FINAL

BASELINE MONITORING REPORT

2022 Annual Baseline Monitoring Report
Red Devil Mine, Alaska

Contract Number: 140L63-21-C-0001
Amendment P00001

Submitted to:

U.S. DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT
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ACRONYMS AND ABBREVIATIONS

BLM	Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
DO	dissolved oxygen
DoD	Department of Defense
DQO	Data Quality Objectives
E&E	Ecology and Environment Inc.
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
ICP	inductively coupled plasma
ID	identification
IDW	Investigation Derived Waste
mg/L	milligrams per liter
MPA	Main Processing Area
MPC	measurement performance criteria
MS	mass spectrometry
MS/MSD	matrix spike/matrix spike duplicates
MW	Monitoring Well
ng/L	nanograms per liter
No.	Number
ORP	oxidation reduction potential
PARCC	Precision, Accuracy, Representativeness, Completeness, and. Comparability
PPE	personal protective equipment
QAPP	Quality Assurance Project Plan
QC	Quality Control
RDM	Red Devil Mine
Report	2022 Annual Baseline Monitoring Report
RI	Remedial Investigation

ACRONYMS AND ABBREVIATIONS (CONCLUDED)

RPD	relative percent difference
SMA	Surface Mined Area
Sundance	Sundance Consulting, Inc.,
TAL	Target Analyte List
TDS	Total dissolved solids
TSS	Total suspended solids
Work Plan	*Final Work Plan, Groundwater and Surface Water Baseline Monitoring, Red Devil Mine, Alaska*

1 INTRODUCTION

This 2022 Annual Baseline Monitoring Report (Report) presents the findings of the 2022 spring and fall baseline groundwater and surface water monitoring efforts performed at the Red Devil Mine (RDM) site (Figure 1-1). The RDM is an abandoned mercury mine and ore processing facility located on public lands managed by the Bureau of Land Management (BLM) in southwest Alaska. Historical mining activities included underground and surface mining and ore processing. On-site ore processing included crushing, retorting/furnacing, milling, and flotation. Sundance Consulting, Inc. (Sundance), prepared this Report on behalf of the BLM under Contract Number (No.) 140L63-21-C-0001 Amendment P00001.

This Report summarizes the field activities, procedures, and results for the 2022 spring and fall baseline monitoring of groundwater and surface water efforts performed at RDM site.

1.1 PURPOSE AND OBJECTIVES

The purpose of baseline monitoring was to collect surface water and groundwater samples, as well as stream discharge and groundwater elevation data during spring and fall to inform remedial actions at the RDM. Baseline monitoring expands upon work that began during the 2011–2014 Remedial Investigation (RI) (Ecology and Environment Inc. [E&E], 2014) and continued through the 2015–2018 Supplemental RI (E&E, 2018) and simultaneous annual baseline monitoring for groundwater and surface water during spring and fall. The objectives are to:

- Characterize the seasonal variability in groundwater and surface water hydrology and quality; and
- Characterize the long-term (multiple year) variability in groundwater and surface water hydrology and quality.

1.2 PROJECT LOCATION, SETTING, AND AREAS

The RDM site is located approximately 250 miles west of Anchorage, Alaska. Located on the southwest bank of the Kuskokwim River, approximately 2 miles southeast of the village of Red Devil, the site is 8 miles northwest of the village of Sleetmute, and 75 miles northeast of Aniak, the largest village in the region. Fifteen villages are located downstream of Red Devil on the Kuskokwim River. The legal description for the RDM site is Township 19 North, Range 44 West, Southeast Quarter of Section 6, Sleetmute D-4 Quadrangle, Seward Meridian. The RDM site's approximate coordinates are 61° 45' 38.1" north latitude and 157° 18' 42.7" west longitude (North American Datum 1927). The RDM site is in a remote location, and access to the site is available by boat or barge on the Kuskokwim River or by means of an airstrip at the nearby village of Red Devil. An unimproved road leads from the airstrip through the village of Red Devil to the RDM site. Access to the RDM site is restricted by two locked gates, one on the unimproved road and a boat landing along the Kuskokwim River.

Historical mining operations left tailings and other remnants that have affected local soil, surface water, sediment, and groundwater. Based on the locations of tailings and other features, baseline monitoring is focused on surface water and groundwater in the following areas as shown on historical Figure 1-2 (E&E, 2021):

- **Main Processing Area (MPA)—**The MPA contained most of the former site structures and was where ore beneficiation and mineral processing was conducted. The area is split by Red Devil Creek. Underground mine openings (e.g., shafts, adits, and stopes to the surface) and ore processing and mine support facilities (e.g., housing and warehousing) were located on the west side of Red Devil Creek until 1955. After 1955, all ore processing was conducted at structures and facilities on the east side of Red Devil Creek.

  The MPA includes three monofills, which are essentially landfills that contain demolished mine structure debris and other material. Two of the monofills, #1 and #3, are unlined. Monofill #2, on the east side of Red Devil Creek, is an engineered and lined containment structure for building debris and materials from the demolished post-1955 retort structure.

- **Surface Mined Area (SMA)—**The SMA is located west of the MPA where historical surface exploration and mining occurred. The SMA is partially underlain by underground mine workings. The "Dolly Sluice" and "Rice Sluice" and their respective deltas on the bank of the Kuskokwim River are associated with the SMA.

- **Vicinity of Proposed Repository—**The Proposed Repository is located uphill of the SMA on the north side of Red Devil Creek.

- **Red Devil Creek—**Red Devil Creek extends from a reservoir upstream of the MPA to the creek's delta at its confluence with the Kuskokwim River.

- **Seep (RD05)—**The Seep is located on the north bank of Red Devil Creek downgradient of the former mine operations and tailings area.

2 BASELINE MONITORING FIELD ACTIVITIES

All field activities were performed in accordance with the *Final Work Plan, Groundwater and Surface Water Baseline Monitoring, Red Devil Mine, Alaska* ([*Work Plan*], BLM, 2019), and the addendum to the *Work Plan* (Sundance, 2021). Field activities included tailgate safety meetings, the assessment of the operational status of the monitoring well network, synaptic measurement of groundwater elevations, downloading of transducer data, groundwater sampling, Red Devil Creek and Seep discharge gauging, and surface water sampling. All field documentation, including Tailgate Safety Field Forms, Monitoring Well Integrity Checklists, field notebooks, groundwater sampling forms, surface water sampling forms, and calibration logs, are provided in Attachment 1. Photographic documentation is provided in Attachment 2 and includes a photograph index log with detailed descriptions included in the caption of each photograph collected during the field activities.

Spring and fall field activities occurred between 02 June 2022 and 10 June 2022, and 27 August 2022 and 04 September 2022, respectively. For the spring and fall sampling events, the field team consisted of the field team lead, Site Health and Safety Officer, George Garner, and Field Technician, Nick Potter. A tailgate safety meeting was held with the field team before the start of each day. As field conditions changed during the day because of type of activity or site conditions, participants had undocumented impromptu safety breaks to discuss changing conditions and how they may apply to health and safety during field visit activities. Tailgate safety meeting forms are provided in Attachment 1.

An initial site walk was conducted to assess the site conditions, assess the operational status of the monitoring well network, clear the trail system from recent deadfall from the previous winter and summer seasons, perform a synaptic measurement of groundwater elevations across the site within a 24-hour period, and download transducer data. The initial site walk was followed by low-flow groundwater sampling and field maintenance of groundwater monitoring wells. After completing groundwater well sampling, the field team performed surface water discharge measurements within Red Devil Creek and Seep and surface water sampling of Red Devil Creek. Each baseline monitoring field activity is further described in the following sections. Associated field documentation of the monitoring well survey, groundwater sampling, and surface water sampling are provided in Attachment 1.

2.1 GROUNDWATER ELEVATIONS

Groundwater elevation during the spring and fall 2022 baseline monitoring events consisted of the following:

- Measuring static water levels at all accessible monitoring wells at the RDM site within a 24-hour period to collect a “synaptic snapshot” of groundwater levels.
- Downloading of continuous water level measurements from pressure transducers installed within specific monitoring wells.

The groundwater static water levels were measured on 04 June 2022 and 28 August 2022. Static water level measurements were augmented with the continuous water level measurements

collected from pressure transducers installed within specific monitoring wells between fall 2017 and fall 2022, as described in the *Work Plan* (BLM, 2019, and Sundance, 2021).

Synaptic groundwater elevations for spring and fall 2022 are shown on Figure 2-1 and Figure 2-2, respectively, and tabulated in Table 2-1. Pressure transducer data recorded between September 2020 and September 2022 were downloaded during the spring and fall 2022 field events, and the transducers were then reinstalled on monitoring wells MW50, MW51, MW53, MW54, MW56, MW57, MW58, and MW59, as noted on Figure 1-1. Pressure transducer data-logger files containing depth of submersion time series data were corrected for barometric pressure and converted to groundwater elevations. The resulting groundwater elevation time series plots are presented on Figure 2-3.

2.2 RED DEVIL CREEK AND SEEP DISCHARGE GAUGING

During the 2022 baseline monitoring spring and fall events, Red Devil Creek and Seep discharge gauging was conducted at five locations along Red Devil Creek between the creek's mouth at the Kuskokwim River and the historical reservoir south-southwest of the MPA. Surface water monitoring locations are illustrated on Figure 1-1.

Surface water discharge was measured using the mid-section method at creek monitoring locations following the mid-section methodology described in the *Work Plan* (BLM, 2019). At the Seep (RD05), discharge was measured using the timed fill method described in the *Work Plan* (BLM, 2019). Surface water discharge values are tabulated in Table 2-2.

2.3 GROUNDWATER SAMPLING

Groundwater sampling during the 2022 baseline monitoring spring and fall events was conducted at 26 existing monitoring wells identified on Figure 1-1. Five monitoring wells (MW06, MW16, MW17, MW33, and MW55) were sampled with a peristaltic pump during the spring event; all others were collected using dedicated bladder pumps. Dedicated bladder pumps were installed in MW06, MW16, MW17, MW33, and MW55 prior to sampling during the fall event. All 26 existing monitoring wells identified on Figure 1-1 now have dedicated bladder pumps for groundwater sampling during baseline monitoring events starting in spring 2023. Groundwater samples were collected for the following analyses:

- Total target analyte list (TAL) metals by U.S. Environmental Protection Agency (EPA) Method 6010D/6020B
- Total low-level mercury by EPA Method 1631E
- Dissolved low-level mercury by EPA Method 1631E
- Field water quality parameters including temperature, specific conductivity, dissolved oxygen (DO), pH, oxidation reduction potential (ORP), and turbidity

Field water quality measurements were collected at each monitoring well prior to groundwater sample collection. Groundwater samples were collected using a low-flow sampling methodologies described in the *Work Plan* (BLM, 2019) with either a peristaltic or dedicated bladder pump with a maximum flow rate of 0.5 liters per minute. Analytical data for groundwater samples collected during the spring and fall events are tabulated in Table 2-3 and Table 2-4, respectfully.

2.4 SURFACE WATER SAMPLING

Surface water sampling during the 2022 baseline monitoring spring and fall events was conducted at five locations from just upstream of Red Devil Mine (historical reservoir) to the point where Red Devil Creek discharges into the Kuskokwim River as identified on Figure 1-1.

Surface water samples were collected for the following analyses and methods:

- Total TAL metals by EPA Method 6010D/6020B
- Total low-level mercury by EPA Method 1631E
- Total suspended solids (TSS) by Method SM 2540D
- Total dissolved solids (TDS) by Method SM 2540C
- Inorganic ions by Method MCAWW 300.0
- Nitrate/nitrite (as N) by Method MCAWW 353.2
- Field water quality parameters including temperature, specific conductivity, DO, pH, ORP, and turbidity

Surface water samples were collected using a battery-operated peristaltic pump outfitted with certified-clean, dedicated silicone tubing following sampling methodologies described in the *Work Plan* (BLM, 2019). Analytical data for surface water samples during the spring and fall events are tabulated in Table 2-5 and Table 2-6, respectively.

2.5 SAMPLE HANDLING

Sample handling (e.g., chain-of-custody and field documentation) was conducted as described in the *Work Plan* (BLM, 2019).

2.6 QUALITY CONTROL SAMPLES

Field quality control (QC) samples, including field duplicates and matrix spike/matrix spike duplicates (MS/MSD), were collected for all matrices (e.g., groundwater and surface water) and analytes as described in the *Work Plan* (BLM, 2019).

2.7 INVESTIGATION-DERIVED WASTE MANAGEMENT

Investigation-derived waste (IDW) generated during the 2022 baseline monitoring spring and fall events included the following:

- Monitoring well purge water
- Used dedicated and disposable sampling equipment, personal protective equipment (PPE), and paper towels
- Decontamination fluids generated during groundwater sampling

IDW was managed in accordance with the *Work Plan* (BLM, 2019). Purge water, decontamination water, paper towels, used tubing, and disposable PPE were disposed of in accordance with the procedures described in the *Work Plan* (BLM, 2019 and Sundance, 2021).

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3 DEVIATIONS

During the 2022 baseline monitoring spring and fall field activities, the following deviations were made from the *Work Plan* (BLM, 2019). These deviations did not affect project data quality objectives (DQOs) or final conclusions and recommendations. Deviations resulted from field conditions, field observations, field access, available resources on a remote site, and schedule adjustments. Deviations were documented in the field logbooks provided in Attachment 1. There were four deviations from the *Work Plan* (BLM, 2019):

1. MW26 was unable to be sampled with the installed bladder pump during the 2022 spring field event. The spring sample was collected using a bailer according to the procedures described in the *Work Plan* (BLM, 2019). The bladder pump was replaced during the 2022 fall sampling event. Further details are provided in the field notes in Attachment 1.
2. The RD08 surface water sampling and gauging location were significantly impacted and eroded by spring breakup flooding. A new location, RD08B, was identified upstream of the flood debris depositional zone. Surface water samples and discharge measurements were collected at the new location for 2022 spring and fall. The new location, RD08B, has been updated on all associated figures.
3. MW33 was flooded during the 2022 spring breakup flood event. Silt and river water infiltrated the well. The well was purged for several hours to remove any flood water remaining in the well during the spring sampling event. The well was allowed to stabilize for a day before the normal purge and stabilization procedures were performed prior to sampling.
4. Bladder pumps were installed in the five remaining monitoring wells, MW06, MW16, MW17, MW33, and MW55, that were using peristaltic pumps historically. The monitoring wells were sampled at least 24 hours after bladder pump installation.

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4 BASELINE MONITORING RESULTS

4.1 GROUNDWATER ELEVATION AND SURFACE WATER DISCHARGE MONITORING

Groundwater elevations for all active groundwater wells at RDM were collected during a single 24-hour period during both the spring and fall sampling events. Table 2-1 presents depth to groundwater measurements and calculated groundwater elevations for monitoring wells during the spring and fall 2022 baseline monitoring events. Transducer data were collected from monitoring wells during the same period to allow for pressure and groundwater depth correction. Table 2-1 presents the physically measured groundwater elevations, not the groundwater elevations calculated by pressure transducers.

Surface water discharge measurements were collected during both spring and fall events. Estimated surface water discharge calculations for Red Devil Creek surface water stations during the spring and fall 2022 baseline monitoring events are presented in Table 2-2.

Based on static water elevations, stream elevations, and discharge measurements along Red Devil Creek, and excluding transducer data, groundwater potentiometric surface and surface water discharge maps for the spring and fall 2022 baseline monitoring were generated and are presented on Figure 2-1 and Figure 2-2.

Pressure transducer data was not used to create the potentiometric groundwater surface map (Figure 2-1).

Pressure transducer data-logger files containing depth of submersion time series data were corrected for barometric pressure and converted to groundwater elevations. The resulting groundwater elevation time series plots are presented on Figure 2-3. Spring and fall groundwater well and stream gauging data is included in Attachment 3.

4.2 GROUNDWATER RESULTS

Analytical results for groundwater samples collected during the 2022 spring and fall baseline monitoring event are presented in Table 2-3 and Table 2-4. Maps of all sampling locations with corresponding analytical results for antimony, arsenic, total low-level mercury, and dissolved low-level mercury are presented on Figure 4-1 through Figure 4-6. Analytical Laboratory Data reports are included in Attachment 4. Analytical results are consistent with past sampling results.

4.2.1 2022 Spring Groundwater Results

Twenty-eight primary groundwater samples were collected during the 2022 spring monitoring event. Duplicate samples were collected from the following monitoring wells per the *Final Baseline Quality Assurance Project Plan* (QAPP), which is included as an appendix to the *Work Plan* (BLM, 2019): MW10, MW49, and MW52. A summary for analytical results for groundwater samples is provided in Table 2-3 and shown on Figure 4-1 through Figure 4-3.

- Antimony was detected in all groundwater samples. Antimony concentrations ranged from 0.00015 J to 0.82 milligrams per liter (mg/L) with the highest concentration in groundwater sample 0622MW16GW.

- Arsenic was detected in all groundwater samples. Arsenic concentrations ranged from 0.0003 J to 1.1 mg/L with the highest concentration in groundwater sample 0622MW26GW.
- Total mercury was detected in all groundwater samples. Total mercury concentrations ranged from 0.64 to 14,000 nanograms per liter (ng/L) with the highest concentration in groundwater sample 0622MW26GW.
- Dissolved mercury was detected in all groundwater samples. Dissolved mercury concentrations ranged from 0.44 to 900 ng/L with the highest concentration in groundwater sample 0622MW27GW.

4.2.2 2022 Fall Groundwater Results

Twenty-eight primary groundwater samples were collected during the 2022 fall event. Duplicate samples were collected from the following three monitoring wells per the *QAPP* in the *Work Plan* (BLM, 2019): MW10, MW43, and MW54. A summary for analytical results for groundwater samples is provided in Table 2-4 and shown on Figure 4-4 through Figure 4-6.

- Antimony was detected in all groundwater samples except for one, 0822MW47GW, which was a non-detect. Antimony concentrations ranged from 0.00017 J to 0.41 mg/L with the highest concentration in groundwater sample 0822MW33GW.
- Arsenic was detected in 27 of the 28 primary groundwater samples. Groundwater sample 0822MW47GW was a non-detect. Arsenic concentrations ranged from 0.00027 J to 1.5 mg/L with the highest concentration in groundwater sample 0822MW26GW.
- Total mercury was detected in all groundwater samples. Total mercury concentrations ranged from 1.1 to 3,900 ng/L with the highest concentration in groundwater sample 0822MW26GW.
- Dissolved mercury was detected in all groundwater samples. Dissolved mercury concentrations ranged from 0.39 JB to 970 B ng/L with the highest concentration in groundwater sample 0822MW16GW.

4.3 SURFACE WATER RESULTS

Analytical results of surface water sampling conducted during the 2022 spring and fall baseline monitoring events are presented in Table 2-5 and Table 2-6. Data quality assurance review memoranda are provided in Attachment 5. Maps of all sampling locations with corresponding analytical results for antimony, arsenic, mercury are presented on Figure 4-7 through Figure 4-8. Analytical results are consistent with past sampling results.

4.3.1 2022 Spring Surface Water Results

During the 2022 spring baseline monitoring event, five surface water samples and one field duplicate sample, 0622RD99SW (field duplicate of 0622RD05SW), were collected from Red Devil Creek. A summary of analytical results for spring surface water samples is provided in Table 2-5 and shown on Figure 4-7.

- Antimony was detected in all surface water samples. Antimony concentrations ranged from 0.002 to 0.22 mg/L with the highest concentration in surface water sample 0622RD08BSW.
- Arsenic was detected in all surface water samples. Arsenic concentrations ranged from 0.001 to 1.0 mg/L with the highest concentration in surface water sample 0622RD05SW.
- Mercury was detected in all surface water samples. Mercury concentrations ranged from 2.63 to 950 ng/L with the highest concentration in surface water sample 0622RD05SW.

4.3.2 2022 Fall Surface Water Results

During the 2022 fall baseline monitoring event, five surface water samples and one field duplicate sample, 0822RD99SW (field duplicate of 0822RD05SW), were collected from Red Devil Creek. A summary for analytical results for fall surface water samples is provided in Table 2-6 and shown on Figure 4-8.

- Antimony was detected in all surface water samples. Antimony concentrations ranged from 0.0022 J+ to 0.19 J mg/L, with the highest concentration in surface water sample 0822RD08BSW.
- Arsenic was detected in all surface water samples. Arsenic concentrations ranged from 0.0011 to 1.0 mg/L with the highest concentration in surface water sample 0822RD05SW.
- Mercury was detected in all surface water samples. Mercury concentrations ranged from 3.6 to 2800 ng/L with the highest concentration in surface water sample 0822RD08SW.

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5 DATA USABILITY ASSESSMENT

A third-party data validation was performed on 100% of the surface water and groundwater analytical data generated during the 2022 spring and fall sampling events. The validation was inclusive of validation levels Stage 2B (90%) and Stage 4 (10%). The data were validated in accordance with the QAPP (BLM, 2019), EPA *National Functional Guidelines for Inorganic Superfund Methods Data Review* (EPA, 2017), and the *Department of Defense* (DoD) *Quality Systems Manual for Environmental Laboratories* Version 5.1 (DoD, 2017).

DQOs are both qualitative and quantitative statements that define the type, quality, and quantity of data necessary to support the decision-making process during project activities. To ensure the collection of data of the type and quality required for project decision-making, data validation results were evaluated for the DQO data quality indicators of precision, bias (accuracy), representativeness, comparability, and completeness (formerly precision, accuracy, representativeness, completeness, and comparability [PARCC] parameters), as outlined in the QAPP. Data quality indicators were evaluated according to analytical and field QC activity and associated measurement performance criteria (MPC). The results of the evaluation were used to assess data usability and completeness.

Spring 2022 samples required qualification due to QC exceedances and procedural issues. The calcium, magnesium, potassium, and sodium sample analyses were originally analyzed and reported by 6020B inductively coupled plasma (ICP)/mass spectrometry (MS). This sample data was unusable due to significant QC and procedural issues. The lab was instructed to reanalyze the four analytes by 6010D ICP. The ICP/MS calcium, magnesium, potassium, and sodium results were rejected, R, as unusable. The more technically correct ICP results are reported for these four analytes.

Surface water and groundwater samples were qualified as non-detect (U) for low-level detections or estimated (J or J+) in method blanks, continuing calibration blanks, initial calibration blanks, equipment blanks, or trip blank samples for metals and low-level mercury analyses for one or more of the following analytes during the spring sampling event:

- Aluminum
- Antimony
- Barium
- Chromium
- Iron
- Lead
- Manganese
- Nickel
- Potassium
- Silver

- Thallium
- Zinc

Surface water and groundwater data were qualified as non-detect (U) for low-level detections or estimated (J or J+) in method blanks, continuing calibration blanks, initial calibration blanks, equipment blanks, or trip blank samples for metals and low-level mercury analyses for one or more of the following analytes during the fall sampling event:

- Arsenic
- Zinc
- Thallium
- Potassium
- Cadmium
- Chromium
- Iron
- Lead
- Manganese
- Nickel
- Silver
- Low-level mercury

Blank qualifications did not impact data usability.

No surface water or groundwater data were qualified due to field or analytical precision MPC exceedances during the spring or fall sampling events. There were minor deviations in field precision during spring and fall sampling events.

During the spring sampling event, metals field duplicate pair 0622RD05SW/0622RD99SW and 0622MW10GW/06222MW99GW (DISS) had relative percent differences (RPDs) greater than ± the reporting limit for low level mercury. Samples 580-114638-3 (Total), 580-114638-5 (Total), and 580-114638-3 (Diss) were qualified J+ or J- due to high or low MS/MSD recovery.

During the fall sampling event, metals field duplicate pairs 0822MW10GW/0822MW99GW, 0822MW43GW/0822MW98GW, and 0822MW54GW/0822MW97GW had RPDs greater than the reporting limit for low level mercury. Metals field duplicate pair 0822MW10GW/ 0822MW99GW had RPDs greater than the reporting limit for antimony. Associated sample results were qualified as estimated (J). Sample IDs 580-117490-27, 117490-23, 117490-25, and 117490-26 were qualified as estimated (J±) due to high MS %R.

Field precision qualifications did not impact data usability.

During the spring sampling event, the laboratory reported results for surface water and groundwater samples above the linear curve range and did not analyze a high linear range check

standard. Sample detections reported above the high standard in the calibration curve were qualified as estimated (J) in all samples for the following analytes:

- Aluminum
- Antimony
- Arsenic
- Barium
- Iron
- Manganese
- Nickel

During the fall sampling event, the laboratory reported results for surface water and groundwater samples above the linear curve range and did not analyze a high linear range check standard. Sample detections reported above the high standard in the calibration curve were qualified as estimated (J) in all samples for the following analytes:

- Aluminum
- Antimony
- Arsenic
- Barium
- Iron
- Manganese

All samples analyzed by Method 300.0 for SO4, Cl- and F- in spring were qualified as estimated (J) due to a hold time exceedance. Qualification for holding time and temperature exceedances did not impact data usability.

