 830	300	
)	944	18	13 88030	14 030	200	
	117	/ 72	117700030	Total Volume (gal):	1000	
	+	01	12020	13130		
	733	38 32	13/30		100	
_	' ' '	l '		13 230	100	
5		28	13230	13530	300	
J	943	22	13530	13830	300	_
	111	18	13830	14030	200	
_		4	12.02.	Total Volume (gal):	1000	
	231	34	13030	13 130	100	
	735	32	13130	13 230	100	
1		24	13230	13 530	300	
6	946	22	13530	13 830	300	
	1946	14	13830	14 030	100	
				Total Volume (gal):	1000	

0915-0920 vanout of 9 As.

SHEET TOTAL (gal): 6000

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME: C	HAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-10	DATE:	11-6-19
DP SUBCONTRACTOR	PES	PERSONNEL:	Rhe
AMENDMENT / PERCENT	CONCENTRATION: 9,89 WB	3 SHEET NO.	20f3

## INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	ina	- Re-	14030	14.130	100	
•	1002	38/2	14 130	14 230	100	
1		28	14230	14 530	300	
•		22 18	14 530	14 830	300	
	1151	18	14830	15030	200	
				Total Volume (gal):	1000	
		38	14030	14 130	100	
	1005	32	14130	14 230	100	
2		28	14230	14 530	300	
		22	14530	14 830	300	
	1152	18	14830	15030	200	
				Total Volume (gal):	1000	
		38	14080	14180	100	
	1006	32	14180	14 280	100	
1		28	14 280	14 580	300	
3	1153	22	14 580	14 880	300	
		18	14 280	15030	200	
				Total Volume (gal):	1000	·
	1015	38	14030	14130	100	
, ,		34	14130	14 230	100	
4		28	14230	14530	300	
·		22	14 530	14 830	300	
	1159	18	14830	15030	200	
	'''		17.070	Total Volume (gal):	1000	
		38	14030	14 130	100	
	1008	34	14130	14 230	1.00	
5	1000	28	14 230	14 530	300	-
	100	22	14 530	14 830	300	
	1205	18	14830	15030	200	
			111 0 10	Total Volume (gal):	1000	
		38	14030	14 130	100	
ſ	11010	34	14130	14 230	100	
10	1010	28	14230	14530	300	
		22	14530	14830	300	
	1 10 00			<del></del>	700	
	1202	18	14931)	15050	200	

SHEET TOTAL (gal): 6000

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO. 60565355
INJECTION TRANSECT	T-10	DATE: 11-6-19
DP SUBCONTRACTOR	PES	PERSONNEL: A K
AMENDMENT / PERCE	ENT CONCENTRATION: 9.89, WB	SHEET NO. 30 + 3

### INJECTION INTERVALS/VOLUMES

Point #	Time Start /		<u> </u>			
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	1 //	38	15030	15 838	100	
127	1224	32	15 130	15230	100	
		28	15 230	15530	300	
<i>  7</i>		22	15 530	15830	300	
•	1437	18	15830	15830	290	
			-	Total Volume (gal):	1090	
	1000	38	15030	15130	100	
	1225	32	15130	15230	100	
$\alpha$		28	15230	15530	300	
8	1110-	22	15 530	15830	300	
	(437	18	15830	16120	290	
				Total Volume (gal):	1090	
	0.00	38	15080	15 180	100	
	1226	32	15 180	15280	100	
G		28	15 290	15580	33,00	
7	1437	22	15 580	15880 mu	300	
•		18	15880	16080120	240	
			<u> </u>	Total Volume (gal):	1040	
10	- 02	38	15030	15130	100	
	1227		15 130	15230	100	
1 15	'	32 28	15 230	15530	300	
10	ル.つ1つ	22	15 530	15830 N	300	•
	+ <del>75+</del>	22	15830	16030120	290	
	n 1737 1437			Total Volume (gal):	1090	
	0.26	38	15030	15130	100	
	1229	32	15130	15230	100	
11		28	15230	15 530	300	
1 [		22	15530	15830	300	
	1437	18	15830	16120	290	
				Total Volume (gal):	1090	
	1021	38	15030	15 130	100	
	1231	32	15 130	15230	100	
12	'	28	15230	15530	300	
1 -		22	15830530	15830	300	· <del>-</del>
	1437	18	15830	16120	290	
	va.			Total Volume (gal):	1090	
	<u> </u>			(84-7)		

SHEET TOTAL (gal): 6, 490

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injecti	on	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-	TII	DATE:	11-11-19
DP SUBCONTRACTOR	PES		PERSONNEL:	TY MM
AMENDMENT / PERCE	NT CONCENTRATION:	9.8% WB	SHEET NO.	1041

## INJECTION INTERVALS/VOLUMES

42	Time Stop	Depth (bgs)				
42		38	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
42	1408	33	15140	15240	100	
日人	1900	28	15240	15540	300	
v		23	15540	15840	300	<del></del>
	1614		11010	111010	000	
	1019			Total Volume (gal):	800	<del></del>
		38	15040	19140	100	•
	1410	33	19140	15240	100	
111		28	15290	15540	300	
41	10.00	23	19940	17840	300	
	1016					
	1010			Total Volume (gal):	800	122
		38	19030	15130	100	
	1412	33	15130	15230	100	
	, -, 1, 2,	28	15230	15530	300	
40	T	23	15530	15830	300	
10	1618					
				Total Volume (gal):	800	
		38	15050	15150	100	
	1414	33	15150	15250	100	
20	7-71-0	28	15250	15550	300	
39		23	ITAMO	19890	300	
	1620					
	1020			Total Volume (gal):	800	
		38	15050	15150	100	
	1416	53	15150	15250	100	
38	1910	28	15250	15550	300	
20		23	15550	15850	300	
	1622					·
	1000.			Total Volume (gal):	800	
		38	15050	15150	100	
	1418	33	15150	19250	100	
		28.	15250	19550	300	
37		23	15550	15850	300	
01	1624					
				Total Volume (gal):	800	
				EET TOTAL (gal):	4800	

**GENERAL NOTES:** 

Planned Amendment Volume (gals) (deep to shallow)

## GENERAL INFORMATION

SITE NAME: C	HAAP 2019 OU1 RAO Injection	PROJECT NO. <b>60565355</b>
INJECTION TRANSECT	T-11	DATE: 11-11-19
DP SUBCONTRACTOR	PES	PERSONNEL: A MZ
AMENDMENT / PERCENT	CONCENTRATION: 9.89, W B	SHEET NO. 10f1

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	A 3. (Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	186120	14 220	100	
	1508	32 AL		14 320	100	7/80/
7	", " "	707	186320	16 620	300	
T			14620	16 920	7- (/	
		1,000	186920	17120		
			110100	Total Volume (gal):	500	EMETRI
		38	16/20	14220	100	
	1509	32	14220	14320	100	
$\bigcirc$	1701	28	16320	14620	300	
9		22	16620	14 920	1 1000	
$\mathcal{O}$		18	16920	17120		
				Total Volume (gal):	500	
£		38	14120	14 220	100	
	1569	32	14220	16320	100	
$\alpha$	1509	28	14 320	14620	300	
9		22	16620	16920		
		18	16920	17 120	0	
				Total Volume (gal):	500	
65		38	16120	14220	100	
	1510	32	14220	14320	100	0000
10	1710	28	16 320	16620	300	
10		22	16620	16920		
		18	14920	17120		***
				Total Volume (gal):	500	
		38	14120	16220	100	111112
,	1510	32	14220	14320	100	
[]		28	16320	16 620	300	
11		22	16620	16920		
		18	16920	17 120		
2000	71823			Total Volume (gal):	500	
	7	38	16120	16220	100	
( ^)	1512		16220	16 320	100	
1			14 320	16 620	300	
t		22	16626	16920	30	
		18	16920	17120		
				Total Volume (gal):	500	

SHEET TOTAL (gal): 3,000

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	on	PROJECT NO.	60565355
INJECTION TRANSECT	EW7	TII	DATE:	11-12-19
DP SUBCONTRACTOR	PES		PERSONNEL:	TY MM
AMENDMENT / PERCE	NT CONCENTRATION:	9.8% WB	SHEET NO.	1092

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
90001 100		18	15040	16040	200	Tiotes
	1224		8131111			
42				19		
	1246	1000		Total Volume (gal):	200	
		18	15840	16040	200	est out about the live
	1226					
41			-			
71	12114				-	0.545
	1248		L	Total Volume (gal):	200	799
		18	15830	10030	200	
	1228					*
40						
910	10-0		l:			
	1250			Total Volume (gal):	200	
		18	15550	16050	200	
	1230					
39						
	1252		-			
	12112			Total Volume (gal):	200	
		18	15850	16050	200	
	1232					4-5
38						
50	1254					
-	17,1-1		5 % #5 200 %	Total Volume (gal):	200	7,000
		18	15850	16050	200	nel .
New St	1234					
37						
0.	1256					
	1 47 7 69		- 100	Total Volume (gal):	200	

SHEET TOTAL (gal): 1200

GENERAL NOTES:

## **GENERAL INFORMATION**

SITE NAME: CHAAP 2019 OU1 RAO Injection PROJECT NO. 60565355

INJECTION TRANSECT EW7-T10 DATE: 11-12-19

DP SUBCONTRACTOR PES PERSONNEL: TY MM

AMENDMENT / PERCENT CONCENTRATION: 9.8% WB SHEET NO. 2 of 2

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
***********	·	38	16050	10190	100	
	1320	33	16150	16250	100	
/10	1520	28	16250	16950	300	
42		23	16550	16850	300	
	11,20	18	16850	17050	200	
ana	1620			Total Volume (gal):	1000	
	<u> </u>	38 33	16050	10150	160	
si d	1415	<i>33</i>	16150	16250	100	
1 1 1		28	16250	16550	300	
		23	16750	16850	300	
	1622	18	16850	17050	200	
K	1020			Total Volume (gal):	1000	
3 123 12		3 <b>8</b>	16050	16150	100	,
	1322	33	16150	16250	160	
110		28	16250	16550	300	
90		23	110000	16850	300	
	1624	18	16850	17050	200	
	102-1			Total Volume (gal):	1000	
		3 <b>5</b>	16030	160 500	20	pulled rod
	1325	33	16050	16230	180	
29		28	16230	16530	300	
39		23	6530	16830	300	
	626	18	16830	17030	200	
				Total Volume (gal):	1000	
	1000	35	16040	16140	100	
	1327	33	16140	16240	100	
25	.0711	28	16240	16540	300	
38	1100	23	16540	16840	300	
	1628	18	16840	17040	200	
				Total Volume (gal):	1000	
	100	38	10040	16060	20	Pulled vod
	1330	33	10000	16240	180	
27		28	16240	16540	300	
31	1,	23	16540	16840	300	
	1630	18	16840	17040	200	
				Total Volume (gal):	1000	

SHEET TOTAL (gal):

GENERAL NOTES:

Planned Amendment Volume (gals) (deep to shallow)

1335 Redvilled point 41, tip not coming off 1500 pump, out of oil, had to vun to snop 1515 Resumed pumping

100, 100, 300, 300, 200

## **GENERAL INFORMATION**

SITE NAME:	<b>CHAAP 2019 OU1 R</b>	AO Injection		PROJECT NO.	60565355	
INJECTION TRANSECT		T-11		DATE:	11-12-19	
DP SUBCONTRACTOR	-	PES		PERSONNEL:	BR	
AMENDMENT / PERCE	NT CONCENTR ATION:		9.89 WB	SHEET NO	1 of 2	

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	10.00	22	16620	16920	300	
7	1252	18	16920	17/20	200	
7	1231					
	1336			Total Volume (gal):	500	
	20	22	16620	16920	300	
<i>C</i> .	1253	18	16920	17120	200	
8	1113					
	1333			Total Volume (gal):	500	
	7 w .	22	16620	11920	300	
	1254	18	16920	17120	200	
9	12261					
	1338	<b></b>	l	Total Volume (gal):	500	
	-	22	16620	16920	300	<u> </u>
	1257	18	16920	17120	200	
10	12111					
	1345		,	Total Volume (gal):	500	
	. %>	22	16620	16920	300	<del> </del>
	1259	18	16920	17120	200	
11	12.4/			-		
	1346			Total Volume (gal):	500	
		22	16620	16920	300	
12-	1302	18	16920	17120	200	
1	10111			Ш		
	1346			Total Volume (gal):	500	

SHEET TOTAL (gal): 3000

### **GENERAL INFORMATION**

SITE NAME: CHAAP 2019 OU1 RAO Injection PROJECT NO. 60565355

INJECTION TRANSECT 7-11DATE: 11-12-19DP SUBCONTRACTOR PES PERSONNEL: 7AMENDMENT / PERCENT CONCENTRATION: 9,89 WB SHEET NO. 2 of 2

## INJECTION INTERVALS/VOLUMES

Point #	Time Start /		Ī			
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	1426	38	17120	17120	100	
10	176	32	17220	17 320	100	
13		28	17 320	17 620	300	
1/	1.5	22	17620	17926		
	1553	18	17920	18120		
	. /			Total Volume (gal):	500	
		38	17120	17 220	100	
	1427	32	17220	17320	100	
	1101	. 28	17 320	17620	300	
14		22	17620	17920		
1 1	1554	18	17920	18120		
	1 ( ) )			Total Volume (gal):	500	
- AMIC		38	17120	17220	100	
	1428	32	17220	17320	100	
,	1900	28	17320	17620	300	
15		22	17 620	17920		
i )	1555	18	17920	18120	1.00 A	
	/ ) ) )		11, 100	Total Volume (gal):	500	
		38	17/20	17220	100	
	1429	32	17 220	17320	100	
1 /	' ' '	28	17320	17620	300	
16		22	17620	17920	700	
1 0	1558	18	17920	19,120		
	1770		117960	Total Volume (gal):	500	
		38	17120	17220	100	
	1430	32	17 220	17 320	100	
	11/0	28		17620		
1+			17320		300	
	1/ 01	22	17620	17920		
	1601	14	17920	16120	C-0.4	
			T 12 12	Total Volume (gal):	500	
	11127	38	17120	17220	100	
10	1432	3 2	17220	17320	100	
		24	17320	17620	300	
18	1559	22	17620	17920		
	17//	18	17 920	18120		
				Total Volume (gal):	500	

SHEET TOTAL (gal): 3,000

#### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-T10	DATE:	11-13-19
DP SUBCONTRACTOR	PES	PERSONNEL:	TY MM

AMENDMENT / PERCENT CONCENTRATION:

98% WB SHEET NO. 1073

### INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
···	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	14050	19070	20	Pulled Rod
	0730	33	19070	19250	180	
21		28	19250	14550	300	
36	1000	23	14550	14850	300	
	1000	18	19850	18050	200	
				Total Volume (gal):	1000	
		38	14050	19060	10	Pulled 1700
	0910	33	14060	14250	190	
		25	19250	19550	300	
35		23	14550	19850	300	
	1005	. 18	19850	18050	200	
				Total Volume (gal):	1000	
		38	17050	14190	100	
	0735	33	14150	19250	100	
	013.1	28	19250	19550	300	
34	1007	23	9550	4850	300	
		18	19850	18050	200	
- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1				Total Volume (gal):	1000	
	0740	38	19030	19130	100	
		33	19130	191230	106	
		28	19230	9530	300	
33		23	19530	19830	300	
	1009	18	197830	18030	200	
	1001			Total Volume (gal):	1000	
		38 38	19040	19140	100	
	0742	33	19140	17240	100	
$\sim$ 0	0112	28	19240	19540	300	
32		23	14540	17840	300	
	1011	18	19840	18040	200	
	10.1			Total Volume (gal):	1000	
	10	38	19040	19140	100	
	0745	33	19140	17240	100	
21		28	14240	19540	300	
0		23	19540	19840	300	
	1013	18	19840	18040	200	
	1015			Total Volume (gal):	1000	

SHEET TOTAL (gal):

600

GENERAL NOTES:

Pt. 36; tip was off, still wouldn't flow Pt. 35: Tip not coming off, rednilled. Pt. 35: tip off, still was not flowing

Planned Amendment Volume (gals) (deep to shallow)

100, 100, 300, 300, 200

### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565	355
INJECTION TRANSECT	EW7-TII	DATE:	11-1	3-10
DP SUBCONTRACTOR	PES	PERSONNEL:	TY	MM
	_			

AMENDMENT / PERCENT CONCENTRATION:

9.8% WB SHEET NO. 20+3

### INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		28	18040	18140	100	110.00
	LIAM	33	18140	18240	100	
0 :	1100	28	18240	18540	300	
36		23	18540	18840	300	
	1310	18	18840	19040	200	
	1010			Total Volume (gal):	1000	
		38	18090	18140	100	
	1102	33	18140	18240	100	
	1105	28	18240	18540	300	
35	ft	23	18540	18840	300	
	1313	18	188410	19040	200	-
	1313			Total Volume (gal):	1000	
		38	18030	18050	20	Rod pulled
7	1104	33	18050	18230	180	
34	1,0	28	18230	18530	300	
	1316	23	18530	18830	300	
		18	18830	19030	200	
				Total Volume (gal):	1000	
	1100	38	18050	18150	100	
2		33	18150	18250	100	
33		28	18250	18550	300	
		23	18550	18850	300	
	1319	18	18850	19050	200	
				Total Volume (gal):	1000	···
		38	18050	18150	100	
1977-1	1108	33	18150	18250	100	
32		28	18250	18550	300	
) [		23	18550	18850	300	
	1322	10	18850	19050	200	
				Total Volume (gal):	1000	
197		38	18050	18150	100	
	1110	33	18150	18250	100	
5		28	18250	18550	300	
	100/	23	18550	18850	300	
	1325	18	18850	19050	200	
200 II			,	Total Volume (gal):	1000	

SHEET TOTAL (gal):

GENERAL NOTES:

Planned Amendment Volume (gals) (deep to shallow)

Pt 34 Pulled rod, tip wass off and no amendment flow 100, 100, 300, 300, 200

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injecti	on	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-	Tq	DATE:	11-13-19
DP SUBCONTRACTOR	PES		PERSONNEL:	TYMM
AMENDMENT / PERCE	NT CONCENTRATION:	9.8% WB	SHEET NO.	3073

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Motor (End)	Astrol Vol. (cal)	Netes
	Time Stop	38	19040	Meter (End)	Actual Vol. (gal)	Notes
	1420	33	19140	19240	100	
48	1720	28	19240	19540	300	
40	-	13	19540	19840	300	
	1612	10	11/140	1 1040	300	
	1012			Total Volume (gal):	800	
		38	19040	19140	100	**
	11100	33	19140	19240	100	
47	1422	28	19240		300	**
91		23	19540	19840	300	
	1614	+8				
	1011			Total Volume (gal):	800	
		38	19030	19130	100	
pe <sup>Town</sup>	1424	33	19130	19230	100	
/1/2	11727	28	19230	19530	300	
46		23	19130	19830	300	
	1616	18				100
	10.10			Total Volume (gal):	800	
	1426	38	19050	19150	100	1000
		33	19150	19250	100	
45		28	19250	19550	300	E9_#
911)		28	19000	19850	360	
	1618	18				
	1010			Total Volume (gal):	800	
		38	19050	19150	100	
. •	1428	33	19150	19250	100	
44	1-120	25	19250	19550	300	1.00
- 1 1		23	19550	19850	300	
	1620	+8	ness 2			
				Total Volume (gal):	800	
		38	19050	19150	100	77 - 38.0
	11120	33	19150	19250	100	
45	1430	28	19250	19550	300	
-   -		28	19550	19850	300	
	1622	18				
				Total Volume (gal):	800	

SHEET TOTAL (gal): 4800

GENERAL NOTES:

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO. 60565355
INJECTION TRANSECT	T-11	DATE: 11-13-19
DP SUBCONTRACTOR	PES	PERSONNEL: A JZ
AMENDMENT / PERCENT	CONCENTRATION: 9,890 WI	3 SHEET NO. 1 o € 3

## INJECTION INTERVALS/VOLUMES

Point #	Time Start /	D 444				
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	7-5-4	22_	17620	17920	300	
	7-59	18	17920	18120	200	
13	00					
,	838			T. 1V.1	manus y samus	
	<u> </u>	2.0	112 ( = 1	Total Volume (gal):	500	
	7/-7	22	17620	17920	300	
	757	7 0	17920	18120	200	
14	1103					
(	837			Total Volume (gal):	500	
		22	17620	17920	300	
	755	18	17920	18120	200	
11-	( ) 5		11100	13120		
15	0,20		ļ			
	839			Total Volume (gal):	1-00	
<del></del> .		0 0	17620		500	<del></del>
	753	2.2	17920	17920	300	
= 1/	(77	18	17720	18120	200	<del> </del>
16	846					
	876			Total Volume (gal):	500	
	193	22	17620	17920	300	
	751	18	17920	18120	200	
17	751					
•	849					<del></del>
				Total Volume (gal):	500	
		22	17620	17920	300	
17	750	14	17920	18120	206	
18					<del></del>	
	851					
				Total Volume (gal):	500	

SHEET TOTAL (gal): 3 000

GENERAL NOTES:

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-10	DATE:	11-13-19
DP SUBCONTRACTOR	PES	PERSONNEL:	BR
AMENDMENT / PERCE	NT CONCENTRATION: 9,89	WB SHEET NO.	2053

### INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	18120	18220	100	
	928	32	18 220	18 320	100	
13		28	18320	18 620	300	-
1 /	Pro Wester	22	18620	18920	300	3
	1150	18	18920	19120	200	
				Total Volume (gal):	1,000	
		38	18120	18220	100	
	929	32	18220	18320	100	
1/3		28	18320	18620	300	
14		22	19620	18 920	300	
	1149	18	18926	19 120	200	
2.				Total Volume (gal):	1,000	
		38	18120	18220	100	
	930	32	18220	18 320	100	
	170	28	18 320	18 620	300	
15	1150	22	18620	18920	300	
' /		18	18920	19120	200	
	11110		7	Total Volume (gal):	1,000	
		38	18120	18220	100	
	932	32	18 220	18320	100	
		28	18 320	18 620	300	
16	1206	22	18 620	18920	300	
7 0	1206 934 m	18	18920	19120	200	
	7 / //		10160	Total Volume (gal):	1,000	
		38	18120	18220	100	
	Gall	32	18220	18 320	100	
17	934	28	18 320	18620	300	
17		22	18620	18920	300	
	1202	18	18920	19120	200	2
	120	. , ,	110 100	Total Volume (gal):	1,000	
		38	14120	18220		
	1021	32		18320	100	
\ (1	936		18 220		100	
\ 7		28 22	18320	18620	300	
·	1158		18 620	18920	300	
	1 / 1	18	18920	19 120	200	
- X				Total Volume (gal):	1,000	

SHEET TOTAL (gal): 6,000

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME: CI	HAAP 2019 OU1 RAO Injection	PROJECT NO. 60565355
INJECTION TRANSECT	T-10	DATE: 11-13-19
DP SUBCONTRACTOR	PES	PERSONNEL: Mu
AMENDMENT/PERCENT (	concentration: 9.89 Wi	3 SHEET NO. 2 2 3 0 + 3

## INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	124.5	38	19120	19220	100	
	1307	32	19220	19 320	100	
19		28	19320	19620	300	
/ 1		22	19620	19920	300	
	1	18	19920	20120	200	
			· .	Total Volume (gal):	1000	
		38	19120	19220	100	2 Attempts
	1447	32	19220	19320	100	Toget Tipot
20		28	19320	19620	300	Acdrilled 3
		22	19 620	19920	300	times
		14	19920	20120	200	
				Total Volume (gal):	1000	
		38	19120	19220	100	
	1310	32	19220	19320	100	-
$\alpha$ 1		28	19 320	19 620	300	
21		22	19620	19920	300	
•		18	19920	20120	200	
	:		177.00	Total Volume (gal):	1000	
		38	19120	19 220	100	
	1312	32	19220	19320	100	
17	' / '	28	19320	19620	300	
22		22	19620	19920	300	
		18	19920	20/20	h 2.00	
			11 12	Total Volume (gal):	1000	
		38	19120 1	4220		
	[313]		19 220	19320	1900	
23	' / '	32 28	19 320	19620	300	
6		22	19 620	19920	300	
		18	19 920	20120	1200	
		10	117 9 60	Total Volume (gal):	M# 1000	
		38	19120	19220	1.00	
,	1314	32	19220	19320	100	
7 (1	' "	28	19 320		300	
1		22	19 620	19620		
				20120	300 200	
		18	19920	Total Volume (gal):		
	<u> </u>			Total volume (gal):	1000	

SHEET TOTAL (gal): 6000

GENERAL NOTES:

#### **GENERAL INFORMATION** CHAAP 2019 OU1 RAO Injection SITE NAME: PROJECT NO. 60565355 DATE: 11-14-19 EW7- T09 INJECTION TRANSECT PERSONNEL: TV MM DP SUBCONTRACTOR PES 9.8% WB SHEET NO. 107 AMENDMENT / PERCENT CONCENTRATION: INJECTION INTERVALS/VOLUMES Point # Time Start / Time Stop Depth (bgs) Meter (Start) Meter (End) Actual Vol. (gal) Notes 19840 20040 200 0754 0830 Total Volume (gal) 200 18 20040 9840 200 0756 1832 Total Volume (gal): 200 18 19830 20030 200 0758 0834 Total Volume (gal): 200 18 9850 20050 0800 0836 Total Volume (gal): 200 18 19850 20050 0802 0838 200 Total Volume (gal): 18 19850 20050 0804 0840 Total Volume (gal): 200

**GENERAL NOTES:** 

Planned Amendment Volume (gals) (deep to shallow)

SHEET TOTAL (gal):

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection		PROJECT NO.	60565355
INJECTION TRANSECT	EW7- 7	8000 TO8	DATE:	11-14-19
DP SUBCONTRACTOR	PES	8	PERSONNEL:	TIMM
AMENDMENT / PERCE	NT CONCENTRATION:	9.8% WB	SHEET NO.	2044

## INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	0900	38	20050	20150	100	
110		33	20150	20250	100	
48		28	20240	20550	300	
	1,125	23	20550	20850	300	
	1135	18	20850	21050	200	
				Total Volume (gal):	1000	
	1	38	20050	20150	100	
	0902	33	20150	20250	100	
117		28	20250	20550	300	
47	1	23	20450	20850	300	
	1137	18	20850	21050	200	
				Total Volume (gal):	1000	
		38	20050	20150	100	
	0904	33	20190	20750	100	
2 1	010	28	20250	20550	300	
46	1139	23	20550	20850	300	
, •		18	20850	21050	200	
				Total Volume (gal):	1000	
		38	20030	20130	100	
	0900	<u>38</u> 33	20130	20230	100	
11		28	20236	20530	300	
45		23	20530	20830	300	
	1 1141	18	20830	21030	200	·····
				Total Volume (gal):	1000	
	1	38	20040	20140	100	-
	0908	33	20140	20240	100	
1 ( )		28	20240	20540	300	
44		23	20540	20840	300	
	1143	18	20840	21040	200	
	11-10			Total Volume (gal):	1000	
112		38	20040	20140	100	
	0910	<u>38</u> 33	20140	20240	100	
		28	20240	20540	300	
43		23	20540	20840	300	······································
	1145	18	20840	21040	200	
	11197	' ()	20040	Total Volume (gal):	1000	
		- W80		Total Volulle (gal):	1000	

SHEET TOTAL (gal): 6000

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355

INJECTION TRANSECT DP SUBCONTRACTOR PERSONNEL:

AMENDMENT / PERCENT CONCENTRATION:

9.8% WB SHEET NO.

INJECTION	INTERV	ERVALS/VOLUMI		

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	21050	21150	100	1,0,00
	1215	33	21150	21250	100	
42	10111	28	21250	21550	306	
40		23	21550	21850	300	
	1500	18	21850	22050	200	
		·		Total Volume (gal):	1000	
		38	21050	21190	100	***
	1217	33	21150	21250	100	
4	1217	28	21250	21550	300	-
		23	21550	22850	300	
	1502	18	2/850	22050	200	
	1 10 0			Total Volume (gal):	1000	
		38	21050	21150	100	
	1719	33	21150	21250	100	
40	1211	28	21250	21550	300	
90		23	21550	21850	300	
	1500	18	21850	22050	200	
	1			Total Volume (gal):	1000	
	1310	38	21030	21130	100	
	122	33	21130	21230	100	
39	72-	28	21230	21530	300	<u> </u>
		23	21430	21830	300	
	1500	18	21830	22030	200	
- Lawrence	1100	D.		Total Volume (gal):	1000	·
		38	21040	21140	100	
	1223	33	21140	21240	100	
	,	28	21240	21540	300	
38		23	21740	21840	300	
	1508	18	21840	22040	200	
	. , , ,			Total Volume (gal):	1000	
27		38	21040	21140	100	
	1225	33	21140	21240	100	
		28	21240	21540	300	
37		23	21540	21840	300	
	1510	18	21840	22040	200	
	' ' ' '			Total Volume (gal):	1000	

6000 SHEET TOTAL (gal):

GENERAL NOTES:

Planned Amendment Volume (gals) (deep to shallow)

Pt. 39: Redvilled, tip wouldn't come off

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-T09	DATE:	11-14-19
DP SUBCONTRACTOR	PES	PERSONNEL:	TY MM
AMENDMENT / PERCE	ent concentration: 9.8%	US SHEET NO.	4 09 4

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Douth (has)	Moton (Stort)	Motor (End)	Astrol Val. (sel)	N-A
		Depth (bgs)	Meter (Start) 2.20万0	Meter (End)	Actual Vol. (gal)	Notes
	1525	38	ZWNO	12190	100	
2 9	\','			,		
42						
,	1545					
	(1) 41		<u>'</u>	Total Volume (gal):	100	
-		38	22050	22150	100	
	1927					
41	11121					
-11	290					
	1547					
	1 00 1 1			Total Volume (gal):	100	
	1 20	38	22050	22150	100	
	1529					
40				<del></del>		
, 0	1549					
	(,, -, (		<u> </u>	T-1-137.1 - (- 1)	- 0	
		38		Total Volume (gal):	100	
		50	22030	22130	100	
20	1531					
39		e.				<del></del>
	1551					
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			Total Volume (gal):	100	
· · · · · · · · · · · · · · · · · · ·		38	22040	22140	100	
	1533			33110		
28	1933				3	
38						
	1553					
	1			Total Volume (gal):	160	
•		38	22040	22140	100	
	1535					
37						
OI	1-70					
	1500		<u> </u>	Tr. 137.1	10	
	1555		•	Total Volume (gal):	100	

SHEET TOTAL (gal):

GENERAL NOTES:

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	1	PROJECT NO.	60565355
INJECTION TRANSECT	T-11		DATE:	11-14-19
DP SUBCONTRACTOR	PES		PERSONNEL:	AR
AMENDMENT / PERCE	NT CONCENTRATION:	1.8% WB	SHEET NO.	1063

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		7 8	20120	20220	100	
	740	32	20220	20320	100	
10	1 , , ,	28	20320	20620	300	
19		22	20620	20920	300	
	941	18	20 920	21120	200	
	1 / /		1 20 100	Total Volume (gal):	1000	
		36	20120	20220	100	
	741	32	20220	20320	100	
	1 ' ' '	28	20320	20620	300	
20		2.2	20620	20920	300	
	939	18	21,920	21120	200	
		10	100 7	Total Volume (gal):	1000	
		32	20120	20220	100	
	742	32	20220	20320	100	
21	' '	28	20320	20620	300	
21		22	20620	20920	300	
	942	18	20920	21120	200	
•	1 ( -			Total Volume (gal):	1000	
		38	20120	20220	100	
	7411	32	20220	20 326	100	
00	744	28	20320	20620	300	
22		22	20620	20920	300	
	952	18	20920	21/20	200	
				Total Volume (gal):	1800	
		38	20120	20220	100	
	745	32	20220	20326	100	
72	' ' /	20	20320	20620	300	
23		22	20 620	20920	300	
72	951	18	20926	21/20	200	
				Total Volume (gal):	1000	
		38	20120	20 220	100	
2//	746	32	20220	20320	100	
	' '	28	20320	20620	300	
24	0.40	22	20620	20920	300	
	949	1%	20920	21120	200	
	'			Total Volume (gal):	1000	

SHEET TOTAL (gal): 6 000

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injec	tion	PROJECT NO.	60565355
INJECTION TRANSECT	T-10	)	DATE:	11-14-19
DP SUBCONTRACTOR	PES		PERSONNEL:	BB
AMENDMENT / PERCE	NT CONCENTRATION:	9.89 WB	SHEET NO.	20+3

## INJECTION INTERVALS/VOLUMES

Point #	Time Start /		1			
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	21120	21220	100	
	1042	32	21220	21320	100	
25		28	21320	21620	300	
	mas .	22	21620	21920	300	
	1241	19	21920	22120	200	
			•	Total Volume (gal):	10,00	
		38	2/120	21220	100	
	1042	32	21220	21320	100	
0 (.		28	21320	21620	300	
26		22	21620	21920	300	
	1243	18	21920	22120	200	
	1101)			Total Volume (gal):	1000	
		38	21120	21220	100	
	1043	32	21220	21320	100	
27	1047	28	21320	21620	300	
1		22	21620	21920	300	
	1241	18	21920	22/20	200	
	1 ' ' ' '			Total Volume (gal):	1000	
		38	21120	21220	100	
	1045	32	21220	21320	100	
00	1077	28	21320	71620	300	
2%		22	21620	21920	300	<del></del>
	1249	18	21920	22120	200	
				Total Volume (gal):	1000	
		38	21120	21220	100	
	1046	32	21220	21320	100	
29	1076	28	21 320	21620	300	
29		22	21 620	21920	300	
83	1251	18	21 920	22120	200	
			1-1-7-5	Total Volume (gal):	1000	
		38	21120	21220	100	
	1047	32	21220	21320	100	
30 10.	1000	28	21320	21620	300	
		22	21620	21920	300	
	1249	12	21920	22 120	200	
	1'''		161 100	Total Volume (gal):	1000	
			Si	HEET TOTAL (gal):	(1221)	

GENERAL NOTES:

## GENERAL INFORMATION

SITE NAME:	CHAAP 2019 OU1 RAO Injection	on	PROJECT NO.	60565355
INJECTION TRANSECT	T-11		DATE:	11-14-19
DP SUBCONTRACTOR	PES		PERSONNEL:	BR
AMENDMENT / PERCEN	NT CONCENTRATION:	9.89 WB	SHEET NO.	30f 3

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
25	Time stop	38'	22/20	22220	100	11000
	1325	32	22220	22320	100	100, 100
	1760		22320	22620	300	
		28 22	22620	22920	300	
	15714	18	22920	23/20	200	
	1534	18	120 120	Total Volume (gal):	1000	
the other section of the		20	122120	22 2 2 0	100	757,195
	1221	38	22 220	22320	100	
	1326		22 320	22620		
26		28	22626	22920	300	
	152	22		23/20	300	
	1533	18	22920	The second secon	200	
		0.0	102 11 /2	Total Volume (gal):	non	
	1327	38	22120	22220	100	
	1727	32	22220	22320	100	
17-		28	22320	22620	300	
27	1500	22	22620	22920	300	
	1533	18	22920	23/20	200	
100-20-20-20-20-20-20-20-20-20-20-20-20-2			Wheeler of a second	Total Volume (gal):	1000	
	1328	38	22 120	22220	100	
28		32	22220	22320	100	
		32 28	22320	22620	300	
	1539	22	22620	22920	300	
		18	22920	23120	200	
				Total Volume (gal):	1000	
	1329	38	22120	22220	100	
29		32	22220	22320	100	
		28	22320	22-620	300	
	1536	22	22620	22920	300	100%
		18	22920	23120	200	= 10.000
				Total Volume (gal):	1000	
30	1330	38	22120	22120	100	
		32	22220	22320	100	
		28	22320	22620	300	
	1538	22	22620	22920	300	
		18	22920	23/20		
		10	12-120	Total Volume (gal):	200 1000	
				. Out + Oldine (gal).	DATE OF COMMERCE PROPERTY.	
			S	HEET TOTAL (gal):	6000	

GENERAL NOTES:

### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7- TØ9	DATE:	11-15-19
DP SUBCONTRACTOR	PES	PERSONNEL:	TY MM
AMENDMENT / PERCE	NT CONCENTRATION: 9.8% WB	SHEET NO.	1043

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start /					10. 0.40/15
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
37		33	22050	22250	100	
	09 0750	28	22250	22550	300	
	01.70	23	22550	22850	300	
20	1 [	18	22850	23050	200	
	0950			23050		
	0 1.70			Total Volume (gal):	900	
14		33	22150	22250	100	
38	0752	28	27250	22550	300	
2.2	07.70	23	22550	22850	300	
3		18	22850	23050	200	270 100700 100
	0982			23010		
				Total Volume (gal):	900	
- 0		33	22150	22250	100	
39 38	0754	28	22250	22550	300	
ad		23	22550	22850	300	
30		18	22850	23050	200	
~	0954			23050		
				Total Volume (gal):	900	3070000
0	A 2000 8 1100 8	33	22130	22230	100	
40	0756	28	22130	22530	300	
		23	22530	22830	300	
8	0956	18	22830	23030	200	
		•		23030		
				Total Volume (gal):	900	
41	0758	33	22140	22240	100	
		28	27740	22540	300	0.0000
		23	22540	22840	300	
		18	22840	23040	200	
	nara			23040		
	0958			Total Volume (gal):	900	1-1
	0850	33	22140	22240	100	
42			22240	22540	300	
		28	22540	22840	300	112
	1000	18	22840	23040	200	
			J., J. 10			
				Total Volume (gal):	900	(U.S. 2000)
	A		Win 1866	W 10.		