Accuracy/bias qualifications did not impact data usability.

Analytical laboratory reports are provided in Attachment 4. Further detailed data validation and quality assessment information is provided in the Data Validation Reports in Attachment 5.

5.1 DATA USABILITY ASSESSMENT

The analytical data completeness for the fall and spring sampling events is 100%. The spring sample results that were analyzed via Method 6020B were qualified as rejected (R) for calcium, potassium, magnesium, and sodium. The samples were also analyzed via EPA 6010D and were reported for this method. No other sample results were rejected or unsuitable for use in project decision-making. Metals, mercury, and anion samples were qualified as estimated (J or UJ) for low-level field and analytical blank contamination during both events, indicating minor uncertainty in sample representativeness. In addition, sample results were qualified as estimated (J or UJ) for minor deviations in accuracy/bias and field precision during both sampling events, indicating minor uncertainty. However, qualified data are considered acceptable for use in project decision-making.

6 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

During the 2022 Annual Baseline Monitoring field efforts, samples were collected from groundwater monitoring wells in three areas: the MPA, the SMA, and the vicinity of the Proposed Repository. Additionally, surface water samples were collected from Red Devil Creek and a perennial seep that discharges into Red Devil Creek. The analytical results of these groundwater and surface water samples were reviewed and compared with historical data to identify concentration trends.

6.1 GROUNDWATER CONCLUSIONS

The groundwater analytical results from the 2022 sampling efforts are consistent with results from historical sampling efforts at RDM as seen in *Final 2020 Baseline Monitoring Report, Red Devil Mine, Alaska* (E&E, 2021).

Groundwater elevation results for the 2022 sampling efforts are consistent with trends defined during the RI/Feasibility Study (FS).

The water table surface in the upper SMA and the MPA mimics topography and flows toward Red Devil Creek. Groundwater flow in the lower SMA is locally perturbed by historical mine workings. Although the underground workings have very likely collapsed, this tunnel network is much more conductive than the surrounding bedrock. Consequently, the water table is depressed around the workings. Because the conductivity of the bedrock aquifer is relatively low, the depressed water table extends only a short distance outside of the zone where the tunnel network is prevalent, creating a very steep gradient. The overall effect of the underground workings is very localized (refer to Figure 2-1 and Figure 2-2). In general, groundwater flow within the entire SMA is toward Red Devil Creek.

Continuous groundwater elevation data recorded in 2022 using transducers extends the temporal trends established in previous years, as shown on Figure 2-3. In late spring, groundwater elevations rise quickly to a maximum elevation that correlates with spring breakup. The seasonal maximum elevation lasts only a few days, followed by a recession that extends until the following spring. Water table elevations vary slightly over the summer and fall months in response to local precipitation. Once subsurface freezing becomes prevalent during the winter, water table elevations decrease steadily until the following spring breakup, which is typically in May.

The concentrations of the three primary contaminants of concern (COCs), antimony, arsenic, and mercury, in the groundwater samples from the 2022 baseline monitoring events are within the range expected based on review of data collected during the RI and previous baseline monitoring. Measured concentrations of COCs in individual monitoring wells reflect conditions at that location. The highest COC concentrations occur in the monitoring wells installed in tailings/waste rock in the MPA. Concentrations of these primary COCs are highly variable in the SMA, reflecting the influence of natural mineralization in the immediate vicinity of each monitoring well. In general, groundwater COC concentrations do not appear to be influenced by seasonal water level fluctuations. Minor fluctuations can be seen in some monitoring wells but are generally not consistent across all monitoring wells. Graphs of groundwater primary COC concentrations and water level measurements for all monitoring wells are presented on Figure 6-1 and Figure 6-2.

6.2 SURFACE WATER CONCLUSIONS

The surface water analytical results from the 2022 sampling efforts are consistent with results from historical sampling efforts at RDM as seen in *Final 2020 Baseline Monitoring Report, Red Devil Mine* (E&E, 2021).

The 2022 concentrations of the three primary COCs, antimony, arsenic, and mercury, in the surface water samples are within the range established during the RI. The highest concentrations were detected in samples collected from the Seep (RD05) and RD08B. Comparison of COC concentrations with stream discharge data indicates no correlation. Graphs of surface water primary COC concentrations and discharge measurements for all locations are found on Figure 6-3 and Figure 6-4.

6.3 RECOMMENDATIONS

Groundwater sampling and analysis has evolved through the RI/FS phases of this Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) project from characterization to baseline monitoring. Initial goals of groundwater sampling and analysis were consistent with the overall objectives of the RI and were focused primarily on the area along the lower reach of Red Devil Creek referred to as the MPA. Additional monitoring wells have been installed since the initial RI was completed that have broadened our understanding of flow within the bedrock aquifer in areas that are influenced by natural mineralization but are not affected by the tailings and waste rock. The BLM selected a preferred remedial action alternative in 2020 that involves consolidating tailings/waste rock in an engineered repository located in the SMA. Consequently, groundwater characterization emphasizing the area dominated by tailings and a broad range of potential contaminants has transitioned to baseline monitoring of upper elevations (upgradient of the tailings) and more focus on the contaminants that are responsible for most of the environmental risk estimated for the site.

Based on the data collected during the two mobilizations covered by this report, continued monitoring of the same scope is recommended until the Record of Decision is complete and the remedial action has been determined. Baseline monitoring should continue to meet remedial action objectives.

7 REFERENCES

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FIGURES

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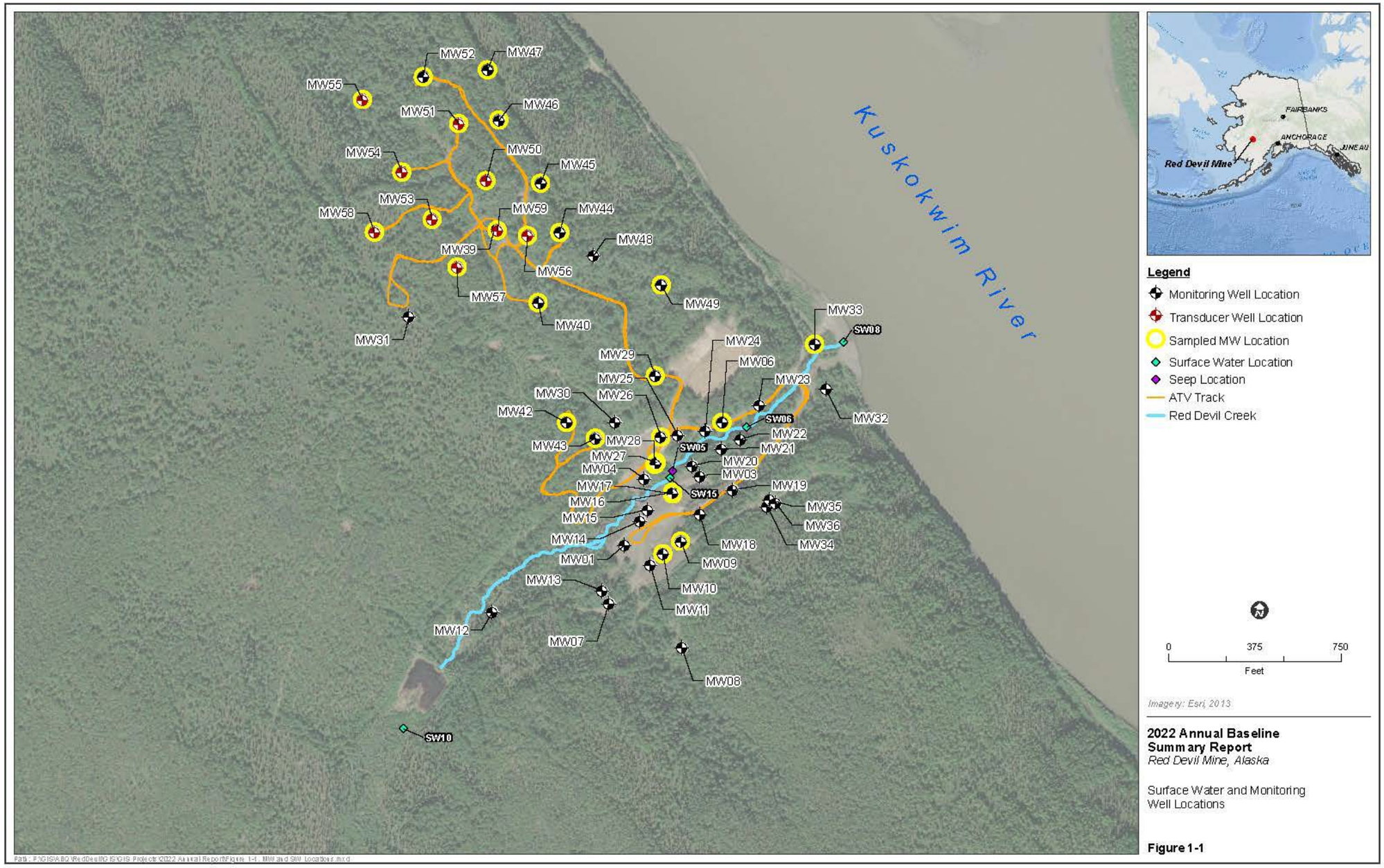
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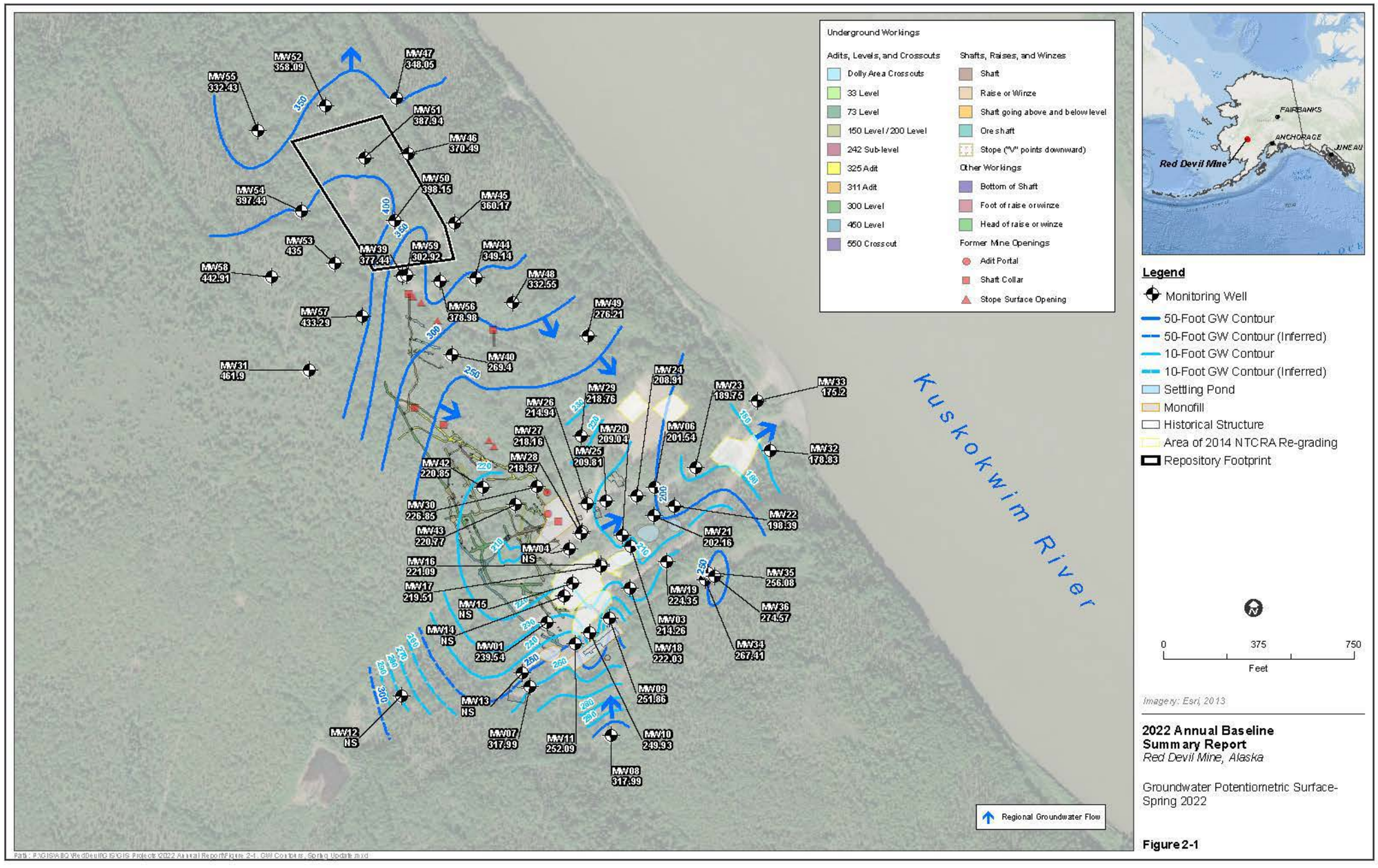
MW47
MW55
MW51
MW46
MW54
MW50
MW45
MW53
MW58
MW59
MW44
MW48
MW39
MW56
MW57
MW49
MW40
MW31
MW33
SW08
MW24
MW29
MW06
MW25
MW23
MW30
MW26
MW32
MW42
SW06
MW22
MW43
MW28
SW05
MW21
MW27
MW20
MW04
MW03
MW17
SW15
MW19
MW16
MW35
MW15
MW36
MW14
MW18
MW34
MW01
MW09
MW13
MW10
MW11
MW12
MW07
MW08
SW10
Kuskokwim River
FAIRBANKS
ANCHORAGE
JUNEAU
Red Devil Mine
Legend
Monitoring Well Location
Transducer Well Location
Sampled MW Location
Surface Water Location
Seep Location
ATV Track
Red Devil Creek
0
375
750
Feet
Imagery: Esri, 2013
2022 Annual Baseline Summary Report
Red Devil Mine, Alaska
Surface Water and Monitoring Well Locations
Figure 1-1


Underground Workings
Adits, Levels, and Crosscuts
Dolly Area Crosscuts
33 Level
73 Level
150 Level / 200 Level
242 Sub-level
325 Adit
311 Adit
300 Level
460 Level
550 Crosscut
Shafts, Raises, and Winzes
Shaft
Raise or Winze
Shaft going above and below level
Ore shaft
Stope ("V" points downward)
Other Workings
Bottom of Shaft
Foot of raise or winze
Head of raise or winze
Former Mine Openings
Adit Portal
Shaft Collar
Stope Surface Opening
MW52 358.09
MW47 348.05
MW55 332.43
MW51 387.94
MW46 370.49
MW50 398.15
MW54 397.44
MW45 360.17
MW53 435
MW39 377.44
MW59 302.92
MW44 349.14
MW58 442.91
MW48 332.55
MW56 378.98
MW49 276.21
MW57 433.29
MW40 269.4
MW31 461.9
MW24 208.91
MW23 189.75
MW33 175.2
MW29 218.76
MW26 214.94
MW27 218.16
MW20 209.04
MW06 201.54
MW25 209.81
MW32 178.83
MW42 220.85
MW28 218.87
MW30 226.85
MW22 198.39
MW43 220.77
MW21 202.16
MW04 NS
MW16 221.09
MW35 256.08
MW17 219.51
MW19 224.35
MW15 NS
MW36 274.57
MW03 214.26
MW14 NS
MW34 267.41
MW01 239.54
MW18 222.03
MW09 251.86
MW13 NS
MW12 NS
MW07 317.99
MW11 252.09
MW10 249.93
MW08 317.99
Kuskokwim River
Regional Groundwater Flow
FAIRBANKS
ANCHORAGE
JUNEAU
Red Devil Mine
Legend
Monitoring Well
50-Foot GW Contour
50-Foot GW Contour (Inferred)
10-Foot GW Contour
10-Foot GW Contour (Inferred)
Settling Pond
Monofill
Historical Structure
Area of 2014 NTCRA Re-grading
Repository Footprint
0
375
750
Feet
Imagery: Esri, 2013
2022 Annual Baseline Summary Report
Red Devil Mine, Alaska
Groundwater Potentiometric Surface-Spring 2022
Figure 2-1

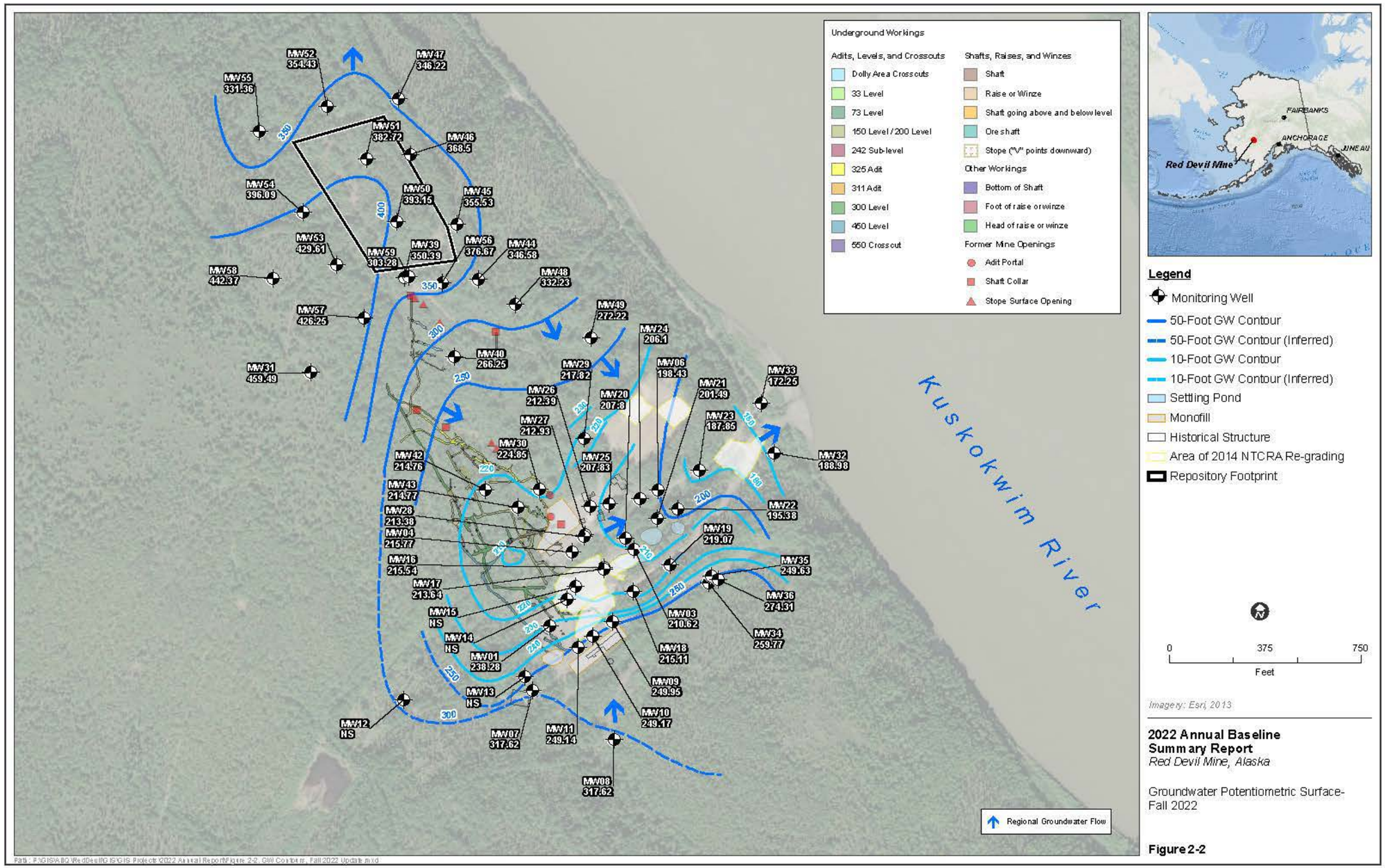
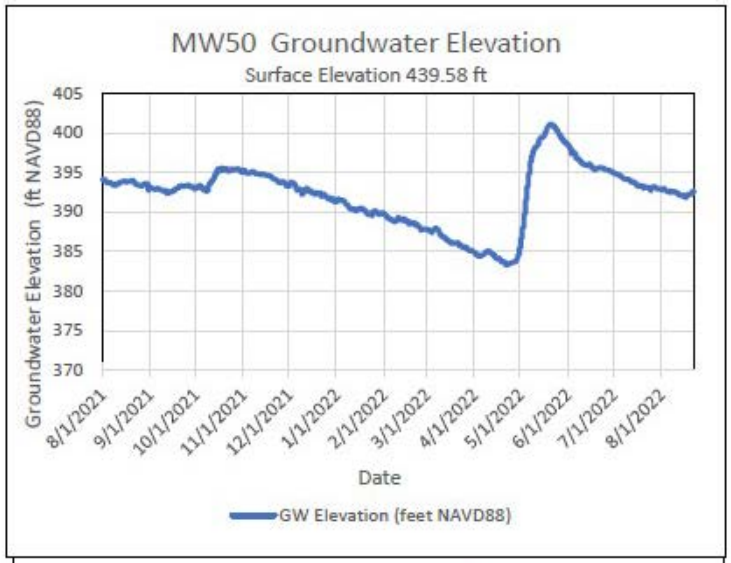
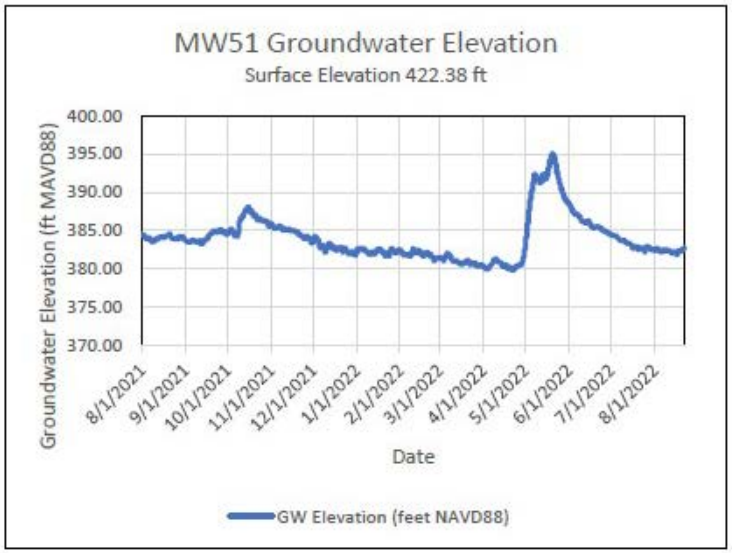
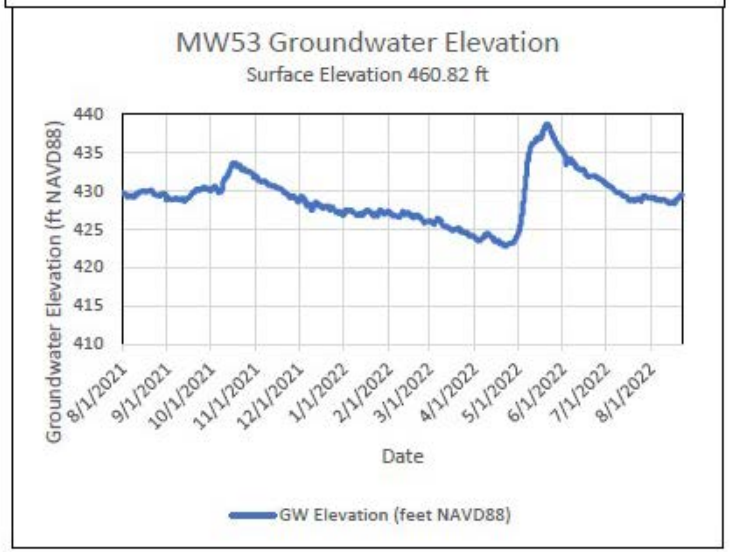

Underground Workings
Adits, Levels, and Crosscuts
Dolly Area Crosscuts
33 Level
73 Level
150 Level / 200 Level
242 Sub-level
325 Adit
311 Adit
300 Level
460 Level
550 Crosscut
Shafts, Raises, and Winzes
Shaft
Raise or Winze
Shaft going above and below level
Ore shaft
Stope ("V" points downward)
Other Workings
Bottom of Shaft
Foot of raise or winze
Head of raise or winze
Former Mine Openings
Adit Portal
Shaft Collar
Stope Surface Opening
MW52 354.43
MW47 346.22
MW55 331.36
MW51 382.72
MW46 368.5
MW54 396.09
MW50 393.15
MW45 355.53
MW53 429.61
MW59 303.28
MW39 350.39
MW56 376.67
MW44 346.58
MW58 442.37
MW48 332.23
MW57 426.25
MW49 272.22
MW24 206.1
MW40 266.25
MW31 459.49
MW29 217.82
MW06 198.43
MW33 172.25
MW26 212.39
MW20 207.8
MW21 201.49
MW27 212.93
MW23 187.85
MW30 224.85
MW32 188.98
MW42 214.76
MW25 207.83
MW43 214.77
MW22 195.38
MW28 213.38
MW19 219.07
MW04 215.77
MW35 249.63
MW16 215.54
MW17 213.64
MW36 274.31
MW15 NS
MW03 210.62
MW34 259.77
MW14 NS
MW18 215.11
MW01 238.28
MW09 249.95
MW13 NS
MW10 249.17
MW12 NS
MW07 317.62
MW11 249.14
MW08 317.62
Kuskokwim River
Regional Groundwater Flow
FAIRBANKS
ANCHORAGE
JUNEAU
Red Devil Mine
Legend
Monitoring Well
50-Foot GW Contour
50-Foot GW Contour (Inferred)
10-Foot GW Contour
10-Foot GW Contour (Inferred)
Settling Pond
Monofill
Historical Structure
Area of 2014 NTCRA Re-grading
Repository Footprint
0
375
750
Feet
Imagery: Esri, 2013
2022 Annual Baseline Summary Report
Red Devil Mine, Alaska
Groundwater Potentiometric Surface-Fall 2022
Figure 2-2

Figure 2-3: Groundwater Elevation Plots







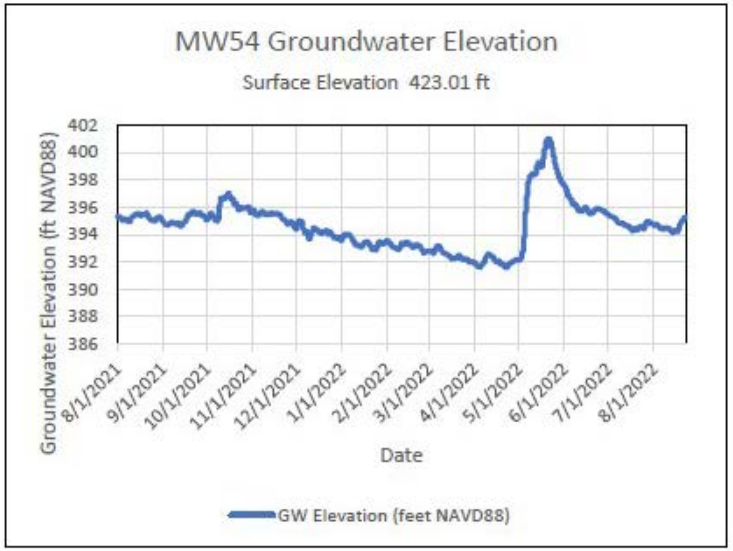
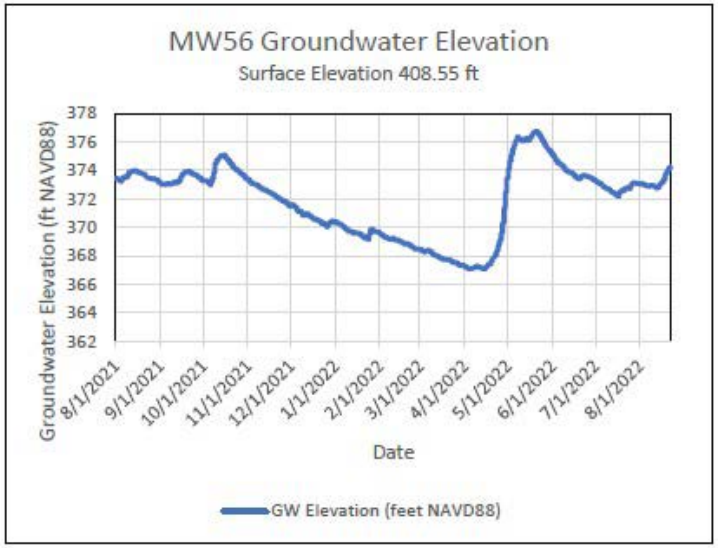
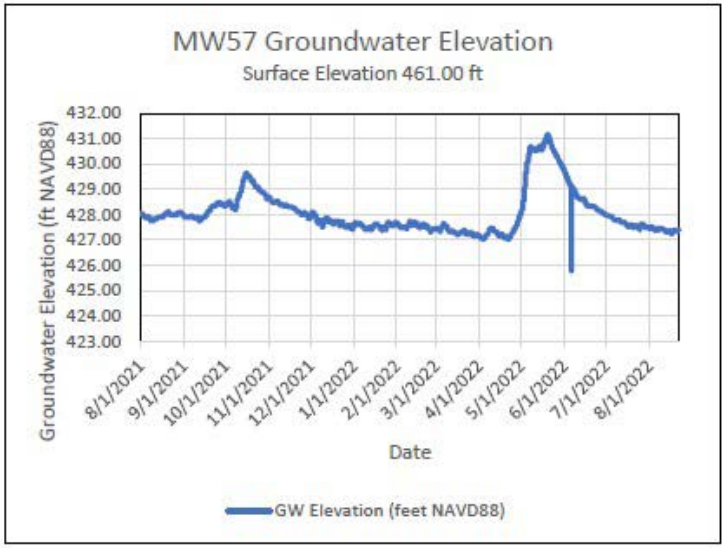
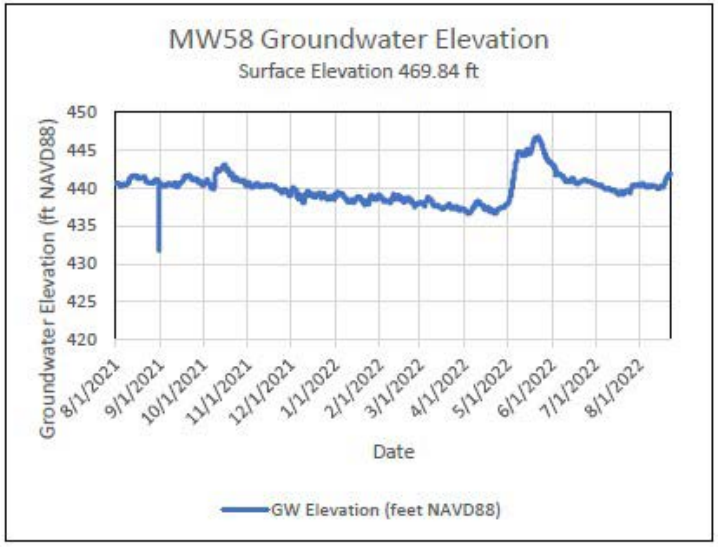
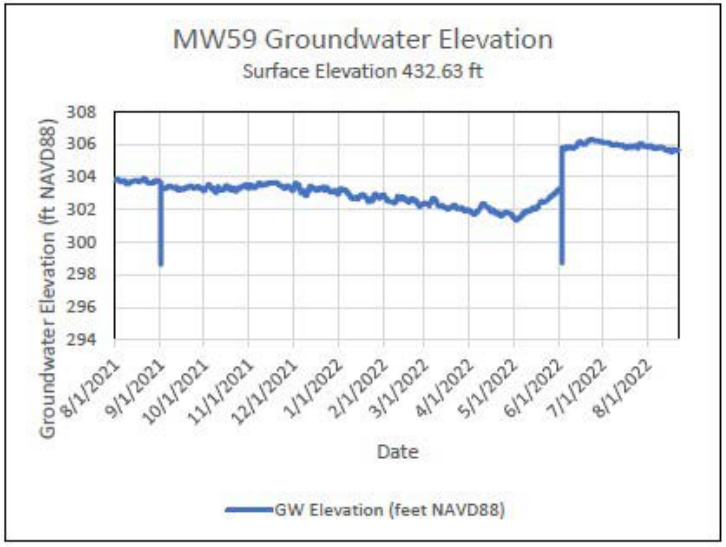


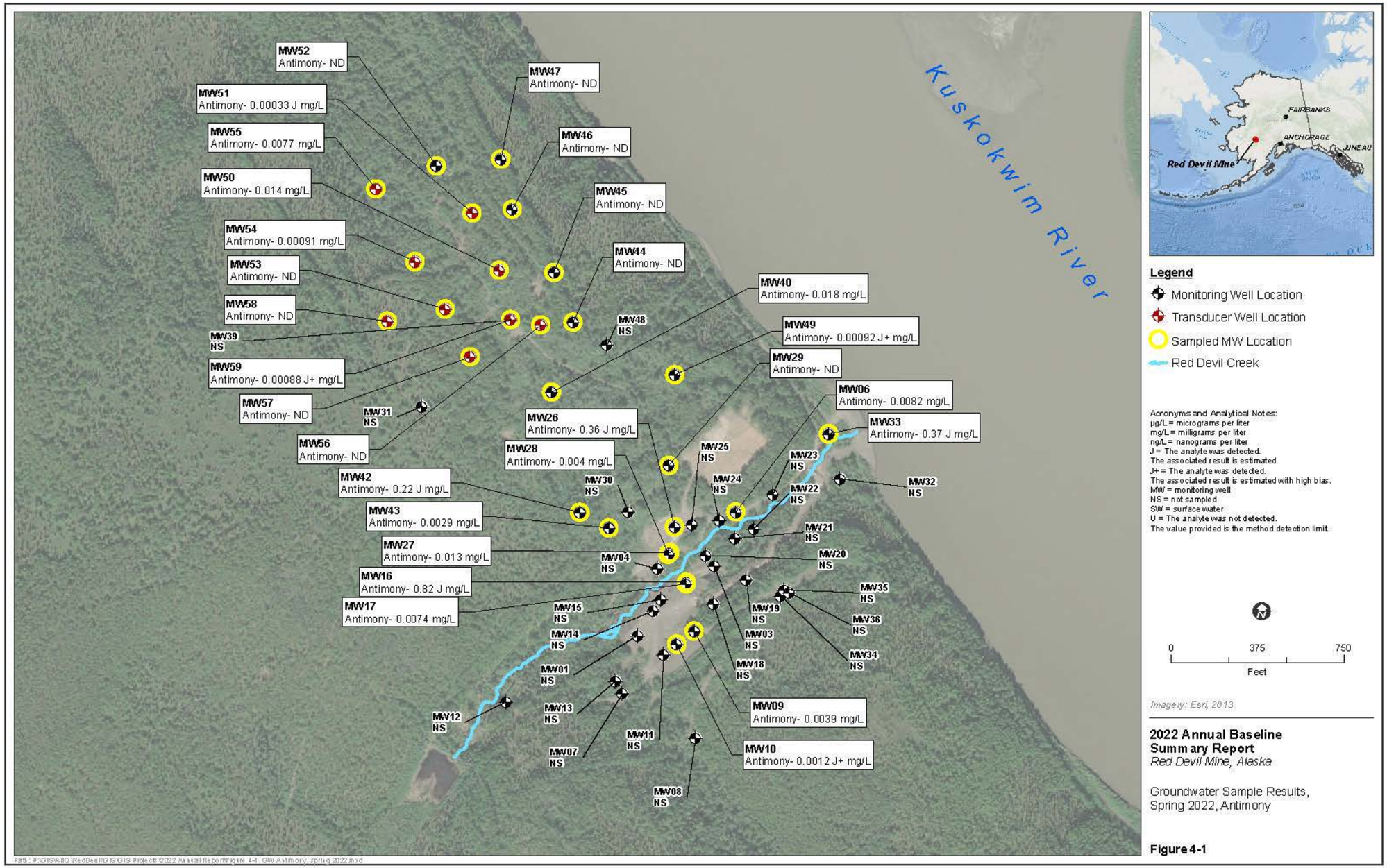
Figure 2-3: Groundwater Elevation Plots

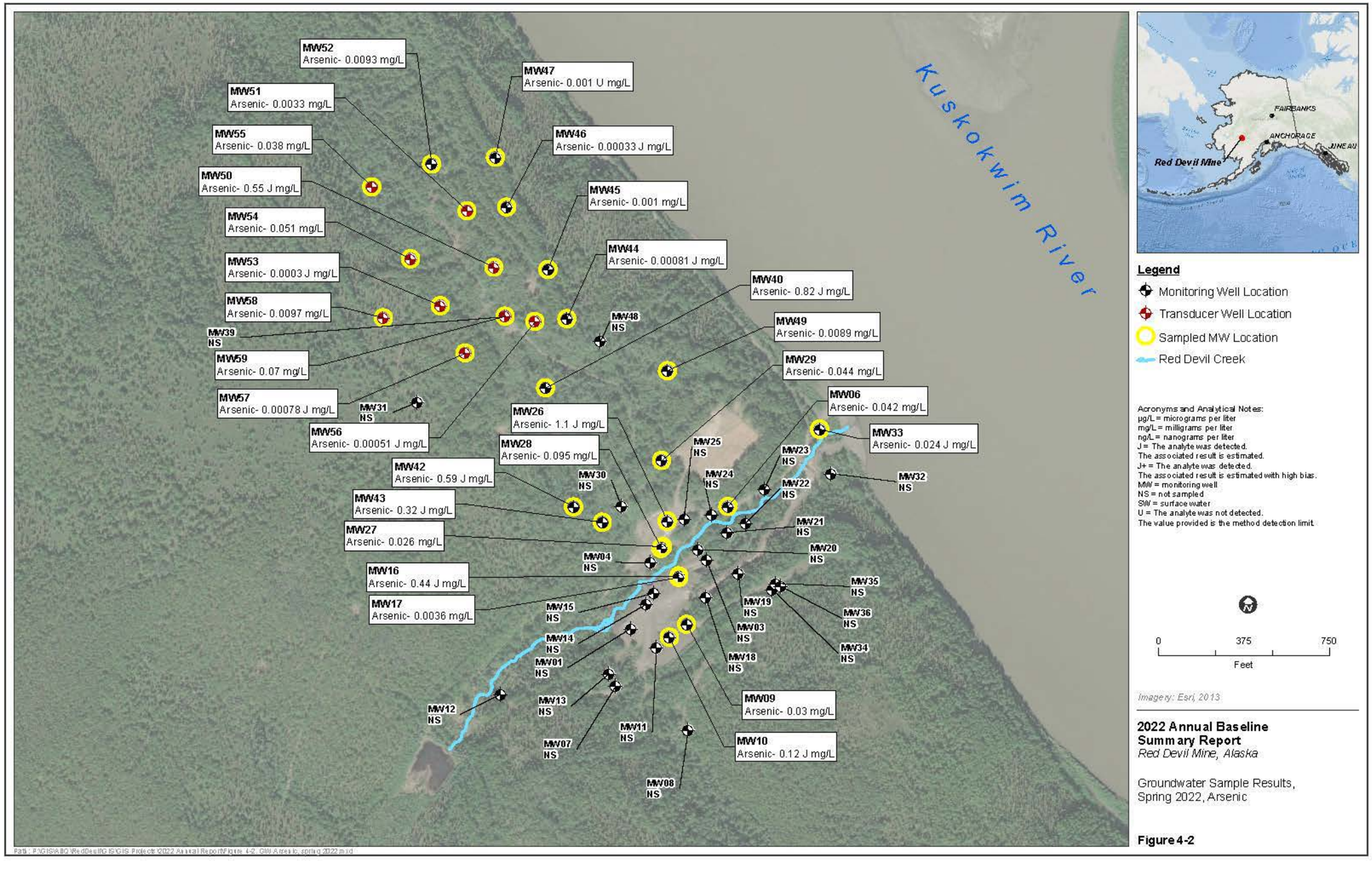


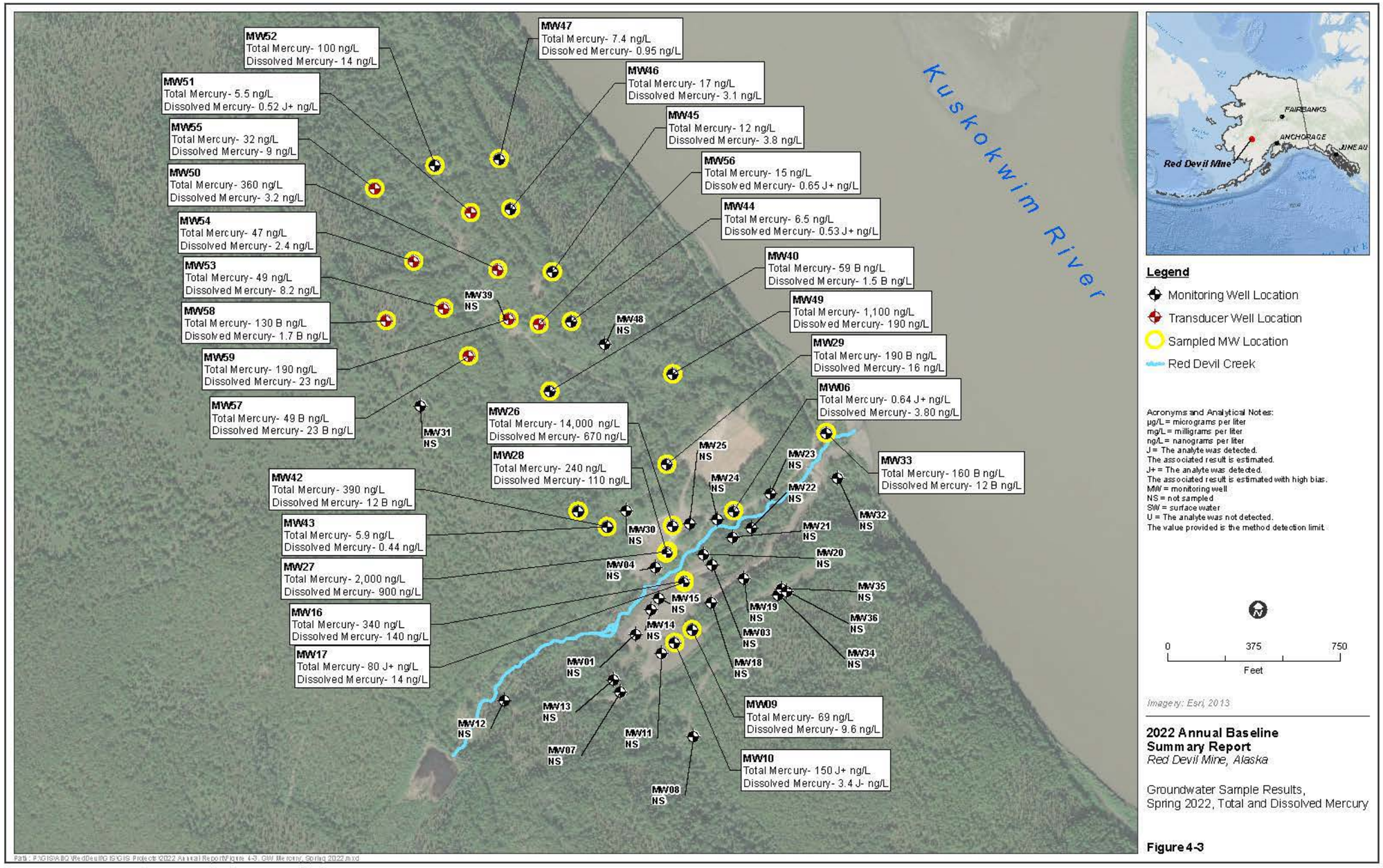







MW52
Antimony- ND
MW47
Antimony- ND
MW51
Antimony- 0.00033 J mg/L
MW55
Antimony- 0.0077 mg/L
MW46
Antimony- ND
MW50
Antimony- 0.014 mg/L
MW45
Antimony- ND
MW54
Antimony- 0.00091 mg/L
MW44
Antimony- ND
MW53
Antimony- ND
MW40
Antimony- 0.018 mg/L
MW58
Antimony- ND
MW48
NS
MW39
NS
MW49
Antimony- 0.00092 J+ mg/L
MW29
Antimony- ND
MW59
Antimony- 0.00088 J+ mg/L
MW06
Antimony- 0.0082 mg/L
MW57
Antimony- ND
MW31
NS
MW33
Antimony- 0.37 J mg/L
MW26
Antimony- 0.36 J mg/L
MW56
Antimony- ND
MW28
Antimony- 0.004 mg/L
MW25
NS
MW23
NS
MW42
Antimony- 0.22 J mg/L
MW30
NS
MW24
NS
MW32
NS
MW43
Antimony- 0.0029 mg/L
MW22
NS
MW27
Antimony- 0.013 mg/L
MW21
NS
MW04
NS
MW20
NS
MW16
Antimony- 0.82 J mg/L
MW35
NS
MW17
Antimony- 0.0074 mg/L
MW15
NS
MW19
NS
MW36
NS
MW14
NS
MW03
NS
MW34
NS
MW01
NS
MW18
NS
MW09
Antimony- 0.0039 mg/L
MW12
NS
MW13
NS
MW11
NS
MW10
Antimony- 0.0012 J+ mg/L
MW07
NS
MW08
NS
Kuskokwim River
FAIRBANKS
ANCHORAGE
JUNEAU
Red Devil Mine
Legend
Monitoring Well Location
Transducer Well Location
Sampled MW Location
Red Devil Creek
Acronyms and Analytical Notes:
µg/L = micrograms per liter
mg/L = milligrams per liter
ng/L = nanograms per liter
J = The analyte was detected.
The associated result is estimated.
J+ = The analyte was detected.
The associated result is estimated with high bias.
MW = monitoring well
NS = not sampled
SW = surface water
U = The analyte was not detected.
The value provided is the method detection limit.
0
375
750
Feet
Imagery: Esri, 2013
2022 Annual Baseline Summary Report
Red Devil Mine, Alaska
Groundwater Sample Results, Spring 2022, Antimony
Figure 4-1


MW52
Arsenic- 0.0093 mg/L
MW51
Arsenic- 0.0033 mg/L
MW55
Arsenic- 0.038 mg/L
MW50
Arsenic- 0.55 J mg/L
MW54
Arsenic- 0.051 mg/L
MW53
Arsenic- 0.0003 J mg/L
MW58
Arsenic- 0.0097 mg/L
MW39
NS
MW59
Arsenic- 0.07 mg/L
MW57
Arsenic- 0.00078 J mg/L
MW31
NS
MW56
Arsenic- 0.00051 J mg/L
MW42
Arsenic- 0.59 J mg/L
MW43
Arsenic- 0.32 J mg/L
MW27
Arsenic- 0.026 mg/L
MW16
Arsenic- 0.44 J mg/L
MW17
Arsenic- 0.0036 mg/L
MW47
Arsenic- 0.001 U mg/L
MW46
Arsenic- 0.00033 J mg/L
MW45
Arsenic- 0.001 mg/L
MW44
Arsenic- 0.00081 J mg/L
MW48
NS
MW26
Arsenic- 1.1 J mg/L
MW28
Arsenic- 0.095 mg/L
MW30
NS
MW04
NS
MW15
NS
MW14
NS
MW01
NS
MW13
NS
MW12
NS
MW07
NS
MW11
NS
MW08
NS
MW10
Arsenic- 0.12 J mg/L
MW09
Arsenic- 0.03 mg/L
MW18
NS
MW03
NS
MW19
NS
MW15
NS
MW25
NS
MW24
NS
MW40
Arsenic- 0.82 J mg/L
MW49
Arsenic- 0.0089 mg/L
MW29
Arsenic- 0.044 mg/L
MW06
Arsenic- 0.042 mg/L
MW33
Arsenic- 0.024 J mg/L
MW23
NS
MW22
NS
MW21
NS
MW20
NS
MW32
NS
MW35
NS
MW36
NS
MW34
NS
Kuskokwim River
FAIRBANKS
ANCHORAGE
JUNEAU
Red Devil Mine
Legend
Monitoring Well Location
Transducer Well Location
Sampled MW Location
Red Devil Creek
Acronyms and Analytical Notes:
µg/L = micrograms per liter
mg/L = milligrams per liter
ng/L = nanograms per liter
J = The analyte was detected.
The associated result is estimated.
J+ = The analyte was detected.
The associated result is estimated with high bias.
MW = monitoring well
NS = not sampled
SW = surface water
U = The analyte was not detected.
The value provided is the method detection limit.
0
375
750
Feet
Imagery: Esri, 2013
2022 Annual Baseline Summary Report
Red Devil Mine, Alaska
Groundwater Sample Results, Spring 2022, Arsenic
Figure 4-2