SHEET TOTAL (gal): 5400

Planned Amendment Volume (gals) (deep to shallow)

Pt 41 Redvilled to 33 ft bgs, sand collapsed into rad, 100, 100, 300, 300, 200

no amendment will from

### **GENERAL INFORMATION**

SITE NAME: CHAAP 2019 OU1 RAO Injection PROJECT NO. 60565355

INJECTION TRANSECT EW7-T08 DATE: 11-15-19

DP SUBCONTRACTOR PES PERSONNEL: TY MM

OF SUBCONTRACTOR PES PERSONNEL: TY MM

AMENDMENT / PERCENT CONCENTRATION:

9.8% WB

SHEET NO. 2043

INJECTION	INTERVAL	S/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	Time Stop	38	23050	23150	100	Notes
<b>.</b>		22	23150	23250	100	
	1045	29	23250	23550		
136		33 28 23		23850	300	
	1215	18	23550	24050	300 200	
	1310	10	23000	Total Volume (gal):	1000	
		38	23050	23150	100	
		33	23150	23250	100	
	1047	28	23250	23550	300	
2.		23	23550	23850	300	
35	1210	18	23850	24050	200	
	1312	10	L AUON ()	Total Volume (gal):	1000	
		38	230万0	23070	20	Pulled
	1200		23070	23250	180	1 01100.
	1200	33 28	23250	23550	300	
34	1330	23	23550	23850	300	
		18	23850	24050	200	
	1,500	, -	1 0.0077	Total Volume (gal):	1000	
-	1220	38	23030	23130	100	-
		33	23130	23230	100	
20		28	23230	23 530	360	
33	1335	23	23530	23830	300	
		23	23830	29030	260	
				Total Volume (gal):	1000	
	1050	38	23040	23140	100	
		33	23140	23240	100	
32		28	23240	23540	300	
	1314	23	23540	23840	300	
		18	23846	24040	200	
				Total Volume (gal):	1000	
31	1052	38	23040	23140	100	
		33	23140	23240	100	
		28	23240	23540	300	
	1316	23	23540	23840	300	
		18	23840	24040	200	
				Total Volume (gal):	1000	

SHEET TOTAL (gal):

6000

GENERAL NOTES:

Planned Amendment Volume (gals) (deep to shallow)

Pt. 34+33: Redrilled. Tips would not come off.

100, 100, 300, 300, 200

Pt.34: Rad puried, amendment wouldn't flow

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injecti	ion	PROJECT NO.	60565355
INJECTION TRANSECT	EW7- TO	<b>9</b> 9	DATE:	11-15-19
DP SUBCONTRACTOR	PES		PERSONNEL:	TY MM
AMENDMENT / PERCE	NT CONCENTRATION:	9.8% WB	SHEET NO.	3093

# INJECTION INTERVALS/VOLUMES

Point #	Time Start /					C - W
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	1400	38 33	24040	24140	100	
			24140	24240	100	
_ ,		28	24240	24540	300	
31		23	24540	24840	300	
, ,	1600	18	24840	25040	200	
	1000			Total Volume (gal):	1000	
		38	24040	24140	100	
	1402	33	24140	24240	100	
	102	28	24240	24540	300	
32		<i>a</i> 3	24540	24840	300	,
	1602	18	24840		200	
	1002	· ·		Total Volume (gal):	1000	
		38	24030	24130	100	
	1404	38 33	24130	24230	100	-
	1 1000	28	24230	24530	300	
72	1604	23	24530	24830	300	
33		18	24830	25030	200	
				Total Volume (gal):	1000	
		38	24050	24150	100	
	1406	33	24150	24250	100	
	1900	28	24250	24550	300	
211		23	24550	24850	300	
34	1606	18	24850	25050	200	
	1000	· ·		Total Volume (gal):	1000	
· · · · · · · · · · · · · · · · · · ·	i.	38	24050	24150	100	
	1408	33	24150	74250	100	
	1700	28	24250	24550	300	
· > /		23	24550	24850	300	
35	1008	23 18	24850	25050	200	
•	1000	,,,	0.70	Total Volume (gal):	1000	
		38	24050	24150	100	
	11/11/0	33	24150	24250	100	
	1410	28	24250	24550	300	
36		23	24550		300	
) 4	1610	18	24850	25050	200	
	100	10	2.10110	Total Volume (gal):	1000	
				- Carrie (Bur).		

SHEET TOTAL (gal):

6000

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Inject	tion		PROJECT NO.	60565355
INJECTION TRANSECT	T-9			DATE:	11-15-19
DP SUBCONTRACTOR	PES			PERSONNEL:	Ath
AMENDMENT / PERCE	NT CONCENTRATION:	9.840	WB	SHEET NO.	1 of 3

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	Time Stop	38	23120	23220	100	
	2/6	32	23220	23320	100	
	756	28	23320	23620	300	
1			23620	23920	300	
l	1007	18	23920	24120	200	
	1002	1 8	127920	Total Volume (gal):	1000	<u> </u>
		38	22.21	2-3 220	100	
	757		23120		100	
	175 T	32 28	23 220	23320	300	
7			23320	23620	300	
2	1261	22	23620	23920		
	1001	18	23926	24/20	200	
			Tag.	Total Volume (gal):	1000	
		38	23120	23 220	100	
	810	32	23220	23320	100	
1		28	23320	23620	300	
3	1000	22 18	23620	23920	300	
	1005	18	23920	24120	200	
				Total Volume (gal):	1000	
	0.64	38	23120	23220	100	
	800	32	23220	23320	100	ļ
1 ,		28	23326	23620	300	
4	n 111	22	23620	23 920	300	
	1014	18	23920	24120	200	
				Total Volume (gal):	1000	
		38	23/20	23 220	100	HAD redrill
	902	32	23220	23320	100	once
	10	28	23320	23 620	300	
)		22	23620	23 920	300	
5	1015	18	23926	24120	200	
1013	1000			Total Volume (gal):	1000	
		38	23120	23220	100	
	604	32	23 220	23320	100	
	1 001	28	23 320	23620	300	
		22	23 620	23920	300	
<u> </u>	11014	18	23920	24/20	200	
	1000	10	1-11-0	Total Volume (gal):	1:000	
		<u> </u>		Toma , Statio (gai).	1,000	1

SHEET TOTAL (gal): 6000

## **GENERAL INFORMATION**

SITE NAME: CI	HAAP 2019 OU1 RAO Inje	ction	PROJECT NO	60565355
INJECTION TRANSECT	7-8		DATE:	11-15-19
DP SUBCONTRACTOR	PES		PERSONNEL:	RPR
AMENDMENT / DEDCENT	CONCENTRATION:	9.890 WB	SHEET NO.	20 f 3

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	24120	24220	100	
	11159	32	24220	24 320	100	
1	1059	28	24320	24620	300	
ι		22	24620	24 920	300	
	1307	18	24920	25 120	200	
	170		220	Total Volume (gal):	1000	
	/	38	24120 ale	29219430	Put00 100	Tho workint
	1100	32	24220 130	24320	Be100-1908	44
2	1100	28	24 320 220		300	100
		22	24620	24920	300	100
	1305	18	24920	25120	200	
	1/0/			Total Volume (gal):	1000	
		38	24120	24220	100	
	1102	32	24220	24320	100	
0	1110	28	24320	24620	300	
3		22	24620	24920	300	
,	1308	18	24920	25120	200	
	11/00		12//00	Total Volume (gal):		
		38	24120	24220	100	
	11119	32	24220	24320	100	
1.1	1 1 / ' '	28	24320	24620	300	
4		22	24620	24920	300	
	1318	18	24920	25/20	200	
	1 // /		101100	Total Volume (gal):	1000	
		38	24120	24220	100	
	11115	32	24220	24320	100	
/		28	24320	24620	300	
5	0:-	22	24620	24920	300	
	1317	18	24920	25120	200	
1/1	1///		1-1-1-	Total Volume (gal):		
130		38	24120	24220	100	
	1119	32	24220	24320	100	
	11100	28	24320	24620	300	4-7-1 1-3200 - G
	2 1 1	22	24620	24920	300	
	11316	18	24920	25120	200	
	1 1 1 1 1	1.4	1-1-5-	Total Volume (gal):	THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAME	

SHEET TOTAL (gal): 6000

# GENERAL INFORMATION

SITE NAME: CHAAP 2019 OU1 RAO Injection PROJECT NO. 60565355

INJECTION TRANSECT T - 8 DATE: 11-15-19DP SUBCONTRACTOR PES PERSONNEL: MMAMENDMENT/PERCENT CONCENTRATION: 9.89MM SHEET NO. 30+3

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	25 120	25 220	100	
	1415	32	25 220	25 320	100	
X 7		28	25 320	25 620	300	
	1.01	22	25 620	25 920	300	
&7 M	1606	18	25920	26120	200	
				Total Volume (gal):	1000	
		38	25120	252320	100	HALTO
n	1407	32	25220	25320	100	redrill once
500	1 , , ,	28	25 320	25620	300	
78		22	25 620	25920	300	
11	1605	18	25920	26/20	200	
	100			Total Volume (gal):	1000	
		38	25120	25130	10	Tipwoud not
M	1350	32	25130	25320	190	84
m & 9	177	28	25 220	25 620	300	
<b>%</b> 9		22	25 620	25 920	300	
	11/12	18	25920	26120	200	
	1603			Total Volume (gal):	1000	
	COLUMN CO	38	25 120	25220	100	
.m	1351	32	25 220	25 320	100	
V.C.	1771	28	25 320	25620	300	
M 10		22	25620	25920	300	
10	1614	18	25920	26/20	200	
	101.	- 10	1-7 100	Total Volume (gal):	1000	
		38	25 120	25 220	100	
m.	12:7	32	25 226	25 320	100	
TQ11	1352	28	25320	25 620	300	
1811	S.W. S. 11 - 12 - 12 - 12 - 12 - 12 - 12 - 12	22	25 620	25920	300	
	1615	18	25 920	26120	200	
1 1019	10	12170	Total Volume (gal):	1000		
		38	25120	25 220	100	
12 1353	1353	32		25 320	100	
		28	25220	25 620	300	
			25 320	25 920	300	
·	1617	22	25620	The second secon	200	
	1011	18	25-920	Total Volume (gal):		
	L.,		- ARRIVATOR S	rotar volume (gal):	1000	

#### **GENERAL INFORMATION**

**CHAAP 2019 OU1 RAO Injection** PROJECT NO. 60565355 SITE NAME: EW7-T9 DATE: 11-16-19 INJECTION TRANSECT

MM 17 PERSONNEL: PES DP SUBCONTRACTOR

9.8% WB AMENDMENT / PERCENT CONCENTRATION:

SHEET NO.

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
(A)	0755	38	25050	25150	100	
74		33	25150	25250	100	
		28	251250	25550	300	
25		23	2550	25850	300	-
	1010	18	25850	26050	200	
				Total Volume (gal):	1000	
No.		35	25050	25150	100	
	0753	33	25150	25250	100	
	0147	28	25750	2500	300	
26		23	25550	25050	300	
	1008	18	25850	26050	200	
	1000			Total Volume (gal):	1000	
		38	25050	25150	100	
	0751	33	25150	25250	100	
	017)	28	25250	25 550	300	
27		23	25550	25850	300	
	1000	18	25850	26050	200	
	1000			Total Volume (gal):	1000	
		38	25030	25130	100	
	0749	33	25130	25230	100	· <del>-</del>
	07-17	28	25230	25530	300	
28		23	25530	25830	300	
	1004	18	25830	26030	200	
	100 1			Total Volume (gal):	1000	
		38	25040	25140	100	
	0747	33	25140	25240	100	
29		28	257240	25540	300	
'		23	25540	25840	300	
	1002	18	25840	26040	200	
	.000		1	Total Volume (gal):	1000	
		38	25040		100	
	0745	33	25140	25240	100	
20		243 23	257240	25540	300	
30		23	25540		300	
	1000	18	25840	26040	200	
	1000			Total Volume (gal):	1000	

SHEET TOTAL (gal):

6000

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-T08	DATE:	11-16-19
DP SUBCONTRACTOR	PES	PERSONNEL:	MM VT
AMENDMENT / PERCE	NT CONCENTRATION: 9.8% WE	SHEET NO.	2043

# INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	26050	20150	100	
	1000	33	20150	26250	100	
2 0	1025	28	26250	26550	300	
30		23	20550	26850	300	
1100000	1230	18	20850	27050	200	
	1200			Total Volume (gal):	1000	
7. VIII 711 - 4.1		38	26050	26150	100	
	1027	33	26/170	26200	100	
	1001	28	26250	26550	300	
29		23	26550	26850	300	
	1235	18	26850	27050	200	
	1001			Total Volume (gal):	1000	
		38	26050	26150	100	
	1029	33	26150	26250	100	
///	,00	28	26250	26550	300	
28	1237	23	20550	26850	300	
		18	26850	<b>370万0</b>	200	
				Total Volume (gal):	1000	
	1031	38	26030	26130	100	
		33	20130	26230	100	
27	1001	28	26230	26530	300	
27		23	26530	26830	300	
	1239	18	26830	27030	200	
	1231			Total Volume (gal):	1000	
610 - AXX - 110		38	26040	BL0140	100	
	1033	33	26140	26240	100	
010	1037	28	26240	26540	300	
20		23	26540	26840	300	
	1241	18	26840	27040	200	
				Total Volume (gal):	1000	
	\	38	26040	26140	100	
	1035	33	20140	26240	100	
26		28	26240	26540	3∞	
25		23	76540	24840	300	
	1243	18	26840	27040	200	
	, 0			Total Volume (gal):	1000	

SHEET TOTAL (gal):

6000

#### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Inject	tion	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-	- T7	DATE:	11-15-19
DP SUBCONTRACTOR	PES	<i>P</i>	PERSONNEL:	TYMM
AMENDMENT / PERCE	NT CONCENTRATION:	9.8% WB	SHEET NO.	3 of 3

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
-40-40-00		38	27040	27140	100	
	1320	33	27140	27240	100	
42	1 7 7 7	28	27240	27540	300	
47		23	27540	27840	300	
	1550	18	27840	28040	200	
				Total Volume (gal):	1000	
		38	27040	27140	100	
	1227	33	27140	27240	100	
2 1 1	1322	28 23	27240	27540	300	
4		23	27540	27840	300	
	1552	18	27840	28040	200	
	1000			Total Volume (gal):	1000	
	9	38	27030	27130	100	
	1324	33	27130	27230	100	
110	1029	28	27230	27530	300	
40	1554	23	27530	27830	300	
		18	27830	28030	200	
			********	Total Volume (gal):	1000	
	1326	38	27050	27150	100	
		33	27150	27250	100	
20	1020	28	27250	27550	300	
39		23	27550	27850	300	
	1556	18	27850	28050	200	
	110			Total Volume (gal):	1000	
		38	27050	27150	100	
	1779	33 28	27150	27250	100	
20	1328	28	27250	27550	300	
38		23	27550	27850	300	
	1558	18	27850	28050	200	
				Total Volume (gal):	1000	
		38	27050	27150	100	
27	1415	33	27150	27250	100	
	ביוו ו	28	27250	27550	300	
$\supset$ /		23	27550	27850	300	
_	1600	18	27850	28050	200	
	1000			Total Volume (gal):	1000	

GENERAL NOTES:

Planned Amendment Volume (gals) (deep to shallow)

6000

#### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO. <b>60565355</b>	
INJECTION TRANSECT	T-9	DATE: 11-16-19	7
DP SUBCONTRACTOR	PES	PERSONNEL: AM	
AMENDMENT / PERCEN	T CONCENTRATION: 9,890 WB	SHEET NO. 32+ 3	

# INJECTION INTERVALS/VOLUMES

Point #	Time Start /		ľ -			
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	Sugar	38	28120	28220	100	
	1426	32	28 220	28 320	100	
12		28	28 320	28 620	300	
13	1100	22	28 620	28920	300	
	1620	18	28920	29/20	200	
8		С		Total Volume (gal):	1000	
		38	28 120	28220	100	
	1427	32	28220	28 320	100	
1/1	11	28	28320	28620	300	
14	1 0	22	28620	28920	300	
	1633	18	28920	29120	200	
	10//		120	Total Volume (gal):	1000	<del></del>
		38	28120	28 220	100	
	1428		28 220	28 320	100	
	1920	32 28	28 320	28620	300	
15		22	28620	28920	300	•
	16211	18	28920	29120	200	
	1661	1 7	120 720	Total Volume (gal):	1000	
		38	28120	28220	100	
	1429	32	28220	28320	100	
1 /	170	28	28320	28620	300	
16		22	28620	28920	300	
	11/21	18		29120	200	
18	1631	190	28920		1000	
		00	106126	Total Volume (gal):		
	1430	38	28120	28220	100	
10	1770	32	28 220	28320	100	
17		28	28320	28620	300	
· (**)	11211	22	28 620	28920	300	<u> </u>
	1634	18	28920	29/20	200	
				Total Volume (gal):	1000	
	11120	34	28120	28220	100	·
10	1432	32	28220	28 320	100	
18		29	28320	28620	300	. <u></u> .
	1120	22	28620	28920	300	
	1632	18	28920	29 120	200	
				Total Volume (gal):	1000	

SHEET TOTAL (gal):

6000

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-8	DATE:	11-16-19
DP SUBCONTRACTOR	PES	PERSONNEL:	1 Kg
AMENDMENT / PERCE	NT CONCENTRATION: 989 WB	SHEET NO.	20+3

# INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	1100	38	27 120	27 220	100	
	1127	32	27220	27 320	100	
12		28	27 320	27620	300	
13		22	27620	27920	300	
	1341	18	27920	28/20	200	
	1			Total Volume (gal):	1000	
		38	27120	27 220	100	
	1129	32	27220	27320	100	
10		28	27320	27620	300	
14	. 7	22	27620	27920	300	
. (	1342	18	27920	28120	200	
	1 7 ( -	•	•	Total Volume (gal):	1000	
		38	27120	27220	100	
	1127	32	27220	27320	100	
	11116	28	27320	27620	300	
15			27620	27920	300	
	1414	22	27920	28120	200	
	' ' '		127120	Total Volume (gal):	1000	
		38	27/20	27220	100	
	11123	32	27220	27320	100	
	1133	29	27320	27 620	300	
16		22	27620	27920	300	
14	1401	10	27920	28120	200	
	11/01	1. 2	121 120	Total Volume (gal):	1600	
		38	127120	27220	100	
	1135	32	27220	27320	100	
/ ¬	(1/7	28	27320	27620	300	
17		22	27620	27 920	300	
( (	1354	18	27920	28120	200	
	1 / / /	1 0	127120	Total Volume (gal):	1000	
		38	27120	27220	100	
	11121	32	27226	27320	1.00	
1//	1136	28			300	
17			27320	27620	300	
, ,	1353	22	27620	27920	200	
	11272	18	27920	28120	1000	
	•			Total Volume (gal):	1000	

## **GENERAL INFORMATION**

SITE NAME: CHAAP 2019 O	U1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-9	DATE:	1-16-19
DP SUBCONTRACTOR	PES	PERSONNEL:	1 R
AMENDMENT / PERCENT CONCENTRATIO	N. 9.8% WB	SHEET NO. 1	0 £ 3

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	26120	26220	1.00	
	815	32	26220	26320	100	
		28	26 320	26 620	300	
(	1 .0 1	22	26620	26 920	300	
	1025	18	26920	27120	200	
				Total Volume (gal):	1000	
		35	26120	26220	100	
	1817	32	26220	26320	100	
8		28	26320	26620	300	
0	`	22	26620	26920	300	
	1023	18	26920	27 120	200	
	1007			Total Volume (gal):	1000	
		39	26 120	26220	100	
	819	32	26220	26320	100	
$\mathcal{C}_{i}$	1011	28	26320	26620	300	
9	1027	22	26620	26920	300	
•		18	26920	27/20	200	
				Total Volume (gal):	1000	
	821	38	24120	26220	100	
		32	26220	26320	100	
10		28	26320	26620	300	
10		22	26620	26920	300	
	1036	18	26920	27/20	200	
	100			Total Volume (gal):	1000	
		32	26120	24220	100	
	833	32	26220	26 320	100	
1 1	09/	28	26320	26620	300	
11	1 1 2 7 7	22	26620	24920	300	
***	11037	18	26920	27120	200	
	10			Total Volume (gal):	1000	
		38	26120	26220	100	
	823	32	24220	26320	100	
12	000	28	26320	26620	300	
V	1	22	26620	26920	300	
	1/039	18	26920	27120	200	
	1001			Total Volume (gal):	0.00	

SHEET TOTAL (gai): 6000

#### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-T6	DATE:	11-17-10
DP SUBCONTRACTOR	PES	PERSONNEL:	TYMM
AMENDMENT / PERCE	ENT CONCENTRATION: 98% WB	SHEET NO.	10+2

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	28050	281110	100	
	0935	33	28150	28250	100	
110	0 1011	28	28250	28750	300	
42		23	28550	28850	300	
0.98	1100	18	28850	29050	200	
,	1100			Total Volume (gal):	1000	
		38	28050	28150	100	
	0820	33	28150	28250	100	<u> </u>
		28	28250	28550	300	-
41	Ö	23	28500	28850	.300	
4 1	1101	18	28850	29050	200	
	1101			Total Volume (gal):	1000	
		38	28050	28150	100	
	0800	33	28150	28250	100	
110	0822	28	28250	28550	300	
40		23	28550	28850	300	
	1102	18	28850	29050	200	
	1102			Total Volume (gal):	1000	
		38	28030	28130	100	
	man	33	28130	28236	100	
20	0824	33 28	28530	28530	300	
39		23	28530	28830	300	
100	1103	18	28830	29030	200	
	1100			Total Volume (gal):	1000	
		38	28040	28140	100	
	(2827	33 28	28140	28240	100	_
20	0826	28	28240	28540	300	
38		23	28540	28840	300	
	1104	18	28840	29040	200	
ne e	110 1			Total Volume (gal):	1000	
10/03		38	28040	28140	100	
	1000	33	28140	28240	100	
0 -	1000	28	28240	28540	300	
<7			28540	28840	300	
0/	1105	23 18	28840	29040	100	
	, , ,			Total Volume (gal):	1000	

SHEET TOTAL (gal):

GENERAL NOTES:

Planned Amendment Volume (gals) (deep to shallow)

Pt. 42+37: Redvilled. Tip not coming off.

# **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-TO	DATE:	11-14-19
DP SUBCONTRACTOR	PES	PERSONNEL:	TYMM
AMENDMENT / PERCE	ENT CONCENTRATION:	SHEET NO.	2012

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	1	38	29050	29150	100	
	1115	33	29150	29250	100	
21	11111	28	29250	29550	300	
36		23	29550	29850	300	
	12.	18	29850	30050	200	
	1310		00000	Total Volume (gal):	1000	
		<i>38</i>	29050	29150	100	
	1117	33	29150	29250	100	
	1111	28	29250	29110	300	
35		23	29550	29850	300	
50	1217	18	29850	300FO	200	
	1312	•	-	Total Volume (gal):	1000	
		38	29050	29150	100	
	1119	3 <i>3</i>	29150	29250	100	
	1,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	28	29250	29550	300	
34	1314	23	29550	29850	300	
		23	29850	30050	200	
				Total Volume (gal):	1000	
		38	29030	29130	100	
	1121	33	29130	29230	100	
-	1121	28	29230	29530	300	
33	200	23	291730	29830	300	
	1316	18	29830	30030	200	
	1010			Total Volume (gal):	1000	
		<i>3</i> 8	29050	29140	100	
	1123	33 28	29140	29240	100	
	1169	28	29240	29540	300	
32		23	29540	29840	300	
	1318	18	29840	30040	200	
				Total Volume (gal):	1000	
		38	29040	29140	100	
	1125	33	29140	29240	100	
21	11 (2)	28	29240	29540	300	
$\supset$ 1		23	29540	29840	300	
	1320	18	29840	30040	200	
				Total Volume (gal):	1000	

GENERAL NOTES:

Planned Amendment Volume (gals) (deep to shallow)

6000

# GENERAL INFORMATION

SITE NAME:	CHAAP 2019 OU1 RAO Inject	tion	PROJECT NO.	60565355
INJECTION TRANSECT	T-8	3	DATE:	11-17-19
DP SUBCONTRACTOR	PES		PERSONNEL:	19 Pr
AMENDMENT / PERCEN	T CONCENTRATION:	9.890 WB	SHEET NO.	1 of 2

## INJECTION INTERVALS/VOLUMES

Point #	Time Start /	- 1 (1 )				
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	Can	38	29120	29220	100	
	826	32	29220	29 320	100	
19		28	29320	29 620	300	
1 1	1000	22	29620	29920	300	
	1021	18	129920	30120	200	
				Total Volume (gal):	1000	
		38	29120	29220	100	
	827	32 28	29220	29320	100	
20	,		29320	29620	300	
		22	29620	29920	300	
	1022	18	29920	36120	200	
	100		·- · · · · · · · · · · · · · · · · · ·	Total Volume (gal):	1000	
		38	29120	29220	100	
	829	32	29220	29320	100	
0 /	1001	28	29 320	29 620	300	
21	1023	22	29620	29 920	300	
•		18	29926	30120	200	
	$  UU\rangle $		12110	Total Volume (gal):	1000	
	833	38	29 120	29220	100	
		32	29 220	29320	100	
22		28	29320	29620	300	
		22	29620	29920	300	
	1032	18	29 920	30120	200	
	10/0	7 -	1010	Total Volume (gal):	1000	
		38	29120	29220	100	
	835	32	29220	29 320	100	
22	777	28	29320	29 620	300	
23		22	29 620	29 920	300	
	1622	18	29920	30/20	200	
	1032	10	169 160	Total Volume (gal):	1000	
		38	29 120	24 220	100	
	C21-					
011	835	32	29 220	29320	100	
14		28	29 320	29620	N. 300	
	1/021	22	29620	29920	300	
	1033	18	29920	30120	200	
	- , .			Total Volume (gal):	1000	

#### GENERAL INFORMATION

SITE NAME: CHAAP 2019 OUT	RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-9	DATE:	1-17-19
DP SUBCONTRACTOR	PES	PERSONNEL:	4 R
AMENDMENT / PERCENT CONCENTRATION:	9,890 WB	SHEET NO. 2	ofZ

## INJECTION INTERVALS/VOLUMES

Point #	Time Start /					_
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	1000	38	30120 pr	30220	100	
ı Ö	1042	32	30730 220		100	
19		28	3033020	30620	300	
V		22	30 620	30920	300	
	104 mos	18	30920	31120	200	
	1300			Total Volume (gal):	1000	
		34	30120	30220	100	
	1 1643 [	32	30 220	30320	100	
00		28	30320	30620	300	
20		22	30620	30920	300	
	300	18	30920	31120	200	
	10			Total Volume (gal):	1000	
		38	30 120	30220	100	
	1044	38 32	30 220	30320	100	-
O i	'	28	30320	30620	300	
21		22	30 620	30 920	300	
	1300	18	30920	31120	200	<del></del>
			, , , ,	Total Volume (gal):	1000	
		38	30 120	30220	100	
	1049	32	30220	30320	100	
22		28	30 320	30 620	300	
20	,	22	30620	30920	300	
		18	30920	31120	200	
	'		170 175	Total Volume (gal):	1000	
		38	30120	30220	100	
	1051	32	30 220	30320	100	
12	1 " "	28	30320	30620	300	
23		22	30620	30920	300	
	1300	18	30920	31120	200	
		10	10 120	Total Volume (gal):	1000	-
		38	30 120	30 220	100	
	1050					_
74	/ · / ·	32	30220	30 320	100	<del></del>
		28	30 320	30620	300	
•	11200	22	30 620	30920	300	
	1300	18	30920	31120	200	·
				Total Volume (gal):	1000	

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7- +7	DATE:	11-18-19
DP SUBCONTRACTOR	PES	PERSONNEL:	TYMM
AMENDMENT / PERCEN	VT CONCENTRATION: 9.7	5% WB SHEET NO.	10f3

# INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	30040	30140	100	
	0742	33	30140	30240	100	
- 1	0/12	28 23	30240	30540	300	
31		23	30540	30840	300	
	0950	18	30840	31040	200	
	01110			Total Volume (gal):	1000	
		38	30040	30140	100	
		33	30140	30240	100	
20	0744	28	30240	30590	300	
32		23	30540	30840	300	
	6050	18	30840	31040	200	
	6952			Total Volume (gal):	1000	
		38	30080	30180	1000	
	87	33	30180	30230	100	
22	0746	28	30250	30930	306	
33		23	3050	30830	300	
	0954	18	30830	31030	200	
			10000	Total Volume (gal):	1000	
		38	30090	30190	100	TATOM POPPOR - SECURIO
	0748	33	30140	30250	100	
2.1		28	30250	30550	300	100111000000000000000000000000000000000
34		23	30550	30850	300	
	BATIL	18	308h0	31050	200	
	0956			Total Volume (gal):	1000	
		38	30050	30190	100	
		33	30150	30250	100	
	0750	28	30750	30550	300	
35		23	30550	30850	300	
	00-0	18	30850	31050	200	
	0958	10		Total Volume (gal):	1000	
	<u> </u>	38	30000	30150	100	
		33	30156	30250	100	
	0752	28	30250	30550	300	
210		23	30550	30850	300	
36	1000	18	30850	31050	200	
	1000	, , , , , ,	100,0	Total Volume (gal):	1000	

SHEET TOTAL (gal):

6000

#### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7- T7	DATE:	11-18-19
DP SUBCONTRACTOR	PES	PERSONNEL:	TY MM
AMENDMENT / PERCE	NT CONCENTRATION:	SHEET NO	7 of 3

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	31040	31140	100	-
	1020	33	31140	31240	100	
-7 0	1000	28	31240	31540	300	
30		23	31540	31840	300	
	1232	18	31840	32040	200	-
				Total Volume (gal):	1000	-
		38	31040	31140	100	
	1022	33	31140	31240	100	
0 0	1020	28	31240	31740	300	
29		23	31540	31840	300	
	1234	18	31840	32040	200	
	100			Total Volume (gal):	1000	
		38	31030	3#0 31130	100	
	1024	33	31130	31230	100	
	1001	28	31230	31530	300	
28	i	23	31530	31830	300	
	1736	18	31830	32030	200	
	1200			Total Volume (gal):	1000	
		38	31050	3/150	100	
	1026	3 <i>3</i>	31150	31250	100	
	1020	28	31250	3/950	300	
$1 2^{-1}$		23	31550	31850	300	
	1238	18	31850	32090	200	
				Total Volume (gal):	1000	
		38	31050	31150	100	
	1028	33 26	31150	31250	100	
		28	31250	31550	300	
26		23	31550	31850	300	
	1240	10	31850	32050	200	
	12 10			Total Volume (gal):	1000	•
		<u> </u>	31050	31190	100	
	1030	33	3/150	31250	100	
25		28	31250	31550	300	
1)		23	31550	31850	300	
	1242	18	31850	32050	200	
	14 10			Total Volume (gal):	1000	

SHEET TOTAL (gal):

6000

## GENERAL INFORMATION

SITE NAME: C	HAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-TU	DATE:	11-18-19
DP SUBCONTRACTOR	PES	PERSONNEL:	MM TY
AMENDMENT / PERCENT	CONCENTRATION: 9.8% W	SHEET NO.	30千里3

# INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	32050	32150	100	
	1255	<u> </u>	32150	32250	100	
$\Omega$ $\Omega$		28	32250	32550	300	
30		23	32550	32850	300	
	1450	10	28850	330FO	200	
	1 1010	2		Total Volume (gal):	1000	
		38	32050	32150	100	
	1267	33	32150	32250	100	
$\Omega$		28	32250	32550	300	
29		23	32550	32850	360	
	1452	18	32850	33050	200	
	1112			Total Volume (gal):	1000	
		38	32050	32150	0	
	1259	33	32150	32250	100	
_	1011	28	32250	32550	300	
28		23	32550	32850	300	
	1454	18	32850	33050	200	
				Total Volume (gal):	1000	
	1301	38	32030	32130	100	
		33	32130	32230	100	
0.1		28	32230	32530	360	·
21		23	32530	22832830	300	
	1456	18	32830	33030	200	<del></del>
	17-17-10			Total Volume (gal):	1000	
		38	32040	32140	100	
	1303	33	32140	32240	100	
010	1303	28	32240	32540	300	
26		23	32540	32840	300	
	1458	18	32840	33040	200	
				Total Volume (gal):	1000	•
		38	32040	32140	100	
25	1305	33	32140	32240	100	
	130.1	28	32240	32540	300	
		23	32540	32840	300	
	1500	18	32840	33040	200	
				Total Volume (gal):	1000	