MW52
Total Mercury- 100 ng/L
Dissolved Mercury- 14 ng/L
MW51
Total Mercury- 5.5 ng/L
Dissolved Mercury- 0.52 J+ ng/L
MW55
Total Mercury- 32 ng/L
Dissolved Mercury- 9 ng/L
MW50
Total Mercury- 360 ng/L
Dissolved Mercury- 3.2 ng/L
MW54
Total Mercury- 47 ng/L
Dissolved Mercury- 2.4 ng/L
MW53
Total Mercury- 49 ng/L
Dissolved Mercury- 8.2 ng/L
MW58
Total Mercury- 130 B ng/L
Dissolved Mercury- 1.7 B ng/L
MW59
Total Mercury- 190 ng/L
Dissolved Mercury- 23 ng/L
MW57
Total Mercury- 49 B ng/L
Dissolved Mercury- 23 B ng/L
MW47
Total Mercury- 7.4 ng/L
Dissolved Mercury- 0.95 ng/L
MW46
Total Mercury- 17 ng/L
Dissolved Mercury- 3.1 ng/L
MW45
Total Mercury- 12 ng/L
Dissolved Mercury- 3.8 ng/L
MW56
Total Mercury- 15 ng/L
Dissolved Mercury- 0.65 J+ ng/L
MW44
Total Mercury- 6.5 ng/L
Dissolved Mercury- 0.53 J+ ng/L
MW40
Total Mercury- 59 B ng/L
Dissolved Mercury- 1.5 B ng/L
MW49
Total Mercury- 1,100 ng/L
Dissolved Mercury- 190 ng/L
MW29
Total Mercury- 190 B ng/L
Dissolved Mercury- 16 ng/L
MW06
Total Mercury- 0.64 J+ ng/L
Dissolved Mercury- 3.80 ng/L
MW33
Total Mercury- 160 B ng/L
Dissolved Mercury- 12 B ng/L
MW39 NS
MW48 NS
MW31 NS
MW26
Total Mercury- 14,000 ng/L
Dissolved Mercury- 670 ng/L
MW28
Total Mercury- 240 ng/L
Dissolved Mercury- 110 ng/L
MW25 NS
MW23 NS
MW24 NS
MW22 NS
MW32 NS
MW42
Total Mercury- 390 ng/L
Dissolved Mercury- 12 B ng/L
MW43
Total Mercury- 5.9 ng/L
Dissolved Mercury- 0.44 ng/L
MW27
Total Mercury- 2,000 ng/L
Dissolved Mercury- 900 ng/L
MW16
Total Mercury- 340 ng/L
Dissolved Mercury- 140 ng/L
MW17
Total Mercury- 80 J+ ng/L
Dissolved Mercury- 14 ng/L
MW30 NS
MW21 NS
MW04 NS
MW20 NS
MW15 NS
MW35 NS
MW19 NS
MW36 NS
MW14 NS
MW03 NS
MW34 NS
MW01 NS
MW18 NS
MW13 NS
MW09
Total Mercury- 69 ng/L
Dissolved Mercury- 9.6 ng/L
MW12 NS
MW11 NS
MW07 NS
MW10
Total Mercury- 150 J+ ng/L
Dissolved Mercury- 3.4 J- ng/L
MW08 NS
Kuskokwim River
FAIRBANKS
ANCHORAGE
JUNEAU
Red Devil Mine
Legend
Monitoring Well Location
Transducer Well Location
Sampled MW Location
Red Devil Creek
Acronyms and Analytical Notes:
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mg/L = milligrams per liter
ng/L = nanograms per liter
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The associated result is estimated.
J+ = The analyte was detected.
The associated result is estimated with high bias.
MW = monitoring well
NS = not sampled
SW = surface water
U = The analyte was not detected.
The value provided is the method detection limit.
0
375
750
Feet
Imagery: Esri, 2013
2022 Annual Baseline
Summary Report
Red Devil Mine, Alaska
Groundwater Sample Results,
Spring 2022, Total and Dissolved Mercury
Figure 4-3
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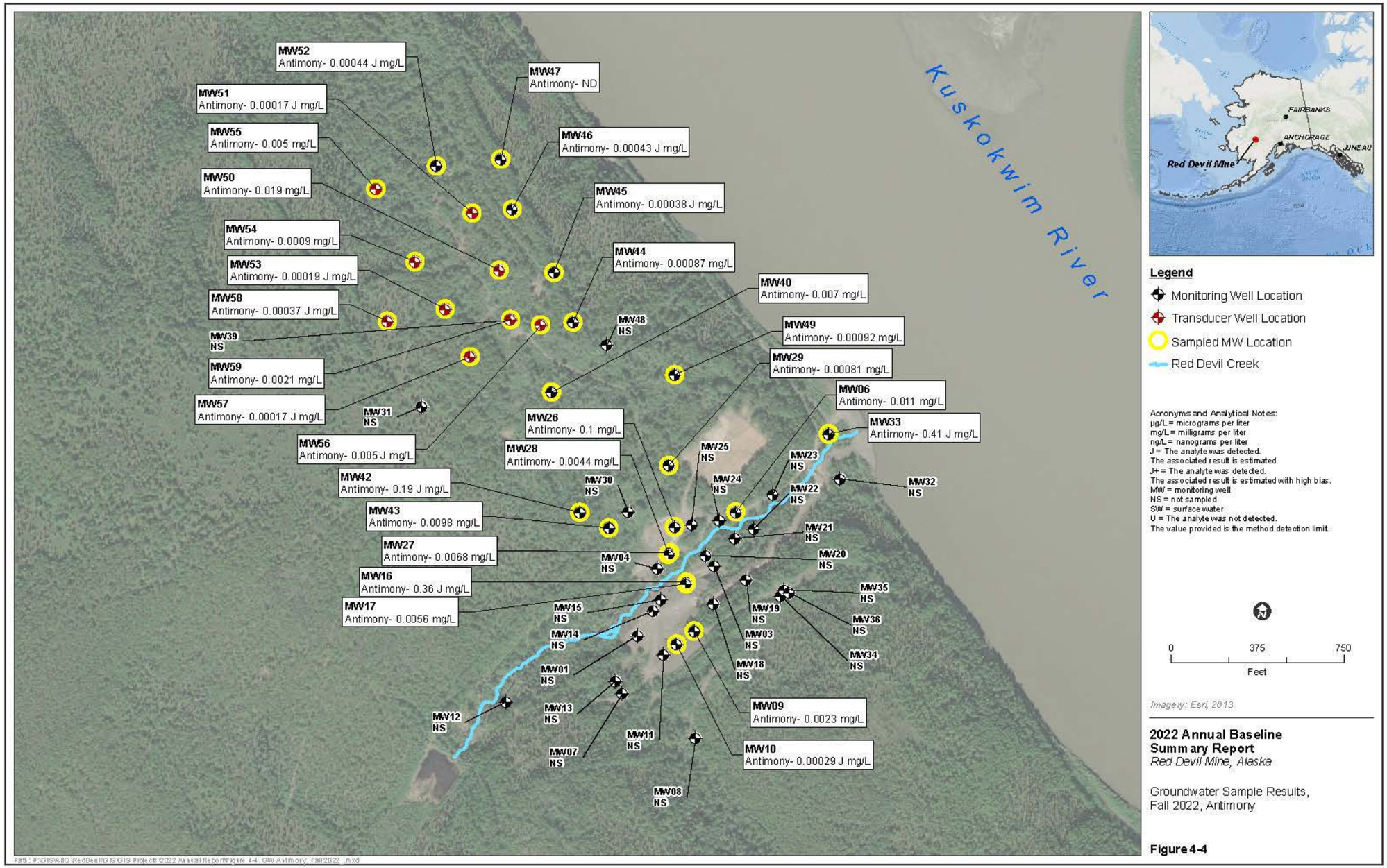
MW52
Antimony- 0.00044 J mg/L
MW47
Antimony- ND
MW51
Antimony- 0.00017 J mg/L
MW55
Antimony- 0.005 mg/L
MW46
Antimony- 0.00043 J mg/L
MW50
Antimony- 0.019 mg/L
MW45
Antimony- 0.00038 J mg/L
MW54
Antimony- 0.0009 mg/L
MW44
Antimony- 0.00087 mg/L
MW53
Antimony- 0.00019 J mg/L
MW40
Antimony- 0.007 mg/L
MW58
Antimony- 0.00037 J mg/L
MW48
NS
MW49
Antimony- 0.00092 mg/L
MW39
NS
MW29
Antimony- 0.00081 mg/L
MW59
Antimony- 0.0021 mg/L
MW06
Antimony- 0.011 mg/L
MW57
Antimony- 0.00017 J mg/L
MW31
NS
MW26
Antimony- 0.1 mg/L
MW33
Antimony- 0.41 J mg/L
MW56
Antimony- 0.005 J mg/L
MW28
Antimony- 0.0044 mg/L
MW25
NS
MW23
NS
MW42
Antimony- 0.19 J mg/L
MW30
NS
MW24
NS
MW32
NS
MW43
Antimony- 0.0098 mg/L
MW22
NS
MW27
Antimony- 0.0068 mg/L
MW21
NS
MW04
NS
MW20
NS
MW16
Antimony- 0.36 J mg/L
MW35
NS
MW17
Antimony- 0.0056 mg/L
MW15
NS
MW19
NS
MW36
NS
MW14
NS
MW03
NS
MW34
NS
MW01
NS
MW18
NS
MW09
Antimony- 0.0023 mg/L
MW13
NS
MW12
NS
MW11
NS
MW10
Antimony- 0.00029 J mg/L
MW07
NS
MW08
NS
Kuskokwim River
FAIRBANKS
ANCHORAGE
JUNEAU
Red Devil Mine
Legend
Monitoring Well Location
Transducer Well Location
Sampled MW Location
Red Devil Creek
Acronyms and Analytical Notes:
µg/L = micrograms per liter
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ng/L = nanograms per liter
J = The analyte was detected.
The associated result is estimated.
J+ = The analyte was detected.
The associated result is estimated with high bias.
MW = monitoring well
NS = not sampled
SW = surface water
U = The analyte was not detected.
The value provided is the method detection limit.
N
0
375
750
Feet
Imagery: Esri, 2013
2022 Annual Baseline Summary Report
Red Devil Mine, Alaska
Groundwater Sample Results, Fall 2022, Antimony
Figure 4-4
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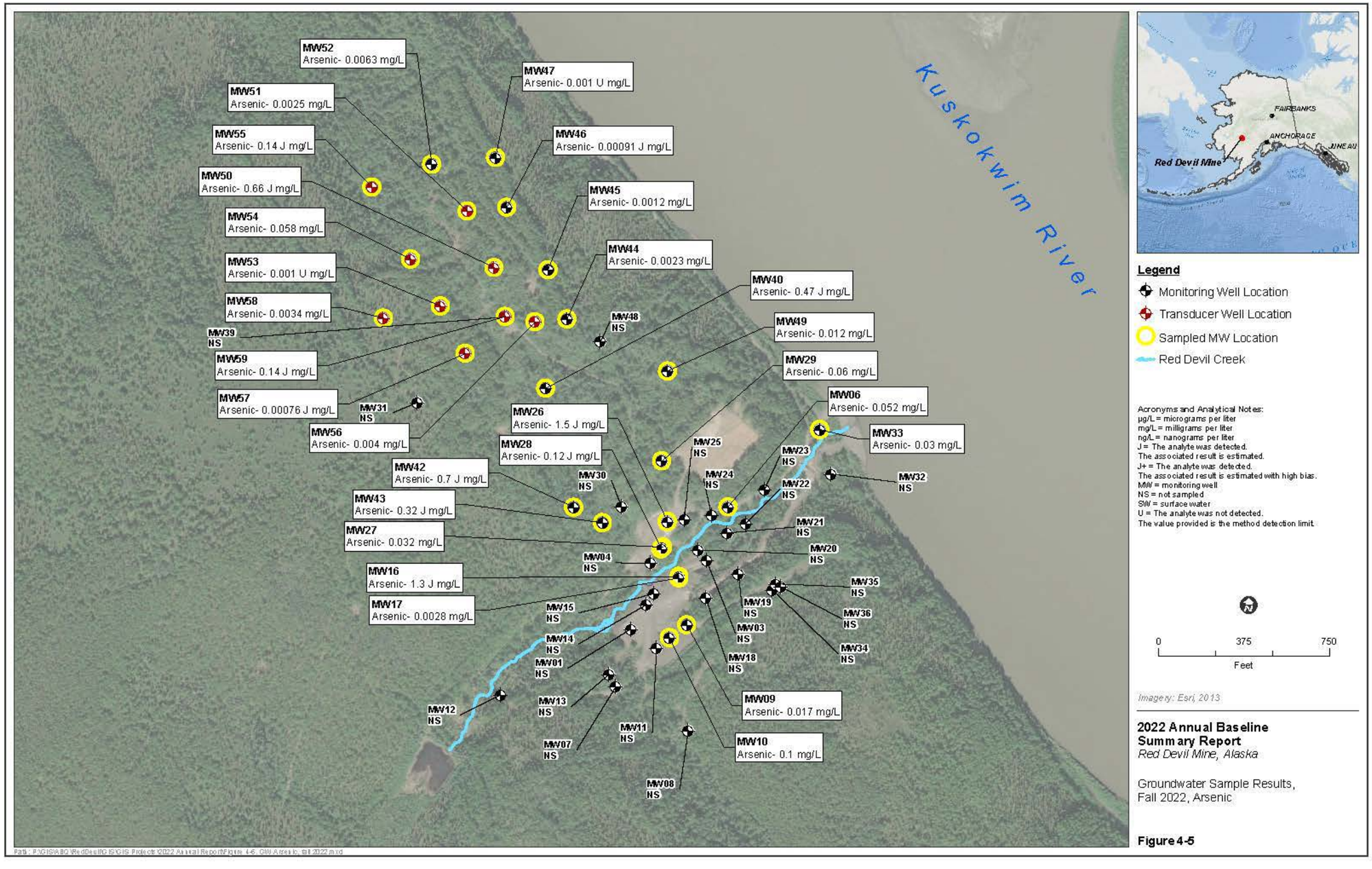
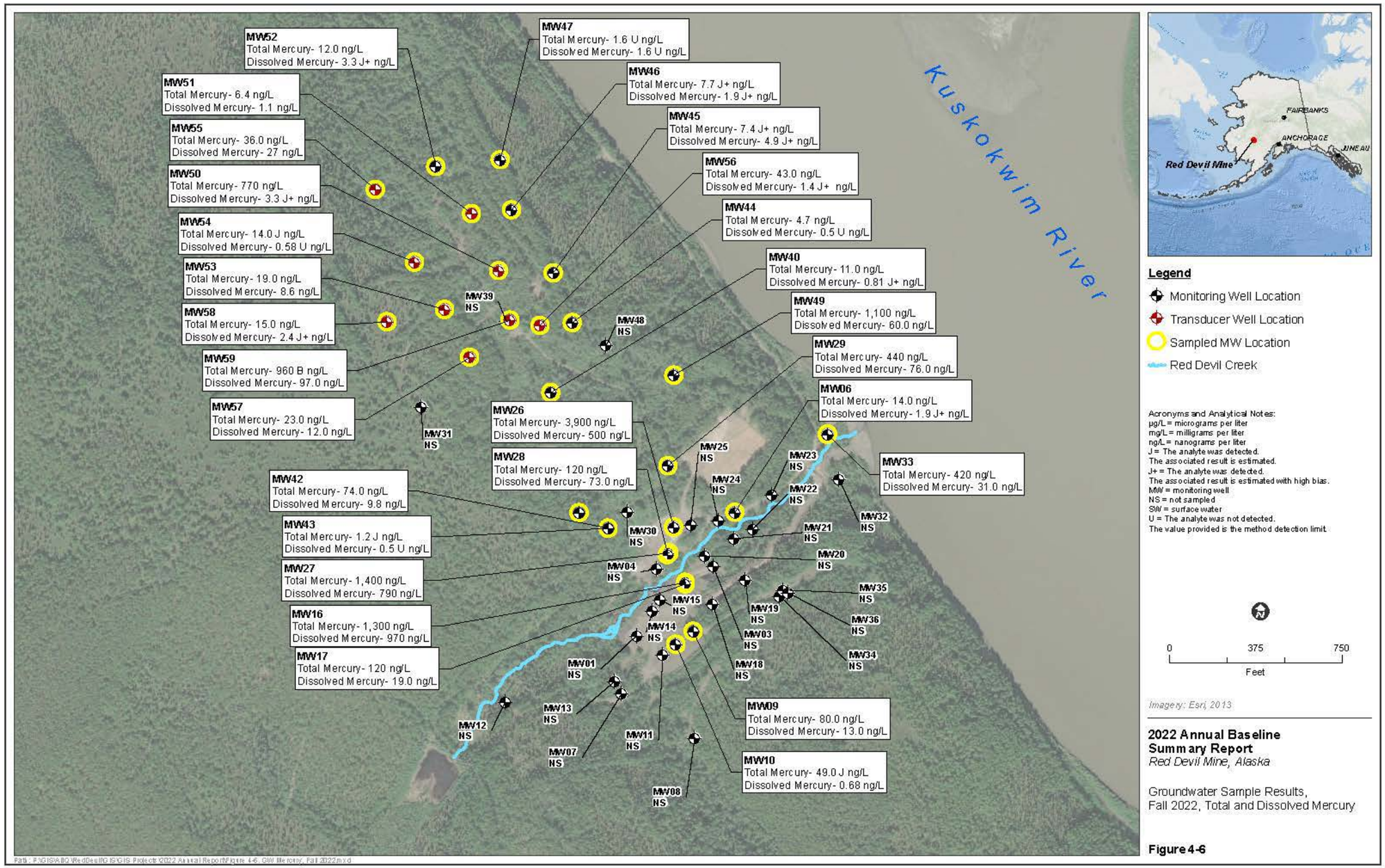
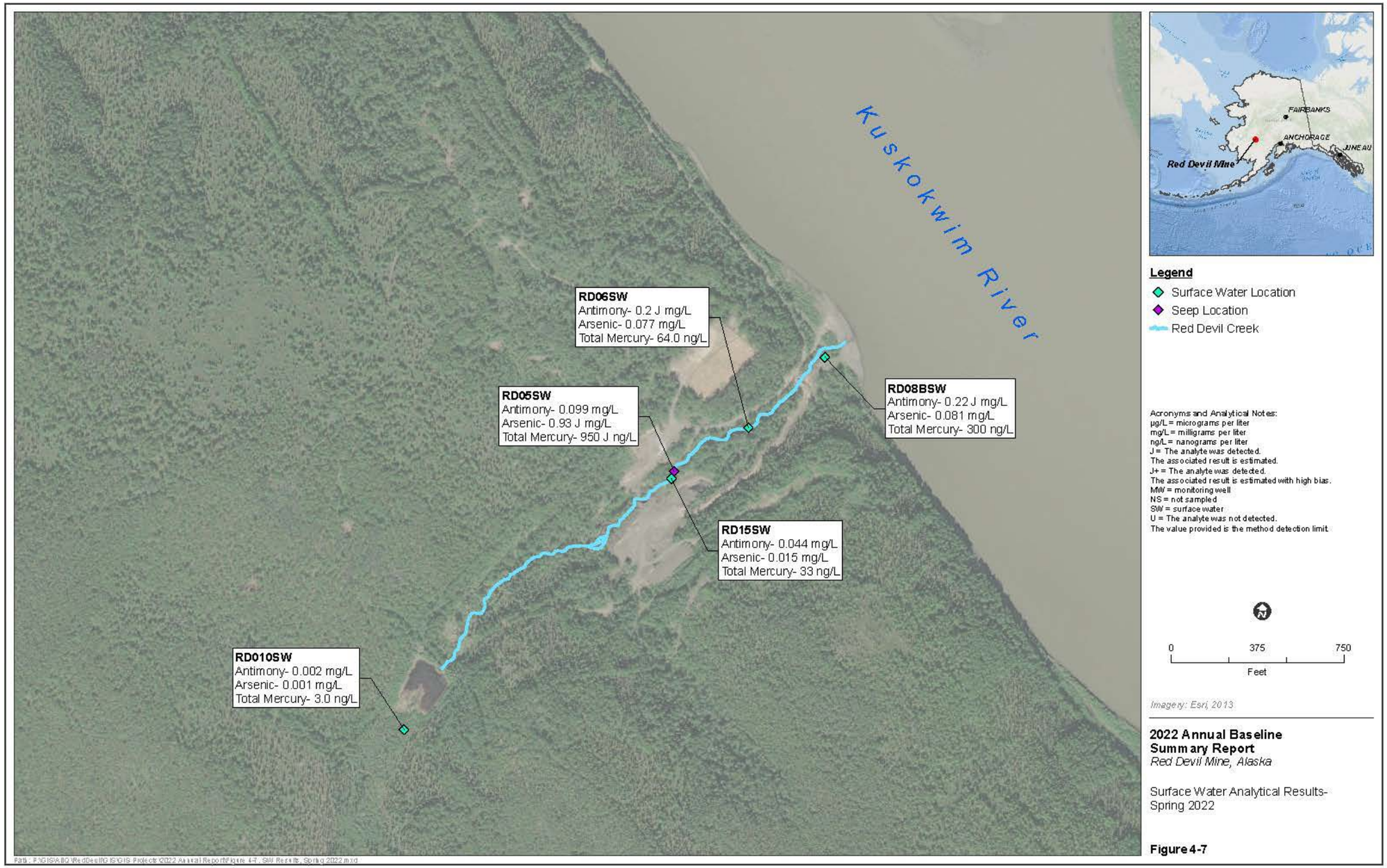
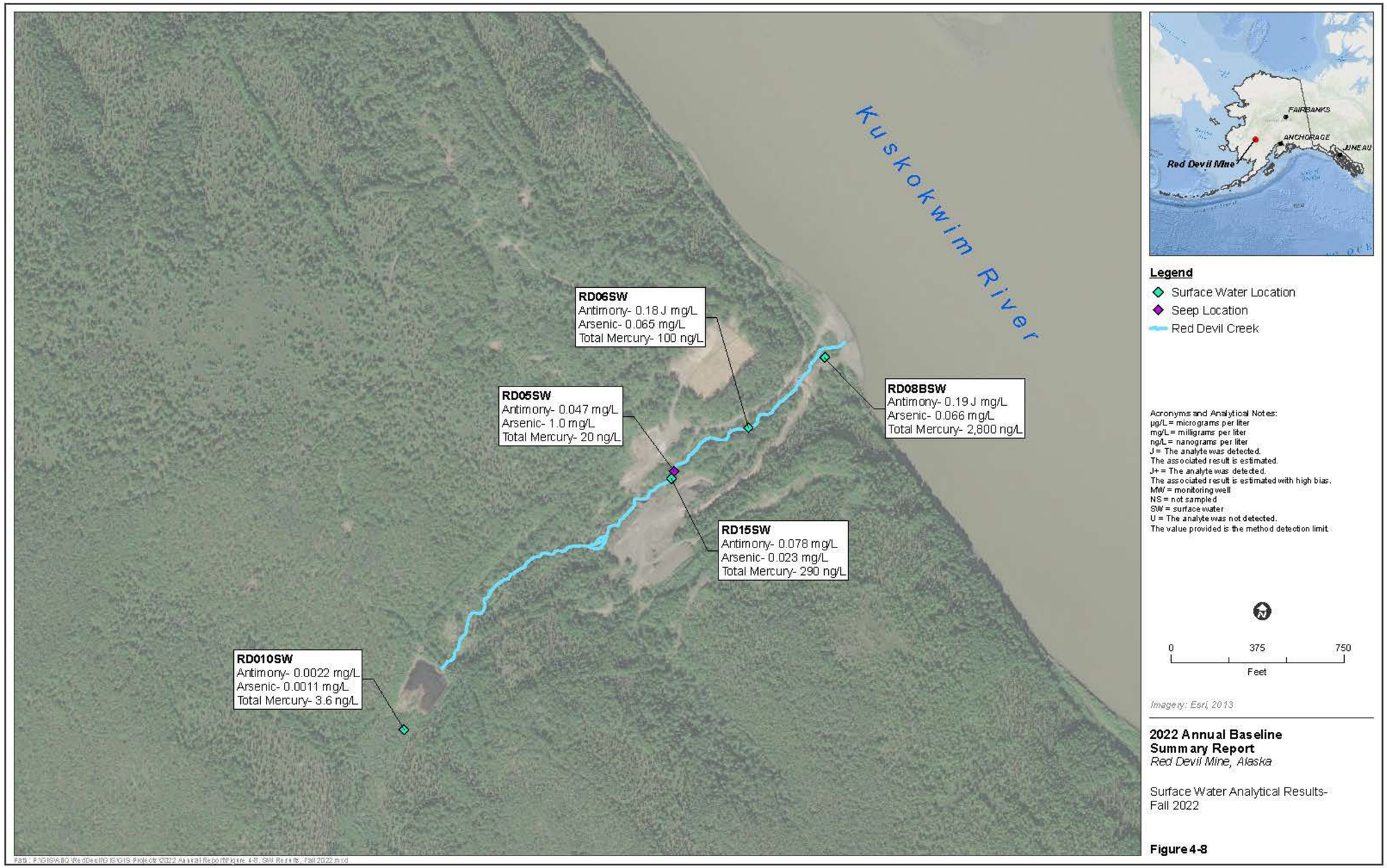

MW52
Arsenic- 0.0063 mg/L
MW47
Arsenic- 0.001 U mg/L
MW51
Arsenic- 0.0025 mg/L
MW55
Arsenic- 0.14 J mg/L
MW46
Arsenic- 0.00091 J mg/L
MW50
Arsenic- 0.66 J mg/L
MW45
Arsenic- 0.0012 mg/L
MW54
Arsenic- 0.058 mg/L
MW44
Arsenic- 0.0023 mg/L
MW53
Arsenic- 0.001 U mg/L
MW40
Arsenic- 0.47 J mg/L
MW58
Arsenic- 0.0034 mg/L
MW48
NS
MW49
Arsenic- 0.012 mg/L
MW39
NS
MW59
Arsenic- 0.14 J mg/L
MW29
Arsenic- 0.06 mg/L
MW57
Arsenic- 0.00076 J mg/L
MW31
NS
MW06
Arsenic- 0.052 mg/L
MW26
Arsenic- 1.5 J mg/L
MW56
Arsenic- 0.004 mg/L
MW33
Arsenic- 0.03 mg/L
MW28
Arsenic- 0.12 J mg/L
MW25
NS
MW42
Arsenic- 0.7 J mg/L
MW23
NS
MW32
NS
MW30
NS
MW24
NS
MW43
Arsenic- 0.32 J mg/L
MW22
NS
MW27
Arsenic- 0.032 mg/L
MW21
NS
MW04
NS
MW20
NS
MW16
Arsenic- 1.3 J mg/L
MW35
NS
MW17
Arsenic- 0.0028 mg/L
MW19
NS
MW15
NS
MW36
NS
MW03
NS
MW14
NS
MW34
NS
MW01
NS
MW18
NS
MW09
Arsenic- 0.017 mg/L
MW13
NS
MW12
NS
MW11
NS
MW10
Arsenic- 0.1 mg/L
MW07
NS
MW08
NS
Kuskokwim River
FAIRBANKS
ANCHORAGE
JUNEAU
Red Devil Mine
Legend
Monitoring Well Location
Transducer Well Location
Sampled MW Location
Red Devil Creek
Acronyms and Analytical Notes:
µg/L = micrograms per liter
mg/L = milligrams per liter
ng/L = nanograms per liter
J = The analyte was detected.
The associated result is estimated.
J+ = The analyte was detected.
The associated result is estimated with high bias.
MW = monitoring well
NS = not sampled
SW = surface water
U = The analyte was not detected.
The value provided is the method detection limit.
N
0
375
750
Feet
Imagery: Esri, 2013
2022 Annual Baseline Summary Report
Red Devil Mine, Alaska
Groundwater Sample Results, Fall 2022, Arsenic
Figure 4-5
Path: P:\GIS\ABQ\RedDevilMine\GIS\GIS Projects\2022 Annual Report\Figure 4-5_GW Arsenic_fall 2022.mxd


MW52
Total Mercury- 12.0 ng/L
Dissolved Mercury- 3.3 J+ ng/L
MW51
Total Mercury- 6.4 ng/L
Dissolved Mercury- 1.1 ng/L
MW55
Total Mercury- 36.0 ng/L
Dissolved Mercury- 27 ng/L
MW50
Total Mercury- 770 ng/L
Dissolved Mercury- 3.3 J+ ng/L
MW54
Total Mercury- 14.0 J ng/L
Dissolved Mercury- 0.58 U ng/L
MW53
Total Mercury- 19.0 ng/L
Dissolved Mercury- 8.6 ng/L
MW58
Total Mercury- 15.0 ng/L
Dissolved Mercury- 2.4 J+ ng/L
MW59
Total Mercury- 960 B ng/L
Dissolved Mercury- 97.0 ng/L
MW57
Total Mercury- 23.0 ng/L
Dissolved Mercury- 12.0 ng/L
MW47
Total Mercury- 1.6 U ng/L
Dissolved Mercury- 1.6 U ng/L
MW46
Total Mercury- 7.7 J+ ng/L
Dissolved Mercury- 1.9 J+ ng/L
MW45
Total Mercury- 7.4 J+ ng/L
Dissolved Mercury- 4.9 J+ ng/L
MW56
Total Mercury- 43.0 ng/L
Dissolved Mercury- 1.4 J+ ng/L
MW44
Total Mercury- 4.7 ng/L
Dissolved Mercury- 0.5 U ng/L
MW40
Total Mercury- 11.0 ng/L
Dissolved Mercury- 0.81 J+ ng/L
MW49
Total Mercury- 1,100 ng/L
Dissolved Mercury- 60.0 ng/L
MW29
Total Mercury- 440 ng/L
Dissolved Mercury- 76.0 ng/L
MW06
Total Mercury- 14.0 ng/L
Dissolved Mercury- 1.9 J+ ng/L
MW33
Total Mercury- 420 ng/L
Dissolved Mercury- 31.0 ng/L
MW26
Total Mercury- 3,900 ng/L
Dissolved Mercury- 500 ng/L
MW28
Total Mercury- 120 ng/L
Dissolved Mercury- 73.0 ng/L
MW42
Total Mercury- 74.0 ng/L
Dissolved Mercury- 9.8 ng/L
MW43
Total Mercury- 1.2 J ng/L
Dissolved Mercury- 0.5 U ng/L
MW27
Total Mercury- 1,400 ng/L
Dissolved Mercury- 790 ng/L
MW16
Total Mercury- 1,300 ng/L
Dissolved Mercury- 970 ng/L
MW17
Total Mercury- 120 ng/L
Dissolved Mercury- 19.0 ng/L
MW09
Total Mercury- 80.0 ng/L
Dissolved Mercury- 13.0 ng/L
MW10
Total Mercury- 49.0 J ng/L
Dissolved Mercury- 0.68 ng/L
MW39 NS
MW48 NS
MW31 NS
MW25 NS
MW23 NS
MW24 NS
MW22 NS
MW32 NS
MW30 NS
MW21 NS
MW04 NS
MW20 NS
MW15 NS
MW35 NS
MW19 NS
MW36 NS
MW14 NS
MW03 NS
MW34 NS
MW01 NS
MW18 NS
MW13 NS
MW12 NS
MW11 NS
MW07 NS
MW08 NS
Kuskokwim River
FAIRBANKS
ANCHORAGE
JUNEAU
Red Devil Mine
Legend
Monitoring Well Location
Transducer Well Location
Sampled MW Location
Red Devil Creek
Acronyms and Analytical Notes:
µg/L = micrograms per liter
mg/L = milligrams per liter
ng/L = nanograms per liter
J = The analyte was detected.
The associated result is estimated.
J+ = The analyte was detected.
The associated result is estimated with high bias.
MW = monitoring well
NS = not sampled
SW = surface water
U = The analyte was not detected.
The value provided is the method detection limit.
0
375
750
Feet
Imagery: Esri, 2013
2022 Annual Baseline Summary Report
Red Devil Mine, Alaska
Groundwater Sample Results, Fall 2022, Total and Dissolved Mercury
Figure 4-6


Kuskokwim River
RD06SW
Antimony- 0.2 J mg/L
Arsenic- 0.077 mg/L
Total Mercury- 64.0 ng/L
RD05SW
Antimony- 0.099 mg/L
Arsenic- 0.93 J mg/L
Total Mercury- 950 J ng/L
RD08BSW
Antimony- 0.22 J mg/L
Arsenic- 0.081 mg/L
Total Mercury- 300 ng/L
RD15SW
Antimony- 0.044 mg/L
Arsenic- 0.015 mg/L
Total Mercury- 33 ng/L
RD010SW
Antimony- 0.002 mg/L
Arsenic- 0.001 mg/L
Total Mercury- 3.0 ng/L
FAIRBANKS
ANCHORAGE
JUNEAU
Red Devil Mine
Legend
Surface Water Location
Seep Location
Red Devil Creek
Acronyms and Analytical Notes:
µg/L = micrograms per liter
mg/L = milligrams per liter
ng/L = nanograms per liter
J = The analyte was detected.
The associated result is estimated.
J+ = The analyte was detected.
The associated result is estimated with high bias.
MW = monitoring well
NS = not sampled
SW = surface water
U = The analyte was not detected.
The value provided is the method detection limit.
0
375
750
Feet
Imagery: Esri, 2013
2022 Annual Baseline Summary Report
Red Devil Mine, Alaska
Surface Water Analytical Results- Spring 2022
Figure 4-7


Kuskokwim River
RD06SW
Antimony- 0.18 J mg/L
Arsenic- 0.065 mg/L
Total Mercury- 100 ng/L
RD05SW
Antimony- 0.047 mg/L
Arsenic- 1.0 mg/L
Total Mercury- 20 ng/L
RD08BSW
Antimony- 0.19 J mg/L
Arsenic- 0.066 mg/L
Total Mercury- 2,800 ng/L
RD15SW
Antimony- 0.078 mg/L
Arsenic- 0.023 mg/L
Total Mercury- 290 ng/L
RD010SW
Antimony- 0.0022 mg/L
Arsenic- 0.0011 mg/L
Total Mercury- 3.6 ng/L
FAIRBANKS
ANCHORAGE
JUNEAU
Red Devil Mine
Legend
Surface Water Location
Seep Location
Red Devil Creek
Acronyms and Analytical Notes:
µg/L = micrograms per liter
mg/L = milligrams per liter
ng/L = nanograms per liter
J = The analyte was detected.
The associated result is estimated.
J+ = The analyte was detected.
The associated result is estimated with high bias.
MW = monitoring well
NS = not sampled
SW = surface water
U = The analyte was not detected.
The value provided is the method detection limit.
N
0
375
750
Feet
Imagery: Esri, 2013
2022 Annual Baseline Summary Report
Red Devil Mine, Alaska
Surface Water Analytical Results- Fall 2022
Figure 4-8

TABLES

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Table 2-1: Monitoring Well Construction and Groundwater Depth Information

Monitoring Well ID	Soil Boring ID	Reported Well Total Depth As Constructed (feet bgs)	Reported Screened Interval (feet bgs)	Surveyed Ground Elevation (feet NAVD88)	Surveyed Top of Casing Elevation (feet NAVD88)	GW Observed During Drilling (feet bgs)	Measured Well Total Depth (feet below TOC)	Static Water Level Depth (feet below TOC)	Static Water Level Date	Static Water Level Time	GW Elevation (feet NAVD88)
MW01											
MW01	B01	29.5	19.0 - 29.1	254.51	257.51	17.8 - TD	NR	25.97	6/4/2021	7:42	231.54
MW01	B01	29.5	19.0 - 29.1	254.51	257.51	17.8 - TD	NR	20.11	8/28/2021	9:19	237.40
MW01	B01	29.5	19.0 - 29.1	254.51	257.51	17.8 - TD	NR	17.97	6/1/2022	10:34	239.54
MW01	B01	29.5	19.0 - 29.1	254.51	257.51	17.8 - TD	NR	19.23	8/22/2022	10:06	238.28
MW03											
MW03	B03	25.5	15.0 - 25.0	228.37	230.77	19.0 - TD	NR	18.84	6/4/2021	9:50	211.93
MW03	B03	25.5	15.0 - 25.0	228.37	230.77	19.0 - TD	NR	20.82	8/28/2021	11:05	209.95
MW03	B03	25.5	15.0 - 25.0	228.37	230.77	19.0 - TD	NR	16.51	6/1/2022	12:47	214.26
MW03	B04	25.5	15.0 - 25.0	228.37	230.77	19.0 - TD	NR	20.15	8/22/2022	9:42	210.62
MW04											
MW04	B04	30.5	20.0 - 30.0	239.92	242.12	25.3 - TD	NR	26.03	6/4/2021	11:29	216.09
MW04	B04	30.5	20.0 - 30.0	239.92	242.12	25.3 - TD	NR	27.69	8/28/2021	12:50	214.43
MW04	B04	30.5	20.0 - 30.0	239.92	242.12	25.3 - TD	NR	NR			
MW04	B04	30.5	20.0 - 30.1	239.92	242.12	25.3 - TD	NR	26.35	8/22/2022	11:47	215.77
MW06											
MW06	B06	23.5	13.0 - 23.0	214.99	217.49	20.0 - TD	NR	17.38	6/4/2021	11:58	200.11
MW06	B06	23.5	13.0 - 23.0	214.99	217.49	20.0 - TD	NR	19.02	8/28/2021	11:55	198.47
MW06	B06	23.5	13.0 - 23.0	214.99	217.49	20.0 - TD	NR	15.95	6/1/2022	13:37	201.54
MW06	B06	23.5	13.0 - 23.0	214.99	217.49	20.0 - TD	NR	19.06	8/22/2022	14:37	198.43
MW07											
MW07	B07	21.5	11.0 - 21.0	278.39	280.89	14.8 - TD	NR	20.35	6/4/2021	9:15	260.54
MW07	B07	21.5	11.0 - 21.0	278.39	280.89	14.8 - TD	NR	20.93	8/28/2021	10:32	259.96
MW07	B07	21.5	11.0 - 21.0	278.39	280.89	14.8 - TD	NR	20.63	6/1/2022	10:51	260.26
MW07	B07	21.5	11.0 - 21.0	278.39	280.89	14.8 - TD	NR	21.94	8/22/2022	10:50	258.95
MW08											
MW08	11MP01SB	16.0	5.0 - 15.0	328.92	331.32	2.5 - 4.0, 10.5 - TD	NR	15.6	6/4/2021	9:04	315.73
MW08	11MP01SB	16.0	5.0 - 15.0	328.92	331.32	2.5 - 4.0, 10.5 - TD	NR	14.3	8/28/2021	10:25	317.05
MW08	11MP01SB	16.0	5.0 - 15.0	328.92	331.32	2.5 - 4.0, 10.5 - TD	NR	13.3	6/1/2022	11:25	317.99
MW08	11MP01SB	16.0	5.0 - 15.0	328.92	331.32	2.5 - 4.0, 10.5 - TD	NR	13.7	8/22/2022	1043	317.62
MW09											
MW09	11MP17SB	31.0	20.0 - 30.0	274.88	277.28	14.0 - 16.0, 31.0 - TD	NR	25.43	6/4/2021	8:20	251.85
MW09	11MP17SB	31.0	20.0 - 30.0	274.88	277.28	14.0 - 16.0, 31.0 - TD	NR	25.37	8/28/2021	9:48	251.91
MW09	11MP17SB	31.0	20.0 - 30.0	274.88	277.28	14.0 - 16.0, 31.0 - TD	NR	25.42	6/1/2022	11:45	251.86

Table 2-1: Monitoring Well Construction and Groundwater Depth Information

Monitoring Well ID	Soil Boring ID	Reported Well Total Depth As Constructed (feet bgs)	Reported Screened Interval (feet bgs)	Surveyed Ground Elevation (feet NAVD88)	Surveyed Top of Casing Elevation (feet NAVD88)	GW Observed During Drilling (feet bgs)	Measured Well Total Depth (feet below TOC)	Static Water Level Depth (feet below TOC)	Static Water Level Date	Static Water Level Time	GW Elevation (feet NAVD88)
MW09	11MP17SB	31.0	20.0 - 30.0	274.88	277.28	14.0 - 16.0, 31.0 - TD	NR	27.33	8/22/2022	1020	249.95
MW10											
MW10	11MP14SB	61.0	50.0 - 60.0	274.31	276.21	48.0 - TD	NR	54.61	6/4/2021	8:08	221.60
MW10	11MP14SB	61.0	50.0 - 60.0	274.31	276.21	48.0 - TD	NR	30.01	8/28/2021	9:43	246.20
MW10	11MP14SB	61.0	50.0 - 60.0	274.31	276.21	48.0 - TD	NR	26.28	6/1/2022	11:40	249.93
MW10	11MP14SB	61.0	50.0 - 60.0	274.31	276.21	48.0 - TD	NR	27.04	8/22/2022	1016	249.17
MW11											
MW11	11MP12SB	23.0	12.0 - 22.0	268.70	271.30	--	NR	21.86	6/4/2021	7:55	249.44
MW11	11MP12SB	23.0	12.0 - 22.0	268.70	271.30	--	NR	23.55	8/28/2021	9:38	247.75
MW11	11MP12SB	23.0	12.0 - 22.0	268.70	271.30	--	NR	19.21	6/1/2022	11:34	252.09
MW11	11MP12SB	23.0	12.0 - 22.0	268.70	271.30	--	NR	22.16	8/22/2022	1013	249.14
MW12											
MW12	11RD13SB	15.0	4.0 - 14.0	263.22	265.62	1.0 - TD	NR	NR	6/4/2021	9:25	Inner casing damaged from settling of outer casing, preventing access for DTW measurements.
MW12	11RD13SB	15.0	4.0 - 14.0	263.22	265.62	1.0 - TD	NR	NR	8/28/2021	10:44	Inner casing damaged from settling of outer casing, preventing access for DTW measurements.
MW12	11RD13SB	15.0	4.0 - 14.0	263.22	265.62	1.0 - TD	NR	NR	6/1/2022	11:11	Inner casing damaged from settling of outer casing, preventing access for DTW measurements.
MW12	11RD13SB	15.0	4.0 - 14.0	263.22	265.62	1.0 - TD	NR	NR	8/22/2022	1059	Inner casing damaged from settling of outer casing, preventing access for DTW measurements.
MW13											
MW13	11MP20SB	32.0	21.0 - 31.0	274.30	276.70	27.0 - TD	NR	28.5	6/4/2021	9:20	Dry (Water Elevation <243.3 feet bgs)
MW13	11MP20SB	32.0	21.0 - 31.0	274.30	276.70	27.0 - TD	31.72	DRY	8/28/2021	10:37	Frost jacked, unusable for DTW measurements
MW13	11MP20SB	32.0	21.0 - 31.0	274.30	276.70	27.0 - TD	NR	24.37	6/1/2022	10:56	Frost jacked, unusable for DTW measurements
MW13	11MP20SB	32.0	21.0 - 31.0	274.30	276.70	27.0 - TD	NR	30.9	8/22/2022	1054	Frost jacked, unusable for DTW measurements
MW14											
MW14	11MP25SB	36.0	25.0 - 35.0	246.71	249.01	25.7 - TD	--	--	--	--	Decommissioned in 2014 NTCRA
MW15											
MW15	11MP29SB	26.0	15.0 - 25.0	242.63	244.93	16.2 - TD	--	--	--	--	Decommissioned in 2014 NTCRA

Table 2-1: Monitoring Well Construction and Groundwater Depth Information

Monitoring Well ID	Soil Boring ID	Reported Well Total Depth As Constructed (feet bgs)	Reported Screened Interval (feet bgs)	Surveyed Ground Elevation (feet NAVD88)	Surveyed Top of Casing Elevation (feet NAVD88)	GW Observed During Drilling (feet bgs)	Measured Well Total Depth (feet below TOC)	Static Water Level Depth (feet below TOC)	Static Water Level Date	Static Water Level Time	GW Elevation (feet NAVD88)
MW16											
MW16	11MP30SB	22.0	11.0 - 21.0	226.09	228.09	16.0 - TD	NR	11.90	6/4/2021	9:45	216.19
MW16	11MP30SB	22.0	11.0 - 21.0	226.09	228.09	16.0 - TD	NR	13.49	8/28/2021	11:01	214.60
MW16	11MP30SB	22.0	11.0 - 21.0	226.09	228.09	16.0 - TD	NR	7.00	1/15/1900	12:42	221.09
MW16	11MP30SB	22.0	11.0 - 21.0	226.09	228.09	16.0 - TD	NR	12.55	8/22/2022	919	215.54
MW17											
MW17	11MP91SB	52.5	41.5 - 51.5	226.36	228.66	25.0 - 33.0, 33.0 - TD	NR	13.67	6/4/2021	9:40	214.99
MW17	11MP91SB	52.5	41.5 - 51.5	226.36	228.66	25.0 - 33.0, 33.0 - TD	NR	15.82	8/28/2021	10:58	212.84
MW17	11MP91SB	52.5	41.5 - 51.5	226.36	228.66	25.0 - 33.0, 33.0 - TD	NR	9.15	6/1/2022	12:38	219.51
MW17	11MP91SB	52.5	41.5 - 51.5	226.36	228.66	25.0 - 33.0, 33.0 - TD	NR	15.02	8/22/2022	9:17	213.64
MW18											
MW18	11MP31SB	40.0	29.0 - 39.0	241.33	243.83	38.0 - TD	NR	27.55	6/4/2021	10:23	216.28
MW18	11MP31SB	40.0	29.0 - 39.0	241.33	243.83	38.0 - TD	NR	29.87	8/28/2021	11:18	213.96
MW18	11MP31SB	40.0	29.0 - 39.0	241.33	243.83	38.0 - TD	NR	21.80	6/1/2022	13:14	222.03
MW18	11MP31SB	40.0	29.0 - 39.0	241.33	243.83	38.0 - TD	NR	28.72	8/22/2022	9:08	215.11
MW19											
MW19	11MP33SB	43.0	32.0 - 42.0	237.70	240.00	39.0 - TD	NR	17.30	6/4/2021	10:32	222.70
MW19	11MP33SB	43.0	32.0 - 42.0	237.70	240.00	39.0 - TD	NR	21.81	8/28/2021	11:24	218.19
MW19	11MP33SB	43.0	32.0 - 42.0	237.70	240.00	39.0 - TD	NR	15.65	6/1/2022	13:08	224.35
MW19	11MP33SB	43.0	32.0 - 42.0	237.70	240.00	39.0 - TD	NR	20.93	8/22/2022	904	219.07
MW20											
MW20	11MP38SB	15.5	4.5 - 14.5	212.90	215.20	6.5 - TD	NR	7.01	6/4/2021	9:58	208.19
MW20	11MP38SB	15.5	4.5 - 14.5	212.90	215.20	6.5 - TD	NR	7.67	8/28/2021	11:09	207.53
MW20	11MP38SB	15.5	4.5 - 14.5	212.90	215.20	6.5 - TD	NR	6.16	6/1/2022	12:52	209.04
MW20	11MP38SB	15.5	4.5 - 14.5	212.90	215.20	6.5 - TD	NR	7.40	8/22/2022	946	207.80
MW21											
MW21	11MP39SB	17.5	6.5 - 16.5	208.23	210.13	7.0 - TD	NR	8.48	6/4/2021	10:08	201.65
MW21	11MP39SB	17.5	6.5 - 16.5	208.23	210.13	7.0 - TD	NR	8.96	8/28/2021	11:40	201.17
MW21	11MP39SB	17.5	6.5 - 16.5	208.23	210.13	7.0 - TD	NR	7.97	6/1/2022	12:57	202.16
MW21	11MP39SB	17.5	6.5 - 16.5	208.23	210.13	7.0 - TD	NR	8.64	8/22/2022	950	201.49
MW22											
MW22	11MP40SB	15.5	4.5 - 14.5	203.10	205.10	7.8 - TD	NR	8.55	6/4/2021	10:13	196.55
MW22	11MP40SB	15.5	4.5 - 14.5	203.10	205.10	7.8 - TD	NR	9.97	8/28/2021	11:37	195.13
MW22	11MP40SB	15.5	4.5 - 14.5	203.10	205.10	7.8 - TD	NR	6.71	6/1/2022	13:02	198.39
MW22	11MP40SB	15.5	4.5 - 14.5	203.10	205.10	7.8 - TD	NR	9.72	8/22/2022	955	195.38
MW23											
MW23	11MP66SB	29.0	18.0 - 28.0	201.96	204.16	20.0 - TD	NR	15.49	6/4/2021	12:03	188.67
MW23	11MP66SB	29.0	18.0 - 28.0	201.96	204.16	20.0 - TD	NR	16.38	8/28/2021	11:51	187.78