SHEET TOTAL (gal): 6000

GENERAL NOTES:

Planned Amendment Volume (gals) (deep to shallow)

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injec	tion	PROJECT NO.	60565355
INJECTION TRANSECT	T - 7	2	DATE:	11-18-19
DP SUBCONTRACTOR	PES		PERSONNEL:	P no
AMENDMENT / PERCEN	T CONCENTRATION:	9.890 WB	SHEET NO.	1063

# INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	3/120	31220	100	
	741	32	31220	31 320	100	
1	743	28	31320	31620	300	·
1		2.7	31620	31920	300	<del></del>
1	928	14	31920	32 120	200	
	1 6 00		1)1100	Total Volume (gal):	1000	
		38	3/120	31220	100	
	745	32	31220	31 320	100	
0		28		231620	300	
2		22	31620	31920	300	
	932	18	31920	32120	200	104
	1170			Total Volume (gal):	1000	
	2000	38	31120	31220	100	
	747	32	31220	31320	100	
0	£ 1 '	MX 28	31 320	31620	300	
3		22	31620	31920	300	
V	936	18	31920	32/20	200	
	1,70			Total Volume (gal):	1000	
		38	31120	31220	100	
	748	32	31220	31320	100	
1.	1 1	28	31320	31620	300	
4		22	31620	31920	300	
(	940	18	31920	32120	200	
	1 ' ' '			Total Volume (gal):	1000	
	7	38	31120	31220	100	
	749	32	31220	31320	100	
		28	31320	31620	300	
5		22	31620	31920	300	
	938	18	31920	32120	200	
				Total Volume (gal):	1000	
		38	31120	31220	100	
75	750	32	31220	31320	100	
	1	28	31320	31620	300	
12	Con	22	31620	31920	300	
	1738	18	31920	32120	200	
				Total Volume (gal):	1000	
			S	HEET TOTAL (gal):	1000	

## **GENERAL INFORMATION**

SITE NAME: (	CHAAP 2019 OU1 RAO Injection	on	PROJECT NO.	60565355
INJECTION TRANSECT	T-6		DATE:	11-18-19
DP SUBCONTRACTOR	PES		PERSONNEL:	An
AMENDMENT / PERCENT	CONCENTRATION:	9,8WB	SHEET NO.	20F3

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	1000	38	32120	32220	100	
, **	1003	32	32220	32 320	100	
1		28	32320	32620	300	
l			32 4 620	32920	300	
	11237	18	132920	133120	200	
	/ / /		·	Total Volume (gal):	1000	
		38	32120	32220	100	
	1005	32	32220	32 320	100	
^	1007	28	32 320	32620	300	
2		22	32626	32920	300	
	1240	18	32920	33 120	200	
				Total Volume (gal):		
		38	32120	32220	100	Had to redrill 3
	1120	32	32220	32320	100	redrill 3
7	1100	20	32320	32620	300	Times
3	1237	22 18	32620	32920	300	TI TI
		18	32920	33120	200	
				Total Volume (gal):	1000	
	1007	38	32120	32220	100	
,		32	32220	32320	100	
4		28	32 320	32610	300	
1		22	32620	32920	300	
	1245	18	32920	33120	200	
	1 - 1)		, , , , , ,	Total Volume (gal):	1000	
		38	32120	32220	100	Hadto
	1107	32	32220	32320	100	Acdrill 3
	110,	28	32320	32620	300	tire 3
7		22	32620	32920	300	
	[245	18	32920	33 120	200	
	' ' '	1-3	17 - 100	Total Volume (gal):	1000	
		38	32120	32220	100	
4	1011	32	32220	32320	100	
	1011	28	32320	32620	300	
		22	32620	32920	300	
7	117-41	18	32920	33120	200	
	11-71	1 7	1/2/00	Total Volume (gal):	1000	
				rotar volunie (gar).	1.000	

#### **GENERAL INFORMATION**

SITE NAME: CHAA	P 2019 OU1 RAO Injection	n	PROJECT NO.	60565355	
INJECTION TRANSECT	T-6		DATE:	11-18-19	
DP SUBCONTRACTOR	PES		PERSONNEL:	Pg Be	
AMENDMENT / PERCENT CONC	ENTRATION:	9.850 WB	SHEET NO.	3 of 3	

# INJECTION INTERVALS/VOLUMES

Point #	Time Start /	Ī	1	7		
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	33120	33 220	100	
	1357	32	33 220	33 320	100	-Was = 500
1	1771	28	33 320	33 620	300	
7		22	33 620	33 920	300	200
	1403	18	33 920	34126.40	220	
	177	( 0001)		Total Volume (gal):	1020	
× 1		38	33 120	33 220	100	5/20
	1405	32	33 220	33 320	100	
	1700	29	33 320	33620	300	=== 1 1 1 1
8		22	33 620	33920	300	
$\mathcal{O}$	1603	18	33920	34126540	220	***
	100 /			Total Volume (gal):	1020	E
¥		38	33120	33220	100	
	1328	32	33 220	33 320	100	
	1700	28	33 320	33620	300	
G	1603	22	33 620	33920	300	
1		18	33 920	3418640	220	
			17.1-0	Total Volume (gal):	1020	21 31
	100.0	38	33120	33220	100	
	1331	32	33220	33320	100	
* .	' ' '	28	33320	33620	300	2.09.7.2
10		22	33620	33920	300	
10	1603	18	33920	3412040	220	
	1007		177.55	Total Volume (gal):	1020	
	4 .	38	33 120	33 220	100	3000
	1332	32	33 220	33 320	100	
1 1	' '	28	33 320	33 620	300	
1 /	11	22	33 620	33920 pm	300	
, (	1603	18	33 920	3412040	220	
	100		1 1 1 -0	Total Volume (gal):	1020	
		38	33 120	33120	100	
. ^	1337	32	33 220	33 320	100	
1)_	11/10	28	33 320	33 620	300	
1 -		22	33 620	33 920 m	M830L	=
	1332	18	33 920	34120 40	220	
	1,001	17	177 160	Total Volume (gal):		
			aman.	rotat volume (gal):	1020	

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355	_
INJECTION TRANSECT	EW7-TO	DATE:	11-19	
DP SUBCONTRACTOR	PES	PERSONNEL:	TY AD	<u>_</u> M (
AMENDMENT / PERCEN	NT CONCENTRATION: 9,8% WB	SHEET NO.	1071	_

# INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	33040	33140	100	110100
	1440	33	33140	33240	100	
9 (1	1-110	28	33240	33740	300	-
19		23	33540	33840	300	
1 1	1610	23	33840	34040	200	
	1010			Total Volume (gal):	1000	
		38	33040	33140	100	
	10128	33	33140	33240	100	
$\sim 10$	1438	28	33240	331140	300	
20		23	33540	33840	300	
	1608	18	33840	34040	200	
				Total Volume (gal):	1000	
		38	33080	33130	100	
	1436	33 28	33130	33230	100	
- T	100	28	33230	33530	300	
21	1606	23	33530	33830	300	
		18	33830	34050	200	
				Total Volume (gal):	1000	
		38	33050	33150	100	
	1434	33	33150	33250	100	
$\sim$ 2	. , . ,	28	33250	33000	300	
22		23	33550	33850	360	
	1604	18	33850	34050	200	
				Total Volume (gal):	1000	· · · · · ·
	10 10 10 10 10 10 10 10 10 10 10 10 10 1	38	33050	33150	100	
	1432	33	33/50	33250	100	
- 0		28	332FO	335FU	300	
23		23	33550	33850	300	
20	5001	18	33890	34050	200	
	1 •			Total Volume (gal):	1000	
		38	33050	33150	100	
24	1430	33	33150	33250	100	
	1 1 3 0	28	33290	33550	300	
		23 18	33550	33850	300	
	1600	18	33850	340FU	200	
				Total Volume (gal):	1000	

# GENERAL INFORMATION

SITE NAME:	CHAAP 2019 OU1 RAO Inj	jection		PROJECT NO	60565355	
INJECTION TRANSECT		- 7		DATE:	11-19-19	
DP SUBCONTRACTOR	PES			PERSONNEL:	AR	
AMENDMENT / PERCEN	T CONCENTRATION:	9,8%	$\omega B$	SHEET NO.	10+1	

# INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	34140	34240	100	
$\neg$	1501	32	34240	34340	100	
7		28	34340	34640	3/00	
	1	22	34640	34940	300	
	1549					
	, ,			Total Volume (gal):	800	
	, , ,	38	34 140	34240	100	
	1448	32	34240	34340	100	
8	, , ,	28	34340	34640	300	·····
U	الدر .	22	34640	34940	300	
	1551					
	1271			Total Volume (gal):	800	
	. ,	38	34 140	34240	100	
	1440	32	34 240	34 340	100	
	, , , ,	28	34 340	34640	300	
9	1634	22	34640	34940	300	
(						
				Total Volume (gal):	800	
		38	34140	34240	100	
	1442	32	34240	34340	100	
10		28	34340	34640	300	
' 0		22	34640	34940	300	
	1557					
	1 / / '			Total Volume (gal):	800	
		38	34140	34 3 240	100	
	1450	32	34240	34340	100	
1.1	117	28	34340	34640	300	
11	,	22	34640	34940	300	
	1601					
	' '			Total Volume (gal):	800	
		38	34 140	34240	100	
	1445	32	34 240	34 340	100	
12	' ' '	288	34340	34640	300	
1 4	1,	22	34640	34940	300	
	1558		<del> </del>			
				Total Volume (gal):	800	

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injec	tion	PROJECT NO.	60565355	
INJECTION TRANSECT	EW7	-T7	DATE:	11-20-19	
DP SUBCONTRACTOR	PES		PERSONNEL:	TYMM	AL
AMENDMENT/PERCE	NT CONCENTRATION:	9.8% WB	SHEET NO.	1074	

# INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
15.00	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	34050	34190	100	
	(37/10)	33	34150	34250	100	
10	0740	28	34250	34550	300	
19		23	34 450	34 850	300	
	0925	18	34850	35050	200	
	0 1211			Total Volume (gal):	1000	
		38	34050	34100	100	
	m7/17	33	34150	34250	100	
0.0	0742	28	34250	34 550	300	
120		23	34550	34850	300	
•	0927	18	34850	35050	200	
	0121			Total Volume (gal):	1000	
		38	34050	34150	100	•
	an Turi	33	34 150	34250	100	
0 1	0744	28	34200	34550	300	
21		23	34 550	34 850	300	
	0929	18	34850	35050	200	
				Total Volume (gal):	1000	
	0746	38	34080	34130	100	
		33	34130	34230	100	
a O	0,70	28	34230	34 530	300	
22		23	34 530	34 830	300	
	0931	18	34830	3F030	200	
	0101			Total Volume (gal):	1000	
		38	34050	34 140	100	
	MAIR	33	34140	34240	100	
12	0748	28	34240	34 540	300	
23		23	34540	34 840	$3\infty$	
	0933	18	34840	35090	200	
				Total Volume (gal):	1000	
- 10		38	34040	34140	100	
0.11	10750	33	34140	34740	100	
	0750	28	34240	34040	300	
24		23	34540	34840	300	
7	0936	18	34840	35 040	200	e.
		· · ·		Total Volume (gal):	1000	

GENERAL NOTES:

Blanck Assets

Planned Amendment Volume (gals) (deep to shallow)

6000

#### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355

EW7-TH DATE: 11-20-19
PERSONNEL: TYMM AD INJECTION TRANSECT

PES DP SUBCONTRACTOR

9.8% WB AMENDMENT / PERCENT CONCENTRATION:

# INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	35050	35150	100	
	1000	33	35150	35250	100	
		28	357250	35550	300	
42		23	35550	35850	300	
, _	1150	18	35850	36000	200	
S - 22-51	III			Total Volume (gal):	1000	
		38	35050	35150	100	
	1002	33	35150	35250	100	
4 1 1	1000	28	35750	35550	300	
41		23	3550	35850	300	
	1152	18	34850	36050	200	
	MAC			Total Volume (gal):	1000	
		38	35050	35/150	100	
	1004	33	35150	35250	100	
	1009	28	35250	35550	<i>300</i>	
40		28 23	3550	30856	300	
10	1154	15	35850	360FD	200	
				Total Volume (gal):	1000	
		36	35030	35130	100	
	1006	33	3×130	3K730	100	
	1000	28	357230	35530	300	
39		23	35530	35830	300	
	1156	18	35830	36030	200	
				Total Volume (gal):	1000	
		38	35040	3 <del>11</del> 140	100	
	1008	33 28	35140	35240	100	
20	1000	28	35740	35540	300	
38		23 18	311540	35840	<i>3</i> 00	
	1150	18	35840	36040	200	
				Total Volume (gal):	1000	
		36	35040	35140	100	
27	1010	33	35140	35240	100	
		23	35240	35540	300	
		23	35540	35840	300	
	1200	18	35840	36040	200	
	1200			Total Volume (gal):	1000	

SHEET TOTAL (gal): 6000

#### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-T4	DATE:	11-20-19
DP SUBCONTRACTOR	PES	PERSONNEL:	TYMM 4D

AMENDMENT / PERCENT CONCENTRATION:

9.8% WB

SHEET NO. 3 of 4

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
<del>-</del>	7	38	36050	36150	100	
	1225	33	30150	36250	100	
112	1225	28	36250	36550	300	
42		23	36550	36550	300	
	1410	18	36850	37050	200	
	1910			Total Volume (gal):	1000	
		38	36090	36150	100	
	1227	33	36150	36250	100	
4 5 1	100	26 23	36250	36550	300	
4		23	36550	30850	300	
( )	1412	18	36850	37050	200	
		·		Total Volume (gal):	1000	
		38	36000	36150	100	
. ^	1229	33	36150	36250	100	
40	100	25 23	36250	36550	300	
20		23	36550	36850	300	
	1414	15	36850	37050	200	
- 1710 - 27 <b>240</b>				Total Volume (gal):	1000	
		34 33	36030	36130	100	
	1231	33	36130	36230	100	
39	10.01	28 23	36230	36530	300	,
			36530 36530	36830	300	
	1416	18	36830	37030	200	
	J			Total Volume (gal):	1000	
		36 33	36040	36140	100	
_ 1	1233	33	36140	36240	100	
30		26	36240	36540	300	
		23	36540	36840	300	
	1418	18	36840	37040	200	<del> </del>
	1 110			Total Volume (gal):	1000	
	1,02	38	36040	36140	100	
	1235	33	36140	36240	100	
2		28	36240	36540	300	
		23	36540	36840	300	
	1420	18	36840	300 H37040	200	
	,			Total Volume (gal):		

SHEET TOTAL (gal):

10000

#### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-T4	DATE:	11-20-19
DP SUBCONTRACTOR	PES	PERSONNEL:	TYMMAD
	and the same of th		

AMENDMENT / PERCENT CONCENTRATION:

9.8% WB SHEET NO. 4644

NJECTION INTERVA	LS/VOLUMES					
Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	37050	37150	100	
	1455	33	37150	37250	100	<del></del>
	149 n	28	37250	37550	300	
36		28 23	37550	378FO	300	
	1625	18	37850	38050	200	
	10ch			Total Volume (gal):	1000	
		38 33	37050	37150	100	
3h	1457	33	37150	37250	100	
511	19h7	28	37250	37550	300	
12		23	37550	37850	300	
51	1627	18	378FO	38050	700	
	1021			Total Volume (gal):	1000	
X677 801		38	37050	37150	100	
	1150	33	37150	37250	100	
211	1459	28	37250	37550	300	
34		23	37550	37850	300	
	1629	18	37850	38050	200	
2 1000				Total Volume (gal):	1000	
	1501	38	37030	37130	100	
	1117	33	37130	37230	100	
22	1014	25 23	37230	37530	300	
35	,	23	37530	37830	300	
	1631	18	37830	38030	200	
	.0 01			Total Volume (gal):	1000	
18.1 -0.00%		38 33 28	37040	37140	100	
	1503	33	37140	37240	100	
20	1110	28	37240	37540	300	
32		23	37540	37840	300	
001	1633	18	37840	38040	200	
				Total Volume (gal):	1000	
		38	37040	37140	100	
	1505	33	37140	37240	100	
つ /	1 10 1	28	37240	37540	300	
$\sim$ 1		23	37530	37840	300	
	1635	18	37840	38040	200	
	IU JN			Total Volume (gal):	1000	

GENERAL NOTES:

Planned Amendment Volume (gals) (deep to shallow)

6000

#### **GENERAL INFORMATION** 60565355 **CHAAP 2019 OU1 RAO Injection** PROJECT NO. SITE NAME: DATE: INJECTION TRANSECT PERSONNEL: MIL **PES** DP SUBCONTRACTOR 9.8% WB SHEET NO. 1 of 4 AMENDMENT / PERCENT CONCENTRATION: INJECTION INTERVALS/VOLUMES Point # Time Start / Actual Vol. (gal) Meter (End) Notes Time Stop Meter (Start) Depth (bgs) 35940 36140 200 18 Total Volume (gal): 200 200 36140 18 35940 742 800 Total Volume (gal): 200 18 35940 200 36140 Total Volume (gal): 200 200 18 35940 36140 745 803 Total Volume (gal): 200 18 35 940 36140 200 200 Total Volume (gal): 200 18 35940 36140 800 200 Total Volume (gal):

GENERAL NOTES:

1200

# GENERAL INFORMATION

SITE NAME: CHAAP 2019 OU	RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-7	DATE:	11-20-19
DP SUBCONTRACTOR	PES	PERSONNEL:	Boz
AMENDMENT / PERCENT CONCENTRATION:	9.890W	B SHEET NO.	2044

# INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
· · · · · · · · · · · · · · · · · · ·	1	38	36140	36240	100	
	848	32	36 240	36340	100	·
. (./	070	28	36344	34640	300	
14		22	36 640	36940	300	
1	1102	18	36940	37140	200	
13	1103		170 140	Total Volume (gal):	1000	
		38	36 140	36 240	100	
	849	32	36240	30 340	100	
,	077	28	36 340	36640	300	
7/		22	36640	36940	300	
LO.	11/03	18	36940	37140	200	
14	1107		170	Total Volume (gal):	1000	
		38	36 140	36240	100	
	909	32	34240	3 6 340	100	
	101	28	36 340	36640	300	
7	1102	22	36640	34940	300	
		18	36940	37140	200	
1)			7	Total Volume (gal):	1000	
	910	38	34140	36240	100	
		32	36240	36340	100	
12		28	36340	36 640	300	
		22	36 640	36940	300	
16	1101	18	36940	37140	200	
16	1101			Total Volume (gal):	1000	
		38	36 140	36240	100	
	G11	32	36240	36 340	100	
72	1 ( )	28	36 340	36640	300	
X)	1 .	22	36640	36940	300	
	1105	18	36 940	37140	200	
17	11100			Total Volume (gal):	1000	
		38	36140	36240	100	
24	1913	32	36 240	36340	100	
	1 (1/	28	36 340	30640	300	
. 18	11011	22	36640	36940	300	
10	1104	18	36940	37140	200	
. 10	1' ''			Total Volume (gal):	1000	
					1-000	

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Inje	ction	PROJECT NO.	60565355
INJECTION TRANSECT	_ T-	6	DATE:	11-20-19
DP SUBCONTRACTOR	PES		PERSONNEL:	BR
AMENDMENT / PERCENT	CONCENTRATION:	9.89 WB	SHEET NO.	3of 4

# INJECTION INTERVALS/VOLUMES

Point #	Time Start /		T			
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	37140	37240	100	
	1132	32	37240	37340	100	
IS	10/	28	37 340	37 640	300	
+1	111	18	37640	37940	300	
13	1330	18	37940	38140	200	
ιj				Total Volume (gal):	1000	<u></u>
		38	37 140	37240	100	
	1133	32	37240	37340	100	
2		28	37 340	37 640	300	
10		22	37640	37940	300	
. 11	1328	18	37940	38140	200	
14	1 /	•		Total Volume (gal):	1000	
•	1120	38	37 140	37240	100	
	1134	32	37 240	37 340	100	
0 1	'' ' '	28	37 340	37640	360	
4	1329	22	37640	37940	300	
15		18	37940	38 140	200	
/5		V-7		Total Volume (gal):	1000	
	1136	38	37 140	37 240	100	
		32	37 240	37340	100	
22		32 28	37 340	37640	300	•
EL	1335	22	37640	37940	300	
		18	37 940	38140	200	
H 16	` ' ' ' '		171.10	Total Volume (gal):	1000	
		3 8	37 140	37 240	100	
	1137	32	37 240	37 340	100	
22	1111	28	37 340	37640	300	
セ)	1000	28 22	37 440	37940	300	
	1334	18	37 940	38140	200	
17	1///	1 0	123 170	Total Volume (gal):	1000	
	_	38	37 140	37 240	100	
_	1139	32	37 240	37340	100	
21	11.51	28	37 340	37 646	300	
14		22	37 40	37940	300	
18	1335			38140	200	
18	1275	18	37940	Total Volume (gal):	1000	
				rotar volume (gat):	1000	

GENERAL NOTES:

6000

## **GENERAL INFORMATION**

SITE NAME: CHAAP 2019 OU1	RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-5	DATE:	1-20-19
DP SUBCONTRACTOR	PES	PERSONNEL:	RK
AMENDMENT / PERCENT CONCENTRATION:	9.89 WB	SHEET NO.	4044

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	Time Stop	38	38140	38 240	100	
	11177	32	38 240	34340	100	
	1427	28	38 340	38640	300	
1		22	38 640	38940	300	
(	1668	18	38940	39 140	200	
	1000		1777.	Total Volume (gal):	1000	
		36	38 140	38240	100	
	1428		38240	38340	100	
	1700	32 28	38340	38640	300	
2		22	38640	38940	300	
	1602	19	38940	39 140	200	
	1/00		17. 1	Total Volume (gal):	1000	
		38	38120	38220	100	
	1430	32	38220	38320	(00	
	1170	28	38 320	38620	300	
3	1608	22	38620	34920	300	
		18	34920	39140	200	
	1000			Total Volume (gal):		
	4	38	38120	38240	100	
	1432	32	38240	38340	100	
			38340	38640	300	
4	. 5	25/2	38640	38 940	300	
250	1607	18	38940	39 140	200	
	100.		17.01.0	Total Volume (gal):	1000	
	1.10	38	38140	38 240	100	
2	1/34	32	38240	38340	100	
	1 1 1 1	28	3834	38 640	300	
フ	1/6/	22	38640	38940	300	
	1606	18	38940	39140	200	
	1			Total Volume (gal):	1000	
	1)	38	38140	38240	100	
	11135	32	38 240	38340	100	
/	10177	29	38 340	38640	300	
	11.5	22	38646	38940	300	
	1160+	18	38940	39140	200	
	11-01		122	Total Volume (gal):	AND DESCRIPTION OF THE PERSON	

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-445 T5	DATE:	11-21-10
DP SUBCONTRACTOR	PES	PERSONNEL:	TVAD
AMENDMENT / PERCEN	T CONCENTRATION: 9.8% WB	Sheet no.	1043

INJECTION INTERVALS/VOLUMES

Point #	Time Start /	David Co.	Manage (Out 1)	Mater (F-4)	A atrial XZ-1 (C-1)	Matas
	Time Stop	Depth (bgs)	Meter (Start) 38 040	Meter (End) 38   40	Actual Vol. (gal)	Notes
		33	38 140			Pulled
_ (3)	083h		38 240	38240	180	
36		28		38540	300	Treating the state of the state
		23	38 540	35840	300	
	1110	170	38840	39040 Total Volume (gal):	200	
		38	36040	38 140	1000	
	0007	33	38 140	38240	100	
	0837	28	38240	38540	300	
35		23	38540	38 840	300	
	1 1112	18	38840	39040	200	
	1112	10		Total Volume (gal):	1000	
		36	36040	38140	100	
	0000	33	36 140	38240	100	
	0839	28	38 240	38 1740	300	
34		23	38 540	38 840	300	····
	1114	18	38 840	39040	200	
	1 '''			Total Volume (gal):	1000	
		38	38000	38 150	100	
	0841	38 33	38150	38250	160	
17	0091	28	38 250	38550	300	
33		23	38 5TO	38850	300	
	1110	13	38 850	39090	200	
	1110			Total Volume (mf):	1000	All colleges of the
		38	38 000	38 150	100	
	0843	33	38150	38 250	100	
20	0043	28	38250	38550	300	
32	1116	23	36550	38850	300	
	1115	18	38850	39 000	200	
			2	Total Volume (gal):	1000	
		38	38 On O	36 150	100	
$\bigcirc$ \	0345	33	38 150	36 2 FO	100	
2,	00-11	25	38250	38 550	300	
	O COLOR	23	38 990	38850	300	
	1120	18	38850	39050	200	
				Total Volume (gal):	1000	

SHEET TOTAL (call-

GENERAL NOTES:

Planned Amendment Volume (gals) (deep to shallow)

pt. 36: Had to pull rod to remove tip.

100, 100, 300, 300, 200

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7- 75 T5	DATE:	11-21-19
DP SUBCONTRACTOR	PES	PERSONNEL:	TYAD

AMENDMENT / PERCENT CONCENTRATION!

9.8% WB 31

SHEET NO. 2043

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	1135	The second secon		39150		
	1120	33	39150	39290	160	
20		28	39250	39550	300	****
50		23	39550	39890	300	
	1345	10	39850	40050 Total Volume (gal):	200	
		20			the later than the party of the later than the late	
	1425	38 33	39050	39150	100	
- 21	1137	28		39250	100	
00		23	39250 39550	39550	300	
1	1 12117	18	39890	39850	300	
	1347	10	21040	Total Volume (gal):	1000	-
	+	7.	200-0	AND DESCRIPTION OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED	100	
	1120	38 33	39050	39150	100	***
1	1139	28	39150	39250		
74		23	39250	39550	300	
	12110	15	39550 39850	40000	200	····
	1349	10		Total Volume (gal):	1000	
		38	39030	39130	100	*****
	I visua I	33	39130	39230	100	
$\sim$	1141	28	39230	39530	300	
		23	39530	39830	300	
01	1317	18	39830	40030	200	
	1011			Total traking runts	1000	
		38	39040	39140	100	
	11112	33	39140	39240	100	
01	1143	28	39240	39540	300	
10		23	39540	39840	300	
$\sim$	1410	18	39840	40040	200	
	1110			Total Volume (gal):	1000	
	1	38	39040	39140	100	
	1145	33	39140	39240	100	
210	11111	23	39240	39540	300	
7		23	39540	39840	300	
1	1412	18	39840	40040	200	

SHEFT TOTAL (040- (000)

GENERAL NOTES:

1350: Out of amendment. 1400: Amendment refilled. Planned Amendment Volume (gals) (deep to shallow)

100, 100, 300, 300, 200

or all take i	RAL INFORMATION					PROJECT NO.	60565355
	CE	A A A ATT4 1	RAO Injection	i i i i		DATE:	11-21-19
ΈN	IAME:	h	EW7	第0丁年			T. / AD
JEC	TION TRANSECT					PERSONNEL:	17/12
19 c	BCONTRACTOR		PES		10	Sheet No	30f3
		الطاو كماني م		9.8% W	16.	SHEET NO.	
vil	Nimichi Fridicini	Uncentration:			7		
	CTION INTERVALS	VOLUMES					Notes
A)E	Point #	Time Start	- 1 (h-m)	Meter (Start)	Meter (End)	Actual Vol. (gal)	140168
	Politic ii	Time Stop	Depth (bgs)	40040	40140	100	
		1 10-1	23	40140	40240	100	
		145n-	28	40240	40540	300	
			72	40540	40840	300	
	30	_ +	12	40840	41040	200	
		1615	10		Total Volume (gal):	1000	
		1001	38	40040	40140	100	
		t	33	40140	40240	100	
		1431	28	40240	40540	300	
	29		23	40540	408410	300	
	1		18	40840	1 41040	200	
١		1617	10	112.5	Total Volume (gal	1000	
1			36	40030	40130	100	
T		.00	33	40130	40230	100	
1		1439	28	40230	40 530	300	
1			23	4053	0 40830	300	-
١	25	10.70.00	18	4083	0 4105		+
Ì		1/9/9			Total Volume (ga	The state of the s	
1			33	400MC	40150	100	
T		1	33	4014	0 40250		
1		11441	23	4025	0 4055		
١	- 1		23	4055	0 40850	300	-
- 1	$Q^{\dagger}I$	1 01	23	4085	2014104	200	
-		1621	10		Total Volume G	m): 1000	
			38	400 MC	0 40190	0 100	
		1117	33	4010	0 4026	0. 100	
		1443	34	402	10 4055	0 300	
	20	Name and Address of the Owner, where the Person of the Owner, where the Person of the Owner, where the Owner, which the Owner		405	50 4081	10 30C	
	00	1.02	18	408	50 410E		7.0
		1623			Total Volume		52.00m
		and the same of th	34	4005	0 401		
		1445	33	4018	10 402		
	0/	1447	25	402	50 40h	FO 300	
	1/1/20		23	409	50 4080	a mi	)
	[ ]		1	LINE	50 4100	0 200	

GENERAL NOTES:

Planned Amendment Volume (gals) (deep to shallow)

Total Volume (gal):

SHEFT TOTAL (val)

100, 100, 300, 300, 200

## **GENERAL INFORMATION**

SITE NAME: CHAAP 2019 OU	1 RAO Injectio	on	PROJECT NO.	60565355
INJECTION TRANSECT	T-4		DATE:	11-21-19
DP SUBCONTRACTOR	PES		PERSONNEL:	RR
AMENDMENT / PERCENT CONCENTRATION		9.890 WB	SHEET NO.	10£3

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	тиве вкер	3 g	38140	38 240	100	
	752	32	38240	38 340	100	
		28	38 340	38 640	300	
		22	38640	38 940	300	
(	1018	18	38940	39140	200	
	101		1,8110	Total Volume (gal):	1000	
		38	38 140	38240	100	Redvilled
	753	32	38240	38 340	100	once sond
0	( ) /		38 340	38 640	300	hagve
2		29 22	38 640	38940	300	700
	11/19	18	38940	39 140	200	
	1/0		170 190	Total Volume (gal):	1000	
		38	38140	38240	100	
	754	32	38240	38 340	100	
	, ,	28	38 340	38640	300	
3	1018	22	38 640	38940	300	
/		18	38940	39140	200	
	10/2	10	17-110	Total Volume (gal):		
		38	38 140	38240	100	
	756	32	38240	38340	100	
		28	38340	38640	300	
U			38 640	38940	300	
l		18	38940	39140	200	
		10	70110	Total Volume (gal):	1000	
		38	38 140	38 240	100	
	910	32	38 240	36340	100	
		28	38340	38640	300	
4		22	38 640	38940	300	
, J		18	38940	39140	200	
		1	1707-70	Total Volume (gal):		
		38	38140	38240	100	
,	758	32	38240	38340	100	
1.		28	38340	3840	300	ж
$\bigvee$		22	38 640	38940	300	
	1021	18	38940	39140	200	
	100	<del>- 18</del>	1,0110	Total Volume (gal):	1000	

SHEET TOTAL (gal): 6000

# **GENERAL INFORMATION**

SITE NAME: C	HAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	7-4	DATE:	11-21-19
DP SUBCONTRACTOR	PES	PERSONNEL:	AR
AMENDMENT / PERCENT	CONCENTRATION: 9,850 WB	SHEET NO.	20 + 3

# INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	39140	39240	100	
	1052	32	39240	39340	100	
~	103	28	39340	39640	300	
1 32		22	39640	39940	300	
l	1306	18	39940	40140	200	
	1100			Total Volume (gal):	1000	
		38	39 140	39240	100	
	11124	32	39240	39 340	100	
0	1101	28	39340	39640	300	
8	772.27	22	39640	39 940	300	
0	1363	18	39940	40140	200	
	1101			Total Volume (gal):	1000	
		38	39 140	39240	100	
	1126	32	39240	39 340	100	
$\mathcal{C}$	11164	28			300	
7		28 39340 39640 22 39640 39640 18 39940 46140 Total Volume (gal):	300			
(	1308				200	
	1100	10	12/10		1000	
	1059	38	39140	39 240	100	
		32	39240	39340	100	
10		28	39340	39640	300	
10		22	39440	39940	300	
1 9		18	39940	40140	200	
		10	127	Total Volume (gal):	1000	
	,	38	39146	39 240	100	<del> </del>
	1101	32	39240	39340	100	
1 .	110	28	39340	39948 040	300	
11		22	39640	39940	300	
· · ·	1308	18	39940	40140	200	
	1 100 1097770	177710	Total Volume (gal):	1000		
	,	38	39 140	39240	100	
	1102	32	39 240	39340	100	
		28	39340	39640	300	
		22	39 640	39940	300	
V	1311	18	39 940	40140	200	
		17	171740	Total Volume (gal):	1000	
				Total volume (gai).	1000	

SHEET TOTAL (gal): 6,000

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-5	DATE:	11-21-19
DP SUBCONTRACTOR	PES	PERSONNEL:	RR
AMENDMENT / PERCEN	T CONCENTRATION: 9,8 WB	SHEET NO.	3 of 3

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start /	5 4 6	36 (6)	Maria (E. I)	A 1 37 - 1 ( 1)	Mata
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	111.66	38	40140	40240	100	
	1409	32	40240	40340	100	
7		28	40340	40640	300	
7	11000	22	40 640	40940	300	
,	1557	18	140940	141140	200	
			, practical and a second process.	Total Volume (gal):	1000	
		38	40140	40240	100	
	1411	32	40240	40340	100	
8	1 1 1 [	28	40340	40640	300	
0		22	40640	40940	300	
	1554	18	40940	41140	200	
				Total Volume (gal):	1000	
		38	40140	40240	100	
	1412	32	40240	40340	100	
$\mathcal{O}_{t}$	11716	28	40340	40640	300	
9	1559	22	40640	40940	300	
,		16	40940	41140	200	
				Total Volume (gal):	1000	
		38	40140	40240	100	
	1414	32	40246	40 340	100	
,			40340	40640	300	
10		24 22	40640	40940	300	
, 0		18	40940	41140	200	
			170	Total Volume (gal):	1000	
	1416	38	40140	40 240	100	
		32	40 240	40340	100	
11		28	40340	40690	300	
[ ]		22	40640	40 940	300	<del></del>
	1552	18	40940	41140	200	<del> </del>
	11//-	10	17-110	Total Volume (gal):	1000	
		38	40140	40240	100	
	1418	32			100	
17		28	40240	40340	300	
12			40340	40690		
ŧ.	1554	22	40640	40940	300	<del> </del>
		18	40940	41/40	200	
				Total Volume (gal):	1000	

1348-1400 TANKS empty

SHEET TOTAL (gal): 6,000

GENERAL INFORMAT	ION		PROJECT NO.	60565355
SITE NAME:	CHAAP 2019 OU1 RAO Inject	tion	DATE:	11-22-19
INJECTION TRANSECT		13	PERSONNEL:	TY AD
DP SUBCONTRACTOR	PES	0 4º1 INB	SHEET NO.	10f3
AN APPLIENT / DEDCE	NT CONCENTRATION:	7.01000	SILLEI NO.	

TON INTEDUAL	LS/VOLUMES			W-M-34-100-100-10		
Point #	Time Start /	Doub (bas)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	Time Stop	Depth (bgs)	41050	41150	100	
	1070	33	41150	41250	100	
	1030	25	41250	41,550	700	
47		23	41550	41850	300	
	1220	18	41850	42050	200	
	160			Total Volume (gal):		
		38	41050	41150	100	
	1022	33	41150	41250	100 300	
1	1000	28	41200	41550	300	
4	1	23 18	41590	41850	200	
V (	1222	18	41850	Total Volume (gal)		
				141 50	100	
		36 32	41050	41250	100	
	11034	33_	41150	41550	300	
110	100.	28 23	41210	41850	300	
40	1.0011	18	41850	42050	200	
	1/2201	10	910110	Total Volume (gal	): 1000	
		38	41030	4/130	100	
	10210	33	41130	41 230	100	
	1000	28	41230	41530	300	
20		23	41530	41830	300	
0	17710	18	41830	42030	200	
	1200			Total Volume (ga		
	1.20	38 33	41040	41140	100	
	11058		41 140	41240	300	
•		28	41240		300	
29	- 0 1	23	41540		200	
	1228	18	4/840	Total Volume (gr		
	100	0.0	11100116	1 11 5	100	
		38	41040		0.0	
$\sim$	11090	33	4/190		300	
2	1	28	4 54	1.0		
0'	0 1-	23	4184		0 - 5	
	1250	10	7107	Total Volume (g		

SHEET TOTAL (gal):

Planned Amendment Volume (gals) (deep to shallow)

GENERAL NOTES: Late start due to Frozen lines.

GENERAL	INFORM	ATION
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SITE NAME: CH.	AAP 2019 OU1 RAO Inje	ction	PROJECT NO.	60565355
INJECTION TRANSECT	EWT	- T3	DATE:	11-22-19
DP SUBCONTRACTOR	PES		PERSONNEL:	TYAD
AMENDMENT / PERCENT CO	DICENTRATION:	9.8% WB	SHEET NO.	2043

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	42050	42 150	100	
	1240	<u>38</u> 33	42150	42.250	100	
	1200	28	42250	47 550	300	
21.		23	42550	42 850	300	
36	11107	18	42850	43050	200	
	1402			Total Volume (gal):	1000	
		38	42050	42150	100	
	1242	33	42 150	42250	100	
	11610	28	42250	4250	300	
1		23 18	42550	42850	300	
3h	1404	18	42850	43050	200	
-	1901			Total Volume (gal):	000	
		35	42050	42190	100	45
	1244	33	42150	42210	100	
	1299	28	42250	42550	300	
24			42550	42850	300	
34	1406	23 18	42850	43050	200	
				Total Volume (gal):	1000	
		38	42030	42130	100	
	12711.	33	42130	212230	100	
112	1246	28	42230	42530	300	
33		23	42 530	42830	300	
5	1408	18	42830	43030	200	
	. 100		1000	Total Volume (gai):	1000	<del></del>
		38	42040	92 140	B 100	
	10118	33	42 140	42 240	100	· · · · · · · · · · · · · · · · · · ·
20	1248	38	42240	42540	300	· · · · · · · · · · · · · · · · · · ·
50		23	42540	42840	300	
	1410	13	42840	43040	200	
	]  -			Total Volume (gal):	1000	
		38	42040	412/40	100	
21	INCO	33	42140	47240	100	
	1250	28	42240	42540	300	
		23	42040	42840	300	
	1412	18	42840	43040	200	<u>-</u>
	' ' ' ' '		100010	Total Volume (gal):	1000	

SHEET TOTAL (gal):

GENERAL NOTES:

Planned Amendment Volume (gals) (deep to shallow)

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EN7-T3	DATE:	11-28-19
DP SUBCONTRACTOR	PES	PERSONNEL:	TY AD
AMENDMENT / PERCE	NT CONCENTRATION: 9.8% UB	SHEET NO.	3043

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	43040	43140	100	
	11120	33	43140	43240	100	
9 0	1430	28	43240	43540	300	
50.		23	43540	43840	300	
	11-211	18	43840	44040	200	
	1624			Total Volume (gal):	1000	•
		3%	43040	43140	100	
	11120	33	43140	43240	(00)	
	1432	28	43240	43540	300	
29		23	43540	48840	300	
6	11.210	18	43840	44040	100	
	1626			Total Volume (gal):	1000	
		38	43030	43130	100	
	111211	3 <i>8</i> 33	43130	43230	100	
1000	1434	28	43230	43730	300	
08	1628	23	43530	43830	300	
50		18	43830	44030	200	
				Total Volume (gal):	1000	
		38	430NO	43150	100	· · · · · · · · · · · · · · · · · · ·
	1436	33	43150	43250	100	
	19100	28	43250	43550	300	
27	1630	23	43550	43850	300	
21		18	43850	44050	200	
				Total Volume (gal):	1000	
		33	43040	43150	100	
	1438	33	43150	43250	100	
01	19100	28	43250	43550	300	
90		23	43550	UBB OTO	300	
	1632	18	43850	44050	200	
2000-2000-2000-000	1000			Total Volume (gal):	1000	
		38	43000	43150	100	
	111111	3 <i>3</i>	43150	43250	100	
0/	1440	28	43250	43550	300	
1/5		33	43550	43850	300	
L'	1634	18	43850	44050	200	
			. , , , , , ,	Total Volume (gal):		

SHEET TOTAL (gal):

6000

GENERAL NOTES:

Planned Amendment Volume (gals) (deep to shallow)

## **GENERAL INFORMATION**

SITE NAME: CHAA	AP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-4	DATE:	11-22-19
DP SUBCONTRACTOR	PES	PERSONNEL:	AR
AMENDMENT / PERCENT CONC	CENTRATION: 9,890 WB	SHEET NO.	10FH

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	41 140	41240	100	
	800	32	41240	41 340	100	
17		28	41340	41640	300	
13		22	41640	41940	300	
V: 6	1015	18	41940	42140	200	
				Total Volume (gal):	1000	
		38	41140	4/240	100	
	802	32	41240	41340	100	
111		M3628	41340	41640	300	
14		22	41640	41940	300	
	1014	18	4/940	42 140	200	
	10.			Total Volume (gal):	1000	
		38	41140	41240	100	F.
	804	32	41240	41 340	100	
15		28	41 340	41640	300	
15	,	22	41640	41940	300	
	1012	18	41940	42140	200	
	100.			Total Volume (gai):	1000	
		38	41140	41240	100	
	823	32	41240	41340	100	
1 /		28	41 340	41640	300	
16		22	41640	41 940	300	
10	1012	18	41940	42140	200	
	1,0,1			Total Volume (gai):	1000	
		38	41 140	41240	100	
	808	32	41 240	41 340	100	
17		28	41340	41640	300	
17		22	41 640	41940	300	
* <b>\</b>	1013	12	41940	42 140	200	
	1/0//			Total Volume (gal):	1000	····
		38	41 140	41240	100	
. 1 .	818	32	41 240	41340	100	
14	1	28	41 340	41640	300	
10		22	41640	41940	300	
•	1015	18	41940	42140	200	<del></del>
	1'0'	17	11110	Total Volume (gal):	1000	

SHEET TOTAL (gal): 60

GENERAL NOTES:

## **GENERAL INFORMATION**

SITE NAME: CHA	AP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-5	DATE:	11-22-19
DP SUBCONTRACTOR	PES	PERSONNEL:	BR
AMENDMENT / PERCENT CO	NCENTRATION: 9,8% WB	SHEET NO.	20+ 4

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	42140	42240	100	
	1033	32	42 240	42340	100	
13	1011	28	42340	42640	300	
1 / 10		22	42640	42940	300	
	1213	18	42940	43140	200	
	, ,			Total Volume (gal):	1000	
rise.		38	42140	42 240	100	
	1035	37	42 240	42340	100	
1/1	10/	28	42340	42640	300	
14	( 7	7.2	42640	42940	300	
' /	1207	18	42940	43140	200	
	•			Total Volume (gal):	1000	
	,	38	42140	42240	100	
_	1035	38 32	42 240	42340	100	
15	10/	24	42340	42640	300	
17	1211	22	42640	42940	300	
		18	42940	43140	200	
				Total Volume (gal):	1000	
		35	42140	42240	100	
	1038	32	42240	42340	100	
) /	(0)	28	42340	42640	300	
16		22	42640	42940	300	
	1215	18	42940	43 140	200	
	101)			Total Volume (gal):	1000	
		38	42 140	42240	100	
	1038	32	42240	42340	100	
17	1070	28	42340	42640	300	
1		22	42640	42940	300	
50	1216	18	42940	43/40	200	
	1210			Total Volume (gal):	1000	
		36	42140	42240	100	
	1039	32	42240	42340	100	
1 ) 4		28	42340	42640	300	
) 0		22	42640	42940	300	
′	1220	18	42940	43140	200	
				Total Volume (gal):	1000	

SHEET TOTAL (gal): 6,000

GENERAL NOTES:

## **GENERAL INFORMATION**

SITE NAME: CHAAP	2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-4	DATE:	11-22-14
DP SUBCONTRACTOR	PES	PERSONNEL:	nn
AMENDMENT / PERCENT CONCE	NTRATION: 9.89 V	VB SHEET NO.	30+4

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	12-1	38	43 140	43 240	100	
	1254	32	43 240	43 340	100	
101		28	43 340	43640	300	
19	1	22	43640	43 940	300	
' (	1518	18	43940	44 140	200	<u>.</u>
	131			Total Volume (gal):	1000	
		38	43140	43 240	100	
	1257	32	43240	43 340	100	
20		28	43 340	43 640	300	
		22	43 640	43 940	300	
	1512	18	43 940	44140	200	
				Total Volume (gal):	1000	
	12 5/2	38	43 140	43240	100	
<b>a</b> ,	1258	32	43 240	43340	100	· · · · · · · · · · · · · · · · · · ·
21		28	43 340	43640	300	
2 (	1508	22	43640	43 940	300	
			43940	44140	200	
			1	Total Volume (gal):	1000	****
		38	43 13 40	43 240	100	
	1259	32	43240	43 340	100	
22		28	43 340	43 640	300	
		22	43 640	43 940	300	
	1508	18	43940	44 140	200	
	1 , 0 ,		1.2.2	Total Volume (gal):	1000	
<u></u>	v.s	38	43 140	43246	100	
	1300	32	43 240	43 340	100	
23	100	28	43340	43 640	300	
L		22	43 640	43 940	300	
ž.	1509	18	43940	44140	200	
	1001	10		Total Volume (gal):	1000	
		38	43 140	43 240	100	
01/	1307	32	43 240	43340	100	
14	11000	28	43 340	43 640	300	
12/3	1302	m3822	43 640	43 940	300	
	1511		43940	44140	200	
:	11/6	18	11/790	Total Volume (gal):	1000	
				roun volume (gai):	1000	

SHEET TOTAL (gal): 6,000

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	7-5	DATE:	11-22-14
DP SUBCONTRACTOR	PES	PERSONNEL:	MP
AMENDMENT / PERCEN	NT CONCENTRATION: 9.85 WB	SHEET NO.	40f4

#### INTECTION INTERVALS/VOLUMES

Point #	Time Start /	D - 41 (1)	Manage (Stand)	Metas (Fod)	Antrol Vol. (cal)	Notes
	Time Stop	Depth (bgs)	Meter (Start)  44 140	Meter (End) 44240	Actual Vol. (gal)	Notes
	1541	70	9-7 170	197210	100	
	' ' '		<del>                                     </del>			· · · · · · · · · · · · · · · · · · ·
19			1			
1 (	1557	· · · · · · · · · · · · · · · · · · ·				
	1 / / /			Total Volume (gal):	100	
	- 0	38	44140	44240	100	
	1543					
20	7 / /					
	1559					
	1775/		<u> </u>	Total Volume (gal):	100	
		38	44140		100	
	1545	2 7	99190	44240	100	
21	1					
	1605		1			
	1605					
				Total Volume (gal):		
	1542	38	44140	44240	100	
0 0	1547					
22	41		<b>_</b>			
	11.20					
	1420			Total Volume (mal):	100	
		21.	44140	Total Volume (gal):	100	
	1548	38	144140	44240	100	
23						<u> </u>
				,		
*	1556					<del></del>
				Total Volume (gal):		
	1 -	38	44140	44240	100	
<b>1</b> 11	1549					
14						
	1603		<b> </b>			
	1601		1	T 177-1 ( ) 5		·
				Total Volume (gal):	100	
			SI	HEET TOTAL (gal):	600	

GENERAL NOTES:

#### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7- T3	DATE:	11-23-19
DP SUBCONTRACTOR	PES	PERSONNEL:	TY AD
AMENDMENT / PERCE	ENT CONCENTRATION: 9.8 % WB	SHEET NO.	10f3

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	Time Stop	35	440FO	44150	100	11000
		33	44150	44250	106	
(1)	0815	28	44250	44 550	300	
		23	44 550	44-850	300	
1 1	1 1.00	18	44850	45 050	200	
	1120	10	99 000	Total Volume (gal):	1000	
		38	44050	44150	100	
	217	33	44 190	44250	100	
	0817	23	44 250	44 500	300	
$\Omega$		23	44550	44850	300	
0	1122	18	44860	45050	200	
	1122	1.0	1	Total Volume (gal):	1000	
X-VI		38	44000	44140	100	
	0819	33	4410	44 250	100	
A	0011	28	44250	44 MAO	300	
7	Part Control of the C	23	44 440	44 850	300	
LI	1124	18	44890	45090	200	
				Total Volume (gal):	1000	
		39 33	44030	44130	100	
	0821	33	44 130	44 230	100	
00		28	44 230	44 530	300	
22		23	44 F30	44 630	300	
	1126	18	44 830	45 030	200	
	1100			Total Volume (gal):	1000	
	1	38	44040	44146	100	
	0823	33	44140	44 240	100	
02	007	28	44 240	44 540	300	
23		23	44 540	44840	300 200	
. 0	1128	18	44 840	45 040		
	1100			Total Volume (gal):	1000	
		38	44040	41140	100	
1	0825	33	44 140	44240	100	
	0001	28	44 240	44540	300	
1		23	44 540	44840	300	
	1130	18	44 840	45040	200	
	1.00		1	Total Volume (gal):	1000	

SHEET TOTAL (gal):

Planned Amendment Volume (gals) (deep to shallow)

0935: out of amendment 1050: Resumed pumping

GENERAL NOTES:

100, 100, 300, 300, 200

GENER	AL	INFOR	MA	TION
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INJECTION TRANSECT  CHAAP 2019 OUT RAO INJECTION  DATE: 11-2	3-19
INJECTION I BANDECT	-01
DP SUBCONTRACTOR PES PERSONNEL:	IAD
AMENDMENT / PERCENT CONCENTRATION: 9.5% WB SHEET NO. 2	of3

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	45050	45150	100	
	1145	33	45150	45250	100	
	1137	28	45250	45550	300	
711		23 18	45550	45850	300	
Col	1355	18	45850	46000	200	
	1500			Total Volume (gal):	1000	
		36	UNORO	45150	100	
	4	33	45150	45250	100	
	1147	28	45250	45550	300	
2		23	45550	45850	300	
1	1357	18	45850	46000	200	
				Total Volume (gal):	1000	
		35	MADAO	45150	100	
	1 with	33	45150	45250	100	
	1149	28	45250	45 55 C	300	
2	1359	23	46550	45850	300	
		23 18	45850	460HO	200	
				Total Volume (gal):		
		38	4030	45130	100	
	15	33	45130	45230	100	
	116/1	28	45230	45530	300	
0 1		23	45530	4530	300	
1	1401	18	45830	46030	200	
	1 101			Total Volume (gal):	NAME AND ADDRESS OF TAXABLE PARTY.	
		34	45040	44140	100	
	1153	33	44140	45240	100	
$\sim$	1153	25	45240	49940		
1		23	45540	45840	300	
. 0	1403	18	45840	46040	200	
	1905			Total Volume (gal)	1000	

SHEET TOTAL (gai): (0000

46040

Total Volume (gal):

1405

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-T2	DATE:	11-23-10
DP SUBCONTRACTOR	PES	PERSONNEL:	TY AD
AMENDMENT / PERCE	NT CONCENTRATION: 9.8% WB	SHEET NO.	3073

## INJECTION INTERVALS/VOLUMES

GENERAL NOTES:

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	46050	46150	100	
,	11120	33	46150	46250	100	
1	1430	27	46250	46550	300	
17		25 23	4600	46800	300	
10	1602					
	1000			Total Volume (gal):	800	
		38	46050	46150	1:00	
	1432	33	410150	46250	100	
$\sqrt{}$		33 25	410250	46550	300	
\		23	46550	46850	300	
• •	110011					
	1664			Total Volume (gal):	000	
		3%	46050	46150	100	
	111911	33	410150	46250	100	
110	1434	26	46250	46550	300	
10		83	410550	46850	300	
	1606					
				Total Volume (gal):	800	
	111210	38	46030	46130	100	
		33	46130	46230	100	
15	1436	25	46230	46 430	300	
101		25 23	46550	46830	300	
	1608					
	1000			Total Volume (gal):	<i>30</i> 0	
		3 <del>8</del> 33	46040	46140	100	
	1438	33	ULETUO	46240	100	
1/1	1700	25	46240	illerico	300	
14		25 23	46940	46840	300	
¥3	1610	13				
	1410			Total Volume (gal):	8∞	
		38	46040	46140	100	
	1440	33	46/40	46240	100	
12	1 190	28	40240	46540	300	
13		23	46540	48840	300	
	ILen					
	ILLIC			Total Volume (gal):	300	

SHEET TOTAL (gal):

## **GENERAL INFORMATION**

SITE NAME: CHAAP 2019 OU	J1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-5	DATE: _/	1-23-19
DP SUBCONTRACTOR	PES	PERSONNEL:	AM
AMENDMENT / PERCENT CONCENTRATION	v: 9.8% WB	SHEET NO.	10f3

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		32	44240	44340	100	
	800	28	44 340	44640	300	16
17.		22	44640	44940	300	
19		15	44940	45140	200	
, (	929			Total Volume (gal):	900	
			1.44 0.44			
	Conti	32	44240	44340	100	
	800	28	44 340	44640	300	
20		22	44640	44940	300	
	915	18	44946	45140	200	
	1115			Total Volume (gal):	900	
		32	44240	44340	100	
21	an.	28	44 346	44640	300	
	800	22	44640	44940	300	
		18	44940	45140	200	
	924					
	1 ' - '			Total Volume (gal):	900	
	800	32	44240	44340	100	
		28	44 340	44640	300	
$\gamma \gamma$		22	44640	44940	300	
22	0 11	18	44946	45140	200	
	924			Total Volume (gal):	900	
		20	144040			
		32	44240	44340	100	
0.2	800	28	44340	44 640	300	
23		22	44 640	44940	300	
*	922	18	44940	45140	200	
	1100			Total Volume (gal):	900	
		32	44240	44 340	100	
0 ( )	800	28	44 340	44640	300	
7.4	1 000	22	44640	44940	300	
	0 -	18	44940	45140	200	
	927	<b>#</b>			0.00	
		1		Total Volume (gal):	900	

SHEET TOTAL (gal): 5,400



#### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO. 60565355
INJECTION TRANSECT	T-3	DATE: 11-23-19
DP SUBCONTRACTOR	PES	PERSONNEL: AR
AMENDMENT / PERCEN	T CONCENTRATION: 9,8WB	SHEET NO. 2 of 3

## INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	-	38	45 140	45240	100	
	0952	M3832	45240	45 340	100	_
1	01)	BB2 28	45340	45640	300	
l		M26 22	45640	45 940	300	
	1203	MOZZ 18	45940	46140	200	
75-500	120)	n+8		Total Volume (gal):	1000	
		38	45 140	45 240	100	
	0953	32	45240	45 340	100	
2	01/	28	45340	45 640	300	
		22	45640	45940	300	
	1201	18	45940	46140	200	
	1,001		1	Total Volume (gal):	1000	
		38	45 140	45 240	100	
	0955	32	45240	45340	100	
1	$ \mathcal{O}(\mathcal{O}) $	28	45340	45 640	300	
	1201	22	45640	45940	300	
		18	45940	46140	200	745-40
			1177.0	Total Volume (gal):	1000	
		38	45140	45240	100	- 111- 102- 145 W 1100 Z
,	11912	32	45240	45340	100	
4	10157	28	45 340	45640	300	
1		22	45640	45940	300	74.14
	11705	18	45940	46/40	200	
	1100		1437	Total Volume (gal):	1000	
		38	45140	45 150	10	No Flow
	0959	32	45240	45 340	190	Pulledup 5'
6	017	28	45340	45 640	300	rangerys
			# 640	45 940	300	
	11204	18	45 940	46140	200	
['	1201	18	77 790	Total Volume (gal):	1000	
U	*	38	45 140	45 150	Water Charles Co.	
	1662	32		45340	100	
	1002	28	45240		100	
			45340	45640	300	
	112 03	22	45 640	45940	300	
	112)	18	45940	46 140	200	-
				Total Volume (gal):	1000	

SHEET TOTAL (gal): 6,000

GENERAL NOTES: 1015-1043 Empty tonk

Planned Amendment Volume (gals) (deep to shallow)

## **GENERAL INFORMATION**

SITE NAME: CHAAP 2019 OU1 RAO Injection PROJECT NO. 60565355

INJECTION TRANSECT 7-3

DATE: 1/-23-19

DP SUBCONTRACTOR PES

AMENDMENT / PERCENT CONCENTRATION: 9,890 WB

SHEET NO. 306-35

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Doub (bas)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	Time Stop	Depth (bgs)	44 140	46240		140103
	1229	32	7	46340	100	
	1239	28	46240	46640	100	
7					300	
(	1000	22	46640	46940		
	1530	18	146940	47140	200	
	*:		Me un	Total Volume (gal):	1000	
	12116	38	46 140	46 240	100	
•	1240	32 28	46 240	46 340	100	
8			46340	46640	300	
U	100	22	46 640	46940	300	
	1529	18	146 940	47140	200	
	1-			Total Volume (gal):	1000	
		38	46140	46240	100	
	[24]	32	46 240	46340	100	
9		28	46340	46640	300	
		22	46640	46940	300	
	1532	18	46940	47140	200	
	17/			Total Volume (gal):	1000	
	12	38	46140	46240	100	
	1241	32	46240	46340	100	
10		28	46340	46640	300	
10	, ,	22	46640	46940	300	
•	1533	18	46940	47140	200	
	(1)			Tatal Valums (gal):	1000	
		38	46 140	46240	100	
	1242	32	44 240	46340	100	
1 1	11-14	28	46 340	46640	300	
( )		22	46640	46940	300	
360	1534	18	46940	47140	200	
	1777			Total Volume (gal):	1000	
	1	30	140 140	46240	100	
12	1743	32	46 240	46340	100	
	100	28	46340	46 640	300	
		22	46640	46 940	300	
1 -	1540		114010		, , , , , , , , , , , , , , , , , , , ,	
1	1540	18	46940	47140	200	

SHEET TOTAL COND. 6,000

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	F	PROJECT NO.	60565355
INJECTION TRANSECT	EW7- T	-2	DATE:	11-24-19
DP SUBCONTRACTOR	PES	1	PERSONNEL:	TY AD
AMENDMENT / PERCE	NT CONCENTRATION:	9.8% WB	SHEET NO.	1 of 4

## INJECTION INTERVALS/VOLUMES

Point #	Time Start /	Daniel (b)	Martine (Charles)	Mater (Fe 4)	Astrol Vol. (5-1)	Mer
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	}	18	46840	47040	200	
	0740					
13						
	0805			•		<del></del>
	USUN			Total Volume (gal):	200	
		18	46840	47040	200	
	0742		47.0	, , , , ,		
V . (	0146					
14						
1 '	0807					
	0,007			Total Volume (gal):	200	
		18	46830	47030	200	
	6744					
1						
16						
	0809					
				Total Volume (gal):	200	
	1.9	18	46850	47050	200	i
	0746					
1.						
(0	1					
10	0811			Total Volume (gal):	200	
		18	41.850	47050	200	
	167.10	10	9(0000	77010		<u>.</u> .
	6748					
\ /		· <del></del> ·				
1 (	noiz					
	0813	-	•	Total Volume (gal):	200	
		18	46850	47050	200	
	10760					
1 1	0750					
10						
	0815					
				Total Volume (gal):	200	

SHEET TOTAL (gal): 1200

**GENERAL INFORMATION** 

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	605653

INJECTION TRANSECT EW7-T2 DATE: 11-24-1

DP SUBCONTRACTOR PES PERSONNEL: TY AD

AMENDMENT/PERCENT CONCENTRATION: 9.8% UB SHEET NO. ZOF U

#### INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	47050	47150	100	
	0820	33	47150	47250	100	
	108.54 (10)	28	47250	47550	300	
16		23	47550	47850	300	
10	1012	18	47850	48050	200	
	1010			Total Volume (gal):	1000	
		38	47050	47150	100	
	0827	33	47150	47250	00	
	0,00	28	47250	47550	300	
1 1		23	47550	47850	300	
1	1014	18	47850	48050	200	
	1017	-		Total Volume (gal):	1000	
*		38	47050	47150	100	
	0824	33	47150	47250	100	
	0001	28	47250	47550	300	·
10		23	47550	47850	300	
	1016	18	47850	48050	200	
				Total Volume (gal):	1000	
		38 33	47030	47130	100	
	0820	33	47130	47230	100	
	0000	23	47230	47530	300	
9		23 23	47530	47830	300	
'	1018	18	47830	48030	200	
	1010	-		Total Volume (gal):	1000	
		38	47040	47140	100	
	0828	33	47140	47240	100	
	UUU	28	47240	47940	300	
8		23 18	47540	47840	300	
	1020	18	47840	48040	200	
	1020			Total Volume (gal):	1000	
		38 35	47040	47140	100	
	607/	35	47140	47240	100	
	6830	28	47240	47540	300	
		23	47540	47840	300	
•	1022	18	47840	48040	200	
	1022			Total Volume (gal):	1000	

SHEET TOTAL (gal):

6000

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355

INJECTION TRANSECT EW7-T3 DATE: 11-24-P

DP SUBCONTRACTOR PES PERSONNEL: TY AD

AMENDMENT / PERCENT CONCENTRATION: 9.8% WB SHEET NO. 3 of 4

## INJECTION INTERVALS/VOLUMES

Point #	Time Start / Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	-	38	48040	48140	100	
~	1040	33	48140	48240	100	
18	1090	28	48240	48540	300	
1 0		23	48540	48840	300	
	1235	18	48840	49040	200	
	1600	. =		Total Volume (gal):	1000	
		38	48040	48140	100	
	1042	33	48140	48240	100	
. 7 8	1012	28	48240	48540	300	
(		23	48540	48840	300	
•	1237	18	48840	49040	200	
			-	Total Volume (gal):	1000	
		38	48030	48130	100	
	1044	33	48130	48230	100	
	1041	28	48230	48530	300	
10	1239	23	48530	48830	300	
		18	48880	49030	200	
				Total Volume (gal):	1000	
		38	48000	48150	100	
	1046	33	48150	48250	100	
	10910	28	48250	48550	300	
15		23	48550	48850	300	
	1241	18	48850	49050	200	
-		·		Total Volume (gal):	1000	
		38 33	48050	48150	100	
	1048	33	48150	48250	100	
14	10 10	28	48250	48550	300	
		23	48550	48850	300	
	1243	18	48850	49050	200	
		Li di		Total Volume (gal):	1000	
		38	48050	48150	100	
	1050	33	48150	48250	100	
	,,,,,	23	48250	48590	300	
13		23	48550	48850	300	
1)	1245	18	48850	49050	200	
	10.12			Total Volume (gal):	1000	

SHEET TOTAL (gal): 600

#### **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	EW7-TI	DATE:	11-24-19
DP SUBCONTRACTOR	PES	PERSONNEL:	TYAD
AMENDMENT / PERCE	ENT CONCENTRATION: 9.8% WB	SHEET NO.	4 of 4

## INJECTION INTERVALS/VOLUMES

Point #	Time Start /				4 . 177	N-4
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	10	38	49050	49150	100	
	1315	33	49150	49250	100	
19		28	49240	49550	300	
18	1	23	49550	49850	300	<b>,</b>
	1515	18	49850	50050	200	
				Total Volume (gal):	1000	
		38	49050	49150	100	<u> </u>
	1317	33	49150	49250	100	
		20 23	49250	49000	300	
17			49550	49850	300	
1 /	N17	18	49850	50050	200	
				Total Volume (gal):	1000	
		38	49050	49150	100	
	1319	33	49150	49250	100	
Y	1011	28	49250	49500	300	
10		23	49550	49850	300	
10	10019	18	49650	40050	200	
				Total Volume (gal):	000	
		38	49030	49130	100	
	1321	33	49130	49230	100	
	102	28	49230	49530	300	
15		23	49530	49830	300	
1 ,	1501	18	49830	h0030	200	
	11721			Total Volume (gal):	1000	
		38	49040	49140	100	
	1272	33	49140	49240	100	
V , (	1323	28	49246	49540	300	
14		23	49840	49840	300	
	1503	18	49840	70040	200	
	1.17			Total Volume (gal):	1000	
***************************************		30	49040	49140	100	
	1325	33	49140	49240	100	
17	1020	28	49240	49540	300	
		23	49540	49840	300	
	1525	18	49840	50040	200	
	1.10/11			Total Volume (gal):	1000	

SHEET TOTAL (gal): 6000

GENERAL NOTES:

Planned Amendment Volume (gals) (deep to shallow)

## **GENERAL INFORMATION**

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO.	60565355
INJECTION TRANSECT	T-2	DATE:	11-24-19
DP SUBCONTRACTOR	PES	PERSONNEL:	n m
AMENDMENT / PERCE	NT CONCENTRATION: 9,83, WB	SHEET NO.	lot3

## INJECTION INTERVALS/VOLUMES

Point #	Time Start /	141				
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
	2-1	38	47140	47240	100	
	756	32	47240	47340	100	
(		28	47340	47646	300	
	0	22	47640	47 940	300	
l	955	18	47940	48140	200	
				Total Volume (gal):	1000	
	/	38	47 140	47 240	100	
	758	32	47240	47340	100	
	, ,	28	47 340	47640	300	
		22	47 640	47940	300	
	950	18	47946	48140	200	
	' '		•	Total Volume (gal):	1000	
		38	47 140	47 240	100	
	759	32	47 240	47340	100	
0	( ) ( _	28	47 340	47640	300	
3		22	47640	47940	300	
	953	18	47940	48140	200	
	' ' /		1. 1.7.0-	Total Volume (gal):	1000	
		38	47140	47240	100	
	1000	32	47240	47340	100	
	800	28	47340	47640	300	
U		22	47640	47 940	300	
l	954	18	47940	48140	200	
	' '	10	117 170	Total Volume (gal):	1000	
		38	47140	47240	100	
	803	32	47 240	47 340	100	
_		28	47340	47640	300	
	Ph.		47 640	47 940	360	<u></u>
7	960900	<u>22</u> 18	47940	48 (40	200	i
J	950956	, 0	117990	Total Volume (gal):		
		0	42 145		1000	
	1010	38	47 140	47240	100	
6	810	32	47240	47 340	100	
		28	47340	47 640	300	
	953	22	47646	47940	300	
	/ /	18	47940	48140	200	
				Total Volume (gal):	1000	

SHEET TOTAL (gal): 6,000

## GENERAL INFORMATION

SITE NAME:	CHAAP 2019 OU1 RAO Injection	PROJECT NO. 60565355
INJECTION TRANSECT	T-1	DATE: 11-24-19
DP SUBCONTRACTOR	PES	PERSONNEL: PR
AMENDMENT / PERCEN	T CONCENTRATION: 9, 82WB	SHEET NO. 2 0 + 3

## INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	48 140	48240	100	
1	1017	32	48240	48340	100	
		28	48340	48640	300	
1	C	22	48640	48 940	300	
·	1229	18	48940	49140	200	
				Total Volume (gal):	1000	
		38	48140	48240	100	
_	1018	32	48240	48340	100	
2	1010	28	48 340	48640	300	
	_	22	48640	48940	300	
	1233	18	48946	49140	200	
	1 - //	1	1,1,1,1,1	Total Volume (gal):	1000	
		38	48140	48240	1000 m	
	1020	32	48240	48 340	100	
	1020	28	48340	48 640	300	
3	100-	2.2	48640	44 940	300	
	1237	19	48940	49140	200	
			1	Total Volume (gal):	1000	
	- 0	38	48140	48240	10	Noflow@ 381
	1033	32	48 240	48 340	190	
[ /		29	48340	48640	300	
4		22	48640	48940	300	
(	1227	19	48940	49140	200	127
	1201		1,0	Total Volume (gal):	1000	
		38	48140	48240	100	
	1025	32	48240	48340	100	
/_	100	28	48340	48640	300	
7		22	48640	48940	300	· ·-
	1228	18	48940	49140	200	
	1220	10	110110	Total Volume (gal):	1000	
		38	48140	48 240	100	
	1027	32	48 240	48340	100	
1	-	28	48 340	48640	300	
10	1 - 2	22	48 640	48 940	300	
y	1229	18	48940	49 140	200	
	''	10	110170	Total Volume (gal):	1000	
	I	l		rotal volume (gai).	1000	

SHEET TOTAL (gal): 6,000

## **GENERAL INFORMATION**

SITE NAME: CHAAP 201	19 OU1 RAO Injectio	on	PROJECT NO.	60565355
INJECTION TRANSECT	7-1		DATE:	11-24-19
DP SUBCONTRACTOR	PES		PERSONNEL:	AR
AMENDMENT / PERCENT CONCENTR	ATION:	9.890WB	Sheet no	3 of 3

## INJECTION INTERVALS/VOLUMES

Point #	Time Start /					
	Time Stop	Depth (bgs)	Meter (Start)	Meter (End)	Actual Vol. (gal)	Notes
		38	49 140	49240	100	
	130+	32	49240	49346	100	
7	11/6	28	49340	49 640	300	
7		22	49640	49 940	300	
•	1515	18	49940	50140	200	
	171~			Total Volume (gal):	1000	
	·	38	49140	49240	100	
	1308	32	49240	49346	100	
$\sim$	1700	28	49340	49640	300	
8		22	49640	49 940	300	
O	1515	18	49940	50140	200	
	1010	······································		Total Volume (gal):	1000	
		38	49146	49240	100	
	1309	32	49240	49 340	100	
0.	1,00	7.8	49340	49646	300	<del>, , , , , , , , , , , , , , , , , , , </del>
9		28 22	49 646	49940	300	
• )	1515	18	49946	50140	200	<del>*************************************</del>
	ران		3 - 1 - 1 - 1 - 1	Total Volume (gal):	1000	<u> </u>
		38	49140	149240	100	
	13:11	32	49240	49 340	100	<del> </del>
$I \wedge A$	17.	28	49340	49 640	300	
10	· · · · · · · · · · · · · · · · · · ·	22	49640	49940	300	
, ,	160	18	49940	50140	200	
	1515	1 0	17 / 170	Total Volume (gal):	1000	<del>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</del>
		38	49140	49240	100	
	1312	32	49240	49340	100	
11	11/1	28	49340	49640	300	···
11		22	49640	49940	300	
	1616	18	49940	50140	200	
	1515		177190	Total Volume (gal):		
		2 0-	110 1110		1000	····
	11213	3.8	49 140	49 240	100	<del></del>
12	1313	32 28	49240	49 340	100	
	I		49340	49 640	300	
	1515	22	49640	49940	300	
	1515	18	49940	50140	200	
				Total Volume (gal):	1000	