Table 2-1: Monitoring Well Construction and Groundwater Depth Information

Monitoring Well ID	Soil Boring ID	Reported Well Total Depth As Constructed (feet bgs)	Reported Screened Interval (feet bgs)	Surveyed Ground Elevation (feet NAVD88)	Surveyed Top of Casing Elevation (feet NAVD88)	GW Observed During Drilling (feet bgs)	Measured Well Total Depth (feet below TOC)	Static Water Level Depth (feet below TOC)	Static Water Level Date	Static Water Level Time	GW Elevation (feet NAVD88)
MW23	11MP66SB	29.0	18.0 - 28.0	201.96	204.16	20.0 - TD	NR	14.41	6/1/2022	17:49	189.75
MW23	11MP66SB	29.0	18.0 - 28.0	201.96	204.16	20.0 - TD	NR	16.31	8/22/2022	1111	187.85
MW24											
MW24	11MP62SB	30.0	19.0 - 29.0	221.41	223.51	20.0 - TD	NR	16.16	6/4/2021	11:56	207.35
MW24	11MP62SB	30.0	19.0 - 29.0	221.41	223.51	20.0 - TD	NR	17.45	8/28/2021	11:58	206.06
MW24	11MP62SB	30.0	19.0 - 29.0	221.41	223.51	20.0 - TD	NR	14.60	6/1/2022	13:56	208.91
MW24	11MP62SB	30.0	19.0 - 29.0	221.41	223.51	20.0 - TD	NR	17.41	8/22/2022	1127	206.10
MW25											
MW25	11MP89SB	42.0	31.0 - 41.0	237.56	239.76	32.0 - TD	NR	32.26	6/5/2021	12:47	207.50
MW25	11MP89SB	42.0	31.0 - 41.0	237.56	239.76	32.0 - TD	NR	32.26	8/28/2021	12:39	207.50
MW25	11MP89SB	42.0	31.0 - 41.0	237.56	239.76	32.0 - TD	NR	29.95	6/1/2022	13:51	209.81
MW25	11MP89SB	42.0	31.0 - 41.0	237.56	239.76	32.0 - TD	NR	31.93	8/22/2022	1131	207.83
MW26											
MW26	11MP52SB	43.0	32.0 - 42.0	244.03	245.93	34.0 - TD	NR	34.4	6/4/2021	11:43	211.58
MW26	11MP52SB	43.0	32.0 - 42.0	244.03	245.93	34.0 - TD	NR	36.15	8/28/2021	12:34	209.78
MW26	11MP52SB	43.0	32.0 - 42.0	244.03	245.93	34.0 - TD	NR	31.0	6/1/2022	13:45	214.94
MW26	11MP52SB	43.0	32.0 - 42.0	244.03	245.93	34.0 - TD	NR	33.5	8/22/2022	1134	212.39
MW27											
MW27	11MP60SB	34.0	23.0 - 33.0	241.04	242.94	29.0 - TD	NR	29.48	6/4/2021	11:40	213.46
MW27	11MP60SB	34.0	23.0 - 33.0	241.04	242.94	29.0 - TD	NR	30.92	8/28/2021	12:43	212.02
MW27	11MP60SB	34.0	23.0 - 33.0	241.04	242.94	29.0 - TD	NR	24.78	6/1/2022	14:01	218.16
MW27	11MP60SB	34.0	23.0 - 33.0	241.04	242.94	29.0 - TD	NR	30.01	8/22/2022	1139	212.93
MW28											
MW28	11MP88SB	64.0	53.0 - 63.0	239.94	241.94	49.0 - TD	NR	27.95	6/4/2021	11:33	213.99
MW28	11MP88SB	64.0	53.0 - 63.0	239.94	241.94	49.0 - TD	NR	29.51	8/28/2021	12:46	212.43
MW28	11MP88SB	64.0	53.0 - 63.0	239.94	241.94	49.0 - TD	NR	23.07	6/1/2022	14:04	218.87
MW28	11MP88SB	64.0	53.0 - 63.0	239.94	241.94	49.0 - TD	NR	28.56	8/22/2022	1141	213.38
MW29											
MW29	11MP41SB	70.0	59.0 - 69.0	280.35	282.25	61.0 - TD	NR	58.5	6/4/2021	16:22	223.75
MW29	11MP41SB	70.0	59.0 - 69.0	280.35	282.25	61.0 - TD	NR	64.00	9/1/2021	15:00	218.25
MW29	11MP41SB	70.0	59.0 - 69.0	280.35	282.25	61.0 - TD	NR	63.49	6/1/2022	14:38	218.76
MW29	11MP41SB	70.0	59.0 - 69.0	280.35	282.25	61.0 - TD	NR	64.43	8/22/2022	1250	217.82
MW30											
MW30	11SM31SB	53.0	42.0 - 52.0	275.71	277.41	45.0 - TD	NR	53.66	6/4/2021	16:30	Suspected Dry (Water Elevation <223.7 feet)
MW30	11SM31SB	53.0	42.0 - 52.0	275.71	277.41	45.0 - TD	NR	54.19	8/28/2021	16:21	Suspected Dry (Water Elevation <223.7 feet)
MW30	11SM31SB	53.0	42.0 - 52.0	275.71	277.41	45.0 - TD	NR	50.56	6/1/2022	14:45	226.85
MW30	11SM31SB	53.0	42.0 - 52.0	275.71	277.41	45.0 - TD	NR	52.56	8/22/2022	1257	224.85

Table 2-1: Monitoring Well Construction and Groundwater Depth Information

Monitoring Well ID	Soil Boring ID	Reported Well Total Depth As Constructed (feet bgs)	Reported Screened Interval (feet bgs)	Surveyed Ground Elevation (feet NAVD88)	Surveyed Top of Casing Elevation (feet NAVD88)	GW Observed During Drilling (feet bgs)	Measured Well Total Depth (feet below TOC)	Static Water Level Depth (feet below TOC)	Static Water Level Date	Static Water Level Time	GW Elevation (feet NAVD88)
MW31											
MW31	11UP11SB	44.8	33.8 - 43.8	495.79	497.99	34.0 - TD	NR	38.56	6/4/2021	15:45	459.43
MW31	11UP11SB	44.8	33.8 - 43.8	495.79	497.99	34.0 - TD	NR	39.02	8/28/2021	15:09	458.97
MW31	11UP11SB	44.8	33.8 - 43.8	495.79	497.99	34.0 - TD	NR	36.09	6/1/2022	16:50	461.90
MW31	11UP11SB	44.8	33.8 - 43.8	495.79	497.99	34.0 - TD	NR	38.5	8/22/2022	0:00	459.49
MW32											
MW32	11RD05SB	25.0	14.0 - 24.0	194.38	196.58	16.5 - TD	NR	18.51	6/4/2021	10:41	178.07
MW32	11RD05SB	25.0	14.0 - 24.0	194.38	196.58	16.5 - TD	NR	19.28	8/28/2021	11:31	177.30
MW32	11RD05SB	25.0	14.0 - 24.0	194.38	196.58	16.5 - TD	NR	17.75	6/1/2022	13:25	178.83
MW32	11RD05SB	25.0	14.0 - 24.0	194.38	196.58	16.5 - TD	NR	7.60	8/22/2022	855	188.98
MW33											
MW33	11RD20SB	23.0	12.0 - 22.0	176.62	178.92	10.5 - TD	NR	6.13	6/4/2021	16:49	172.79
MW33	11RD20SB	23.0	12.0 - 22.0	176.62	178.92	10.5 - TD	NR	8.12	8/28/2021	16:53	170.80
MW33	11RD20SB	23.0	12.0 - 22.0	176.62	178.92	10.5 - TD	NR	3.72	6/1/2022	17:55	175.20
MW33	11RD20SB	23.0	12.0 - 22.0	176.62	178.92	10.5 - TD	NR	6.67	8/22/2022	838	172.25
MW34											
MW34	AST5 MW1	NR	NR	290.95	294.25	--	NR	58.13	6/4/2021	8:35	236.12
MW34	AST5 MW1	NR	NR	290.95	294.25	--	NR	34.59	8/28/2021	9:55	259.66
MW34	AST5 MW1	NR	NR	290.95	294.25	--	NR	26.84	6/1/2022	11:56	267.41
MW34	AST5 MW1	NR	NR	290.95	294.25	--	NR	34.48	8/22/2022	1024	259.77
MW35											
MW35	AST5 MW2	NR	NR	285.76	289.26	--	NR	35.42	6/4/2021	8:42	253.84
MW35	AST5 MW2	NR	NR	285.76	289.26	--	NR	39.18	8/28/2021	9:59	250.08
MW35	AST5 MW2	NR	NR	285.76	289.26	--	NR	33.18	6/1/2022	12:01	256.08
MW35	AST5 MW2	NR	NR	285.76	289.26	--	NR	39.63	8/22/2022	1027	249.63
MW36											
MW36	AST5 MW3	NR	NR	286.33	290.03	--	NR	15.74	6/4/2021	8:49	274.29
MW36	AST5 MW3	NR	NR	286.33	290.03	--	NR	16.39	8/28/2021	10:02	273.64
MW36	AST5 MW3	NR	NR	286.33	290.03	--	NR	15.46	6/1/2022	12:05	274.57
MW36	AST5 MW3	NR	NR	286.33	290.03	--	NR	15.72	8/22/2022	1031	274.31
MW39											
MW39	SM67	84.0	63 - 83	432.83	435.26	--	NR	84.81	6/4/2021	14:40	Dry (Water Elevation <349.8 feet)
MW39	SM67	84.0	63 - 83	432.83	435.26	--	NR	84.79	8/28/2021	15:35	Dry (Water Elevation <349.8 feet)
MW39	SM67	84.0	63 - 83	432.83	435.26	--	NR	57.82	6/1/2022	16:30	377.44
MW39	SM67	84.0	63 - 83	432.83	435.26	--	NR	84.87	8/22/2022	1501	350.39

Table 2-1: Monitoring Well Construction and Groundwater Depth Information

Monitoring Well ID	Soil Boring ID	Reported Well Total Depth As Constructed (feet bgs)	Reported Screened Interval (feet bgs)	Surveyed Ground Elevation (feet NAVD88)	Surveyed Top of Casing Elevation (feet NAVD88)	GW Observed During Drilling (feet bgs)	Measured Well Total Depth (feet below TOC)	Static Water Level Depth (feet below TOC)	Static Water Level Date	Static Water Level Time	GW Elevation (feet NAVD88)
MW40											
MW40	SM68c	140.0	119 - 139	392.86	395.18	--	NR	127.99	6/4/2021	14:29	267.19
MW40	SM68c	140.0	119 - 139	392.86	395.18	--	NR	128.91	8/28/2021	15:45	266.27
MW40	SM68c	140.0	119 - 139	392.86	395.18	--	NR	125.78	6/1/2022	16:18	269.40
MW40	SM68c	140.0	119 - 139	392.86	395.18	--	NR	128.93	8/22/2022	1643	266.25
MW42											
MW42	SM70b	140.0	119 - 139	339.85	342.34	--	NR	127.2	6/4/2021	11:08	215.14
MW42	SM70b	140.0	119 - 139	339.85	342.34	--	NR	128.7	8/28/2021	16:31	213.66
MW42	SM70b	140.0	119 - 139	339.85	342.34	--	NR	121.5	6/1/2022	14:18	220.85
MW42	SM70b	140.0	119 - 139	339.85	342.34	--	NR	127.6	8/22/2022	1204	214.76
MW43											
MW43	SM71b	118.5	98 - 118	300.87	303.69	--	NR	88.62	6/4/2021	11:18	215.07
MW43	SM71b	118.5	98 - 118	300.87	303.69	--	NR	90.14	8/28/2021	16:38	213.55
MW43	SM71b	118.5	98 - 118	300.87	303.69	--	NR	82.92	6/1/2022	14:26	220.77
MW43	SM71b	118.5	98 - 118	300.87	303.69	--	NR	88.92	8/22/2022	1155	214.77
MW44											
MW44	SM72	69	48-68	378.92	381.59	--	NR	33.80	6/4/2021	16:02	347.79
MW44	SM72	69	48-68	378.92	381.59	--	NR	35.42	8/28/2021	15:56	346.17
MW44	SM72	69	48-68	378.92	381.59	--	NR	32.45	6/1/2022	15:06	349.14
MW44	SM72	69	48-68	378.92	381.59	--	NR	35.01	8/22/2022	1311	346.58
MW45											
MW45	SM73	82	61-81	397.70	400.37	--	NR	43.91	6/4/2021	13:35	356.46
MW45	SM73	82	61-81	397.70	400.37	--	NR	46.72	8/28/2021	13:40	353.65
MW45	SM73	82	61-81	397.70	400.37	--	NR	40.20	6/1/2022	15:32	360.17
MW45	SM73	82	61-81	397.70	400.37	--	NR	44.84	8/22/2022	1337	355.53
MW46											
MW46	SM74	57	36-56	399.62	402.50	--	NR	33.58	6/4/2021	13:27	368.92
MW46	SM74	57	36-56	399.62	402.50	--	NR	35.63	8/28/2021	13:32	366.87
MW46	SM74	57	36-56	399.62	402.50	--	NR	32.01	6/1/2022	15:39	370.49
MW46	SM74	57	36-56	399.62	402.50	--	NR	34.00	8/22/2022	1342	368.50
MW47											
MW47	SM75	67	46-66	380.67	383.67	--	NR	36.62	6/4/2021	13:14	347.05
MW47	SM75	67	46-66	380.67	383.67	--	NR	39.06	8/28/2021	13:25	344.61
MW47	SM75	67	46-66	380.67	383.67	--	NR	35.62	6/1/2022	15:50	348.05
MW47	SM75	67	46-66	380.67	383.67	--	NR	37.45	8/22/2022	1348	346.22
MW48											
MW48	SM76	44.5	23-43	348.87	351.51	--	NR	19.51	6/4/2021	16:13	332.00
MW48	SM76	44.5	23-43	348.87	351.51	--	NR	20.19	8/28/2021	16:02	331.32
MW48	SM76	44.5	23-43	348.87	351.51	--	NR	18.96	6/1/2022	14:58	332.55
MW48	SM76	44.5	23-43	348.87	351.51	--	NR	19.28	8/22/2022	1304	332.23

Table 2-1: Monitoring Well Construction and Groundwater Depth Information

Monitoring Well ID	Soil Boring ID	Reported Well Total Depth As Constructed (feet bgs)	Reported Screened Interval (feet bgs)	Surveyed Ground Elevation (feet NAVD88)	Surveyed Top of Casing Elevation (feet NAVD88)	GW Observed During Drilling (feet bgs)	Measured Well Total Depth (feet below TOC)	Static Water Level Depth (feet below TOC)	Static Water Level Date	Static Water Level Time	GW Elevation (feet NAVD88)
MW49											
MW49	SM77	61.7	40-60	301.15	303.78	--	NR	29.72	6/4/2021	16:36	274.06
MW49	SM77	61.7	40-60	301.15	303.78	--	NR	30.31	8/28/2021	16:10	273.47
MW49	SM77	61.7	40-60	301.15	303.78	--	NR	27.57	6/1/2022	17:40	276.21
MW49	SM77	61.7	40-60	301.15	303.78	--	NR	31.56	8/22/2022	12:44	272.22
MW50											
MW50	SM78	92	71-91	439.58	442.6501	--	NR	47.31	6/4/2021	15:15	395.34
MW50	SM78	92	71-91	439.58	442.6501	--	NR	49.26	8/28/2021	14:30	393.39
MW50	SM78	92	71-91	439.58	442.6501	--	NR	44.50	6/1/2022	17:01	398.15
MW50	SM78	92	71-91	439.58	442.6501	--	NR	49.50	8/22/2022	15:01	393.15
MW51											
MW51	SM79	77	56-76	422.38	425.05	--	NR	38.45	6/4/2021	14:55	386.60
MW51	SM79	77	56-76	422.38	425.05	--	NR	40.28	8/28/2021	14:03	384.77
MW51	SM79	77	56-76	422.38	425.05	--	NR	37.11	6/1/2022	17:08	387.94
MW51	SM79	77	56-76	422.38	425.05	--	NR	42.33	8/22/2022	1522	382.72
MW52											
MW52	SM80	56	35-55	383.91	386.83	--	NR	30.66	6/4/2021	13:08	356.17
MW52	SM80	56	35-55	383.91	386.83	--	NR	34.17	8/28/2021	13:17	352.66
MW52	SM80	56	35-55	383.91	386.83	--	NR	28.74	6/1/2022	15:58	358.09
MW52	SM80	56	35-55	383.91	386.83	--	NR	32.40	8/22/2022	1355	354.43
MW53											
MW53	SM81	62	41-61	460.82	463.7785	--	NR	30.43	6/4/2021	15:35	433.35
MW53	SM81	62	41-61	460.82	463.7785	--	NR	34.08	8/28/2021	14:56	429.70
MW53	SM81	62	41-61	460.82	463.7785	--	NR	28.78	6/1/2022	17:20	435.00
MW53	SM81	62	41-61	460.82	463.7785	--	NR	34.17	8/22/2022	1610	429.61
MW54											
MW54	SM82	50	29-49	423.01	425.7406	--	NR	29.43	6/4/2021	15:05	396.31
MW54	SM82	50	29-49	423.01	425.7406	--	NR	30.52	8/28/2021	14:17	395.22
MW54	SM82	50	29-49	423.01	425.7406	--	NR	28.30	6/1/2022	17:14	397.44
MW54	SM82	50	29-49	423.01	425.7406	--	NR	29.65	8/22/2022	1533	396.09
MW55											
MW55	SM83	27	10-20	341.26	344.09	--	NR	12.80	6/4/2021	13:00	331.29
MW55	SM83	27	10-20	341.26	344.09	--	NR	14.08	8/28/2021	13:10	330.01
MW55	SM83	27	10-20	341.26	344.09	--	NR	11.66	6/1/2022	16:06	332.43
MW55	SM83	27	10-20	341.26	344.09	--	NR	12.73	8/22/2022	1405	331.36
MW56											
MW56	SM84	76	55-75	408.55	411.329	--	NR	34.80	6/4/2021	13:43	376.53
MW56	SM84	76	55-75	408.55	411.329	--	NR	37.93	8/28/2021	13:46	373.40
MW56	SM84	76	55-75	408.55	411.329	--	NR	32.35	6/1/2022	15:00	378.98
MW56	SM84	76	55-75	408.55	411.329	--	NR	34.66	8/22/2022	1318	376.67

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Monitoring Well ID	Soil Boring ID	Reported Well Total Depth As Constructed (feet bgs)	Reported Screened Interval (feet bgs)	Surveyed Ground Elevation (feet NAVD88)	Surveyed Top of Casing Elevation (feet NAVD88)	GW Observed During Drilling (feet bgs)	Measured Well Total Depth (feet below TOC)	Static Water Level Depth (feet below TOC)	Static Water Level Date	Static Water Level Time	GW Elevation (feet NAVD88)
MW57											
MW57	SM85	60	37.5-57.5	461.00	463.8141	--	NR	32.22	6/4/2021	15:53	431.59
MW57	SM85	60	37.5-57.5	461.00	463.8141	--	NR	35.75	8/28/2021	15:17	428.06
MW57	SM85	60	37.5-57.5	461.00	463.8141	--	NR	30.52	6/1/2022	16:43	433.29
MW57	SM85	60	37.5-57.5	461.00	463.8141	--	NR	37.56	8/22/2022	1625	426.25
MW58											
MW58	SM86	58	36.62-56.62	469.84	472.7246	--	NR	30.48	6/4/2021	15:25	442.24
MW58	SM86	58	36.62-56.62	469.84	472.7246	--	NR	31.76	8/28/2021	14:43	440.96
MW58	SM86	58	36.62-56.62	469.84	472.7246	--	NR	29.81	6/1/2022	17:28	442.91
MW58	SM86	58	36.62-56.62	469.84	472.7246	--	NR	30.35	8/22/2022	1600	442.37
MW59											
MW59	SM87	161.5	140-160	432.63	435.4785	--	NR	133.66	6/4/2021	14:46	301.82
MW59	SM87	161.5	140-160	432.63	435.4785	--	NR	131.74	8/28/2021	15:28	303.74
MW59	SM87	161.5	140-160	432.63	435.4785	--	NR	132.56	6/1/2022	16:33	302.92
MW59	SM87	162.5	140-161	432.63	435.4785	--	NR	132.20	8/22/2022	1418	303.28

Notes
Elevation datum: NAVD88 calculated using GEOID09.
TOC refers to the top of PVC inner casing.

Acronyms and Abbreviations
bgs = below ground surface
GW = groundwater
ID = Identification
NAVD88 = North American Vertical Datum, 1988
NR = Not Recorded
NTCRA = non-time-critical removal action
PVC = polyvinyl chloride
TD = Total depth
TOC = Top of Casing
-- = No information avialable

Table 2-2. Red Devil Creek and Seep Discharge Gauging

Location[1]		RD02	RD03	RD10	RD14	RD04	RD12	RD13	RD15	RD05 (seep)	RD16	RD09	RD06	RD07	RD08B*
Average Spring		--	--	5.14	6.67	12.67	10.53	--	5.26	0.14	6.88	7.80	6.45	--	6.35
Average Fall		5.96	4.09	2.49	2.57	4.70	6.02	--	2.27	0.12	0.54	3.77	3.25	5.61	2.98
Estimated Discharge (cfs) by Date	**8/18/2011**	5.96	4.09	5.52	--	5.95	8.24	--	--	0.18	--	5.98	6.81	7.61	7.19
	5/26/2012	NR	NR	12.18	--	12.67	10.53	--	--	NR	--	13.36	14.47	NR	14.20
	9/12/2012	NR	NR	4.64	--	3.45	3.79	--	--	0.16	--	3.40	3.80	3.61	3.09
	6/19/2015	NR	NR	1.25	1.41	NR	NR	NR	1.40	0.23	1.61	1.40	1.54	NR	1.90
	9/2/2015	NR	NR	0.48	0.54	NR	NR	NR	0.67	0.19	0.60	0.80	0.79	NR	0.81
	9/28/2016	NR	NR	2.45	3.01	NR	NR	NR	3.53	0.35	NR	2.43	5.51	NR	NR
	6/1/2017	NR	NR	1.20	1.54	NR	NR	NR	1.91	0.01	NR	1.55	1.26	NR	2.15
	9/16/2017	NR	NR	5.22	6.35	NR	NR	NR	6.85	0.05	NR	6.23	7.08	NR	7.38
	5/19/2018	NR	NR	11.60	10.84	NR	NR	NR	15.80	0.33	NR	14.87	13.69	NR	10.41
	5/18/2019	NR	NR	11.47	12.87	NR	NR	NR	13.04	0.12	12.14	NR	15.15	NR	13.12
	9/10/2019	NR	NR	0.42	0.37	NR	NR	NR	0.41	0.01	0.47	NR	0.33	NR	0.26
	6/17/2020	NR	NR	0.54	NR	NR	NR	NR	0.88	0.17	NR	NR	1.11	NR	1.28
	9/2/2020	NR	NR	0.40	NR	NR	NR	NR	0.39	0.03	NR	NR	0.43	NR	0.44
	6/9/2021	NR	NR	1.47	NR	NR	NR	NR	1.68	0.04	NR	NR	1.78	NR	1.39
	9/3/2021	NR	NR	0.76	NR	NR	NR	NR	1.75	0.03	NR	NR	1.23	NR	1.66
	6/6/2022	NR	NR	1.39	NR	NR	NR	NR	2.13	0.05	NR	NR	2.61	NR	2.34*
	8/27/2022	NR	NR	2.89	NR	NR	NR	NR	2.59	0.04	NR	NR	2.60	NR	3.64*

Notes:

[1] Locations are organized from upstream to downstream along Red Devil Creek to the Kuskokwim River.

[*] RD08 was washed out due to the spring breakup flooding and replaced by RD08B in June 2022.