SHEFT TOTAL (2017 6,000

**TABLE B-1 OU1 SUBSURFACE INJECTION SUMMARY** OU1 REBOUND STUDY LETTER REPORT - BASELINE

Injection Transect Point ID	Date(s)	Ground Elevation <sup>1</sup> (feet amsl)	Number of Intervals	Starting Depth (feet bgs)	Ending Depth (feet bgs)	Meter Start	Meter End	Total Volume (gal)
Rotwoon FW6	and EW7 Trans			, ,	, <u>U</u>			<u> </u>
	blend 66-10 9.8%		_ 1000 gall(	ns ner noint	_ 15-foot poir	nt spacing)		
EW7-T1-1	11/24/2019	1896.15	5 5	38	18	48140	49140	1000
EW7-T1-2	11/24/2019	1896.15	5	38	18	48140	49140	1000
EW7-T1-3	11/24/2019	1896.15	5	38	18	48140	49140	1000
EW7-T1-4	11/24/2019	1896.15	5	38	18	48140	49140	1000
EW7-T1-5	11/24/2019	1896.15	5	38	18	48140	49140	1000
EW7-T1-6	11/24/2019	1896.15	5	38	18	48140	49140	1000
EW7-T1-7	11/24/2019	1896.15	5	38	18	49140	50140	1000
EW7-T1-8	11/24/2019	1896.15	5	38	18	49140	50140	1000
EW7-T1-9	11/24/2019	1896.15	5	38	18	49140	50140	1000
EW7-T1-10	11/24/2019	1896.77	5	38	18	49140	50140	1000
EW7-T1-11	11/24/2019	1896.77	5	38	18	49140	50140	1000
EW7-T1-12	11/24/2019	1896.77	5	38	18	49140	50140	1000
EW7-T1-13	11/24/2019	1896.77	5	38	18	49040	50040	1000
EW7-T1-14	11/24/2019	1896.77	5	38	18	49040	50040	1000
EW7-T1-15	11/24/2019	1896.77	5	38	18	49030	50030	1000
EW7-T1-16	11/24/2019	1896.77	5	38	18	49050	50050	1000
EW7-T1-17	11/24/2019	1896.77	5	38	18	49050	50050	1000
EW7-T1-18	11/24/2019	1896.77	5	38	18	49050	50050	1000
		•	EW7-T1	<b>Total Points:</b>	24	EW7-T1 To	tal Gallons:	18,000
EW7-T2 (Wes	blend 66-10 9.8%	6 by volume -	- 1000 gallo	ons per point	– 15-foot poir	nt spacing)		
EW7-T2-1	11/24/2019	1895.96	5	38	18	47140	48140	1000
EW7-T2-2	11/24/2019	1895.96	5	38	18	47140	48140	1000
EW7-T2-3	11/24/2019	1895.96	5	38	18	47140	48140	1000
EW7-T2-4	11/24/2019	1895.96	5	38	18	47140	48140	1000
EW7-T2-5	11/24/2019	1895.96	5	38	18	47140	48140	1000
EW7-T2-6	11/24/2019	1895.96	5	38	18	47140	48140	1000
EW7-T2-7	11/24/2019	1895.96	5	38	18	47040	48040	1000
EW7-T2-8	11/24/2019	1895.96	5	38	18	47040	48040	1000
EW7-T2-9	11/24/2019	1895.96	5	38	18	47030	48030	1000
EW7-T2-10	11/24/2019	1895.96	5	38	18	47050	48050	1000
EW7-T2-11	11/24/2019	1896.34	5	38	18	47050	48050	1000
EW7-T2-12	11/24/2019	1896.34	5	38	18	47050	48050	1000
EW7-T2-13	11/24/2019	1896.34	5	38	18	46040	47040	1000
EW7-T2-14	11/24/2019	1896.34	5	38	18	46040	47040	1000
EW7-T2-15	11/24/2019	1896.34	5	38	18	46030	47030	1000
EW7-T2-16	11/24/2019	1897.39	5	38	18	46050	47050	1000
EW7-T2-17	11/24/2019	1897.39	5	38	18	46050	47050	1000
EW7-T2-18	11/24/2019	1897.39	5	38	18	46050	47050	1000
EW7-T2-19	11/23/2019	1897.39	5	38	18	45050	46050	1000
EW7-T2-20	11/23/2019	1897.39	5	38	18	45050	46050	1000
EW7-T2-21	11/23/2019	1897.39	5	38	18	45050	46050	1000
EW7-T2-22	11/23/2019	1897.39	5	38	18	45030	46030	1000
EW7-T2-23	11/23/2019	1897.39	5	38	18	45040	46040	1000
EW7-T2-24	11/23/2019	1897.39	5 EW7 TO	38	18	45040	46040	1000
			EW7-12	Total Points:	24	EW7-T2 To	tal Gallons:	24,000

**TABLE B-1 OU1 SUBSURFACE INJECTION SUMMARY** OU1 REBOUND STUDY LETTER REPORT - BASELINE

Injection Transect Point ID	Date(s)	Ground Elevation <sup>1</sup> (feet amsl)	Number of Intervals	Starting Depth (feet bgs)	Ending Depth (feet bgs)	Meter Start	Meter End	Total Volume (gal)
	blend 66-10 9.8%					nt spacing)		
EW7-T3-1	11/23/2019	1896.19	5	38	18	45140	46140	1000
EW7-T3-2	11/23/2019	1896.19	5	38	18	45140	46140	1000
EW7-T3-3	11/23/2019	1896.19	5	38	18	45140	46140	1000
EW7-T3-4	11/23/2019	1896.19	5	38	18	45140	46140	1000
EW7-T3-5	11/23/2019	1896.19	5	38	18	45140	46140	1000
EW7-T3-6	11/23/2019	1896.19	5	38	18	45140	46140	1000
EW7-T3-7	11/23/2019	1896.19	5	38	18	46140	47140	1000
EW7-T3-8	11/23/2019	1896.19	5	38	18	46140	47140	1000
EW7-T3-9	11/23/2019	1896.19	5	38	18	46140	47140	1000
EW7-T3-10	11/23/2019	1896.19	5	38	18	46140	47140	1000
EW7-T3-11	11/23/2019	1896.19	5	38	18	46140	47140	1000
EW7-T3-12	11/23/2019	1896.19	5	38	18	46140	47140	1000
EW7-T3-13	11/24/2019	1896.19	5	38	18	48050	49050	1000
EW7-T3-14	11/24/2019	1896.19	5	38	18	48050	49050	1000
EW7-T3-15	11/24/2019	1896.19	5	38	18	48050	49050	1000
EW7-T3-16	11/24/2019	1896.19	5	38	18	48030	49030	1000
EW7-T3-17	11/24/2019	1896.19	5	38	18	48040	49040	1000
EW7-T3-18	11/24/2019	1896.19	5	38	18	48040	49040	1000
EW7-T3-19	11/23/2019	1896.19	5	38	18	44050	45050	1000
EW7-T3-20	11/23/2019	1896.19	5	38	18	44050	45050	1000
EW7-T3-21	11/23/2019	1896.19	5	38	18	44050	45050	1000
EW7-T3-22	11/23/2019	1897.69	5	38	18	44030	45030	1000
EW7-T3-23	11/23/2019	1897.69	5	38	18	44040	45040	1000
EW7-T3-24	11/23/2019	1897.69	5	38	18	44040	45040	1000
EW7-T3-25	11/22/2019	1897.69	5	38	18	43050	44050	1000
EW7-T3-26	11/22/2019	1897.69	5	38	18	43050	44050	1000
EW7-T3-27	11/22/2019	1897.69	5	38	18	43050	44050	1000
EW7-T3-28	11/22/2019	1897.69	5	38	18	43030	44030	1000
EW7-T3-29	11/22/2019	1897.69	5	38	18	43040	44040	1000
EW7-T3-30	11/22/2019	1897.69	5	38	18	43040	44040	1000
EW7-T3-31	11/22/2019	1897.69	5	38	18	42040	43040	1000
EW7-T3-32	11/22/2019	1897.69	5	38	18	42040	43040	1000
EW7-T3-33	11/22/2019	1897.69	5	38	18	42030	43030	1000
EW7-T3-34	11/22/2019	1897.69	5	38	18	42050	43050	1000
EW7-T3-35	11/22/2019	1897.69	5	38	18	42050	43050	1000
EW7-T3-36	11/22/2019	1897.69	5	38	18	42050	43050	1000
EW7-T3-37	11/22/2019	1897.69	5	38	18	41040	42040	1000
EW7-T3-38	11/22/2019	1897.69	5	38	18	41040	42040	1000
EW7-T3-39	11/22/2019	1897.69	5	38	18	41030	42030	1000
EW7-T3-40	11/22/2019	1897.69	5	38	18	41050	42050	1000
EW7-T3-41	11/22/2019	1897.69	5	38	18	41050	42050	1000
EW7-T3-42	11/22/2019	1897.69	5	38	18	41050	42050	1000
				Total Points:	24	EW7-T3 Total C	Gallons:	42,000
	blend 66-10 9.8%						1 201.10	1000
EW7-T4-1	11/21/2019	1896.63	5	38	18	38140	39140	1000
EW7-T4-2	11/21/2019	1896.63	5	38	18	38140	39140	1000
EW7-T4-3	11/21/2019	1896.63	5	38	18	38140	39140	1000

**TABLE B-1 OU1 SUBSURFACE INJECTION SUMMARY OU1 REBOUND STUDY LETTER REPORT - BASELINE** 

Injection Transect		Ground Elevation <sup>1</sup>	Number of	Starting Depth	Ending Depth			Total Volume		
Point ID	Date(s)	(feet amsl)	Intervals	(feet bgs)	(feet bgs)	Meter Start	Meter End	(gal)		
EW7-T4-4	11/21/2019	1896.63	5	38	18	38140	39140	1000		
EW7-T4-5	11/21/2019	1896.63	5	38	18	38140	39140	1000		
EW7-T4-6	11/21/2019	1896.63	5	38	18	38140	39140	1000		
EW7-T4-7	11/21/2019	1896.63	5	38	18	39140	40140	1000		
EW7-T4-8	11/21/2019	1896.63	5	38	18	39140	40140	1000		
EW7-T4-9	11/21/2019	1896.63	5	38	18	39140	40140	1000		
EW7-T4-10	11/21/2019	1896.63	5	38	18	39140	40140	1000		
EW7-T4-11	11/21/2019	1896.63	5	38	18	39140	40140	1000		
EW7-T4-12	11/21/2019	1896.63	5	38	18	39140	40140	1000		
EW7-T4-13	11/22/2019	1896.63	5	38	18	41140	42140	1000		
EW7-T4-14	11/22/2019	1896.63	5	38	18	41140	42140	1000		
EW7-T4-15	11/22/2019	1896.63	5	38	18	41140	42140	1000		
EW7-T4-16	11/22/2019	1896.63	5	38	18	41140	42140	1000		
EW7-T4-17	11/22/2019	1896.63	5	38	18	41140	42140	1000		
EW7-T4-18	11/22/2019	1896.63	5	38	18	41140	42140	1000		
EW7-T4-19	11/22/2019	1896.63	5	38	18	43140	44140	1000		
EW7-T4-20	11/22/2019	1896.63	5	38	18	43140	44140	1000		
EW7-T4-21	11/22/2019	1896.63	5	38	18	43140	44140	1000		
EW7-T4-22	11/22/2019	1897.83	5	38	18	43140	44140	1000		
EW7-T4-23	11/22/2019	1897.83	5	38	18	43140	44140	1000		
EW7-T4-24	11/22/2019	1897.83	5	38	18	43140	44140	1000		
EW7-T4-25	11/21/2019	1897.83	5	38	18	40050	41050	1000		
EW7-T4-26	11/21/2019	1897.83	5	38	18	40050	41050	1000		
EW7-T4-27	11/21/2019	1897.83	5	38	18	40050	41050	1000		
EW7-T4-28	11/21/2019	1897.83	5	38	18	40030	41030	1000		
EW7-T4-29	11/21/2019	1897.83	5	38	18	40040	41040	1000		
EW7-T4-30	11/21/2019	1897.83	5	38	18	40040	41040	1000		
EW7-T4-31	11/20/2019	1897.83	5	38	18	37040	38040	1000		
EW7-T4-32	11/20/2019	1897.83	5	38	18	37040	38040	1000		
EW7-T4-33	11/20/2019	1897.83	5	38	18	37030	38030	1000		
EW7-T4-34	11/20/2019	1897.83	5	38	18	37050	38050	1000		
EW7-T4-35	11/20/2019	1897.83	5	38	18	37050	38050	1000		
EW7-T4-36	11/20/2019	1897.83	5	38	18	37050	38050	1000		
EW7-T4-37	11/20/2019	1897.83	5	38	18	36040	37040	1000		
EW7-T4-38	11/20/2019	1897.83	5	38	18	36040	37040	1000		
EW7-T4-39	11/20/2019	1897.83	5	38	18	36030	37030	1000		
EW7-T4-40	11/20/2019	1897.83	5	38	18	36050	37050	1000		
EW7-T4-41	11/20/2019	1897.83	5	38	18	36050	37050	1000		
EW7-T4-42	11/20/2019	1897.83	5	33	18	36050	37050	1000		
				Total Points:	42		otal Gallons:	42,000		
	EW7-T5 (Wesblend 66-10 9.8% by volume – 1000 gallons per point – 15-foot point spacing)									
EW7-T5-1	11/20/2019	1897.2	5	38	18	38140	39140	1000		
EW7-T5-2	11/20/2019	1897.2	5	38	18	38140	39140	1000		
EW7-T5-3	11/20/2019	1897.2	5	38	18	38140	39140	1000		
EW7-T5-4	11/20/2019	1897.2	5	38	18	38140	39140	1000		
EW7-T5-5	11/20/2019	1897.2	5	38	18	38140	39140	1000		
EW7-T5-6	11/20/2019	1897.2	5	38	18	38140	39140	1000		
EW7-T5-7	11/21/2019	1897.2	5	38	18	40140	41140	1000		

**TABLE B-1 OU1 SUBSURFACE INJECTION SUMMARY OU1 REBOUND STUDY LETTER REPORT - BASELINE** 

Injection Transect	D.4.(A)	Ground Elevation <sup>1</sup>	Number of	Starting Depth	Ending Depth	M.A. St. A	Maritia	Total Volume
Point ID EW7-T5-8	Date(s) 11/21/2019	( <b>feet amsl</b> )	Intervals	(feet bgs)	(feet bgs)	Meter Start 40140	Meter End 41140	( <b>gal</b> )
EW7-T5-9	11/21/2019	1897.2	5	38	18	40140	41140	1000
EW7-T5-10	11/21/2019	1897.2	5	38	18	40140	41140	1000
EW7-T5-11	11/21/2019	1897.2	5	38	18	40140	41140	1000
EW7-T5-11	11/21/2019	1897.2	5	38	18	40140	41140	1000
EW7-T5-13	11/21/2019	1897.2	5	38	18	42140	43140	1000
EW7-T5-14	11/22/2019	1897.2	5	38	18	42140	43140	1000
EW7-T5-15	11/22/2019	1897.2	5	38	18	42140	43140	1000
EW7-T5-16	11/22/2019	1897.2	5	38	18	42140	43140	1000
EW7-T5-17	11/22/2019	1897.2	5	38	18	42140	43140	1000
EW7-T5-18	11/22/2019	1897.2	5	38	18	42140	43140	1000
EW7-T5-19	11/23/2019	1897.2	5	38	18	44140	45140	1000
EW7-T5-20	11/23/2019	1897.2	5	38	18	44140	45140	1000
EW7-T5-21	11/23/2019	1897.2	5	38	18	44140	45140	1000
EW7-T5-22	11/23/2019	1897.61	5	38	18	44140	45140	1000
EW7-T5-23	11/23/2019	1897.61	5	38	18	44140	45140	1000
EW7-T5-24	11/23/2019	1897.61	5	38	18	44140	45140	1000
EW7-T5-25	11/21/2019	1897.61	5	38	18	39040	40040	1000
EW7-T5-26	11/21/2019	1897.61	5	38	18	39040	40040	1000
EW7-T5-27	11/21/2019	1897.61	5	38	18	39030	40030	1000
EW7-T5-28	11/21/2019	1897.61	5	38	18	39050	40050	1000
EW7-T5-29	11/21/2019	1897.61	5	38	18	39050	40050	1000
EW7-T5-30	11/21/2019	1897.61	5	38	18	39050	40050	1000
EW7-T5-31	11/21/2019	1897.61	5	38	18	38050	39050	1000
EW7-T5-32	11/21/2019	1897.61	5	38	18	38050	39050	1000
EW7-T5-33	11/21/2019	1897.61	5	38	18	38050	39050	1000
EW7-T5-34	11/21/2019	1897.61	5	38	18	38030	39030	1000
EW7-T5-35	11/21/2019	1897.61	5	38	18	38040	39040	1000
EW7-T5-36	11/21/2019	1897.61	5	38	18	38040	39040	1000
EW7-T5-37	11/20/2019	1897.61	5	38	18	35040	36040	1000
EW7-T5-38	11/20/2019	1897.61	5	38	18	35040	36040	1000
EW7-T5-39	11/20/2019	1897.61	5	38	18	35030	36030	1000
EW7-T5-40	11/20/2019	1897.61	5	38	18	35050	36050	1000
EW7-T5-41	11/20/2019	1897.61	5	38	18	35050	36050	1000
EW7-T5-42	11/20/2019	1897.61	5	38	18	35050	36050	1000
				Total Points:	42		otal Gallons:	42,000
	blend 66-10 9.8%							
EW7-T6-1	11/18/2019	1897.51	5	38	18	32120	33120	1000
EW7-T6-2	11/18/2019	1897.51	5	38	18	32120	33120	1000
EW7-T6-3	11/18/2019	1897.51	5	38	18	32120	33120	1000
EW7-T6-4	11/18/2019	1897.51	5	38	18	32120	33120	1000
EW7-T6-5	11/18/2019	1897.51	5	38	18	32120	33120	1000
EW7-T6-6	11/18/2019	1897.51	5	38	18	32120	33120	1000
EW7-T6-7	11/18/2019	1897.51	5	38	18	33120	34140	1020
EW7-T6-8	11/18/2019	1897.51	5	38	18	33120	34140	1020
EW7-T6-9	11/18/2019	1897.51	5	38	18	33120	34140	1020
EW7-T6-10	11/18/2019	1897.51	5	38	18	33120	34140	1020
EW7-T6-11	11/18/2019	1897.51	5	38	18	33120	34140	1020

**TABLE B-1 OU1 SUBSURFACE INJECTION SUMMARY** OU1 REBOUND STUDY LETTER REPORT - BASELINE

Injection Transect Point ID	Date(s)	Ground Elevation <sup>1</sup> (feet amsl)	Number of Intervals	Starting Depth (feet bgs)	Ending Depth (feet bgs)	Meter Start	Meter End	Total Volume (gal)
EW7-T6-12	11/18/2019	1897.51	5	38	18	33120	34140	1020
EW7-T6-13	11/20/2019	1897.51	5	38	18	37140	38140	1000
EW7-T6-14	11/20/2019	1897.51	5	38	18	37140	38140	1000
EW7-T6-15	11/20/2019	1897.51	5	38	18	37140	38140	1000
EW7-T6-16	11/20/2019	1897.51	5	38	18	37140	38140	1000
EW7-T6-17	11/20/2019	1897.51	5	38	18	37140	38140	1000
EW7-T6-18	11/20/2019	1897.51	5	38	18	37140	38140	1000
EW7-T6-19	11/19/2019	1897.51	5	38	18	33040	34040	1000
EW7-T6-20	11/19/2019	1897.51	5	38	18	33040	34040	1000
EW7-T6-21	11/19/2019	1897.51	5	38	18	33030	34030	1000
EW7-T6-22	11/19/2019	1896.99	5	38	18	33050	34050	1000
EW7-T6-23	11/19/2019	1896.99	5	38	18	33050	34050	1000
EW7-T6-24	11/19/2019	1896.99	5	38	18	33050	34050	1000
EW7-T6-25	11/18/2019	1896.99	5	38	18	32040	33040	1000
EW7-T6-26	11/18/2019	1896.99	5	38	18	32040	33040	1000
EW7-T6-27	11/18/2019	1896.99	5	38	18	32030	33030	1000
EW7-T6-28	11/18/2019	1896.99	5	38	18	32050	33050	1000
EW7-T6-29	11/18/2019	1896.99	5	38	18	32050	33050	1000
EW7-T6-30	11/18/2019	1896.99	5	38	18	32050	33050	1000
EW7-T6-31	11/17/2019	1896.99	5	38	18	29040	30040	1000
EW7-T6-32	11/17/2019	1896.99	5	38	18	29040	30040	1000
EW7-T6-33	11/17/2019	1896.99	5	38	18	29030	30030	1000
EW7-T6-34	11/17/2019	1896.99	5	38	18	29050	30050	1000
EW7-T6-35	11/17/2019	1896.99	5	38	18	29050	30050	1000
EW7-T6-36	11/17/2019	1896.99	5	38	18	29050	30050	1000
EW7-T6-37	11/17/2019	1896.99	5	38	18	28040	29040	1000
EW7-T6-38	11/17/2019	1896.99	5	38	18	28040	29040	1000
EW7-T6-39	11/17/2019	1896.99	5	38	18	28030	29030	1000
EW7-T6-40	11/17/2019	1896.99	5	38	18	28050	29050	1000
EW7-T6-41	11/17/2019	1896.99	5	38	18	28050	29050	1000
EW7-T6-42	11/17/2019	1896.99	5	38	18	28050	29050	1000
				Total Points:	42		otal Gallons:	42,120
	blend 66-10 9.8%							
EW7-T7-1	11/18/2019	1898.07	5	38	18	31120	32120	1000
EW7-T7-2	11/18/2019	1898.07	5	38	18	31120	32120	1000
EW7-T7-3	11/18/2019	1898.07	5	38	18	31120	32120	1000
EW7-T7-4	11/18/2019	1898.07	5	38	18	31120	32120	1000
EW7-T7-5	11/18/2019	1898.07	5	38	18	31120	32120	1000
EW7-T7-6	11/18/2019	1898.07	5	38	18	31120	32120	1000
EW7-T7-7	11/20/2019	1898.07	5	38	18	34140	35140	1000
EW7-T7-8	11/20/2019	1898.07	5	38	18	34140	35140	1000
EW7-T7-9	11/20/2019	1898.07	5	38	18	34140	35140	1000
EW7-T7-10	11/20/2019	1898.07	5	38	18	34140	35140	1000
EW7-T7-11	11/20/2019	1898.07	5	38	18	34140	35140	1000
EW7-T7-12	11/20/2019	1898.07	5	38	18	34140	35140	1000
EW7-T7-13	11/20/2019	1898.07	5	38	18	36140	37140	1000
EW7-T7-14	11/20/2019	1898.07	5	38	18	36140	37140	1000
EW7-T7-15	11/20/2019	1898.07	5	38	18	36140	37140	1000

**TABLE B-1 OU1 SUBSURFACE INJECTION SUMMARY** OU1 REBOUND STUDY LETTER REPORT - BASELINE

Injection Transect Point ID	Data(s)	Ground Elevation <sup>1</sup> (feet amsl)	Number of Intervals	Starting Depth (feet bgs)	Ending Depth (feet bgs)	Meter Start	Meter End	Total Volume (gal)
EW7-T7-16	Date(s) 11/20/2019	1898.07						1000
EW7-T7-17	11/20/2019	1898.07	5	38 38	18 18	36140 36140	37140 37140	1000
EW7-T7-18	11/20/2019		5	38	18		37140	
EW7-T7-19	11/20/2019	1898.07 1898.07	5	38	18	36140 34050	35050	1000
EW7-T7-20	11/20/2019	1898.07	5	38	18	34050	35050	1000
EW7-T7-21	11/20/2019	1898.07	5	38	18	34050	35050	1000
EW7-T7-21	11/20/2019	1896.69	5	38	18	34030	35030	1000
EW7-T7-23	11/20/2019	1896.69	5	38	18	34040	35040	1000
EW7-T7-24	11/20/2019	1896.69	5	38	18	34040	35040	1000
EW7-T7-25	11/18/2019	1896.69	5	38	18	31050	32050	1000
EW7-T7-26	11/18/2019	1896.69	5	38	18	31050	32050	1000
EW7-T7-20	11/18/2019	1896.69	5	38	18	31050	32050	1000
EW7-T7-28	11/18/2019	1896.69	5	38	18	31030	32030	1000
EW7-T7-28	11/18/2019	1896.69	5	38	18	31040	32040	1000
EW7-T7-30	11/18/2019	1896.69	5	38	18	31040	32040	1000
EW7-T7-30	11/18/2019	1896.69	5	38	18	30040	31040	1000
EW7-T7-31	11/18/2019	1896.69	5	38	18	30040	31040	1000
EW7-T7-32	11/18/2019	1896.69	5	38	18	30030	31030	1000
EW7-T7-34	11/18/2019	1896.69	5	38	18	30050	31050	1000
EW7-T7-35	11/18/2019	1896.69	5	38	18	30050	31050	1000
EW7-T7-36	11/18/2019	1896.69	5	38	18	30050	31050	1000
EW7-T7-37	11/15/2019	1896.69	5	38	18	27050	28050	1000
EW7-T7-38	11/15/2019	1896.69	5	38	18	27050	28050	1000
EW7-T7-39	11/15/2019	1896.69	5	38	18	27050	28050	1000
EW7-T7-40	11/15/2019	1896.69	5	38	18	27030	28030	1000
EW7-T7-40	11/15/2019	1896.69	5	38	18	27040	28040	1000
EW7-T7-42	11/15/2019	1896.69	5	38	18	27040	28040	1000
LW/-1/-42	11/13/2017	1070.07		Total Points:	42		otal Gallons:	42,000
EW7-T8 (Wes	blend 66-10 9.8%	6 by volume -					otai Gailolis.	42,000
EW7-T8-1	11/15/2019	1897.52	5	38	18	24120	25120	1000
EW7-T8-2	11/15/2019	1897.52	5	38	18	24120	25120	1000
EW7-T8-3	11/15/2019	1897.52	5	38	18	24120	25120	1000
EW7-T8-4	11/15/2019	1897.52	5	38	18	24120	25120	1000
EW7-T8-5	11/15/2019	1897.52	5	38	18	24120	25120	1000
EW7-T8-6	11/15/2019	1897.52	5	38	18	24120	25120	1000
EW7-T8-7	11/15/2019	1897.52	5	38	18	25120	26120	1000
EW7-T8-8	11/15/2019	1897.52	5	38	18	25120	26120	1000
EW7-T8-9	11/15/2019	1897.52	5	38	18	25120	26120	1000
EW7-T8-10	11/15/2019	1897.52	5	38	18	25120	26120	1000
EW7-T8-11	11/15/2019	1897.52	5	38	18	25120	26120	1000
EW7-T8-12	11/15/2019	1897.52	5	38	18	25120	26120	1000
EW7-T8-13	11/16/2019	1897.52	5	38	18	27120	28120	1000
EW7-T8-14	11/16/2019	1897.52	5	38	18	27120	28120	1000
EW7-T8-15	11/16/2019	1897.52	5	38	18	27120	28120	1000
EW7-T8-16	11/16/2019	1897.52	5	38	18	27120	28120	1000
EW7-T8-17	11/16/2019	1897.52	5	38	18	27120	28120	1000
EW7-T8-18	11/16/2019	1897.52	5	38	18	27120	28120	1000
EW7-T8-19	11/17/2019	1897.52	5	38	18	29120	30120	1000

**TABLE B-1 OU1 SUBSURFACE INJECTION SUMMARY** OU1 REBOUND STUDY LETTER REPORT - BASELINE

Injection Transect		Ground Elevation <sup>1</sup>	Number of	Starting Depth	Ending Depth			Total Volume
Point ID	Date(s)	(feet amsl)	Intervals	(feet bgs)	(feet bgs)	Meter Start	Meter End	(gal)
EW7-T8-20	11/17/2019	1897.52	5	38	18	29120	30120	1000
EW7-T8-21	11/17/2019	1897.52	5	38	18	29120	30120	1000
EW7-T8-22	11/17/2019	1897.52	5	38	18	29120	30120	1000
EW7-T8-23	11/17/2019	1897.52	5	38	18	29120	30120	1000
EW7-T8-24	11/17/2019	1897.52	5	38	18	29120	30120	1000
EW7-T8-25	11/15/2019	1895.99	5	38	18	26040	27040	1000
EW7-T8-26	11/15/2019	1895.99	5	38	18	26040	27040	1000
EW7-T8-27	11/15/2019	1895.99	5	38	18	26030	27030	1000
EW7-T8-28	11/15/2019	1895.99	5	38	18	26050	27050	1000
EW7-T8-29	11/15/2019	1895.99	5	38	18	26050	27050	1000
EW7-T8-30	11/15/2019	1895.99	5	38	18	26050	27050	1000
EW7-T8-31	11/15/2019	1895.99	5	38	18	23040	24040	1000
EW7-T8-32	11/15/2019	1895.99	5	38	18	23040	24040	1000
EW7-T8-33	11/15/2019	1895.99	5	38	18	23030	24030	1000
EW7-T8-34	11/15/2019	1895.99	5	38	18	23050	24050	1000
EW7-T8-35	11/15/2019	1895.99	5	38	18	23050	24050	1000
EW7-T8-36	11/15/2019	1895.99	5	38	18	23050	24050	1000
EW7-T8-37	11/14/2019	1895.99	5	38	18	21040	22040	1000
EW7-T8-38	11/14/2019	1895.99	5	38	18	21040	22040	1000
EW7-T8-39	11/14/2019	1895.99	5	38	18	21030	22030	1000
EW7-T8-40	11/14/2019	1895.99	5	38	18	21050	22050	1000
EW7-T8-41	11/14/2019	1895.99	5	38	18	21050	22050	1000
EW7-T8-42	11/14/2019	1895.99	5	38	18	21050	22050	1000
EW7-T8-43	11/14/2019	1895.99	5	38	18	20040	21040	1000
EW7-T8-44	11/14/2019	1895.99	5	38	18	20040	21040	1000
EW7-T8-45	11/14/2019	1895.99	5	38	18	20040	21040	1000
EW7-T8-46	11/14/2019	1895.99	5	38	18	20050	21050	1000
EW7-T8-47	11/14/2019	1895.99	5	38	18	20050	21050	1000
EW7-T8-48	11/14/2019	1895.99	5	38	18	20050	21050	1000
	11 166 10 0 0			Total Points:	48		otal Gallons:	48,000
	sblend 66-10 9.89						24120	1000
EW7-T9-1	11/15/2019	1897.38	5	38	18	23120	24120	1000
EW7-T9-2	11/15/2019	1897.38	5	38	18	23120	24120	1000
EW7-T9-3	11/15/2019	1897.38	5	38	18	23120	24120	1000
EW7-T9-4	11/15/2019	1897.38	5	38 38	18	23120	24120	1000
EW7-T9-5 EW7-T9-6	11/15/2019 11/15/2019	1897.38 1897.38	5	38	18 18	23120 23120	24120 24120	1000
EW7-T9-6	11/15/2019	1897.38	5	38	18	26120	27120	1000
EW7-T9-8	11/16/2019	1897.38	5	38	18	26120	27120	1000
EW7-T9-9	11/16/2019	1897.38	5	38	18	26120	27120	1000
EW7-T9-10	11/16/2019	1897.38	5	38	18	26120	27120	1000
EW7-T9-10	11/16/2019	1897.38	5	38	18	26120	27120	1000
EW7-T9-11	11/16/2019	1897.38	5	38	18	26120	27120	1000
EW7-T9-12	11/16/2019	1897.38	5	38	18	28120	29120	1000
EW7-T9-13	11/16/2019	1897.38	5	38	18	28120	29120	1000
EW7-T9-14 EW7-T9-15	11/16/2019	1897.38	5	38	18	28120	29120	1000
EW7-T9-13	11/16/2019	1897.38	5	38	18	28120	29120	1000
EW7-T9-10	11/16/2019	1897.38	5	38	18	28120	29120	1000
L 11 /-1 /-1 /	11/10/2017	1071.30	ر	50	10	20120	27120	1000

**TABLE B-1 OU1 SUBSURFACE INJECTION SUMMARY OU1 REBOUND STUDY LETTER REPORT - BASELINE** 

Injection Transect		Ground Elevation <sup>1</sup>	Number of	Starting Depth	Ending Depth			Total Volume
Point ID	Date(s)	(feet amsl)	Intervals	(feet bgs)	(feet bgs)	<b>Meter Start</b>	<b>Meter End</b>	(gal)
EW7-T9-18	11/16/2019	1897.38	5	38	18	28120	29120	1000
EW7-T9-19	11/17/2019	1897.38	5	38	18	30120	31120	1000
EW7-T9-20	11/17/2019	1897.38	5	38	18	30120	31120	1000
EW7-T9-21	11/17/2019	1897.38	5	38	18	30120	31120	1000
EW7-T9-22	11/17/2019	1897.38	5	38	18	30120	31120	1000
EW7-T9-23	11/17/2019	1897.38	5	38	18	30120	31120	1000
EW7-T9-24	11/17/2019	1897.38	5	38	18	30120	31120	1000
EW7-T9-25	11/16/2019	1894.57	5	38	18	25050	26050	1000
EW7-T9-26	11/16/2019	1894.57	5	38	18	25050	26050	1000
EW7-T9-27	11/16/2019	1894.57	5	38	18	25050	26050	1000
EW7-T9-28	11/16/2019	1894.57	5	38	18	25030	26030	1000
EW7-T9-29	11/16/2019	1894.57	5	38	18	25040	26040	1000
EW7-T9-30	11/16/2019	1894.57	5	38	18	25040	26040	1000
EW7-T9-31	11/15/2019	1894.57	5	38	18	24040	25040	1000
EW7-T9-32	11/15/2019	1894.57	5	38	18	24040	25040	1000
EW7-T9-33	11/15/2019	1894.57	5	38	18	24030	25030	1000
EW7-T9-34	11/15/2019	1894.57	5	38	18	24050	25050	1000
EW7-T9-35	11/15/2019	1894.57	5	38	18	24050	25050	1000
EW7-T9-36	11/15/2019	1894.57	5	38	18	24050	25050	1000
EW7-T9-37	11/15/2019	1894.57	5	38	18	22040	23040	1000
EW7-T9-38	11/15/2019	1894.57	5	38	18	22040	23040	1000
EW7-T9-39	11/15/2019	1894.57	5	38	18	22030	23030	1000
EW7-T9-40	11/15/2019	1894.57	5	38	18	22050	23050	1000
EW7-T9-41	11/15/2019	1894.57	5	38	18	22050	23050	1000
EW7-T9-42	11/15/2019	1894.57	5	38	18	22050	23050	1000
EW7-T9-43	11/14/2019	1894.57	5	38	18	19050	20050	1000
EW7-T9-44	11/14/2019	1894.57	5	38	18	19050	20050	1000
EW7-T9-45	11/14/2019	1894.57	5	38	18	19050	20050	1000
EW7-T9-46	11/14/2019	1894.57	5	38	18	19030	20030	1000
EW7-T9-47	11/14/2019	1894.57	5	38	18	19040	20040	1000
EW7-T9-48	11/14/2019	1894.57	5	38	18	19040	20040	1000
				Total Points:	48		otal Gallons:	48,000
	sblend 66-10 9.8	·					15000	1000
EW7-T10-1	11/6/2019	1896.19	5	38	18	14030	15030	1000
EW7-T10-2	11/6/2019	1896.19	5	38	18	14030	15030	1000
EW7-T10-3	11/6/2019	1896.19	5	38	18	14080	15080	1000
EW7-T10-4	11/6/2019	1896.19	5	38	18	14030	15030	1000
EW7-T10-5	11/6/2019	1896.19	5	38	18	14030	15030	1000
EW7-T10-6	11/6/2019	1896.19	5	38	18	14030	15030	1000
EW7-T10-7	11/6/2019	1896.19	5	38	18	15030	16120	1090
EW7-T10-8	11/6/2019	1896.19	5	38	18	15030	16120	1090
EW7-T10-9	11/6/2019	1896.19	5	38	18	15080	16120	1040
EW7-T10-10	11/6/2019	1896.19	5	38	18	15030	16120	1090
EW7-T10-11	11/6/2019	1896.19	5	38	18	15030	16120	1090
EW7-T10-12	11/6/2019	1896.19	5	38	18	15030	16120	1090
EW7-T10-13	11/13/2019	1896.19	5	38	18	18120	19120	1000
EW7-T10-14	11/13/2019	1896.19	5	38	18	18120	19120	1000
EW7-T10-15	11/13/2019	1896.19	5	38	18	18120	19120	1000

**TABLE B-1 OU1 SUBSURFACE INJECTION SUMMARY** OU1 REBOUND STUDY LETTER REPORT - BASELINE

Injection Transect Point ID	Data(s)	Ground Elevation <sup>1</sup> (feet amsl)	Number of Intervals	Starting Depth (feet bgs)	Ending Depth (feet bgs)	Meter Start	Meter End	Total Volume (gal)
EW7-T10-16	Date(s) 11/13/2019	1896.19	5	38	18	18120	19120	1000
EW7-T10-16	11/13/2019	1896.19	5	38	18	18120	19120	1000
EW7-T10-17	11/13/2019		5	38	18	18120	19120	
EW7-T10-18	11/13/2019	1896.19 1896.19	5	38	18	19120	20120	1000
EW7-T10-19	11/13/2019	1896.19	5	38	18	19120	20120	1000
EW7-T10-20	11/13/2019	1896.19	5	38	18	19120	20120	1000
EW7-T10-21	11/13/2019	1896.19	5	38	18	19120	20120	1000
EW7-T10-22	11/13/2019	1896.19	5	38	18	19120	20120	1000
EW7-T10-23	11/13/2019	1896.19	5	38	18	19120	20120	1000
EW7-T10-24	11/13/2019	1893.72	5	38	18	21120	22120	1000
EW7-T10-25	11/14/2019	1893.72	5	38	18	21120	22120	1000
EW7-T10-20	11/14/2019	1893.72	5	38	18	21120	22120	1000
EW7-T10-27	11/14/2019	1893.72	5	38	18	21120	22120	1000
EW7-T10-28	11/14/2019	1893.72	5	38	18	21120	22120	1000
EW7-T10-29	11/14/2019	1893.72	5	38	18	21120	22120	1000
EW7-T10-30	11/13/2019	1893.72	5	38	18	17040	18040	1000
EW7-T10-32	11/13/2019	1893.72	5	38	18	17040	18040	1000
EW7-T10-33	11/13/2019	1893.72	5	38	18	17030	18030	1000
EW7-T10-34	11/13/2019	1893.72	5	38	18	17050	18050	1000
EW7-T10-35	11/13/2019	1893.72	5	38	18	17050	18050	1000
EW7-T10-36	11/13/2019	1893.72	5	38	18	17050	18050	1000
EW7-T10-37	11/12/2019	1893.72	5	38	18	16040	17040	1000
EW7-T10-38	11/12/2019	1893.72	5	38	18	16040	17040	1000
EW7-T10-39	11/12/2019	1893.72	5	38	18	16030	17030	1000
EW7-T10-40	11/12/2019	1893.72	5	38	18	16050	17050	1000
EW7-T10-41	11/12/2019	1893.72	5	38	18	16050	17050	1000
EW7-T10-42	11/12/2019	1893.72	5	38	18	16050	17050	1000
EW7-T10-43	11/6/2019	1893.72	5	38	18	14050	15050	1000
EW7-T10-44	11/6/2019	1893.72	5	38	18	14050	15050	1000
EW7-T10-45	11/6/2019	1893.72	5	38	18	14050	15050	1000
EW7-T10-46	11/6/2019	1893.72	5	38	18	14030	15030	1000
EW7-T10-47	11/6/2019	1893.72	5	38	18	14040	15040	1000
EW7-T10-48	11/6/2019	1893.72	5	38	18	14040	15040	1000
•		•	EW7-T10	Total Points:	48	EW7-T10 To	otal Gallons:	48,490
EW7-T11 (We	sblend 66-10 9.8	% by volume	– 1000 gal	lons per point	- 15-foot po	int spacing)		<u> </u>
EW7-T11-1	11/6/2019	1894.73	5	38	18	13030	14030	1000
EW7-T11-2	11/6/2019	1894.73	5	38	18	13030	14030	1000
EW7-T11-3	11/6/2019	1894.73	5	38	18	13080	14080	1000
EW7-T11-4	11/6/2019	1894.73	5	38	18	13030	14030	1000
EW7-T11-5	11/6/2019	1894.73	5	38	18	13030	14030	1000
EW7-T11-6	11/6/2019	1894.73	5	38	18	13030	14030	1000
EW7-T11-7	11/12/2019	1894.73	5	38	18	16120	17120	1000
EW7-T11-8	11/12/2019	1894.73	5	38	18	16120	17120	1000
EW7-T11-9	11/12/2019	1894.73	5	38	18	16120	17120	1000
EW7-T11-10	11/12/2019	1894.73	5	38	18	16120	17120	1000
EW7-T11-11	11/12/2019	1894.73	5	38	18	16120	17120	1000
EW7-T11-12	11/12/2019	1894.73	5	38	18	16120	17120	1000
EW7-T11-13	11/13/2019	1894.73	5	38	18	17120	18120	1000

**TABLE B-1 OU1 SUBSURFACE INJECTION SUMMARY** OU1 REBOUND STUDY LETTER REPORT - BASELINE

Injection Transect		Ground Elevation <sup>1</sup>	Number of	Starting Depth	Ending Depth			Total Volume
Point ID	Date(s)	(feet amsl)	Intervals	(feet bgs)	(feet bgs)	Meter Start	Meter End	(gal)
EW7-T11-14	11/13/2019	1894.73	5	38	18	17120	18120	1000
EW7-T11-15	11/13/2019	1894.73	5	38	18	17120	18120	1000
EW7-T11-16	11/13/2019	1894.73	5	38	18	17120	18120	1000
EW7-T11-17	11/13/2019	1894.73	5	38	18	17120	18120	1000
EW7-T11-18	11/13/2019	1894.73	5	38	18	17120	18120	1000
EW7-T11-19	11/14/2019	1894.73	5	38	18	20120	21120	1000
EW7-T11-20	11/14/2019	1894.73	5	38	18	20120	21120	1000
EW7-T11-21	11/14/2019	1894.73	5	38	18	20120	21120	1000
EW7-T11-22	11/14/2019	1894.73	5	38	18	20120	21120	1000
EW7-T11-23	11/14/2019	1894.73	5	38	18	20120	21120	1000
EW7-T11-24	11/14/2019	1894.73	5	38	18	20120	21120	1000
EW7-T11-25	11/14/2019	1893.69	5	38	18	22120	23120	1000
EW7-T11-26	11/14/2019	1893.69	5	38	18	22120	23120	1000
EW7-T11-27	11/14/2019	1893.69	5	38	18	22120	23120	1000
EW7-T11-28	11/14/2019	1893.69	5	38	18	22120	23120	1000
EW7-T11-29	11/14/2019	1893.69	5	38	18	22120	23120	1000
EW7-T11-30	11/14/2019	1893.69	5	38	18	22120	23120	1000
EW7-T11-31	11/13/2019	1893.69	5	38	18	18050	19050	1000
EW7-T11-32	11/13/2019	1893.69	5	38	18	18050	19050	1000
EW7-T11-33	11/13/2019	1893.69	5	38	18	18050	19050	1000
EW7-T11-34	11/13/2019	1893.69	5	38	18	18030	19030	1000
EW7-T11-35	11/13/2019	1893.69	5	38	18	18040	19040	1000
EW7-T11-36	11/13/2019	1893.69	5	38	18	18040	19040	1000
EW7-T11-37	11/12/2019	1893.69	5	38	18	15050	16050	1000
EW7-T11-38	11/12/2019	1893.69	5	38	18	15050	16050	1000
EW7-T11-39	11/12/2019	1893.69	5	38	18	15050	16050	1000
EW7-T11-40	11/12/2019	1893.69	5	38	18	15030	16030	1000
EW7-T11-41	11/12/2019	1893.69	5	38	18	15040	16040	1000
EW7-T11-42	11/12/2019	1893.69	5	38	18	15040	16040	1000
EW7-T11-43	11/6/2019	1893.69	5	38	18	13040	14040	1000
EW7-T11-44	11/6/2019	1893.69	5	38	18	13030	14030	1000
EW7-T11-45	11/6/2019	1893.69	5	38	18	13030	14030	1000
EW7-T11-46	11/6/2019	1893.69	5	38	18	13050	14050	1000
EW7-T11-47	11/6/2019	1893.69	5	38	18	13050	14050	1000
EW7-T11-48	11/6/2019	1893.69	5	38	18	13050	14050	1000
			EW7-T11	<b>Total Points:</b>	48	EW7-T11 To	otal Gallons:	48,000
EW7-T12 (We	sblend 66-10 9.8							,
EW7-T12-1	11/4/2019	1894.25	5	38	18	7030	8030	1000
EW7-T12-2	11/4/2019	1894.25	5	38	18	7030	8030	1000
EW7-T12-3	11/4/2019	1894.25	5	38	18	7080	8080	1000
EW7-T12-4	11/4/2019	1894.25	5	38	18	7030	8030	1000
EW7-T12-5	11/4/2019	1894.25	5	38	18	7030	8030	1000
EW7-T12-6	11/4/2019	1894.25	5	38	18	7030	8030	1000
EW7-T12-7	11/4/2019	1894.25	5	38	18	8030	9030	1000
EW7-T12-8	11/4/2019	1894.25	5	38	18	8030	9030	1000
EW7-T12-9	11/4/2019	1894.25	5	38	18	8080	9080	1000
EW7-T12-10	11/4/2019	1894.25	5	38	18	8030	9030	1000
EW7-T12-11	11/4/2019	1894.25	5	38	18	8030	9030	1000
2/ 112 11	11/1/2017		,	50	10	0050	7030	1000

**TABLE B-1 OU1 SUBSURFACE INJECTION SUMMARY OU1 REBOUND STUDY LETTER REPORT - BASELINE** 

Injection		Ground	Number	Starting	Ending			Total
Transect		Elevation <sup>1</sup>	of	Depth	Depth			Volume
Point ID	Date(s)	(feet amsl)	Intervals	(feet bgs)	(feet bgs)	Meter Start	Meter End	(gal)
EW7-T12-12	11/4/2019	1894.25	5	38	18	8030	9030	1000
EW7-T12-13	11/4/2019	1894.25	5	38	18	9030	10030	1000
EW7-T12-14	11/4/2019	1894.25	5	38	18	9030	10030	1000
EW7-T12-15	11/4/2019	1894.25	5	38	18	9080	10080	1000
EW7-T12-16	11/4/2019	1894.25	5	38	18	9030	10030	1000
EW7-T12-17	11/4/2019	1894.25	5	38	18	9030	10030	1000
EW7-T12-18	11/4/2019	1894.25	5	38	18	9030	10030	1000
EW7-T12-19	11/5/2019	1894.25	5	38	18	11030	12030	1000
EW7-T12-20	11/5/2019	1894.25	5	38	18	11030	12030	1000
EW7-T12-21	11/5/2019	1894.25	5	38	18	11080	12080	1000
EW7-T12-22	11/5/2019	1894.25	5	38	18	11030	12030	1000
EW7-T12-23	11/5/2019	1894.25	5	38	18	11030	12030	1000
EW7-T12-24	11/5/2019	1894.25	5	38	18	11030	12030	1000
EW7-T12-25	11/5/2019	1893.97	5	38	18	12050	13050	1000
EW7-T12-26	11/5/2019	1893.97	5	38	18	12050	13050	1000
EW7-T12-27	11/5/2019	1893.97	5	38	18	12050	13050	1000
EW7-T12-28	11/5/2019	1893.97	5	38	18	12030	13030	1000
EW7-T12-29	11/5/2019	1893.97	5	38	18	12030	13030	1000
EW7-T12-30	11/5/2019	1893.97	5	38	18	12040	13040	1000
EW7-T12-31	11/5/2019	1893.97	5	38	18	9040	10040	1000
EW7-T12-32	11/5/2019	1893.97	5	38	18	9030	10030	1000
EW7-T12-33	11/5/2019	1893.97	5	38	18	9030	10030	1000
EW7-T12-34	11/5/2019	1893.97	5	38	18	9050	10050	1000
EW7-T12-35	11/5/2019	1893.97	5	38	18	9050	10050	1000
EW7-T12-36	11/5/2019	1893.97	5	38	18	9050	10050	1000
EW7-T12-37	11/4/2019	1893.97	5	38	18	7040	8040	1000
EW7-T12-38	11/4/2019	1893.97	5	38	18	7030	8030	1000
EW7-T12-39	11/4/2019	1893.97	5	38	18	7030	8030	1000
EW7-T12-40	11/4/2019	1893.97	5	38	18	7050	8050	1000
EW7-T12-41	11/4/2019	1893.97	5	38	18	7050	8050	1000
EW7-T12-42	11/4/2019	1893.97	5	38	18	7050	8050	1000
EW7-T12-43	11/4/2019	1893.97	5	38	18	6040	7040	1000
EW7-T12-44	11/4/2019	1893.97	5	38	18	6030	7030	1000
EW7-T12-45	11/4/2019	1893.97	5	38	18	6030	7030	1000
EW7-T12-46	11/4/2019	1893.97	5	38	18	6050	7050	1000
EW7-T12-47	11/4/2019	1893.97	5	38	18	6050	7050	1000
EW7-T12-48	11/4/2019	1893.97	5	38	18	6050	7050	1000
	– •			Total Points:	48	EW7-T12 To		48,000
EW7-T13 (Wes	sblend 66-10 9.8							,
EW7-T13-1	11/3/2019	1893.05	5	38	18	6030	7030	1000
EW7-T13-2	11/3/2019	1893.05	5	38	18	6030	7030	1000
EW7-T13-3	11/3/2019	1893.05	5	38	18	6080	7080	1000
EW7-T13-4	11/3/2019	1893.05	5	38	18	6030	7030	1000
EW7-T13-5	11/3/2019	1893.05	5	38	18	6030	7030	1000
EW7-T13-6	11/3/2019	1893.05	5	38	18	6030	7030	1000
EW7-T13-7	11/5/2019	1893.05	5	38	18	10030	11030	1000
EW7-T13-8	11/5/2019	1893.05	5	38	18	10030	11030	1000
EW7-T13-9	11/5/2019	1893.05	5	38	18	10080	11080	1000
E VV /-113-9	11/3/2017	1073.03	J	50	10	10000	11000	1000

**TABLE B-1 OU1 SUBSURFACE INJECTION SUMMARY OU1 REBOUND STUDY LETTER REPORT - BASELINE** 

Injection Transect	D-4-(A)	Ground Elevation <sup>1</sup>	Number of	Starting Depth	Ending Depth	Maristan	Marie	Total Volume
Point ID	Date(s)	(feet amsl)	Intervals	(feet bgs)	(feet bgs)	Meter Start	Meter End	(gal)
EW7-T13-10	11/5/2019	1893.05	5	38	18	10030	11030	1000
EW7-T13-11	11/5/2019	1893.05	5	38	18	10030	11030	1000
EW7-T13-12	11/5/2019	1893.05	5	38 38	18	10030	11030	1000
EW7-T13-13 EW7-T13-14	11/5/2019 11/5/2019	1893.05	5	38	18	12030	13030	1000
EW7-T13-14 EW7-T13-15	11/5/2019	1893.05 1893.05	5	38	18 18	12030 12080	13030 13080	1000
EW7-T13-16	11/5/2019	1893.05	5	38	18	12030	13030	1000
EW7-T13-10	11/5/2019	1893.05	5	38	18	12030	13030	1000
EW7-T13-17	11/5/2019	1893.05	5	38	18	12030	13030	1000
EW7-T13-18	11/5/2019	1893.05	5	38	18	11050	12050	1000
EW7-T13-19	11/5/2019	1893.05	5	38	18	11050	12050	1000
EW7-T13-20	11/5/2019	1893.05	5	38	18	11050	12050	1000
EW7-T13-21	11/5/2019	1893.03	5	38	18	11030	12030	1000
EW7-T13-22	11/5/2019	1894.17	5	38	18	11030	12030	1000
EW7-T13-23	11/5/2019	1894.17	5	38	18	11040	12030	1000
EW7-T13-25	11/5/2019	1894.17	5	38	18	10040	11040	1000
EW7-T13-26	11/5/2019	1894.17	5	38	18	10030	11030	1000
EW7-T13-27	11/5/2019	1894.17	5	38	18	10030	11030	1000
EW7-T13-28	11/5/2019	1894.17	5	38	18	10050	11050	1000
EW7-T13-29	11/5/2019	1894.17	5	38	18	10050	11050	1000
EW7-T13-30	11/5/2019	1894.17	5	38	18	10050	11050	1000
EW7-T13-31	11/4/2019	1894.17	5	38	18	8050	9050	1000
EW7-T13-32	11/4/2019	1894.17	5	38	18	8050	9050	1000
EW7-T13-33	11/4/2019	1894.17	5	38	18	8050	9050	1000
EW7-T13-34	11/4/2019	1894.17	5	38	18	8030	9030	1000
EW7-T13-35	11/4/2019	1894.17	5	38	18	8030	9030	1000
EW7-T13-36	11/4/2019	1894.17	5	38	18	8040	9040	1000
EW7-T13-37	11/3/2019	1894.17	5	38	18	5040	6040	1000
EW7-T13-38	11/3/2019	1894.17	5	38	18	5030	6030	1000
EW7-T13-39	11/3/2019	1894.17	5	38	18	5030	6030	1000
EW7-T13-40	11/3/2019	1894.17	5	38	18	5050	6050	1000
EW7-T13-41	11/3/2019	1894.17	5	38	18	5050	6050	1000
EW7-T13-42	11/3/2019	1894.17	5	38	18	5050	6050	1000
			EW7-T13	<b>Total Points:</b>	42	EW7-T13 To	otal Gallons:	42,000
	sblend 66-10 9.8		– 1000 gal	lons per point				
EW7-T14-1	11/1/2019	1891.82	5	38	18	2030	3030	1000
EW7-T14-2	11/1/2019	1891.82	5	38	18	2030	3030	1000
EW7-T14-3	11/1/2019	1891.82	5	38	18	2080	3080	1000
EW7-T14-4	11/1/2019	1891.82	5	38	18	2030	3030	1000
EW7-T14-5	11/1/2019	1891.82	5	38	18	2030	3030	1000
EW7-T14-6	11/1/2019	1891.82	5	38	18	2030	3030	1000
EW7-T14-7	11/2/2019	1891.82	5	38	18	3030	4030	1000
EW7-T14-8	11/2/2019	1891.82	5	38	18	3030	4030	1000
EW7-T14-9	11/2/2019	1891.82	5	38	18	3080	4080	1000
EW7-T14-10	11/2/2019	1891.82	5	38	18	3030	4030	1000
EW7-T14-11	11/2/2019	1891.82	5	38	18	3030	4030	1000
EW7-T14-12	11/2/2019	1891.82	5	38	18	3030	4030	1000
EW7-T14-13	11/2/2019	1891.82	5	38	18	4030	5030	1000

**TABLE B-1 OU1 SUBSURFACE INJECTION SUMMARY OU1 REBOUND STUDY LETTER REPORT - BASELINE** 

Injection Transect	<b>D</b> . ( ( )	Ground Elevation <sup>1</sup>	Number of	Starting Depth	Ending Depth	No. of		Total Volume
Point ID	Date(s)	(feet amsl)	Intervals	(feet bgs)	(feet bgs)	Meter Start	Meter End	(gal)
EW7-T14-14	11/2/2019	1891.82	5	38	18	4030	5030	1000
EW7-T14-15	11/2/2019	1891.82	5	38	18	4080	5080	1000
EW7-T14-16	11/2/2019	1891.82	5	38	18	4030	5030	1000
EW7-T14-17	11/2/2019	1891.82	5	38	18	4030	5030	1000
EW7-T14-18	11/2/2019	1891.82	5	38 38	18	4030	5030	1000
EW7-T14-19 EW7-T14-20	11/3/2019 11/3/2019	1891.82	5	38	18 18	5030 5030	6030	1000
EW7-T14-20	11/3/2019	1891.82 1891.82	5	38	18	5080	6080	1000
EW7-T14-21 EW7-T14-22	11/3/2019	1891.82	5	38	18	5030	6030	1000
EW7-T14-22 EW7-T14-23	11/3/2019	1895.05	5	38	18	5030	6030	1000
EW7-T14-23	11/3/2019	1895.05	5	38	18	5030	6030	1000
EW7-T14-24	11/2/2019	1895.05	5	38	18	2040	3040	1000
EW7-T14-25	11/2/2019	1895.05	5	38	18	2050	3050	1000
EW7-T14-20	11/2/2019	1895.05	5	38	18	2030	3030	1000
EW7-T14-27	11/2/2019	1895.05	5	38	18	2040	3040	1000
EW7-T14-29	11/2/2019	1895.05	5	38	18	2040	3040	1000
EW7-T14-29	11/2/2019	1895.05	5	38	18	2040	3040	1000
EW7-T14-31	11/2/2019	1895.05	5	38	18	3040	4040	1000
EW7-T14-32	11/2/2019	1895.05	5	38	18	3020	4020	1000
EW7-T14-33	11/2/2019	1895.05	5	38	18	3030	4030	1000
EW7-T14-34	11/2/2019	1895.05	5	38	18	3030	4030	1000
EW7-T14-35	11/2/2019	1895.05	5	38	18	3040	4040	1000
EW7-T14-36	11/2/2019	1895.05	5	38	18	3040	4040	1000
EW7-T14-37	11/3/2019	1895.05	5	38	18	4050	5050	1000
EW7-T14-38	11/3/2019	1895.05	5	38	18	4050	5050	1000
EW7-T14-39	11/3/2019	1895.05	5	38	18	4050	5050	1000
EW7-T14-40	11/3/2019	1895.05	5	38	18	4030	5030	1000
EW7-T14-41	11/3/2019	1895.05	5	38	18	4030	5030	1000
EW7-T14-42	11/3/2019	1895.05	5	38	18	4040	5040	1000
				Total Points:	42	EW7-T14 To		42,000
EW7-T15 (Wes	sblend 66-10 9.8							,,,,,,
EW7-T15-1	10/31/2019	1891.55	5	38	18	1030	2030	1000
EW7-T15-2	10/31/2019	1891.55	5	38	18	1030	2030	1000
EW7-T15-3	10/31/2019	1891.55	5	38	18	1080	2080	1000
EW7-T15-4	10/31/2019	1891.55	5	38	18	1030	2030	1000
EW7-T15-5	10/31/2019	1891.55	5	38	18	1030	2030	1000
EW7-T15-6	10/31/2019	1891.55	5	38	18	1030	2030	1000
EW7-T15-7	11/1/2019	1893.47	5	38	18	1040	2040	1000
EW7-T15-8	11/1/2019	1893.47	5	38	18	1040	2040	1000
EW7-T15-9	11/1/2019	1893.47	5	38	18	1030	2030	1000
EW7-T15-10	11/1/2019	1893.47	5	38	18	1040	2040	1000
EW7-T15-11	11/1/2019	1893.47	5	38	18	1040	2040	1000
EW7-T15-12	11/1/2019	1893.47	5	38	18	1040	2040	1000
EW7-T15 Total Points: 12 EW7-T15 Total Gallons: 12,000								
	sblend 66-10 9.8				t – 15-foot po			
EW7-T16-1	10/30/2019	1891.38	5	38	18	30	1030	1000
EW7-T16-2	10/30/2019	1891.38	5	38	18	30	1030	1000
EW7-T16-3	10/30/2019	1891.38	5	38	18	80	1080	1000

## **TABLE B-1 OU1 SUBSURFACE INJECTION SUMMARY OU1 REBOUND STUDY LETTER REPORT - BASELINE**

Injection Transect Point ID	Date(s)	Ground Elevation <sup>1</sup> (feet amsl)	Number of Intervals	Starting Depth (feet bgs)	Ending Depth (feet bgs)	Meter Start	Meter End	Total Volume (gal)
EW7-T16-4	10/30/2019	1891.38	5	38	18	30	1030	1000
EW7-T16-5	10/30/2019	1891.38	5	38	18	30	1030	1000
EW7-T16-6	10/30/2019	1891.38	5	38	18	30	1030	1000
EW7-T16-7	10/31/2019	1893.31	5	38	18	40	1040	1000
EW7-T16-8	10/31/2019	1893.31	5	38	18	90	1090	1000
EW7-T16-9	10/31/2019	1893.31	5	38	18	30	1030	1000
EW7-T16-10	10/31/2019	1893.31	5	38	18	40	1040	1000
EW7-T16-11	10/31/2019	1893.31	5	38	18	40	1040	1000
EW7-T16-12	10/31/2019	1893.31	5	38	18	40	1040	1000

**EW7-T16 Total Points:** 12 **EW7-T16 Total Gallons:** 12,000 **Between EW6 and EW7 Total Points:** 600 Between EW6 and EW7 Total Gallons: 600,610

#### Notes:

<sup>1</sup>Elevation datum based on National Geodetic Vertical Datum of 1929.

% = percent

amsl = above mean sea levelbgs= below ground surface

EW = extraction well

gal = gallon

ID = identification number

T = transect

Direct Push Groundwater Sampling (Off-post), OU1 Groundwater Monitoring Well Sampli Subsurface Injection and Performance Monitoring DQCRs and Weekly Reports	ng,

# DAILY QUALITY CONTROL REPORT

**COE Project Manager** Doug Simpleman

Date 10/14/19 S S T Day M W T F X On Site Hours 0930-1730 Travel Time 2.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 1 Humidity Dry Moderate Humid

X

Project	CHAAP RAO 2019 - OU1
	Rebound Study/Injections
Project No.	60565355
Contract No.	W9128F-18-D-0004

## 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), macro-core, support trucks, hand-held GPS unit, performance monitoring (PM) temporary well materials (1"-OD PVC., 10' screens, filter pack sand, granular bentonite, coated chips, grount mix), peristaltic pump and tubing, laboratory provided sample containers, IDW buckets, decon supplies, LaMotte turbidity meter, survey equipment, MiniRAE PID, level D PPE, first-aid/safety supplies, and field/safety paperwork.

#### **Visitors on Site:**

None.

#### AECOM/Brice Personnel on Site:

AECOM - Ryan Herold, Taylor Young, Bob Exceen

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

- -Began OU1 Rebound Study baseline sampling event (install/sample/abandon performance monitoring wells, DP screen point sampling, and MW sampling).
- -All locations were marked with 4-foot lath and pink marking tape.

Direct Push (Screen Point) Groundwater Samples Collected

-OS001-DP01-25

-OS001-DP01-35 (+ Duplicate)

-OS001-DP01-45 (+ MS/MSD)

Began subsurface lithology (Geoprobe Macro-Core MC5) at location OS001.

- -OU1 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.
- -Containerized IDW purge/decontamination water and disposed of at Treatment Plant.

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

-Completed staking of sample locations using hand-held GPS with predetermined coordinates. Utility locate for sample locations, and notifying property owners of field activities were completed week of October 14th.

-Calibration check of PIDs, water level indicator.

#### **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, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

- -Re-capped overall health and safety concerns, stressed road 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

Date 10/15/19 S M F Day S T W Т X 700-1800 On Site Hours Travel Time 0.5 Office Time 0.5 Weather Bright Sun Clear Overcast Rain Snow X X Temp To 32 32-50 50-70 70-85 85 up X Report No. Wind Still Moderate High X 2 Humidity Dry Moderate Humid

 Rebound Study/Injections

 Project No.
 60565355

 Contract No.
 W9128F-18-D-0004

Doug Simpleman

CHAAP RAO 2019 - OU1

#### Subcontractors on Site:

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

#### **Equipment on Site:**

**COE Project Manager** 

**Project** 

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

#### Visitors on Site:

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen

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

- -Finished subsurface lithology (Geoprobe Macro-Core MC5) at location OS001.
- -Installed temporary PM well at EW7-PM23A at 30' feet bgs (screened 20-30').
- -Inventoried bottle count for OU1 Rebound Study sampling activities (DP sampling, PM sampling, MW sampling).
- -Completed injection set up activities (metered manifolds, blast shields, pumps and hoses).
- -OU1 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.
- -Containerized IDW purge/decontamination water and disposed of at Treatment Plant.

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

-Calibration check of PIDs, water level indicator.

#### **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, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

- -Re-capped overall health and safety concerns, stressed road and direct push safety.
- -Completed Daily Tailgate Meeting Sheet
- -Completed Daily Task Hazard Assessment Sheet

Bentonite pellets bridged inside the 3" rods as the rods were being extracted from the EW7-PM23B @ 40 ft. well. The rods were removed and next seal attempt will be completed using grout mixture tomorrow.

# Office Work Performed:

-Organized paperwork and equipment, scanned SCFSs.

-Completed DQCR.

By Ryan Herold

Date 10/16/19 S F Day S M Т W Т 700-1800 On Site Hours Travel Time 0.5 Office Time 0.5 Weather Bright Sun Clear Overcast Rain Snow X X Temp To 32 32-50 50-70 70-85 85 up X Report No. Wind Still Moderate High X X Humidity 3 Dry Moderate Humid

X

### Subcontractors on Site:

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

Doug Simpleman

60565355

CHAAP RAO 2019 - OU1

Rebound Study/Injections

W9128F-18-D-0004

#### **Equipment on Site:**

**COE Project Manager** 

**Project** 

Project No.

Contract No.

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

#### Visitors on Site:

USACE - Jeff Gill

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Dean Converse

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

PM wells installed

EW7-PM25A, PM25B, PM24A, PM22A, PM22B, PM21A, PM21B

PM wells sampled

EW7-PM25A-1-25, EW7-PM25B-1-35 (+ MS/MSD), EW7-PM24A-1-25, EW7-PM23A-1-25

- -OU1 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.
- -Containerized IDW purge/decontamination water and disposed of at Treatment Plant.

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

-EW7-PM25B-1-35 had an MS/MSD collected.

-Calibration check of PIDs, water level indicator. Weekly calibration and daily calibration checks of YSIs (AM/PM) (Serial #'s 1 - RFW24698 and 2 - U77883X).

#### **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, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

- -Re-capped overall health and safety concerns, stressed road and direct push safety.
- -Completed Daily Tailgate Meeting Sheet

None.

# Office Work Performed:

-Organized paperwork and equipment, scanned SCFSs.

-Completed DQCR.

By Ryan Herold

Date 10/17/19 S F Day S M Т W Т 700-1800 On Site Hours Travel Time 0.5 Office Time 0.5 Weather Bright Sun Clear Overcast Rain Snow X X Temp To 32 32-50 50-70 70-85 85 up X Report No. Wind Still Moderate High X Humidity 4 Dry Moderate Humid

X

<b>COE Project Manager</b>	Doug Simpleman
Project	CHAAP RAO 2019 - OU1
	Rebound Study/Injections

Doug Simpleman

Project No. 60565355

Contract No. W9128F-18-D-0004

#### 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), macro-core, support trucks, hand-held GPS unit, performance monitoring (PM) temporary well materials (1"-OD PVC., 10' screens, filter pack sand, granular bentonite, coated chips, grount mix), peristaltic pump and tubing, laboratory provided sample containers, IDW buckets, decon supplies, LaMotte turbidity meter, survey equipment, MiniRAE PID, level D PPE, first-aid/safety supplies, and field/safety paperwork.

#### Visitors on Site:

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Dean Converse

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

PM wells installed

EW7-PM23BA, PM24B, PM26A, PM26B, PM27A, PM27B

PM wells sampled

EW7-PM21A-1-25, EW7-PM21B-1-35 (+ field duplicate), EW7-PM22A-1-25, EW7-PM22B-1-35, EW7-PM23B-1-35

- -OU1 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.
- -Containerized IDW purge/decontamination water and disposed of at Treatment Plant.

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

- -EW7-PM21B-1-35 had a field duplicate collected (EW7-PM521B-1-35).
- -Calibration check of PIDs, water level indicator. Weekly calibration and daily calibration checks of YSIs (AM/PM) (Serial #'s 1 -RFW24698 and 2 - U77883X).

#### **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, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

- -Re-capped overall health and safety concerns, stressed road and direct push safety.
- -Completed Daily Tailgate Meeting Sheet
- -Completed Daily Task Hazard Assessment Sheet

None.

# Office Work Performed:

-Organized paperwork and equipment, scanned SCFSs.

-Completed DQCR.

By Ryan Herold

**COE Project Manager** Doug Simpleman

Date 10/18/19 S Day S M Т W Т F  $\mathbf{X}$ 0730-1630 On Site Hours Travel Time 0.5 Office Time 0.5 Weather Bright Sun Clear Overcast Rain Snow X X Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 5 Humidity Dry Moderate Humid

X

-	Rebound Study/Injections
Project No.	60565355
Contract No.	W9128F-18-D-0004

W9128F-18-D-0004

#### Subcontractors on Site:

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

CHAAP RAO 2019 - OU1

#### **Equipment on Site:**

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

#### Visitors on Site:

None.