Acronyms and Abbreviations:

cfs = cubic feet per second

NR = Not Recorded; Station not monitored

RD = Red Devil

-- = Station not established

Table 2-3. Groundwater Baseline Analytical Data - Spring 2022

Analyte	Station ID		Units	MW06	MW09	MW10	MW16	MW17	MW26	MW27	MW28	MW29	MW33
	Geographic Area			Pre-1955 MPA	Pre-1955 MPA	Pre-1955 MPA	Pre-1955 MPA	Pre-1955 MPA	Pre-1955 MPA	Pre-1955 MPA	Pre-1955 MPA	Pre-1955 MPA	Surface Mined Area
	Sample ID			0622MW06GW	0622MW09GW	0622MW10GW	0622MW16GW	0622MW17GW	0622MW26GW	0622MW27GW	0622MW28GW	0622MW29GW	0622MW33GW
	Method												
Metals													
Aluminum	Metals (ICP)	6020B	mg/L	0.040 U	0.062	0.04 U	0.047	0.04 U	1.2 J	0.09	0.04 U	0.85 J	0.11 J
Antimony	Metals (ICP/MS)	6020B	mg/L	0.0082	0.0039	0.0012 J+	0.82 J	0.0074	0.36 J	0.013	0.004	0.0008 U	0.37 J
Arsenic	Metals (ICP/MS)	6020B	mg/L	0.042	0.03	0.12 J	0.44 J	0.0036	1.1 J	0.026	0.095	0.044	0.024
Barium	Metals (ICP/MS)	6020B	mg/L	0.085	0.39 J	0.095	0.036	0.036	0.51 J	0.041	0.044	0.17 J	0.033
Beryllium	Metals (ICP/MS)	6020B	mg/L	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.00011 J	0.0004 U	0.0004 U	0.0004 U	0.0004 U
Cadmium	Metals (ICP/MS)	6020B	mg/L	0.0004 U	0.00007 J	0.0004 U	0.00014 J	0.0004 U	0.00014 J	0.000061 J	0.0004 U	0.0004 U	0.0004 U
Calcium	Metals (ICP)	6020B	mg/L	30	35	20	19	18 J	48	75	35	45	18
Chromium	Metals (ICP/MS)	6020B	mg/L	0.00080 U	0.00098 J+	0.0008 U	0.0008 U	0.0008 U	0.0042	0.0016	0.0008 U	0.0027	0.0008 U
Cobalt	Metals (ICP/MS)	6020B	mg/L	0.0019	0.00078	0.000059 J	0.0054	0.0004 U	0.02	0.0029	0.0026	0.0018	0.00011 J
Copper	Metals (ICP/MS)	6020B	mg/L	0.00083 J	0.0031	0.00079 J	0.0063	0.00064 J	0.018	0.0051	0.00069 J	0.0024	0.0012 J
Iron	Metals (ICP)	6020B	mg/L	4.7 J	2.3 J	1.3 J	2.1 J	0.1 U	48 J	0.31 J	0.91 J	2.5 J	0.22 J
Lead	Metals (ICP/MS)	6020B	mg/L	0.000400 U	0.00081	0.0004 U	0.00096	0.0004 U	0.0034	0.00045	0.0004 U	0.0004 J+	0.0004 U
Magnesium	Metals (ICP)	6020B	mg/L	29	25	33	48	14	30	50	29	48	14
Manganese	Metals (ICP/MS)	6020B	mg/L	0.64 J	2.3 J	0.14 J	2.6 J	0.0015 J+	5.3 J	1.1 J	0.76 J	0.37 J	0.012
Nickel	Metals (ICP/MS)	6020B	mg/L	0.0034	0.0025 J	0.00038 J	0.0055	0.003 U	0.02	0.018	0.0065	0.0066	0.003 U
Potassium	Metals (ICP)	6020B	mg/L	0.9 J	1 J	1.1 J	2.1 J	0.46 J	3.4	1.4 J	0.86 J	1.2 J	0.81 J
Selenium	Metals (ICP/MS)	6020B	mg/L	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U
Silver	Metals (ICP/MS)	6020B	mg/L	0.000056 J+	0.000052 J+	0.000061 J+	0.000033 J+	0.000038 J+	0.000058 J+	0.000039 J+	0.0004 U	0.0004 U	0.000069 J+
Sodium	Metals (ICP)	6020B	mg/L	3.7	2.9	3.1	3.7	2.1	3.5	14	8.7	2	3.8
Thallium	Metals (ICP/MS)	6020B	mg/L	0.001000 U	0.0010 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vanadium	Metals (ICP/MS)	6020B	mg/L	0.004 U	0.00067 J	0.00093 J	0.0013 J	0.00067 J	0.0051	0.00054 J	0.004 U	0.0035 J	0.0011 J
Zinc	Metals (ICP/MS)	6020B	mg/L	0.007 U	0.012	0.007 U	0.017	0.007 U	0.019	0.014	0.007 U	0.007 U	0.007 U
Mercury	Metals (ICP/MS)	7470A	mg/L	0.0003 U	0.0003 U	0.0003 UJ	0.00025 J	0.0003 U	0.012	0.00081	0.0003 U	0.0003 U	0.0003 U
Total Low Level Mercury													
Mercury	Total Mercury	EPA 1631E	ng/L	3.8	69	150 J+	340	80 J+	14000	2000	240	190 B	160 B
Dissolved Low Level Mercury													
Mercury	Dissolved Mercury	EPA 1631E	ng/L	0.64 J+	9.6	3.4 J-	140	14	670	900	110	16	12 B
Field Water Quality Parameters													
Temperature	Field Measurement		Deg C	6.09	7.52	7.91	8.82	8.04	6.21	6.92	5.55	10.59	11.33
pH	Field Measurement		pH Units	6.8	6.54	7.21	6.28	7.05	6.58	6.22	6.93	6.66	6.44
Conductivity	Field Measurement		µS/cm	373	231	212	450	193	590	492	250	538	202
Turbidity	Field Measurement		NTU	7.67	9.07	4.16	0	0	59.37	8.06	1.86	33.04	0
Dissolved Oxygen	Field Measurement		mg/L	1.32	4.15	9.8	2	9.65	2.16	292	1.43	0.42	9.65
Oxidation-Reduction Potential	Field Measurement		mV	33.3	56.2	-0.9	57.9	74.2	-10.8	53.9	40.3	-42.4	82.1

Acronyms and Abbreviations
ADEC = Alaska Department of Environmental Conservation
Deg C = Degrees Celsius.
EPA = United States Environmental Protection Agency
GC/MS = Gas Chromatography/Mass Spectrometry
ICP/ MS = Inductively coupled plasma/mass spectrometry
mg/L = milligrams per liter
mS/cm = Millisiemens per centimeter
mV = Millivolts
ng/L = Nanograms per liter
NTU = Nephelometric turbidity units
µg/L = micrograms per liter

Data Qualifiers:
J = The analyte was detected. The associated result is estimated.
J+ = The analyte was detected. The associated result is estimated with high bias.
J- = The analyte was detected. The associated result is estimated low bias.
U = The analyte was analyzed for but not detected. The value provided is the method detection limit.
UJ = The analyte was analyzed for but not detected. The associated reporting limit is estimated.

Table 2-3. Groundwater Baseline Analytical Data - Spring 2022

Analyte	Station ID / Geographic Area / Sample ID / Method		Units	MW40 Surface Mined Area 0622MW40GW	MW42 Vicinity of the Proposed Repository 0622MW42GW	MW43 Vicinity of the Proposed Repository 0622MW43GW	MW44 Vicinity of the Proposed Repository 0622MW44GW	MW45 Vicinity of the Proposed Repository 0622MW45GW	MW46 Vicinity of the Proposed Repository 0622MW46GW	MW47 Vicinity of the Proposed Repository 0622MW47GW	MW49 Vicinity of the Proposed Repository 0622MW49GW	MW50 Vicinity of the Proposed Repository 0622MW50GW	MW51 Vicinity of the Proposed Repository 0622MW51GW
Metals													
Aluminum	Metals (ICP)	6020B	mg/L	0.04 U	0.086	0.04 U	0.05	0.04 U	0.04 U	0.04 U	3.4 J	0.056	0.04 U
Antimony	Metals (ICP/MS)	6020B	mg/L	0.018	0.22 J	0.0029	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.00092 J+	0.014	0.00033 J
Arsenic	Metals (ICP/MS)	6020B	mg/L	0.82 J	0.59 J	0.32 J	0.00081 J	0.001	0.00033 J	0.001 U	0.0089	0.55 J	0.0033
Barium	Metals (ICP/MS)	6020B	mg/L	0.14 J	0.13 J	0.13 J	0.026	0.00075 J	0.0025	0.00075 J+	0.058	0.27 J	0.022
Beryllium	Metals (ICP/MS)	6020B	mg/L	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U
Cadmium	Metals (ICP/MS)	6020B	mg/L	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.000097 J	0.0004 U	0.0004 U
Calcium	Metals (ICP)	6020B	mg/L	50	47	20	37	17	10	13	9.6	67	18
Chromium	Metals (ICP/MS)	6020B	mg/L	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0066	0.0008 U	0.0008 U
Cobalt	Metals (ICP/MS)	6020B	mg/L	0.037	0.0049	0.022	0.0027	0.0004 U	0.000057 J	0.0004 U	0.0027	0.0032	0.00083
Copper	Metals (ICP/MS)	6020B	mg/L	0.001 J	0.0016 J	0.00064 J	0.002 U	0.00092 J	0.00069 J	0.002 U	0.0044	0.00066 J	0.0019 J
Iron	Metals (ICP)	6020B	mg/L	2.4 J	1.8 J	3.4 J	1.1 J	0.1 U	0.13 J	0.1 U	2.4 J	3 J	0.36 J
Lead	Metals (ICP/MS)	6020B	mg/L	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0009	0.0004 U	0.0004 U
Magnesium	Metals (ICP)	6020B	mg/L	55	39	15	33	16	11	15	7.5	59	17
Manganese	Metals (ICP/MS)	6020B	mg/L	0.38 J	0.43 J	2.7 J	0.68 J	0.0019 J+	0.002 U	0.002 U	0.81 J	0.95 J	0.11 J
Nickel	Metals (ICP/MS)	6020B	mg/L	0.12 J	0.076	0.058	0.003 U	0.003 U	0.003 U	0.00061 J	0.013	0.009	0.003 U
Potassium	Metals (ICP)	6020B	mg/L	1 J	0.92 J	0.6 J	0.55 J	0.45 J	0.44 J	0.4 J	1.3 J	0.79 J	0.4 J
Selenium	Metals (ICP/MS)	6020B	mg/L	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U
Silver	Metals (ICP/MS)	6020B	mg/L	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0037	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.000039 J+
Sodium	Metals (ICP)	6020B	mg/L	1.8	3.1	2.7	1.9	1	1.2	1.5	1.3	2	1.7
Thallium	Metals (ICP/MS)	6020B	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vanadium	Metals (ICP/MS)	6020B	mg/L	0.00052 J	0.00072 J	0.004 U	0.00051 J	0.00046 J	0.0007 J	0.004 U	0.011	0.00056 J	0.004 U
Zinc	Metals (ICP/MS)	6020B	mg/L	0.0083	0.0076	0.007 U	0.007 U	0.013	0.007 U	0.007 U	0.012	0.01	0.007 U
Mercury	Metals (ICP/MS)	7470A	mg/L	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.00087	0.0003 U	0.0003 U
Total Low Level Mercury													
Mercury	Total Mercury	EPA 1631E	ng/L	59 B	390	5.9	6.5	12	17	7.4	1100	360	5.5
Dissolved Low Level Mercury													
Mercury	Dissolved Mercury	EPA 1631E	ng/L	1.5 B	12 B	0.44	0.53 J+	3.8	3.1	0.95	190	3.2	0.52 J+
Field Water Quality Parameters													
Temperature	Field Measurement		Deg C	8.03	6.4	4.85	4.55	3.78	3.9	9.21	4.59	6.32	7.33
pH	Field Measurement		pH Units	6.91	6.72	6.59	7.17	6.46	6.49	6.66	5.89	6.78	6.4
Conductivity	Field Measurement		µS/cm	591	301	146	404	210	130	186	114	673	216
Turbidity	Field Measurement		NTU	7.08	14.24	3.77	5.28	1.89	4.35	1.67	67.99	16.36	6.8
Dissolved Oxygen	Field Measurement		mg/L	3.64	2.6	1.1	0.46	8.8	10.74	7.61	8.24	4.22	4.38
Oxidation-Reduction Potential	Field Measurement		mV	58.6	-20.6	-53.3	-45.4	38	25.4	10.7	4.1	52.1	0.6

Acronyms and Abbreviations
ADEC = Alaska Department of Environmental Conservation
Deg C = Degrees Celsius.
EPA = United States Environmental Protection Agency
GC/MS = Gas Chromatography/Mass Spectrometry
ICP/ MS = Inductively coupled plasma/mass spectrometry
mg/L = milligrams per liter
mS/cm = Millisiemens per centimeter
mV = Millivolts
ng/L = Nanograms per liter
NTU = Nephelometric turbidity units
µg/L = micrograms per liter

Data Qualifiers:
J = The analyte was detected. The associated result is estimated.
J+ = The analyte was detected. The associated result is estimated with high bias.
J- = The analyte was detected. The associated result is estimated low bias.
U = The analyte was analyzed for but not detected. The value provided is the method detection limit.
UJ = The analyte was analyzed for but not detected. The associated reporting limit is estimated.

Table 2-3. Groundwater Baseline Analytical Data - Spring 2022

Analyte	Station ID / Geographic Area / Sample ID / Method		Units	MW52 Vicinity of the Proposed Repository 0622MW52GW	MW53 Vicinity of the Proposed Repository 0622MW53GW	MW54 Vicinity of the Proposed Repository 0622MW54GW	MW55 Vicinity of the Proposed Repository 0622MW55GW	MW56 Vicinity of the Proposed Repository 0622MW56GW	MW57 Vicinity of the Proposed Repository 0622MW57GW	MW58 Vicinity of the Proposed Repository 0622MW58GW	MW59 Vicinity of the Proposed Repository 0622MW59GW	Duplicate of MW49 Vicinity of the Proposed Repository 0622MW97GW	Duplicate of MW52 Vicinity of the Proposed Repository 0622MW98GW	Duplicate of MW10 Pre-1955 MPA 0622MW99GW
Metals														
Aluminum	Metals (ICP)	6020B	mg/L	0.67 J	0.067	0.04 U	0.04 U	0.04 U	0.079	0.051	1.3 J	3.3 J	0.75 J	0.04 U
Antimony	Metals (ICP/MS)	6020B	mg/L	0.0008 U	0.0008 U	0.00091	0.0077	0.0008 U	0.0008 U	0.0008 U	0.00088 J+	0.0009 J+	0.0008 U	0.0022
Arsenic	Metals (ICP/MS)	6020B	mg/L	0.0093	0.0003 J	0.051	0.038	0.00051 J	0.00078 J	0.0097	0.07	0.009	0.0099	0.12 J
Barium	Metals (ICP/MS)	6020B	mg/L	0.014	0.13 J	0.12 J	0.13 J	0.067	0.0047	0.13 J	0.35 J	0.057	0.015	0.094
Beryllium	Metals (ICP/MS)	6020B	mg/L	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U
Cadmium	Metals (ICP/MS)	6020B	mg/L	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.000098 J	0.0004 U	0.0004 U
Calcium	Metals (ICP)	6020B	mg/L	9.9	19	39	22	45	5.7	28	52	9.5	9.5	19
Chromium	Metals (ICP/MS)	6020B	mg/L	0.0019	0.0008 U	0.0008 U	0.0008 U	0.00034 J	0.00085 J+	0.0008 U	0.0041	0.0065	0.002	0.0008 U
Cobalt	Metals (ICP/MS)	6020B	mg/L	0.0019	0.00032 J	0.0013	0.0024	0.00069	0.000059 J	0.00078	0.0015	0.0028	0.0024	0.000063 J
Copper	Metals (ICP/MS)	6020B	mg/L	0.0014 J	0.00079 J	0.002 U	0.00075 J	0.00074 J	0.00071 J	0.00079 J	0.0039	0.0045	0.0013 J	0.00063 J
Iron	Metals (ICP)	6020B	mg/L	0.59 J	0.1 U	3 J	13 J	0.1 U	0.1 U	8.5 J	2 J	2.4 J	0.62 J	31
Lead	Metals (ICP/MS)	6020B	mg/L	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0023	0.0005	0.00097	0.0004 U	0.0004 U
Magnesium	Metals (ICP)	6020B	mg/L	6.1	11	39	17	43	3.1	23	52	7.4	5.9	1 J
Manganese	Metals (ICP/MS)	6020B	mg/L	0.086	0.12 J	0.34 J	0.76 J	0.89 J	0.002 U	0.25 J	0.42 J	0.84 J	0.1 J	0.14 J
Nickel	Metals (ICP/MS)	6020B	mg/L	0.0025 J	0.0012 J	0.0065	0.003	0.0059	0.0014 J	0.0032	0.0049	0.013	0.0027 J	0.00036 J
Potassium	Metals (ICP)	6020B	mg/L	0.48 J	0.32 J	0.77 J	0.85 J	0.64 J	0.31 J	0.64 J	1.3 J	1.5 J	0.55 J	
Selenium	Metals (ICP/MS)	6020B	mg/L	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U
Silver	Metals (ICP/MS)	6020B	mg/L	0.000073 J+	0.00012 J+	0.00068	0.0004 U	0.0004 U	0.000034 J	0.000027 J+	0.00025 J+	0.000039 J+	0.0004 U	0.0004 U
Sodium	Metals (ICP)	6020B	mg/L	2.1	1.7	1.7	2	1.2	1.7	1.4	1.6	1.3	2.1	
Thallium	Metals (ICP/MS)	6020B	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vanadium	Metals (ICP/MS)	6020B	mg/L	0.0023 J	0.00059 J	0.004 U	0.00054 J	0.004 U	0.00056 J	0.00049 J	0.0045	0.01	0.0027 J	0.00075 J
Zinc	Metals (ICP/MS)	6020B	mg/L	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.0075	0.012	0.007 U	0.007 U
Mercury	Metals (ICP/MS)	7470A	mg/L	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.00015 J	0.00078	0.0003 U	0.00037 J
Total Low Level Mercury														
Mercury	Total Mercury	EPA 1631E	ng/L	100	49	47	32	15	49 B	130 B	190	900 B	99	150
Dissolved Low Level Mercury														
Mercury	Dissolved Mercury	EPA 1631E	ng/L	14	8.2	2.4	9	0.65 J+	23 B	1.7 B	23	220	17	2.2 J
Field Water Quality Parameters														
Temperature	Field Measurement		Deg C	4.92	7.75	6.24	5.64	4.04	5.95	8.05	11.35	4.59	4.92	8.04
pH	Field Measurement		pH Units	5.87	6.53	7.02	6.49	6.68	6.13	7.38	6.92	5.89	5.87	7.05
Conductivity	Field Measurement		µS/cm	103	113	452	292	502	62	205	450	114	103	193
Turbidity	Field Measurement		NTU	36.29	0	10.79	12.32	0.74	0	27.32	58.22	67.99	36.29	0
Dissolved Oxygen	Field Measurement		mg/L	11.85	8.33	0.67	1.98	3.17	11.7	1.25	2.89	8.24	11.85	9.65
Oxidation-Reduction Potential	Field Measurement		mV	12.7	62.6	-38	33.3	51.7	61.6	35.5	-3.5	4.1	12.7	74.2

Acronyms and Abbreviations
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Deg C = Degrees Celsius.
EPA = United States Environmental Protection Agency
GC/MS = Gas Chromatography/Mass Spectrometry
ICP/ MS = Inductively coupled plasma/mass spectrometry
mg/L = milligrams per liter
mS/cm = Millisiemens per centimeter
mV = Millivolts
ng/L = Nanograms per liter
NTU = Nephelometric turbidity units
µg/L = micrograms per liter

Data Qualifiers:
J = The analyte was detected. The associated result is estimated.
J+ = The analyte was detected. The associated result is estimated with high bias.
J- = The analyte was detected. The associated result is estimated low bias.
U = The analyte was analyzed for but not detected. The value provided is the method detection limit.
UJ = The analyte was analyzed for but not detected. The associated reporting limit is estimated.

Table 2-4. Groundwater Baseline Analytical Data - Fall 2022

Analyte		Station ID / Geographic Area		MW06 Pre-1955 MPA		MW09 Pre-1955 MPA		MW10 Pre-1955 MPA		MW16 Pre-1955 MPA		MW17 Pre-1955 MPA		MW26 Pre-1955 MPA		MW27 Pre-1955 MPA	
		Sample ID		0822MW06GW		0822MW09GW		0822MW10GW		0822MW16GW		0822MW17GW		0821MW26GW		0822MW27GW	
Metals	**Method**		**Units**		**Q**		**Q**		**Q**		**Q**		**Q**		**Q**		**Q**
Aluminum	Metals (ICP)	6020B	mg/L	0.023	J	0.053		0.04	U	0.071		0.03	J	0.14		0.012	J
Antimony	Metals (ICP/MS)	6020B	mg/L	0.011		0.0023		0.00029	J	0.36	J	0.0056		0.1		0.0068	
Arsenic	Metals (ICP/MS)	6020B	mg/L	0.052		0.017		0.1		1.3	J	0.0028		1.5	J	0.032	
Barium	Metals (ICP/MS)	6020B	mg/L	0.089		0.45	J	0.094		0.074		0.045		0.56	J	0.041	
Beryllium	Metals (ICP/MS)	6020B	mg/L	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.0004	U
Cadmium	Metals (ICP/MS)	6020B	mg/L	0.0004	U	0.0004	U	0.0004	U	0.00038	J	0.0004	U	0.0004	U	0.000088	J
Calcium	Metals (ICP)	6010D	mg/L	27		30		19		35		21		57		78	
Chromium	Metals (ICP/MS)	6020B	mg/L	0.0008	U	0.0008	U	0.0008	U	0.0008	U	0.0008	U	0.0019		0.0008	U
Cobalt	Metals (ICP/MS)	6020B	mg/L	0.0018		0.0017		0.0004	U	0.013		0.0004	U	0.023		0.0033	
Copper	Metals (ICP/MS)	6020B	mg/L	0.00069	J	0.002	U	0.002	U	0.0013	J	0.002	U	0.0055		0.0009	J
Iron	Metals (ICP)	6020B	mg/L	4.2	J	2.6	J	1		22	J	0.039	J	53	J	0.21	
Lead	Metals (ICP/MS)	6020B	mg/L	0.00019	J	0.00015	J+	0.0004	U	0.00024	J+	0.000051	J	0.00085		0.0004	U
Magnesium	Metals (ICP)	6010D	mg/L	27		20		28		63		16		34		50	
Manganese	Metals (ICP/MS)	6020B	mg/L	0.64	J	5.2	J	0.14	J	9.2	J	0.0014	J	6.7	J	2.3	J
Nickel	Metals (ICP/MS)	6020B	mg/L	0.0048		0.003	U	0.00017	J	0.0047		0.00013	J	0.025		0.033	
Potassium	Metals (ICP)	6010D	mg/L	0.79	J	0.49	J	1	J	2.1	J	0.37	J	3.1	J	1.2	J
Selenium	Metals (ICP/MS)	6020B	mg/L	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U
Silver	Metals (ICP/MS)	6020B	mg/L	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.00003	J+	0.0004	U	0.000043	J+
Sodium	Metals (ICP)	6010D	mg/L	3.8		2.5		2.9		5		2.6		4.1		13	
Thallium	Metals (ICP/MS)	6020B	mg/L	0.001	U	0.001	U	0.001	U	0.001	U	0.001	U	0.001	U	0.001	U
Vanadium	Metals (ICP/MS)	6020B	mg/L	0.004	U	0.004	U	0.004	U	0.00098	J	0.004	U	0.0013	J	0.004	U
Zinc	Metals (ICP/MS)	6020B	mg/L	0.0051	J	0.0028	J	0.007	U	0.0063	J	0.0023	J	0.019		0.017	
Mercury	Metals (ICP/MS)	7470A	mg/L	0.0003	U	0.0003	U	0.0003	U	0.00098		0.0003	U	0.0025		0.00064	
Total Low Level Mercury																	
Mercury	Total Mercury	EPA 1631E	ng/L	14		80		49	J	1300		120		3900		1400	
Dissolved Low Level Mercury																	
Mercury	Dissolved Mercury	EPA 1631E	ng/L	1.9	J+	13		0.68		970		19		500		790	
Field Water Quality Parameters																	
Temperature	Field Measurement		Deg C	6.0		6.9		9.4		8.4		7.5		9.3		16.1	
pH	Field Measurement		pH Units	6.71		6.68		7.23		6.31		6.95		6.30		5.76	
Conductivity	Field Measurement		µS/cm	322.2		324.1		318.9		760		232.0		677		6	
Turbidity	Field Measurement		NTU	3.34		9.55		0.28		7.20		1.31		92.6		0.49	
Dissolved Oxygen	Field Measurement		mg/L	0.43		1.09		0.72		0.43		8.97		0.87		0.48	
Oxidation-Reduction Potential	Field Measurement		mV	-13.9		-12.5		38.4		52.8		164.1		44.5		39.0	

Acronyms and Abbreviations
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EPA = United States Environmental Protection Agency
GC/MS = Gas Chromatography/Mass Spectrometry
ICP/ MS = Inductively coupled plasma/mass spectrometry
mg/L = milligrams per liter
mS/cm = Millisiemens per centimeter
mV = Millivolts
ng/L = Nanograms per liter
NTU = Nephelometric turbidity units
µg/L = micrograms per liter

Data Qualifiers:
J = The analyte was detected. The associated result is estimated.
J+ = The analyte was detected. The associated result is estimated with high bias.
J- = The analyte was detected. The associated result is estimated low bias.
U = The analyte was analyzed for but not detected. The value provided is the method detection limit.
UJ = The analyte was analyzed for but not detected. The associated reporting limit is estimated.