**Project** 

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen

### Field Work Performed (including sampling):

PM wells installed

EW7-PM28A, PM28B, PM29B

PM wells sampled

EW7-PM26A-1-25, EW7-PM26B-1-35, EW7-PM27A-1-25, EW7-PM27B-1-35

- -OU1 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.
- -Containerized IDW purge/decontamination water and disposed of at Treatment Plant.

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

-Calibration check of PIDs, water level indicator. Weekly calibration and daily calibration checks of YSIs (AM/PM) (Serial #'s 1 - RFW24698 and 2 - U77883X).

#### 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, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

- -Re-capped overall health and safety concerns, stressed road and direct push safety.
- -Completed Daily Tailgate Meeting Sheet
- -Completed Daily Task Hazard Assessment Sheet

None.

# Office Work Performed:

-Organized paperwork and equipment, scanned SCFSs.

-Completed DQCR.

By Ryan Herold

Date 10/19/19 F Day  $\mathbf{S}$ S M Т W Т 0730-1730 On Site Hours Travel Time 0.5 Office Time 0.5 Weather Bright Sun Clear Overcast Rain Snow X X Temp To 32 32-50 50-70 70-85 85 up Wind Report No. Still Moderate High X 6 Humidity Dry Moderate Humid

Doug Simpleman

CHAAP RAO 2019 - OU1

#### Subcontractors on Site:

None.

**Project** 

#### **Equipment on Site:**

**COE Project Manager** 

Support trucks, hand-held GPS unit, peristaltic pump and tubing, laboratory provided sample containers, IDW buckets, decon supplies, LaMotte turbidity meter, survey equipment, MiniRAE PID, level D PPE, first-aid/safety supplies, and field/safety paperwork.

X

#### **Visitors on Site:**

None.

#### AECOM/Brice Personnel on Site:

AECOM - Ryan Herold, Taylor Young, Bob Exceen

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

PM wells sampled

EW7-PM24B-1-35, EW7-PM28A-1-25, EW7-PM29A-1-25, EW7-PM29B-1-35

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

-Containerized IDW purge/decontamination water and disposed of at Treatment Plant.

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

-Calibration check of PIDs, water level indicator. Weekly calibration and daily calibration checks of YSIs (AM/PM) (Serial #'s 1 - RFW24698 and 2 - U77883X).

#### **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, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

None.

# Office Work Performed:

-Organized paperwork and equipment, scanned SCFSs.

-Completed DQCR.

By Ryan Herold

Doug Simpleman

60565355

CHAAP RAO 2019 - OU1

Rebound Study/Injections

W9128F-18-D-0004

Date 10/20/19 S Т W Т F Day S M 0800 - 1730 On Site Hours Travel Time 0.5 Office Time 0.5 Weather Bright Sun Clear Overcast Rain Snow X Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 7 Humidity Dry Moderate Humid

#### Subcontractors on Site:

None.

**Project** 

Project No.

Contract No.

#### **Equipment on Site:**

COE Project Manager

Support trucks, hand-held GPS unit, peristaltic pump and tubing, laboratory provided sample containers, IDW buckets, decon supplies, LaMotte turbidity meter, survey equipment, MiniRAE PID, level D PPE, first-aid/safety supplies, and field/safety paperwork.

X

#### **Visitors on Site:**

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen

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

PM wells sampled

EW7-PM28B-1-35

- -All DP screen point, PM, and injection locations were field surveyed.
- -All PM wells were abandoned.
- -OU1 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.
- -Containerized IDW purge/decontamination water and disposed of at Treatment Plant.

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

-Calibration check of PIDs, water level indicator. Weekly calibration and daily calibration checks of YSIs (AM/PM) (Serial #s 1 - RFW24698 and 2 - U77883X).

#### 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, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

- -Re-capped overall health and safety concerns, stressed road and direct push safety.
- -Completed Daily Tailgate Meeting Sheet
- -Completed Daily Task Hazard Assessment Sheet

None.

# Office Work Performed:

-Organized paperwork and equipment, scanned SCFSs.

-Completed DQCR.

By Ryan Herold

Date 10/21/19 S Т W F Day S M Т 0600 - 1730 On Site Hours Travel Time 0.5 Office Time 1.5 Weather Bright Sun Clear Overcast Rain Snow X Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 8 Humidity Dry Moderate Humid

X

COE Project Manager Doug CHA

Doug Simpleman
CHAAP RAO 2019 - OU1
Rebound Study/Injections

Project No. 60565355

Contract No. W9128F-18-D-0004

#### Subcontractors on Site:

None.

#### **Equipment on Site:**

Support trucks, laboratory provided sample containers, Monsoon Pumps, YSI 556 Probes, LaMotte turbidity meter, Hach Iron kits, MiniRAE PID, IDW buckets, decon supplies, level D PPE, first-aid/safety supplies, and field/safety paperwork.

#### **Visitors on Site:**

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen

Brice - Chris Holt, Rebecca Reyes, Corey Schwabenlander

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

OU1 Rebound Study monitoring wells (off-, onsite) purged and sampled

G0070-1, G0075-1, G0076-1, G0079-1, G0080-1, G0081-1, G0082-1, CA210-1, CA211-1, CA212-1, CA213-1, NW070-1, NW071-1

- -OU1 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.
- -Containerized IDW purge/decontamination water and disposed of at Treatment Plant.

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

-G0070 had an MS/MSD collected.

-Calibration check of PIDs, water level indicator. Weekly calibration and daily calibration checks of YSIs (AM/PM) (Serial #'s 1 - RFW24698 and 2 - U77883X).

#### **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, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

- -Re-capped overall health and safety concerns, stressed road and direct push safety.
- -Completed Daily Tailgate Meeting Sheet

None.

# Office Work Performed:

-Organized paperwork and equipment, scanned SCFSs.

-Completed DQCR.

By Ryan Herold

**COE Project Manager** Doug Simpleman

Date 10/22/19 F Day S S M Τ W Т 0700 - 1930 On Site Hours Travel Time 0.5 Office Time 1.5 Weather Bright Sun Clear Overcast Rain Snow X Temp 32-50 50-70 70-85 85 up To 32 X Wind Report No. Still Moderate High X 9 Humidity Dry Moderate Humid

X

Project	CHAAP RAO 2019 - OU1
	Rebound Study/Injections
Project No.	60565355
	VV 0.1.00 F 1.0 F 0.00 1

Contract No. W9128F-18-D-0004

#### Subcontractors on Site:

None.

#### **Equipment on Site:**

Support trucks, laboratory provided sample containers, Monsoon Pumps, YSI 556 Probes, LaMotte turbidity meter, Hach Iron kits, MiniRAE PID, IDW buckets, decon supplies, level D PPE, first-aid/safety supplies, and field/safety paperwork.

#### Visitors on Site:

Various Meeting Attendees (USEPA, NDEE, USACE, USAEC, ATI)

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Dean Converse, Corey Anderson

Brice - Chris Holt, Rebecca Reyes, Corey Schwabenlander

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

OU1 Rebound Study monitoring wells (off-, onsite) purged and sampled

G0087-1, G0091-1, G0092-1, NW080-1, NW081R-1, NW082R-1, NW020-1, NW021-1, NW022-1, NW060-1, NW061-1, NW062-1, PZ019-1, NW050-1, NW051-1

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

-Containerized IDW purge/decontamination water and disposed of at Treatment Plant.

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

-NW021 had a field duplicate collected (NW023) and an MS/MSD was collecgted at PZ019.

-Calibration check of PIDs, water level indicator. Weekly calibration and daily calibration checks of YSIs (AM/PM) (Serial #s 1 -RFW24698 and 2 - U77883X).

#### **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, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

None.

# Office Work Performed:

-Organized paperwork and equipment, scanned SCFSs.

-Completed DQCR.

By Ryan Herold

**COE Project Manager** Doug Simpleman

Date 10/23/19 S F Day S M Т W Т 0700-1600 On Site Hours Travel Time 0.5 Office Time 1.5 Weather Bright Sun Clear Overcast Rain Snow X Temp 32-50 50-70 70-85 85 up To 32 X Report No. Wind Still Moderate High X 10 Humidity Dry Moderate Humid

X

	Rebound Study/Injections
Project No.	60565355
Contract No.	W9128F-18-D-0004

CHAAP RAO 2019 - OU1

#### Subcontractors on Site:

None.

**Project** 

#### **Equipment on Site:**

Support trucks, laboratory provided sample containers, Monsoon Pumps, YSI 556 Probes, LaMotte turbidity meter, Hach Iron kits, MiniRAE PID, IDW buckets, decon supplies, level D PPE, first-aid/safety supplies, and field/safety paperwork.

#### **Visitors on Site:**

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen

Brice - Chris Holt, Rebecca Reyes

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

OU1 Rebound Study monitoring wells (off-, onsite) purged and sampled

PZ018-1, G0086-1, NW052-1, PZ020-1, PZ017R-1, G0024-1, G0077-1, G0078-1, irrigation well 2019 (prior to injection activities).

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

-Containerized IDW purge/decontamination water and disposed of at Treatment Plant.

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

-PZ017R had a field duplicate collected (PZ021).

-Calibration check of PIDs, water level indicator. Weekly calibration and daily calibration checks of YSIs (AM/PM) (Serial #'s 1 - RFW24698 and 2 - U77883X).

#### 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, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

None.

# Office Work Performed:

-Organized paperwork and equipment, scanned SCFSs.

-Completed DQCR.

By Ryan Herold

Doug Simpleman

60565355

CHAAP RAO 2019 - OU1

Rebound Study/Injections

W9128F-18-D-0004

Date 10/28/19 T W Т F Day S S M X 0700-1800 On Site Hours Travel Time 0.5 Office Time 1.5 Weather Bright Sun Clear Overcast Rain Snow X Temp 32-50 50-70 70-85 To 32 85 up X Wind Still Moderate Report No. High X 11 Humidity Dry Moderate Humid

# Subcontractors on Site:

**COE Project Manager** 

**Project** 

Project No.

Contract No.

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson, Henry Walker Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Jim Mathews

X

#### **Equipment on Site:**

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, trash pump, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

For DP sampling: One direct push rig (Geoprobe 6620DT), Screen point sampler (SP15), support truck, hand-held GPS unit, peristaltic pump and tubing, laboratory provided sample containers, IDW buckets, decon supplies, LaMotte turbidity meter, MiniRAE PID, level D PPE, first-aid/safety supplies, and field/safety paperwork.

#### Visitors on Site:

None.

#### AECOM/Brice Personnel on Site:

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon, Dean Converse Brice - Paul Caron, Mikayla Daigle

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

- -Injection preparation activities were completed week of October 18. Activities included Utility Locate, flow meter calibration, staking of injection transects using GPS and surveying ground surface elevations, check pressure meters, pump tune-ups, irrigatuion well access and pump check, collected irrigation well groundwater sample for analysis, notified all landowners of field activities, and ensure proper operation of pressure relief valves throughout injection system.
- -Began setting up equipment, tanks, manifolds, hoses for injection starting at transect EW7-T16.
- -PES on site @ 11am. Followoing meeting, began DP activities at EW7-T16 (depths 18'-38' bgs).
- -PF on site @ 11am. Following meeting, began transfering amendment into water trucks (2) and water @ 9.8% mixed volume.
- -Began completing DP screen point sampling at off-site locations OS002, OS003 (each location 25', 35', 45' samples for explosives + MNX only (8330).

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

-OS002-DP01-25 -OS003-DP01-25 -OS002-DP01-35 -OS003-DP01-35 -OS002-DP01-45 -OS003-DP01-45

- -OU1 sample analysis will be completed in accordance with Addendum 2, and Addendum 3 UFP-QAPPs.
- -Containerized IDW purge/decontamination water and disposed of at Treatment Plant.

Amendment delivery (Wesway lbs.): 45,940 (10/23/19) 45,580 (10/28/19)

#### **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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

- -Re-capped overall health and safety concerns, stressed road and direct push safety.
- -Completed Daily Tailgate Meeting Sheet
- -Completed Daily Task Hazard Assessment Sheet

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

Due to extreme cold, amendment transfer to water trucks not successful using various trash pumps (as used during past injection events). Alternative pumps will be researched and utilized next day.

#### Office Work Performed:

-Organized paperwork and equipment, scanned SCFSs.

-Completed DQCR.

**By** Ryan Herold

**COE Project Manager** Doug Simpleman

Date 10/29/19 Т Day S S M T W F On Site Hours 0700-1800 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow X Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 12 Humidity Moderate Humid Dry

# Subcontractors on Site:

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson, Henry Walker Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Jim Mathews

X

#### **Equipment on Site:**

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, trash pump, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### **Visitors on Site:**

None.

**Project** 

Project No.

Contract No.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon, Dean Converse Brice - Paul Caron, Mikayla Daigle

CHAAP RAO 2019 - OU1

Rebound Study/Injections

W9128F-18-D-0004

60565355

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

-Researched additional pump options to transfer amendment. Transferred minor amounts of amendment (gravity fed), mixed with water for 1 truck, but not off loaded. Both trucks were stored in GWTF overnight. Purchased an electric gear-pump from manufacture in Palmer, NE and a generator. Electrician will be contacted next day to wire system.

#### Summary:

Total gallons of WB66-10 injected today = 0 Total gallons of WB66-10 injected this week = 0

Total gallons of WB66-10 injected to date = 0

Amendment delivery (Wesway lbs.): NO

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

Due to extreme cold, amendment transfer to water trucks was problematic. New pump/generator will be utilized next day.

#### Office Work Performed:

-Organized paperwork and equipment, scanned SCFSs.

-Completed DQCR.

**By** Ryan Herold

Date 10/30/19 Day S S Μ T W T F X On Site Hours 0700-1900 Travel Time 0.5 Office Time 0.5 Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Moderate Still High X 13 Humidity Dry Moderate Humid

X

Project CHAAP RAO 2019 - OUT
Rebound Study/Injections

Doug Simpleman

Project No. 60565355

Contract No. W9128F-18-D-0004

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

**COE Project Manager** 

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### **Visitors on Site:**

Messersmith Electric LLC - Shawn Messersmith

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon, Dean Converse Brice - Paul Caron, Mikayla Daigle

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

EW7-T16 points 1-6 completed EW7-T16 points 7-12 started

#### Summary:

Total gallons of WB66-10 injected today = 9,500

Total gallons of WB66-10 injected this week (Sat. - F.) = 9,500

Total gallons of WB66-10 injected to date = 9,500

Amendment delivery (Wesway lbs.): NO

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

Electrician on site to wire pump/generator (off-site 1230). Due to temperatures, amendment can be transferred with new pump; however, still slow. Will continue optimizing process next day.

#### Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

Date 10/31/19 Day S S Μ T W T F On Site Hours 0700-1800 Travel Time 0.5 Office Time 0.5 Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Moderate Still High X 14 Humidity Dry Moderate Humid

X

COE Project Manager	
Project	

Doug Simpleman

CHAAP RAO 2019 - OU1

Rebound Study/Injections

Project No. 60565355

**Contract No.** W9128F-18-D-0004

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### Visitors on Site:

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon, Dean Converse Brice - Paul Caron, Mikayla Daigle

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

EW7-T15 points 1-6 completed EW7-T16 points 7-12 completed

#### Summary:

Total gallons of WB66-10 injected today = 8,500

Total gallons of WB66-10 injected this week (Sat. - F.) = 18,000

Total gallons of WB66-10 injected to date = 18,000

Amendment delivery (Wesway lbs.): NO

#### Health and Safety and Activities:

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

Resumed injection procedures @ 1430 on T16 and T15 after thawing out lines and valves. Paul with Brice was working on a heating element for the molasses tanks. More straw was purchased for insulation around the valves and hoses.

#### Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

Date 11/01/19 T Day S S Μ W T F  $\mathbf{X}$ On Site Hours 0700-1700 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 15 Humidity Dry Moderate Humid

X

Project	CHAAP RAO 2019 - OU1
	Rebound Study/Injections
Project No.	60565355
Contract No.	W9128F-18-D-0004

Doug Simpleman

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

**COE Project Manger** 

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### **Visitors on Site:**

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon, Brice - Paul Caron, Mikayla Daigle

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

EW7-T15 points 7-12 completed EW7-T14 points 1-6 completed EW7-T14 points 7-12 started EW7-T14 points 25-30 started

#### Summary

Total gallons of WB66-10 injected today = 14,900

Total gallons of WB66-10 injected this week (Sat. - F.) = 32,900

Total gallons of WB66-10 injected to date = 32,900

Amendment delivery (Wesway lbs.): Yes 45,860

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

- -Re-capped overall health and safety concerns, stressed road and direct push safety.
- -Completed Daily Tailgate Meeting Sheet
- -Completed Daily Task Hazard Assessment Sheet

We were down to one water truck after lunch due to Panowicz employee having to leave for a Dr, appointment. We were then delayed due to the second water truck having pump issues. The water truck pump has been fixed.

#### Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

Date 11/02/19 T Day S S Μ W T F X On Site Hours 0700-1730 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 16 Humidity Dry Moderate Humid

X

 Project
 CHAAP RAO 2019 - OU1

 Rebound Study/Injections

 Project No.
 60565355

 Contract No.
 W9128F-18-D-0004

Doug Simpleman

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

**COE Project Manager** 

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### Visitors on Site:

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon

Brice - Paul Caron, Mikayla Daigle

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

EW7-T14 points 25-30 completed EW7-T14 points 19-24 started

EW7-T14 points 7-12 completed EW7-T14 points 13-18 completed EW7-T14 points 31-36 completed

#### <u>Summary</u>

Total gallons of WB66-10 injected today = 22,100

Total gallons of WB66-10 injected this week (Sat. - F.) = 22,100

Total gallons of WB66-10 injected to date = 55,000

Amendment delivery (Wesway lbs.): NO

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

We were down one water truck the first half of the morning because of transfer pump issues. The water truck pump was fixed and put back into service.

#### Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

Date 11/03/19 T Day S S Μ W T F X On Site Hours 0700-1630 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 17 Humidity Dry Moderate Humid

X

Project CHAAP RAO 2019 - OUT
Rebound Study/Injections

Rebound Study/Injections

Doug Simpleman

**Project No.** 60565355

Contract No. W9128F-18-D-0004

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

**COE Project Manager** 

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### Visitors on Site:

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon Brice - Paul Caron, Mikayla Daigle

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

EW7-T13 points 1-6 completed EW7-T12 points 1-6 started EW7-T14 points 19-24 completed EW7-T12 points 43-48 started

EW7-T14 points 37-42 completed EW7-T13 points 37-42 completed

#### Summary:

Total gallons of WB66-10 injected today = 26,600

Total gallons of WB66-10 injected this week (Sat. - F.) = 48,700

Total gallons of WB66-10 injected to date = 81,600

Amendment delivery (Wesway lbs.): NO

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

None.

# Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

**COE Project Manager** Doug Simpleman

Date 11/04/19 T Day S S M W T F X On Site Hours 0630-1730 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 18 Humidity Dry Moderate Humid

X

Project	CHAAP RAO 2019 - OU1
	Rebound Study/Injections
Project No.	60565355

Contract No. W9128F-18-D-0004

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### **Visitors on Site:**

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon Brice - Paul Caron, Mikayla Daigle

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

EW7-T12 points 43-48 completed EW7-T12 points 36-31 started EW7-T12 points 37-42 completed EW7-T12 points 7-12 completed EW7-T13 points 31-36 completed EW7-T12 points 1-6 completed

EW7-T12 points 13-18 completed

Total gallons of WB66-10 injected today = 33,000 Total gallons of WB66-10 injected this week (Sat. - F.) = 81,700 Total gallons of WB66-10 injected to date = 114,600

Amendment delivery (Wesway lbs.): Yes 45,960

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

None.

# Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

**COE Project Manager** Doug Simpleman

Date 11/05/19 Day S S Μ T W T F X On Site Hours 0630-1730 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 19 Humidity Dry Moderate Humid

X

Project	CHAAP RAO 2019 - OU1
	Rebound Study/Injections
Project No.	60565355
Contract No.	W9128F-18-D-0004

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### Visitors on Site:

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon

Brice - Paul Caron, Mikayla Daigle

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

EW7-T12 points 31-36 completed EW7-T12 points 19-24 completed EW7-T13 points 25-30 completed EW7-T13 points 19-24 completed EW7-T13 points 19-24 completed EW7-T13 points 7-12 completed

EW7-T12 points 25-30 completed

Summary:

Total gallons of WB66-10 injected today = 41,400

Total gallons of WB66-10 injected this week (Sat. - F.) = 123,100

Total gallons of WB66-10 injected to date = 156,000

Amendment delivery (Wesway lbs.): Yes 45,880

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

None.

## Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

Date 11/06/19 Day S S Μ T W T F X On Site Hours 0630-1630 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 20 Humidity Dry Moderate Humid

X

CHAAP RAO 2019 - OU1 **Project** 

Rebound Study/Injections

Doug Simpleman

Project No. 60565355

W9128F-18-D-0004 Contract No.

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

**COE Project Manager** 

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### **Visitors on Site:**

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon

Brice - Paul Caron, Mikayla Daigle

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

EW7-T11 points 1-6 completed EW7-T10 points 43-48 completed

EW7-T10 points 1-6 completed EW7-T10 points 7-12 completed EW7-T11 points 43-48 completed

Total gallons of WB66-10 injected today = 30,490 Total gallons of WB66-10 injected this week (Sat. - F.) = 153,590 Total gallons of WB66-10 injected to date = 186,490

Amendment delivery (Wesway lbs.): Yes 46,320

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

- -Re-capped overall health and safety concerns, stressed road and direct push safety.
- -Completed Daily Tailgate Meeting Sheet
- -Completed Daily Task Hazard Assessment Sheet

None.

## Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

Date 11/11/19 T Day S S M W T F X On Site Hours 0630-1730 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 21 Humidity Dry Moderate Humid

X

COE Project Manager Doug Simpleman
Project CHAAP RAO 20

CHAAP RAO 2019 - OU1

Rebound Study/Injections

**Project No.** 60565355

**Contract No.** W9128F-18-D-0004

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### Visitors on Site:

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon Brice - Paul Caron, Rebecca Reyes

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

EW7-T11 points 7-12 started EW7-T11 points 37-42 started

#### Summary:

Total gallons of WB66-10 injected today = **7,800**Total gallons of WB66-10 injected this week (Sat. - F.) = **7,800**Total gallons of WB66-10 injected to date = **194,290** 

Amendment delivery (Wesway lbs.): Yes 45,920

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

- -Re-capped overall health and safety concerns, stressed road and direct push safety.
- -Completed Daily Tailgate Meeting Sheet
- -Completed Daily Task Hazard Assessment Sheet

Delayed due to moving field tanks to new location. Once moved, residual amendment froze in lines and couldn't fill field tanks. After thawing, resuming filling and injections.

### Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

Date 11/12/19 Day S S Μ T W T F X On Site Hours 1000-1730 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp 32-50 50-70 70-85 To 32 85 up X Wind Report No. Still Moderate High X 22 Humidity Dry Moderate Humid

X

CHAAP RAO 2019 - OU1 **Project** Rebound Study/Injections 60565355

Doug Simpleman

Project No. W9128F-18-D-0004 Contract No.

### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

**COE Project Manager** 

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### **Visitors on Site:**

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon Brice - Paul Caron, Rebecca Reyes

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

EW7-T11 points 7-12 completed EW7-T11 points 37-42 completed EW7-T11 points 13-18 started EW7-T10 points 37-42 completed

Total gallons of WB66-10 injected today = 13,200 Total gallons of WB66-10 injected this week (Sat. - F.) = 21,000 207,490 Total gallons of WB66-10 injected to date =

Amendment delivery (Wesway lbs.): NO

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

A late start was issued this morning because of extreme cold temperatures. We were able to resume pumping at 1300 hr. after everything had thawed out.

### Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

Date 11/13/19 T Day S S Μ W T F X On Site Hours 0630-1730 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 23 Humidity Dry Moderate Humid

X

<b>COE Project Manager</b>	Doug Simpleman
Project	CHAAP RAO 2019 - OU1
	Rebound Study/Injections

60565355

Project No. 60565355

Contract No. W9128F-18-D-0004

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### Visitors on Site:

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon

Brice - Paul Caron, Rebecca Reyes

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

EW7-T10 points 31-36 completed EW7-T10 points 13-18 completed EW7-T11 points 31-36 completed EW7-T10 points 19-24 completed

EW7-T9 points 43-48 started EW7-T11 points 13-18 completed

<u>Summary</u>:

Total gallons of WB66-10 injected today = 31,800

Total gallons of WB66-10 injected this week (Sat. - F.) = 52,800

Total gallons of WB66-10 injected to date = 239,290

Amendment delivery (Wesway lbs.): Yes 46,000

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

- -Re-capped overall health and safety concerns, stressed road and direct push safety.
- -Completed Daily Tailgate Meeting Sheet
- -Completed Daily Task Hazard Assessment Sheet

None.

## Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

**COE Project Manager** Doug Simpleman

Date 11/14/19 T Day S S Μ W T F On Site Hours 0630-1700 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 24 Humidity Dry Moderate Humid

X

Project	CHAAP RAO 2019 - OU1
	Rebound Study/Injections
Project No.	60565355
Contract No.	W9128F-18-D-0004

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### Visitors on Site:

Jeff Gill (USACE)

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon, Dean Converse Brice - Paul Caron, Rebecca Reyes

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

EW7-T11 points 19-24 completed EW7-T8 points 37-42 completed EW7-T11 points 25-30 completed EW7-T9 points 43-48 completed EW7-T10 points 25-30 completed EW7-T9 points 37-42 started

EW7-T8 points 43-48 completed

Summary

Total gallons of WB66-10 injected today = 31,800

Total gallons of WB66-10 injected this week (Sat. - F.) = 84,600

Total gallons of WB66-10 injected to date = 271,090

Amendment delivery (Wesway lbs.): NO

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

None.

## Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

Date 11/15/19 T Day S S Μ W T F  $\mathbf{X}$ On Site Hours 0700-1730 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 25 Humidity Dry Moderate Humid

X

<b>COE Project Manager</b>	Doug Simpleman
Project	CHAAP RAO 20

CHAAP RAO 2019 - OU1
Rebound Study/Injections

Project No. 60565355

Contract No. W9128F-18-D-0004

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### Visitors on Site:

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon, Dean Converse Brice - Paul Caron, Rebecca Reves

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

EW7-T9 points 37-42 completed EW7-T8 points 7-12 completed EW7-T9 points 31-36 completed EW7-T8 points 31-36 completed

EW7-T9 points 1-6 completed EW7-T8 points 1-6 completed

Summary:

Total gallons of WB66-10 injected today = 35,400

Total gallons of WB66-10 injected this week (Sat. - F.) = 120,000

Total gallons of WB66-10 injected to date = 306,490

Amendment delivery (Wesway lbs.): Yes (2) 45,940 and 46,380

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

- -Re-capped overall health and safety concerns, stressed road and direct push safety.
- -Completed Daily Tailgate Meeting Sheet
- -Completed Daily Task Hazard Assessment Sheet

None.

## Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

Date 11/16/19 T Day S S Μ W T F X On Site Hours 0700-1700 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 26 Humidity Dry Moderate Humid

X

 Rebound Study/Injections

 Project No.
 60565355

 Contract No.
 W9128F-18-D-0004

Doug Simpleman

CHAAP RAO 2019 - OU1

W71201 10 B 0001

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

**COE Project Manager** 

**Project** 

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### Visitors on Site:

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon

Brice - Paul Caron, Rebecca Reyes

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

EW7-T7 points 37-42 completed EW7-T8 points 13-18 completed EW7-T8 points 25-30 completed EW7-T9 points 7-12 completed

EW7-T9 points 25-30 completed EW7-T9 points 13-18 completed

<u>Summary</u>:

Total gallons of WB66-10 injected today = 36,000

Total gallons of WB66-10 injected this week (Sat. - F.) = 36,000

Total gallons of WB66-10 injected to date = 342,490

Amendment delivery (Wesway lbs.): NO

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

None.

## Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

Date 11/17/19 T Day S S Μ W T F X On Site Hours 0800-1430 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 27 Humidity Dry Moderate Humid

X

Project CHAAP R

**COE Project Manager** 

CHAAP RAO 2019 - OU1
Rebound Study/Injections

Doug Simpleman

Project No. 60565355

Contract No. W9128F-18-D-0004

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### Visitors on Site:

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon Brice - Paul Caron, Rebecca Reyes

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

EW7-T6 points 31-36 completed

EW7-T6 points 37-42 completed

EW7-T9 points 19-24 completed

EW7-T8 points 19-24 completed

#### Summary:

Total gallons of WB66-10 injected today = 24,000

Total gallons of WB66-10 injected this week (Sat. - F.) = 60,000

Total gallons of WB66-10 injected to date = 366,490

Amendment delivery (Wesway lbs.): NO

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

- -Re-capped overall health and safety concerns, stressed road and direct push safety.
- -Completed Daily Tailgate Meeting Sheet
- -Completed Daily Task Hazard Assessment Sheet

None.

## Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

Date 11/18/19 T Day S S M W T F X On Site Hours 0700-1700 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 28 Humidity Dry Moderate Humid

X

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

**COE Project Manager** 

**Project** 

Project No.

Contract No.

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### **Visitors on Site:**

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon, Alex Deters Brice - Paul Caron, Rebecca Reyes

Doug Simpleman

60565355

CHAAP RAO 2019 - OU1

Rebound Study/Injections

W9128F-18-D-0004

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

EW7-T7 points 31-36 completed EW7-T6 points 1-6 completed EW7-T7 points 25-30 completed EW7-T6 points 7-12 completed

EW7-T6 points 25-30 completed EW7-T7 points 1-6 completed

Summary:

Total gallons of WB66-10 injected today = 36,120

Total gallons of WB66-10 injected this week (Sat. - F.) = 96,120

Total gallons of WB66-10 injected to date = 402,610

Amendment delivery (Wesway lbs.): NO

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

None.

## Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

Date 11/19/19 Day S S Μ T W T F X On Site Hours 0800-1730 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 29 Humidity Dry Moderate Humid

X

 Project
 CHAAP RAO 2019 - OU1

 Rebound Study/Injections

 Project No.
 60565355

 Contract No.
 W9128F-18-D-0004

Doug Simpleman

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

**COE Project Manager** 

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### Visitors on Site:

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon, Alex Deters Brice - Paul Caron, Rebecca Reyes

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

EW7-T6 points 19-24 completed EW7-T7 points 7-12 started

#### Summary:

Total gallons of WB66-10 injected today = 10,800

Total gallons of WB66-10 injected this week (Sat. - F.) = 106,920

Total gallons of WB66-10 injected to date = 413,410

Amendment delivery (Wesway lbs.): Yes 46,340

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

- -Re-capped overall health and safety concerns, stressed road and direct push safety.
- -Completed Daily Tailgate Meeting Sheet
- -Completed Daily Task Hazard Assessment Sheet

No amendment was delivered on Monday. Had to wait for the delivery to show up before we could resume pumping again.

### Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

**COE Project Manager** Doug Simpleman

Date 11/20/19 T Day S S Μ W T F X On Site Hours 0700-1700 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 30 Humidity Dry Moderate Humid

X

Project	CHAAP RAO 2019 - OU1
	Rebound Study/Injections
Project No.	60565355
Contract No.	W9128F-18-D-0004

### Subcontractors on Site:

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### Visitors on Site:

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon, Alex Deters Brice - Paul Caron, Rebecca Reyes

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

EW7-T7 points 7-12 completed
EW7-T7 points 19-24 completed
EW7-T7 points 13-18 completed
EW7-T6 points 13-18 completed
EW7-T6 points 13-18 completed
EW7-T9 points 37-42 completed
EW7-T9 points 1-6 completed
EW7-T9 points 31-36 completed

Summary:

Total gallons of WB66-10 injected today = 43,200

Total gallons of WB66-10 injected this week (Sat. - F.) = 150,120

Total gallons of WB66-10 injected to date = 456,610

Amendment delivery (Wesway lbs.): Yes 46,320

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

None.

## Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

Date 11/21/19 T Day S S Μ W T F On Site Hours 0700 - 1730 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Moderate Still High X 31 Humidity Dry Moderate Humid

X

**Project** 

**COE Project Manager** 

CHAAP RAO 2019 - OU1 Rebound Study/Injections

60565355

Doug Simpleman

Project No.

W9128F-18-D-0004 Contract No.

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### **Visitors on Site:**

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Alex Deters

Brice - Paul Caron, Rebecca Reyes

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

EW7-T4 points 1-6 completed EW7-T5 points 25-30 completed EW7-T4 points 7-12 completed EW7-T4 points 25-30 completed

EW7-T5 points 7-12 completed EW7-T5 points 31-36 completed

Total gallons of WB66-10 injected today = 36,000 Total gallons of WB66-10 injected this week (Sat. - F.) = 186,120 492,610 Total gallons of WB66-10 injected to date =

Amendment delivery (Wesway lbs.): Yes 46,420

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

None.

## Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

**COE Project Manager** Doug Simpleman

Date 11/22/19 T Day S S Μ W T F  $\mathbf{X}$ On Site Hours 0700 - 1730 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 32 Humidity Dry Moderate Humid

X

Project	CHAAP RAO 2019 - OU1
	Rebound Study/Injections
Project No.	60565355
Contract No.	W9128F-18-D-0004

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### Visitors on Site:

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Alex Deters

Brice - Paul Caron, Rebecca Reyes

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

EW7-T3 points 37-42 completedEW7-T5 points 13-18 completedEW7-T3 points 31-36 completedEW7-T4 points 19-24 completedEW7-T3 points 25-30 completedEW7-T5 points 19-24 started

EW7-T4 points 13-18 completed

Summary

Total gallons of WB66-10 injected today = 36,600

Total gallons of WB66-10 injected this week (Sat. - F.) = 222,720

Total gallons of WB66-10 injected to date = 529,210

Amendment delivery (Wesway lbs.): Yes (2) 45,840, and 45,740

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

None.

## Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

Doug Simpleman

60565355

CHAAP RAO 2019 - OU1

Rebound Study/Injections

W9128F-18-D-0004

Date 11/23/19 S T Day S Μ W T F X On Site Hours 0700 - 1700 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 33 Humidity Dry Moderate Humid

X

#### Subcontractors on Site:

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

**COE Project Manager** 

**Project** 

Project No.

Contract No.

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### Visitors on Site:

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Alex Deters

Brice - Paul Caron, Rebecca Reyes

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

EW7-T5 points 19-24 completed EW7-T2 points 19-24 completed EW7-T3 points 1-6 completed EW7-T2 points 13-18 started

EW7-T3 points 7-12 completed EW7-T3 points 19-24 completed

<u>Summary</u>:

Total gallons of WB66-10 injected today = 34,200

Total gallons of WB66-10 injected this week (Sat. - F.) = 34,200

Total gallons of WB66-10 injected to date = 563,410

Amendment delivery (Wesway lbs.): NO

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

One of the water trucks had a flat tire this morning. We were running with one truck until 11:00. Both trucks were back in service before the end of day.

#### Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

Date 11/24/19 T Day S S Μ W T F X On Site Hours 0700 - 1630 Travel Time 0.5 0.5 Office Time Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 34 Humidity Dry Moderate Humid

X

Project CHAAP RAO 2019 - OU1
Rebound Study/Injections

Doug Simpleman

Project No. <u>60565355</u>

Contract No. W9128F-18-D-0004

#### **Subcontractors on Site:**

Plains Environmental Services (PES) (Direct Push Subcontractor) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

**COE Project Manager** 

For Direct Push (DP) Injection: Three direct push rigs with injection tools, two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### Visitors on Site:

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Alex Deters

Brice - Paul Caron, Rebecca Reyes

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

EW7-T2 points 13-18 completed
EW7-T2 points 7-12 completed
EW7-T3 points 13-18 completed
EW7-T3 points 13-18 completed
EW7-T1 points 7-12 completed

EW7-T1 points 13-18 completed

Summary

Total gallons of WB66-10 injected today = 37,200

Total gallons of WB66-10 injected this week (Sat. - F.) = 71,400

Total gallons of WB66-10 injected to date = 600,610

Amendment delivery (Wesway lbs.): NO

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

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

-Re-capped overall health and safety concerns, stressed road and direct push safety.

-Completed Daily Tailgate Meeting Sheet

None.

## Office Work Performed:

-Organized paperwork and equipment, scanned Injection Field Sheets.

-Completed DQCR.

**By** Ryan Herold

Date 11/25/19 S T Day S M W T F X On Site Hours 0700 - 1300 Travel Time 2.5 Office Time 0.5 Weather Bright Sun Clear Overcast Rain Snow Temp To 32 32-50 50-70 70-85 85 up X Wind Report No. Still Moderate High X 35 Humidity Dry Moderate Humid

X

COE Project ManagerDoug SimplemanProjectCHAAP RAO 20

CHAAP RAO 2019 - OU1
Rebound Study/Injections

Project No. 60565355

Contract No. W9128F-18-D-0004

#### Subcontractors on Site:

Panowicz Farms (Water Truck Subcontractor) - Arthur Thompson, Manuel Herrera

#### **Equipment on Site:**

For Direct Push (DP) Injection: Two water trucks with transfer pump, five support trucks, injection equipment including two injection pumps, gear pump with generator, two-6,000 gallon tank trailers, two metered-injection manifolds, various plastic storage/transfer tanks, various lengths of one-, two-, and three-inch hose, and level D PPE, first-aid/safety supplies, and field/safety paperwork

#### **Visitors on Site:**

None.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Alex Deters

Brice - Paul Caron, Rebecca Reyes

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

Site clean-up

#### Health and Safety and Activities:

Had the morning 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, pressurized lines, pump and traffic safety, potential exposure to explosives contamination, fire hazards, cold stress, hearing protection, slip-trip-falls, and lifting hazards. Discussed route to hospital, severe weather procedures, farming activities, and trains and railroad track safety. Utility locates were performed (Nebraska811) and utilities were marked.

- -Re-capped overall health and safety concerns, stressed road and driver 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 Injection Field Sheets.
- -Completed DQCR.

**By** Ryan Herold

 COE Project Manager Project
 Doug Simpleman CHAAP RAO 2019 - OU1
 Report No.
 1

 Rebound Study/Injections Project No.
 Rebound Study/Injections G0565355
 Brice W9128F-18-D-0020
 Brice W9128F-18-D-0020
 Subcontractor Hours
 50

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

Dean Converse, Ryan Herold, Bob Exceen, Taylor Young (AECOM)

F0041

#### Subcontractors on Site:

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

#### Visitors on Site:

**Delivery Order No.** 

Jeff Gill (USACE)

#### **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 10/7/19).
- -Mobilized to site, conducted initial health and safety meeting, prepped field equipment, and staked all direct push (DP) locations using hand-held GPS including: 3 off-site (screen point) locations OS001, OS002, OS003; and 18 temporary performance monitoring (PM) wells for injections EW7-PM21A/B through PM29A/B.
- -Calibration (weekly) and calibration checks (daily) of field PIDs, water level indicators, and YSI 556s.

#### Began OU1 Rebound Study/injection baseline sampling activities:

- -At off-site location OS001: completed continuous soil lithology logging (Geoprobe macro-core) of shallow Grand Island aquifer. The Holdrege formation (clay aquitard) was reached at ~60 feet below ground surface (bgs). 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-DP01-25, OS001-DP01-35, OS001-DP01-45).
- -Onsite, <u>installed 18 temporary PM wells</u> (1" PVC via DP techniques) at 9 locations for PM of subsurface injections (planned October/November 2019). 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 13 of the 18 groundwater samples at temporary PM wells (EW7-PM21A, PM21B, PM22A, PM22B, PM23A, PM24A, PM25A, PM25B, PM26A, PM26B, PM27A, PM27B, PM28B). 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 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.
- -IDW water (purge and decon) from all sample locations were containerized and taken to the groundwater treatment plant for treatment through the existing GAC system.
- -All field and sampling activities were completed in accordance with the 2019 Draft Final Addendum 3 UFP-QAPP, 2018 Final Addendum 2 UFP-QAPP, and 2018 Annual Groundwater Monitoring Report recommendations.

#### Percentage of Work Completed:

Mobilization, 3 of 9 planned off-site DP (screen point) groundwater samples were completed, 18 of 18 temporary PM wells were installed, and 13 of 18 temporary PM wells were sampled. <u>Approximately 25%</u> of the 2019 OU1 Rebound Study/injection baseline sampling field work is now complete.

#### **Schedule for Next Week:**

-Calibration of water quality equipment. Complete temporary PM well sampling (5 PM wells remain). Field survey all off-post and temporary PM well locations for ground elevations. Abandon all temporary PM wells. Complete groundwater purge and sample collection activities at 36 monitoring wells for OU1 Rebound Study/injection baseline sampling.

COE Project Manager Doug Simpleman

Project CHAAP RAO 2019 - OU1

Rebound Study/Injections

**Project No.** 60565355

Contract No. Brice W9128F-18-D-0020

Delivery Order No. F0041

 Report No.
 1

 Date
 10/14/19 to 10/18/19

 Brice/AECOM On-site Hour
 172

 Subcontractor Hours
 50

#### 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.

#### Deviations from SOW and/or WP:

Off-site DP sample location OS001 was collected for quick turn analysis. Pending OS001 results (above/below HALs for explosives), off-site DP locations OS002 and OS003 will be sampled (following week), if necessary.

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

None.

#### Recommendations:

Preparation being completed this week for Groundwater Treatment Facility (GWTF) and extraction well 7 (EW7) shutdown and 'standby' status. GWTF/EW7 shutdown anticipated following week, pending completion of all OU1 Rebound Study/injection sampling activities (including potential remaining off-site DP sampling activities/OS001 analysis results).

### Communication Notice This Week:

None.

#### **Key Personnel Changes:**

Dean Converse (AECOM) off site on 10/17/19. Jeff Gill (USACE) on/off site 10/16/19.



Off-site DP location OS001 (facing west)



Development/sampling of temporary PM wells: EW7-PM25A (shallow) and PM25B (shallow intermediate)

By: Ryan Herold Title: Field Manager

 COE Project Manager Project
 Doug Simpleman CHAAP RAO 2019 - OU1 Rebound Study/Injections
 Report No.
 2

 Project No.
 Rebound Study/Injections Project No.
 Brice W9128F-18-D-0020
 Brice W9128F-18-D-0020
 Subcontractor Hours
 0

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

Ryan Herold, Bob Exceen, Taylor Young (AECOM), Chris Holt, Rebecca Reyes (Brice)

#### Subcontractors on Site:

None.

#### Visitors on Site:

**Delivery Order No.** 

Various Meeting Attendees\_Annual Site Visit Meeting (10/22/19)

F0041

#### **Summary of Work Performed:**

-Calibration (weekly) and calibration checks (daily) of field PIDs, water level indicators, and YSI 556s.

#### Continued OU1 Rebound Study/injection baseline sampling activities:

-Onsite, collected 5 of the 18 groundwater samples at temporary PM wells (EW7-PM23B, PM24B, PM28A, PM29A, and 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 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 surveyed all PM wells, off-post DP sample locations, and planned injection transects. Abandoned all 18 temporary PM wells.

-Collected groundwater samples from 36 OU1 Rebound Study off-post and on-post wells/piezometers (G0024, G0070, G0075, G0076, G0077, G0078, G0079, G0080, G0082, G0083, G0086, G0087, G0091, G0092, PZ017R, PZ018, PZ019, PZ020, NW020, NW021, NW022, NW050, NW051, NW052, NW060, NW061, NW062, NW070, NW071, NW080, NW081R, NW082R, CA210, CA211, CA212, and CA213). Each well will be analyzed for explosives + MNX (Method 8330A) and MNA parameters (see above).

-IDW water (purge and decon) from all sample locations were containerized and taken to the groundwater treatment plant for treatment through the existing GAC system.

-All field and sampling activities were completed in accordance with the 2019 Draft Final Addendum 3 UFP-QAPP, 2018 Final Addendum 2 UFP-QAPP, and 2018 Annual Groundwater Monitoring Report recommendations.

#### Percentage of Work Completed:

Mobilization, 3 of 9 planned off-site DP (screen point) groundwater samples were completed, 18 of 18 temporary PM wells were installed, 18 of 18 temporary PM wells were sampled, and 36 of 36 monitoring wells were sampled.

<u>Approximately 90%</u> of the 2019 OU1 Rebound Study/injection baseline sampling field work is now complete.

#### Schedule for Next Week:

-Complete remaining 6 off-site DP samples (OS002, OS003). Begin injection activities following shutdown of EW7.

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

-Had the 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.

COE Project Manager Doug Simpleman Report No.

Project CHAAP RAO 2019 - OU1 Date 10/19/19 to 10/23/19

Rebound Study/Injections Brice/AECOM On-site Hour 206

Project No. 60565355 Subcontractor Hours 0

 Contract No.
 Brice W9128F-18-D-0020

 Delivery Order No.
 F0041

#### **Deviations from SOW and/or WP:**

Lab results from location OS001 samples were received this week. Due to TNT concentrations above HAL in the 25 and 35 foot bgs samples, next week will collect samples from both OS002 and OS003 locations (3 sample intervals each).

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

None.

#### Recommendations:

EW7 pumping will be turned off following the completion of remaining OU1 Rebound Study sampling locations (OS002, OS003).

#### Communication Notice This Week:

None.

#### Key Personnel Changes:

Chris Holt, Rebecca Reyes (Brice) on site 10/21/19. All crew off site on 10/23/19.



Sample set up at piezometer PZ017R (facing east)



Sample collection at monitoring well G0087 (facing northeast)

By: Ryan Herold Title: Field Manager

 COE Project Manager Project
 Doug Simpleman
 Report No.
 3

 Project
 CHAAP RAO 2019 - OU1 Rebound Study/Injections
 Date
 10/28/19 to 11/01/19

 Project No.
 60565355
 Subcontractor Hours
 215

 Contract No.
 Brice W9128F-18-D-0020
 215

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

F0041

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon, Dean Converse Brice - Paul Caron, Mikayla Daigle

#### Subcontractors on Site:

Plains Envir. Services (PES) (Direct Push Sub.) - Jason Auernheimer, Jesse Kalvig, Eric Robinson, Henry Walker Panowicz Farms (PF) (Water Truck Sub.) - Arthur Thompson, Jim Mathews, Manuel Herrera

#### **Visitors on Site:**

**Delivery Order No.** 

Messersmith Electric LLC - Shawn Messersmith; Sargent Drilling; Westway delivery trucks

# Summary of Work Performed:

#### OU1 Rebound Study baseline sampling activities:

- At off-site locations OS002 and OS003 (10/28/19): Collected 3 DP groundwater samples (screen point) for each location at depths 25 feet, 35 feet, and 45 feet bgs for explosives + MNX (Method 8330A) analysis only (OS002-DP01-25, OS002-DP01-35, OS002-DP01-45).
- IDW water (purge and decon) from all sample locations were containerized and taken to the groundwater treatment plant for treatment through the existing GAC system.
- All field and sampling activities were completed in accordance with the 2019 Draft Final Addendum 3 UFP-QAPP, 2018 Final Addendum 2 UFP-QAPP, and 2018 Annual Groundwater Monitoring Report recommendations.
- Sargent Drilling onsite to pull pump, motor, and stem from EW7 (11/1/19).

#### OU1 subsurface injection activities:

- Field activity setup (i.e., utility locates, DP sample and injection transects location staking and surveying, and equipment tests) completed weeks of October 7, 14, and 21, 2019.
- Completed 30 injection points this week at transects EW7-T16, T15, and T14. All transects were Wesblend 66-10, 9.8% mix, 15-foot spacing. Injection depths (5-foot intervals) were from 18-38 ft bgs.

## **Injection Summary:**

- Total gallons of WB66-10 injected this week = 32,900
- Total gallons of WB66-10 injected to date = 32,900

Transect	Number of points	Number of points completed Notes
EW7-T1	18	0
EW7-T2	24	0
EW7-T3	42	0
EW7-T4	42	0
EW7-T5	42	0
EW7-T6	42	0
EW7-T7	42	0
EW7-T8	48	0
EW7-T9	48	0
EW7-T10	48	0
EW7-T11	48	0
EW7-T12	48	0
EW7-T13	42	0
EW7-T14	42	6
EW7-T15	12	12
EW7-T16	12	12
Totals	600	30

**COE Project Manager** Doug Simpleman Report No. 10/28/19 to 11/01/19 CHAAP RAO 2019 - OU1 **Project** Date Rebound Study/Injections **Brice/AECOM On-site Hour 385** Project No. 60565355 **Subcontractor Hours** 215 Brice W9128F-18-D-0020 Contract No. F0041 **Delivery Order No.** 

# Percentage of Work Completed:

- Mobilization, 9 of 9 planned off-site DP (screen point) groundwater samples were completed, 18 of 18 temporary PM wells were installed, sampled, abandoned, 36 of 36 monitoring wells were sampled. 100% of the 2019 OU1 Rebound Study/injection baseline sampling field work is now complete.
- A total of 30 of the 600 injection points were completed this week. Injection field work is approximately 5% complete.

#### Schedule for Next Week:

- Continue injections at EW7.

#### 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 Sheet

### **Deviations from SOW and/or WP:**

None.

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

- Unseasonably low temperatures (48hrs straight below freezing temps) caused slow production and transfer pumping of amendment issues during mid-week. Tank heaters, covers, and alternate transfer pumps were purchased and increases in production rates were achieved. Daily temperatures also increased.
- Both water trucks had minor issues causing minor delays (tire damage/tire was replaced, truck transfer pump/pump was repaired, truck water pump/water pump was repaired).

#### Recommendations:

During low temperatures, pumps and water trucks are kept in GWTF overnight.

#### **Communication Notice This Week:**

None.

COE Project Manager Doug Simpleman

Project CHAAP RAO 2019 - OU1

Rebound Study/Injections Brice/A

**Project No.** 60565355

**Contract No.** Brice W9128F-18-D-0020

Delivery Order No.  $\overline{F0041}$ 

Report No. 3

Date 10/28/19 to 11/01/19

Brice/AECOM On-site Hour 385

Subcontractor Hours 215

# **Key Personnel Changes:**

Jim Mathews off site, Manuel Herrera (PF) on site on 10/29/19. Messersmith Electric LLC on-, off site on 10/30/19. Dean Converse (AECOM) off site on 10/31/19. Sargent Drilling on-, off site on 11/1/19. Westway deliveries on-, off site on 10/28/19, 11/1/19.



Groundwater purging at OS002-DP01-35 (facing southwest)



Subsurface injection and manifold system at EW7-T16, points 1-6 (facing southwest).

 COE Project Manager
 Doug Simpleman
 Report No.
 4

 Project
 CHAAP RAO 2019 - OU1
 Date
 11/02/19 to 11/06/19

 Rebound Study/Injections
 Brice/AECOM On-site Hours
 312

 Project No.
 60565355
 Subcontractor Hours
 235

 Contract No.
 Brice W9128F-18-D-0020

 Delivery Order No.
 F0041

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon

Brice - Paul Caron, Mikayla Daigle

## **Subcontractors on Site:**

Plains Envir. Services (PES) (Direct Push Sub.) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (PF) (Water Truck Sub.) - Arthur Thompson, Manuel Herrera

#### **Visitors on Site:**

Westway - Deliveries on 11/04/19, 11/06/19.

# **Summary of Work Performed:**

#### OU1 subsurface injection activities:

- Completed 156 injection points this week at transects EW7-T14, T13, T12, T11, and T10. All transects were Wesblend 66-10, 9.8% mix, 15-foot spacing. Injection depths (5-foot intervals) were from 18-38 ft bgs.

#### **Injection Summary:**

- Total gallons of WB66-10 injected this week = 153,590
- Total gallons of WB66-10 injected to date = 186,490

Transect	Number of points	Number of points completed Notes
EW7-T1	18	0
EW7-T2	24	0
EW7-T3	42	0
EW7-T4	42	0
EW7-T5	42	0
EW7-T6	42	0
EW7-T7	42	0
EW7-T8	48	0
EW7-T9	48	0
EW7-T10	48	18
EW7-T11	48	12
EW7-T12	48	48
EW7-T13	42	42
EW7-T14	42	42
EW7-T15	12	12
EW7-T16	12	12
Totals	600	186

#### **Percentage of Work Completed:**

- Mobilization, 9 of 9 planned off-site DP (screen point) groundwater samples were completed, 18 of 18 temporary PM wells were installed, sampled, abandoned, 36 of 36 monitoring wells were sampled. 100% of the 2019 OU1 Rebound Study/injection baseline sampling field work is now complete.
- A total of 186 of the 600 injection points have been completed to date. Injection field work is approximately 31% complete.

#### **Schedule for Next Week:**

- Continue injections at EW7.

COE Project Manager Doug Simpleman Report No.

Project CHAAP RAO 2019 - OU1 Date 11/02/19 to 11/06/19

Rebound Study/Injections Brice/AECOM On-site Hours 312

 Project No.
 60565355
 Subcontractor Hours
 235

 Contract No.
 Brice W9128F-18-D-0020
 235

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

**Delivery Order No.** 

- Had the 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

F0041

- Completed Daily Tailgate Meeting Sheets
- Completed Daily Task Hazard Assessment Sheet

#### Deviations from SOW and/or WP:

None.

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

None.

#### **Recommendations:**

During low temperatures, pumps and water trucks are kept in GWTF overnight.

#### **Communication Notice This Week:**

None.

## **Key Personnel Changes:**

Field team left site on 11/06/19 (end of 10-day shift). Will remob and resume injection activities on 11/11/19.



Direct Push rig w/ operator at EW7-T13, points 13-18 (facing north)



Manifold system w/ operator at EW7-T13, points 13-18 (facing south)

 COE Project Manager
 Doug Simpleman
 Report No.
 5

 Project
 CHAAP RAO 2019 - OU1 Rebound Study/Injections
 Date Brice/AECOM On-site Hours
 11/09/19 to 11/15/19

 Project No.
 60565355
 Subcontractor Hours
 252

 Contract No.
 Brice W9128F-18-D-0020

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon, Dean Converse

Brice - Paul Caron, Rebecca Reyes

## **Subcontractors on Site:**

Plains Envir. Services (PES) (Direct Push Sub.) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (PF) (Water Truck Sub.) - Arthur Thompson, Manuel Herrera

#### Visitors on Site:

**Delivery Order No.** 

Westway - Deliveries on 11/11/19, 11/13/19, 11/15/19.

F0041

USACE - Jeff Gill

# Summary of Work Performed:

#### OU1 subsurface injection activities:

- Completed 120 injection points this week at transects EW7-T11, T10, T9, and T8. All transects were Wesblend 66-10, 9.8% mix, 15-foot spacing. Injection depths (5-foot intervals) were from 18-38 ft bgs.

#### **Injection Summary:**

- Total gallons of WB66-10 injected this week = 120,000
- Total gallons of WB66-10 injected to date = 306,490

Transect	Number of points	Number of points completed	Notes
EW7-T1	18	0	
EW7-T2	24	0	
EW7-T3	42	0	
EW7-T4	42	0	
EW7-T5	42	0	
EW7-T6	42	0	
EW7-T7	42	0	
EW7-T8	48	30	
EW7-T9	48	24	
EW7-T10	48	48	
EW7-T11	48	48	
EW7-T12	48	48	
EW7-T13	42	42	
EW7-T14	42	42	
EW7-T15	12	12	
EW7-T16	12	12	
Totals	600	306	

#### Percentage of Work Completed:

- Mobilization, 9 of 9 planned off-site DP (screen point) groundwater samples were completed, 18 of 18 temporary PM wells were installed, sampled, abandoned, 36 of 36 monitoring wells were sampled. 100% of the 2019 OU1 Rebound Study/injection baseline sampling field work is now complete.
- A total of 306 of the 600 injection points have been completed to date. Injection field work is approximately <u>51%</u> complete.

## Schedule for Next Week:

- Continue injections at EW7.

COE Project Manager Doug Simpleman Report No.

F0041

 Project
 CHAAP RAO 2019 - OU1
 Date
 11/09/19 to 11/15/19

Rebound Study/Injections Brice/AECOM On-site Hours 32

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

**Delivery Order No.** 

- Had the 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 Sheet

#### **Deviations from SOW and/or WP:**

None.

#### Problems Encountered/Corrective Action Taken:

- Low temperatures on 11/9 and 11/10/19 caused freezing in injection lines and slow production. Continued use of valve covers, straw, and emptying of lines/manifolds at end of day to prevent freezing. Temperatures on 11/10/19 also increased.

## **Recommendations:**

During low temperatures, pumps and water trucks are kept in GWTF overnight.

#### Communication Notice This Week:

None.

#### **Key Personnel Changes:**

Rebecca Reyes (Brice) replaced Mikayla Daigle (Brice) for field event. Jeff Gill (USACE) on- and off-site 11/14/19. Dean Converse (AECOM) on site 11/14/19, off site 11/15/19.



Direct Push rig w/ operator at EW7-T11, points 19-24. 2 x 6,000-gallon trailer tanks w/ mixed amendment in background (facing east)



4,000-gallon water truck (at EW7) discharging mixed amendment to field trailer tanks (facing northeast)

 COE Project Manager
 Doug Simpleman
 Report No.
 6

 Project
 CHAAP RAO 2019 - OU1
 Date
 11/16/19 to 11/22/19

 Rebound Study/Injections
 Brice/AECOM On-site Hours
 431

 Project No.
 60565355
 Subcontractor Hours
 300

 Contract No.
 Brice W9128F-18-D-0020
 Total Contract No.
 Total Contract No.
 Total Contract No.

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Mike McKeon, Alex Deters

Brice - Paul Caron, Rebecca Reyes

## **Subcontractors on Site:**

Plains Envir. Services (PES) (Direct Push Sub.) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (PF) (Water Truck Sub.) - Arthur Thompson, Manuel Herrera

#### **Visitors on Site:**

**Delivery Order No.** 

Westway - Deliveries on 11/16, 11/19, 11/20, 11/21, and 11/22/19

F0041

# **Summary of Work Performed:**

#### OU1 subsurface injection activities:

- Completed 222 injection points this week at transects EW7-T9, T8, T7, T6, T5, T4, and T3. All transects were Wesblend 66-10, 9.8% mix, 15-foot spacing. Injection depths (5-foot intervals) were from 18-38 ft bgs.

#### <u>Injection Summary:</u>

- Total gallons of WB66-10 injected this week = 222,720
- Total gallons of WB66-10 injected to date = 529,210

Transect	Number of points	Number of points completed	Notes
EW7-T1	18	0	
EW7-T2	24	0	
EW7-T3	42	18	
EW7-T4	42	42	
EW7-T5	42	36	
EW7-T6	42	42	
EW7-T7	42	42	
EW7-T8	48	48	
EW7-T9	48	48	
EW7-T10	48	48	
EW7-T11	48	48	
EW7-T12	48	48	
EW7-T13	42	42	
EW7-T14	42	42	
EW7-T15	12	12	
EW7-T16	12	12	
Totals	600	528	_

#### **Percentage of Work Completed:**

- Mobilization, 9 of 9 planned off-site DP (screen point) groundwater samples were completed, 18 of 18 temporary PM wells were installed, sampled, abandoned, 36 of 36 monitoring wells were sampled. 100% of the 2019 OU1 Rebound Study/injection baseline sampling field work is now complete.
- A total of 528 of the 600 injection points have been completed to date. Injection field work is approximately <u>88%</u> complete.

## **Schedule for Next Week:**

Complete the 2019 injection activities including site restoration and equipment storage, and demobilize from site.

COE Project Manager Doug Simpleman Report No. 6

 Project
 CHAAP RAO 2019 - OU1
 Date
 11/16/19 to 11/22/19

Rebound Study/Injections Brice/AECOM On-site Hours 431

 Project No.
 60565355
 Subcontractor Hours
 300

 Contract No.
 Brice W9128F-18-D-0020
 300

Delivery Order No. F0041

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

- Had the 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 Sheet

# Deviations from SOW and/or WP:

None.

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

Amendment supplier (Westway) had delivery issues on 11/18 and unable to deliver until 11/19/19, causing minor delay in field activities. Remaining scheduled deliveries for field event were confirmed.

#### **Recommendations:**

During low temperatures, pumps and water trucks are kept in GWTF overnight.

#### **Communication Notice This Week:**

None.

#### **Key Personnel Changes:**

Alex Deters (AECOM) on site 11/18/19. Mike McKeon (AECOM) off site 11/21/19.



Bulk delivery of amendment (Westway). Off loaded into 4 x 3000-gallon tanks at GWTF. Each delivery approximately 45,000 lbs / 4,500 gal.

(facing east)



Two 6,000-gallon trailer tanks w/ mixed amendment and firefighter pumps (facing east)

 COE Project Manager
 Doug Simpleman
 Report No.
 7

 Project
 CHAAP RAO 2019 - OU1 Rebound Study/Injections
 Date Brice/AECOM On-site Hours
 11/23/19 to 11/25/19

 Project No.
 60565355 Subcontractor Hours
 Subcontractor Hours
 104

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

AECOM - Ryan Herold, Taylor Young, Bob Exceen, Alex Deters

F0041

Brice - Paul Caron, Rebecca Reyes

## **Subcontractors on Site:**

Plains Envir. Services (PES) (Direct Push Sub.) - Jason Auernheimer, Jesse Kalvig, Eric Robinson Panowicz Farms (PF) (Water Truck Sub.) - Arthur Thompson, Manuel Herrera

## Visitors on Site:

**Delivery Order No.** 

None.

# **Summary of Work Performed:**

#### OU1 subsurface injection activities:

- Completed 72 injection points this week at transects EW7-T5, T3, T2, and T1. All transects were Wesblend 66-10, 9.8% mix, 15-foot spacing. Injection depths (5-foot intervals) were from 18-38 ft bgs.

#### <u>Injection Summary:</u>

- Total gallons of WB66-10 injected this week = 71,400
- Total gallons of WB66-10 injected to date = 600,610

Transect	Number of points	Number of points completed	Notes
EW7-T1	18	18	
EW7-T2	24	24	
EW7-T3	42	42	
EW7-T4	42	42	
EW7-T5	42	42	
EW7-T6	42	42	
EW7-T7	42	42	
EW7-T8	48	48	
EW7-T9	48	48	
EW7-T10	48	48	
EW7-T11	48	48	
EW7-T12	48	48	
EW7-T13	42	42	
EW7-T14	42	42	
EW7-T15	12	12	
EW7-T16	12	12	
Totals	600	600	

#### **Percentage of Work Completed:**

- Mobilization, 9 of 9 planned off-site DP (screen point) groundwater samples were completed, 18 of 18 temporary PM wells were installed, sampled, abandoned, 36 of 36 monitoring wells were sampled. 100% of the 2019 OU1 Rebound Study/injection baseline sampling field work is now complete.
- A total of 600 of the 600 injection points have been completed to date. Completed site restoration, equipment storage, and demobilization. Injection field work is 100% complete.

## **Schedule for Next Week:**

None.

COE Project Manager Doug Simpleman

Project CHAAP RAO 2019 - OU1

Rebound Study/Injections

**Project No.** 60565355

Contract No. Brice W9128F-18-D-0020

Delivery Order No.  $\overline{F0041}$ 

 Report No.
 7

 Date
 11/23/19 to 11/25/19

 Brice/AECOM On-site Hours
 153

 Subcontractor Hours
 104

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

- Had the 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 Sheet

# **Deviations from SOW and/or WP:**

None.

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

One PF water truck had flat tire on 11/23/19. Tire was repaired and water truck was returned to activities on same day.

## **Recommendations:**

During low temperatures, pumps and water trucks are kept in GWTF overnight.

#### **Communication Notice This Week:**

None.

#### **Key Personnel Changes:**

None.



Direct Push rig w/ operator at EW7-T5, points 19-24 (facing south)



Abandonment of direct push boreholes with hydrated bentonite chips

Appendix C Photographic Log

Field Activities: OU1 Rebound Study and **Subsurface Injections – Baseline Events** 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 Baseline Sampling**

At off-site location OS001, groundwater samples were collected at screen point depths 25 feet, 35 feet, and 45 feet for explosives + MNX analysis. Laboratory results indicated TNT concentrations above HAL, prompting samples to be collected at locations OS002 and OS003 to establish the extent of the explosives plume.

Date: 11/14/2019 Direction: west Photographer: RH Location: OS001



# Photograph No. 2

#### **Description:**

#### **OU1 Rebound Study Baseline Sampling**

Monitoring wells were purged, and groundwater samples were collected using low-flow techniques and submersible pumps. All purging and sample collection were completed in accordance with UFP-QAPP.

Date: 10/23/2019 Direction: east Photographer: RH Location: PZ017R



Field Activities: OU1 Rebound Study and **Subsurface Injections – Baseline Events** 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 Baseline Sampling**

Groundwater samples were collected in laboratoryprovided containers and analyzed for explosives + MNX and MNA laboratory parameters by TestAmerica laboratory.

Date: 10/23/2019 Direction: northeast Photographer: RH Location: G0087



# Photograph No. 4

#### **Description:**

#### **OU1 Subsurface Injections**

For baseline subsurface injection performance monitoring, 1" PVC temporary wells were installed (via Direct Push technology), developed, purged, sampled, and abandoned within 10 days of installation. All performance monitoring wells were sampled and analyzed for explosives + MNX and MNA laboratory parameters.

Date: 10/16/2019 Direction: -Photographer: DC Location: EW7-PM25



Field Activities: OU1 Rebound Study and **Subsurface Injections – Baseline Events** Cornhusker Army Ammunition Plant, Nebraska

**USACE - Omaha District** 

Contract No. W9128F-18-D-0020 Delivery Order No. F0041

# Photograph No. 5

#### **Description:**

#### **OU1 Subsurface Injections**

All decontamination, development, and purge IDW water from sampling activities were containerized and emptied into GWTF sump for treatment.

Date: 10/16/2019 Direction: -Photographer: RH Location: OU1 On-Post



# Photograph No. 6

#### **Description:**

#### **OU1 Subsurface Injections**

Injection was completed by direct push methods. Injection occurred from the base of the plume (approximately 38 feet bgs) up to slightly below the water table (approximately 18 feet bgs) at 5-foot intervals. Injection points are 15-feet apart.

Date: 11/05/2019 Direction: south Photographer: RH

Location: EW7-T13 (13-18)



Field Activities: OU1 Rebound Study and **Subsurface Injections – Baseline Events** Cornhusker Army Ammunition Plant, Nebraska

**USACE - Omaha District** 

Contract No. W9128F-18-D-0020 Delivery Order No. F0041

# Photograph No. 7

#### **Description:**

#### **OU1 Subsurface Injections**

A 45,000-lb delivery of Wesblend 66-10 (molasses) amendment from Westway, being off loaded into 3000gallon storage tanks.

Date: 11/22/2019 Direction: east Photographer: RH Location: GWTF



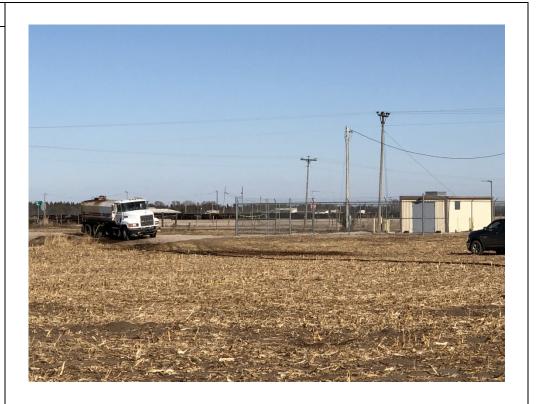
# Photograph No. 8

#### **Description:**

#### **OU1 Subsurface Injections**

Amendment was batch-mixed with water in 4,000- and 5,000-gallon water trucks to the desired percent concentration and delivered to the injection field location holding tanks.

Date: 11/22/2019 Direction: northeast Photographer: RH Location: EW7



Field Activities: OU1 Rebound Study and **Subsurface Injections – Baseline Events** Cornhusker Army Ammunition Plant, Nebraska

**USACE - Omaha District** 

**Contract No. W9128F-18-D-0020** Delivery Order No. F0041

# Photograph No. 9

# **Description:**

#### **OU1 Subsurface Injections**

Amendment was held in holding tank systems at injection locations during injection activities. The holding tank systems were designed to allow for amendment off-loading from water trucks to be concurrently completed during injection activities.

Date: 11/21/2019 Direction: southeast Photographer: RH Location: EW7



# Photograph No. 10

#### **Description:**

#### **OU1 Subsurface Injections**

The pressure and flow were controlled at the manifold (shown in this photograph). Flow meters were used to measure the total gallons injected per interval. Readings for each injection point were recorded on an injection log sheet and in the Daily Quality Control Reports.

Date: 11/05/2019 Direction: south Photographer: RH

Location: EW7-T13 (13-18)



Field Activities: OU1 Rebound Study and **Subsurface Injections – Baseline Events** Cornhusker Army Ammunition Plant, Nebraska

**USACE – Omaha District** 

Contract No. W9128F-18-D-0020 Delivery Order No. F0041

# Photograph No. 11

# **Description:**

#### **OU1 Subsurface Injections**

After injection was complete, holes were backfilled with hydrated granular bentonite.

Date: 11/22/2019 Direction: -Photographer: RH Location: EW7



# 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

			MAROS DATA INI CIS					
WellName	XCoord	YCoord	Constituent	SampleDate	Result	Units	DetLim	Flags
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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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

			MAROS DATA INTO IS					
WellName	XCoord	YCoord	Constituent	SampleDate	Result	Units	DetLim	Flags
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	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	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	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	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	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	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	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
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	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	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	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	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	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	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	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	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	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	10/21/2019		μg/L	0.16	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	10/21/2019		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	10/21/2019		μg/L	0.16	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	10/21/2019		μg/L	0.16	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	10/22/2019		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	10/22/2019		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	10/23/2019		μg/L	0.16	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	10/22/2019		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	10/22/2019		μg/L	0.16	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	10/22/2019		μg/L	0.16	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	10/21/2019		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
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	10/21/2019		μg/L	0.16	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	10/22/2019		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	10/22/2019		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	10/22/2019		μg/L	0.16	ND