Table 2-4. Groundwater Baseline Analytical Data - Fall 2022

Analyte		Station ID Geographic Area Sample ID		MW28 Pre-1955 MPA 0822MW28GW		MW29 Pre-1955 MPA 0822MW29GW		MW33 Pre-1955 MPA 0822MW33GW		MW40 Surface Mined Area 0822MW40GW		MW42 Surface Mined Area 0822MW42GW		MW43 Surface Mined Area 0822MW43GW		MW44 Vicinity of the Proposed Repository 0822MW44GW		MW45 Vicinity of the Proposed Repository 0822MW45GW	
Metals	**Method**		**Units**		**Q**		**Q**		**Q**		**Q**		**Q**		**Q**		**Q**		**Q**
Aluminum	Metals (ICP)	6020B	mg/L	0.011	J	0.9		0.66		0.016	J	0.021	J	0.017	J	0.044		0.019	J
Antimony	Metals (ICP/MS)	6020B	mg/L	0.0044		0.00081		0.41	J	0.007		0.19	J	0.0098		0.00087		0.00038	J
Arsenic	Metals (ICP/MS)	6020B	mg/L	0.12	J	0.06		0.03		0.47	J	0.7	J	0.32	J	0.0023		0.0012	
Barium	Metals (ICP/MS)	6020B	mg/L	0.053		0.2		0.043		0.13	J	0.15	J	0.12	J	0.03		0.00056	J
Beryllium	Metals (ICP/MS)	6020B	mg/L	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.0004	U
Cadmium	Metals (ICP/MS)	6020B	mg/L	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.0004	U
Calcium	Metals (ICP)	6010D	mg/L	37		53		16		42		36		22		37		18	
Chromium	Metals (ICP/MS)	6020B	mg/L	0.0008	U	0.0061		0.0024		0.0008	U	0.0008	U	0.0008	U	0.0008	U	0.00059	J
Cobalt	Metals (ICP/MS)	6020B	mg/L	0.003		0.0023		0.00045		0.028		0.0014		0.035		0.0031		0.0004	U
Copper	Metals (ICP/MS)	6020B	mg/L	0.0018	J	0.0031		0.002		0.002	U	0.0011	J	0.002	U	0.022		0.0004	U
Iron	Metals (ICP)	6020B	mg/L	1.2		3.7	J	1.2		1.4		2.3	J	2.8	J	1.9		0.1	U
Lead	Metals (ICP/MS)	6020B	mg/L	0.000092	J	0.00055		0.00055		0.00012	J	0.00004	J	0.000047	J+	0.00065		0.0004	U
Magnesium	Metals (ICP)	6010D	mg/L	30		54		12		45		29		17		33		16	
Manganese	Metals (ICP/MS)	6020B	mg/L	0.86	J	0.48	J	0.04		0.31	J	0.42	J	2.7	J	0.86	J	0.0012	J
Nickel	Metals (ICP/MS)	6020B	mg/L	0.0082		0.0089		0.003	U	0.094		0.016		0.1		0.0026	J	0.003	U
Potassium	Metals (ICP)	6010D	mg/L	0.92	J	1.3	J	0.76	J	0.84	J	0.63	J	0.54	J	0.43	J	0.39	J
Selenium	Metals (ICP/MS)	6020B	mg/L	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U
Silver	Metals (ICP/MS)	6020B	mg/L	0.000096	J+	0.0004	U	0.0004	U	0.0004	U	0.000045	J+	0.000033	J+	0.000025	J+	0.0004	U
Sodium	Metals (ICP)	6010D	mg/L	9.8		2.3		4.1		1.7		2.7		3.1		2.2		1.2	
Thallium	Metals (ICP/MS)	6020B	mg/L	0.001	U	0.001	U	0.001	U	0.001	U	0.001	U	0.001	U	0.001	U	0.001	U
Vanadium	Metals (ICP/MS)	6020B	mg/L	0.004	U	0.004		0.0024	J	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U
Zinc	Metals (ICP/MS)	6020B	mg/L	0.0086		0.0072		0.0067	J	0.0055	J	0.005	J	0.0048	J	0.014		0.0012	J
Mercury	Metals (ICP/MS)	7470A	mg/L	0.0003	U	0.00015	J	0.00028	J	0.0003	U	0.0003	U	0.0003	U	0.0003	U	0.0003	U
Total Low Level Mercury																			
Mercury	Total Mercury	EPA 1631E	ng/L	120		440		420		11		74		1.2	J	4.7		7.4	J+
Dissolved Low Level Mercury																			
Mercury	Dissolved Mercury	EPA 1631E	ng/L	73		76		31		0.81	J+	9.8		0.5	U	0.5	U	4.9	J+
Field Water Quality Parameters																			
Temperature	Field Measurement		Deg C	8.0		4.4		7.0		6.1		5.3		4.0		4.5		3.6	
pH	Field Measurement		pH Units	6.78		6.44		6.38		6.89		6.62		6.56		6.99		6.58	
Conductivity	Field Measurement		µS/cm	419.6		543		11		516		395.6		267.7		414.0		194.7	
Turbidity	Field Measurement		NTU	0.34		247		6.72		10.3		15.3		0.42		9.34		7.51	
Dissolved Oxygen	Field Measurement		mg/L	0.86		0.53		6.18		1.26		0.40		0.39		0.54		6.71	
Oxidation-Reduction Potential	Field Measurement		mV	84.6		-2.5		3.8		137.2		87.4		72.4		72.2		-7.6	

Acronyms and Abbreviations
ADEC = Alaska Department of Environmental Conservation
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EPA = United States Environmental Protection Agency
GC/MS = Gas Chromatography/Mass Spectrometry
ICP/ MS = Inductively coupled plasma/mass spectrometry
mg/L = milligrams per liter
mS/cm = Millisiemens per centimeter
mV = Millivolts
ng/L = Nanograms per liter
NTU = Nephelometric turbidity units
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Table 2-4. Groundwater Baseline Analytical Data - Fall 2022

Analyte		Station ID Geographic Area		MW46 Vicinity of the Proposed Repository		MW47 Vicinity of the Proposed Repository		MW49 Vicinity of the Proposed Repository		MW50 Vicinity of the Proposed Repository		MW51 Vicinity of the Proposed Repository		MW52 Vicinity of the Proposed Repository		MW53 Vicinity of the Proposed Repository		MW54 Vicinity of the Proposed Repository	
		Sample ID		0822MW46GW		0822MW47GW		0822MW49GW		0822MW50GW		0822MW51GW		0822MW52GW		0822MW53GW		0822MW54GW	
Metals	**Method**		**Units**		**Q**		**Q**		**Q**		**Q**		**Q**		**Q**		**Q**		**Q**
Aluminum	Metals (ICP)	6020B	mg/L	0.055		0.0068	J	3.6	J	0.12		0.018	J	0.024	J	0.027	J	0.018	J
Antimony	Metals (ICP/MS)	6020B	mg/L	0.00043	J	0.0008	U	0.00092		0.019		0.00017	J	0.00044	J	0.00019	J	0.0009	
Arsenic	Metals (ICP/MS)	6020B	mg/L	0.00091	J	0.001	U	0.012		0.66	J	0.0025		0.0063		0.001	U	0.058	
Barium	Metals (ICP/MS)	6020B	mg/L	0.0018		0.00099	J	0.066		0.32	J	0.015		0.021		0.13	J	0.14	J
Beryllium	Metals (ICP/MS)	6020B	mg/L	0.0004	U	0.0004	U	0.00028	J	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.0004	U
Cadmium	Metals (ICP/MS)	6020B	mg/L	0.0004	U	0.0004	U	0.00016	J	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.0004	U
Calcium	Metals (ICP)	6010D	mg/L	12		18		12		68		16		14		18		38	
Chromium	Metals (ICP/MS)	6020B	mg/L	0.00065	J	0.0008	U	0.0075		0.0007	J	0.00059	J	0.00082	J+	0.0008	U	0.0008	U
Cobalt	Metals (ICP/MS)	6020B	mg/L	0.0004	U	0.000043	J	0.0046		0.0032		0.001		0.00044		0.000062	J	0.0012	
Copper	Metals (ICP/MS)	6020B	mg/L	0.002	U	0.0018	J	0.0066		0.0011	J	0.00097	J	0.002	U	0.002	U	0.002	U
Iron	Metals (ICP)	6020B	mg/L	0.1	U	0.1	U	3.4	J	2.8	J	0.36		0.036	J	0.066	J	2.9	J
Lead	Metals (ICP/MS)	6020B	mg/L	0.0004	U	0.000043	J	0.0015		0.00025	J	0.0004	U	0.0004	U	0.0004	U	0.000063	J
Magnesium	Metals (ICP)	6010D	mg/L	12		20		8.9		56		15		9.8		10		36	
Manganese	Metals (ICP/MS)	6020B	mg/L	0.0013	J	0.037		1.1	J	1.1	J	0.14	J	0.029		0.0099		0.33	J
Nickel	Metals (ICP/MS)	6020B	mg/L	0.003	U	0.003	U	0.018		0.007		0.0014	J	0.0015	J	0.0009	J	0.0057	
Potassium	Metals (ICP)	6010D	mg/L	0.41	J	0.45	J	1.4	J	0.67	J	0.28	J	0.31	J	0.33	J	0.65	J
Selenium	Metals (ICP/MS)	6020B	mg/L	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U
Silver	Metals (ICP/MS)	6020B	mg/L	0.0004	U	0.0004	U	0.00003	J+	0.0004	U	0.00042		0.0004	U	0.000036	J+	0.0004	U
Sodium	Metals (ICP)	6010D	mg/L	1.2		1.9		1.6		2		1.9		2.4		1.9		1.8	
Thallium	Metals (ICP/MS)	6020B	mg/L	0.001	U	0.001	U	0.001	U	0.001	U	0.001	U	0.001	U	0.001	U	0.001	U
Vanadium	Metals (ICP/MS)	6020B	mg/L	0.00052	J	0.004	U	0.012		0.00078	J	0.004	U	0.004	U	0.004	U	0.004	U
Zinc	Metals (ICP/MS)	6020B	mg/L	0.0011	J	0.007	U	0.017		0.0049	J	0.0025	J	0.0011	J	0.0015	J	0.0014	J
Mercury	Metals (ICP/MS)	7470A	mg/L	0.0003	U	0.0003	U	0.0013		0.00025	J	0.0003	U	0.0003	U	0.0003	U	0.0003	U
Total Low Level Mercury																			
Mercury	Total Mercury	EPA 1631E	ng/L	7.7	J+	1.6	U	1100		770		6.4		12		19		14	J
Dissolved Low Level Mercury																			
Mercury	Dissolved Mercury	EPA 1631E	ng/L	1.9	J+	1.6	U	60		3.3	J+	1.1		3.3	J+	8.6		0.58	U
Field Water Quality Parameters																			
Temperature	Field Measurement		Deg C	3.7		5.3		5.2		3.9		5.5		4.3		5.2		3.8	
pH	Field Measurement		pH Units	6.67		6.89		5.78		6.64		6.44		6.24		6.51		6.87	
Conductivity	Field Measurement		µS/cm	145.4		209.9		1317		6.75		199.5		1760		180.7		474.2	
Turbidity	Field Measurement		NTU	10.2		5.96		310		250		5.95		5.31		0.80		8.36	
Dissolved Oxygen	Field Measurement		mg/L	8.48		4.23		5.0		1.27		7.23		8.79		7.47		1.60	
Oxidation-Reduction Potential	Field Measurement		mV	-12.6		-24.2		35.5		-11.5		183.4		10.5		185.2		69.9	

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ICP/ MS = Inductively coupled plasma/mass spectrometry
mg/L = milligrams per liter
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mV = Millivolts
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Table 2-4. Groundwater Baseline Analytical Data - Fall 2022

Analyte		Station ID / Geographic Area		MW55 Vicinity of the Proposed Repository		MW56 Vicinity of the Proposed Repository		MW57 Vicinity of the Proposed Repository		MW58 Vicinity of the Proposed Repository		MW59 Vicinity of the Proposed Repository		Duplicate of MW54 Vicinity of the Proposed Repository		Duplicate of MW43 Pre-1955 MPA		Duplicate of MW10 Pre-1955 MPA	
		Sample ID		0822MW55GW		0822MW56GW		0822MW57GW		0822MW58GW		0822MW59GW		0822MW97GW		0822MW98GW		0822MW99GW	
Metals	**Method**		**Units**																
Aluminum	Metals (ICP)	6020B	mg/L	0.013	J	0.35		0.026	J	0.084		5.1	J	0.015	J	0.0061	J	0.04	U
Antimony	Metals (ICP/MS)	6020B	mg/L	0.005		0.0005	J	0.00017	J	0.00037	J	0.0021		0.00076	J	0.01		0.0014	J
Arsenic	Metals (ICP/MS)	6020B	mg/L	0.14	J	0.004		0.00076	J	0.0034		0.14	J	0.061		0.34	J	0.1	
Barium	Metals (ICP/MS)	6020B	mg/L	0.18	J	0.11	J	0.005		0.11	J	0.53	J	0.14	J	0.13	J	0.095	
Beryllium	Metals (ICP/MS)	6020B	mg/L	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.00037	J	0.0004	U	0.0004	U	0.0004	U
Cadmium	Metals (ICP/MS)	6020B	mg/L	0.0004	U	0.000076	J	0.0004	U	0.0004	U	0.00009	J	0.0004	U	0.000062	J	0.0004	U
Calcium	Metals (ICP)	6010D	mg/L	19		43		8.7		26		54		40		21		19	
Chromium	Metals (ICP/MS)	6020B	mg/L	0.001		0.0025		0.00091		0.00082		0.018		0.0008	U	0.0008	U	0.0008	U
Cobalt	Metals (ICP/MS)	6020B	mg/L	0.0017		0.014		0.0004	U	0.00037	J	0.0055		0.0011		0.035		0.0004	U
Copper	Metals (ICP/MS)	6020B	mg/L	0.00077	J	0.003		0.002	U	0.002	U	0.019		0.00099	J	0.002	U	0.002	U
Iron	Metals (ICP)	6020B	mg/L	55	J	0.96		0.1	U	2.9	J	8	J	3	J	2.8	J	1.1	
Lead	Metals (ICP/MS)	6020B	mg/L	0.000055	J	0.00032	J	0.0004		0.00006	J	0.0026		0.00005	J	0.000094	J	0.0004	U
Magnesium	Metals (ICP)	6010D	mg/L	11		37		5		21		54		39		17		28	
Manganese	Metals (ICP/MS)	6020B	mg/L	0.97	J	5.1	J	0.0016	J	0.098		0.51	J	0.35	J	2.7	J	0.14	J
Nickel	Metals (ICP/MS)	6020B	mg/L	0.0031		0.033		0.0041		0.003	U	0.018		0.0057		0.099		0.00013	J
Potassium	Metals (ICP)	6010D	mg/L	0.94	J	0.55	J	0.19	J	3.3	U	3.3	U	0.66	J	0.48	J	0.98	J
Selenium	Metals (ICP/MS)	6020B	mg/L	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U
Silver	Metals (ICP/MS)	6020B	mg/L	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.00018	J+	0.0004	U	0.000092	J+	0.0004	U
Sodium	Metals (ICP)	6010D	mg/L	2.3		1.3		2.1		1.6		1.9		1.8		3		2.9	
Thallium	Metals (ICP/MS)	6020B	mg/L	0.001	U	0.001	U	0.001	U	0.000044	J+	0.00012	J+	0.001	U	0.001	U	0.001	U
Vanadium	Metals (ICP/MS)	6020B	mg/L	0.0009	J	0.0019	J	0.004	U	0.0005	J	0.021		0.004	U	0.004	U	0.004	U
Zinc	Metals (ICP/MS)	6020B	mg/L	0.0064	J	0.0079		0.0031	J	0.0018	J	0.021		0.0012	J	0.007		0.007	U
Mercury	Metals (ICP/MS)	7470A	mg/L	0.0003	U	0.0003	U	0.0003	U	0.0003	U	0.0011		0.0003	U	0.0003	U	0.0003	U
Total Low Level Mercury																			
Mercury	Total Mercury	EPA 1631E	ng/L	36		43		23		15		960		6.9	J	34	J	8.5	J
Dissolved Low Level Mercury																			
Mercury	Dissolved Mercury	EPA 1631E	ng/L	27		1.4	J+	12		2.4	J+	97		0.78		0.5	U	0.95	
Field Water Quality Parameters																			
Temperature	Field Measurement		Deg C	4.7		4.7		4.3		4.7		6.5		3.8		4.0		9.4	
pH	Field Measurement		pH Units	6.33		6.77		6.26		6.89		6.98		6.87		6.56		7.23	
Conductivity	Field Measurement		µS/cm	3892		4218		1083		2849		599		474.2		267.7		318.9	
Turbidity	Field Measurement		NTU	34.7		21.2		1.04		94.8		284		8.36		0.42		0.28	
Dissolved Oxygen	Field Measurement		mg/L	0.43		1.44		7.90		0.31		0.61		1.60		0.39		0.72	
Oxidation-Reduction Potential	Field Measurement		mV	5.6		-18.0		9.1		-25.8		66.6		69.9		72.4		38.4	

Acronyms and Abbreviations
ADEC = Alaska Department of Environmental Conservation
Deg C = Degrees Celsius.
EPA = United States Environmental Protection Agency
GC/MS = Gas Chromatography/Mass Spectrometry
ICP/ MS = Inductively coupled plasma/mass spectrometry
mg/L = milligrams per liter
mS/cm = Millisiemens per centimeter
mV = Millivolts
ng/L = Nanograms per liter
NTU = Nephelometric turbidity units
µg/L = micrograms per liter

Data Qualifiers:
J = The analyte was detected. The associated result is estimated.
J+ = The analyte was detected. The associated result is estimated with high bias.
J- = The analyte was detected. The associated result is estimated low bias.
U = The analyte was analyzed for but not detected. The value provided is the method detection limit.
UJ = The analyte was analyzed for but not detected. The associated reporting limit is estimated.

Table 2-5. Surface Water Baseline Analytical Data - Spring 2022

Sample Location			RD10SW		RD15SW		RD05SW (seep)		RD05SW (seep)		RD06SW		RD08BSW	
Sample ID			0622RD10SW		0622RD15SW		0622RD05SW		0622RD99SW		0622RD06SW		0622RD08BSW	
Sampling Date			6/6/2022		6/6/2022		6/6/2022		6/6/2022		6/6/2022		6/6/2022	
Matrix			WS		WS		WS		WS		WS		WS	
Analyte	**Method**	**Units**	Result	Q		Q		Q		Q		Q		Q
General Chemistry														
Total Dissolved Solids	160.1	mg/L	**64**		**93**		**240**		**270**		**130**		**82**	
Total Suspended Solids	160.2	mg/L	**2**	U	**2**	U	**3.4**		**2.6**		**2**	U	**2**	U
Chloride	300.0	mg/L	**0.65**	**J**	**0.69**	**J**	**0.78**	**J**	**0.81**	**J**	**0.7**	**J**	**0.73**	**J**
Fluoride	300.0	mg/L	**0.2**	UJ	**0.2**	UJ	**0.2**	UJ	**0.2**	UJ	**0.2**	UJ	**0.2**	UJ
Sulfate	300.0	mg/L	**8.3**	**J**	**8.3**	**J**	**31**	**J**	**31**	**J**	**10**	**J**	**10**	**J**
Alkalinity	310.1	mg/L	**62**		**56**		**260**		**270**		**74**		**74**	
Bicarbonate Alkalinity as CaCO3	310.1	mg/L	**62**		**56**		**260**		**270**		**74**		**74**	
Carbonate Alkalinity as CaCO3	310.1	mg/L	**7**	U	**7**	U	**7**	U	**7**	U	**7**	U	**7**	U
Nitrate Nitrite as N	353.2	mg/L	**0.16**	**J+**	**0.24**	**J+**	**0.1**	U	**0.1**	U	**0.17**	**J+**	**0.14**	**J+**
Metals		null												
Aluminum	6020B	mg/L	**0.037**	**J**	**0.051**		**0.012**	**J**	**0.0081**	**J**	**0.038**	**J**	**0.044**	
Antimony	6020B	mg/L	**0.002**		**0.044**		**0.099**		**0.098**		**0.2**	**J**	**0.22**	**J**
Arsenic	6020B	mg/L	**0.001**		**0.015**		**0.93**	**J**	**1**	**J**	**0.077**		**0.081**	
Barium	6020B	mg/L	**0.021**		**0.021**		**0.1**	**J**	**0.11**	**J**	**0.026**		**0.026**	
Beryllium	6020B	mg/L	**0.0004**	U	**0.0004**	U	**0.0004**	U	**0.0004**	U	**0.0004**	U	**0.0004**	U
Cadmium	6020B	mg/L	**0.0004**	U	**0.0004**	U	**0.0004**	U	**0.0004**	U	**0.0004**	U	**0.0004**	U
Calcium	6010D	mg/L	**14**		**14**		**37**		**36**		**15**		**15**	
Chromium	6020B	mg/L	**0.00037**	**J**	**0.00039**	**J**	**0.00023**	**J**	**0.00022**	**J**	**0.00037**	**J**	**0.00034**	**J**
Cobalt	6020B	mg/L	**0.0004**	U	**0.000062**	**J**	**0.0041**		**0.0039**		**0.00021**	**J**	**0.00019**	**J**
Copper	6020B	mg/L	**0.002**	U	**0.002**	U	**0.00074**	**J**	**0.00064**	**J**	**0.00065**	**J**	**0.00073**	**J**
Iron	6020B	mg/L	**0.098**	**J**	**0.14**	**J**	**1.8**	**J**	**1.9**	**J**	**0.16**	**J**	**0.15**	**J**
Lead	6020B	mg/L	**0.0004**	U	**0.000042**	**J**	**0.0004**	U	**0.0004**	U	**0.000082**	**J**	**0.0004**	U
Magnesium	6010D	mg/L	**8.4**		**8.5**	**J**	**44**		**43**		**11**	**J**	**11**	
Manganese	6020B	mg/L	**0.011**		**0.014**		**0.21**	**J**	**0.21**	**J**	**0.025**		**0.026**	
Nickel	6020B	mg/L	**0.00027**	**J+**	**0.00031**	**J+**	**0.018**		**0.018**		**0.001**	**J+**	**0.0011**	**J+**
Potassium	6010D	mg/L	**0.37**	**J**	**0.42**	**J**	**1.4**	**J**	**1.4**	**J**	**0.41**	**J**	**0.43**	**J**
Selenium	6020B	mg/L	**0.008**	U	**0.008**	U	**0.008**	U	**0.008**	U	**0.008**	U	**0.008**	U
Silver	6020B	mg/L	**0.0004**	U	**0.000051**	**J+**	**0.000032**	**J+**	**0.0004**	U	**0.000025**	**J+**	**0.0004**	U
Sodium	6010D	mg/L	**1.2**		**1.4**		**13**	**R**	**10**		**1.8**		**1.9**	
Thallium	6020B	mg/L	**0.001**	U	**0.001**	U	**0.001**	U	**0.001**	U	**0.001**	U	**0.001**	U
Vanadium	6020B	mg/L	**0.00059**	**J**	**0.00064**	**J**	**0.004**	U	**0.004**	U	**0.00066**	**J**	**0.00055**	**J**
Zinc	6020B	mg/L	**0.007**	U	**0.0023**	**J+**	**0.0054**	**J+**	**0.0038**	**J+**	**0.004**	**J+**	**0.0025**	**J+**
Mercury	7470A	mg/L	**0.0003**	U	**0.0003**	U	**0.0003**	U	**0.0003**	U	**0.0003**	U	**0.0003**	U
Low Level Mercury Analysis		null												
Mercury	EPA 1631E	ng/L	**3**		**33**		**950**	**J**	**85**	**J**	**64**		**300**	
Field Water Quality Parameters		null												
Temperature	Field Measurement	Deg C	7.6		5.97		3.65		3.65		4.99		4.73	
pH	Field Measurement	pH Units	7.52		7.6		6.86		6.86		7.28		7.2	
Conductivity	Field Measurement	µS/cm	137		132		321		321		156		159	
Turbidity	Field Measurement	NTU	2.19		2.89		11.12		11.12		9.5		4.45	
Dissolved Oxygen	Field Measurement	mg/L	15.44		13.56		3.13		3.13		15.2		15.51	
Oxidation-Reduction Potential	Field Measurement	mV	53.3		38.76		41.6		41.6		48.1		74.5	

Notes
Bold font indicates a detection
- = not applicable

Acronyms and Abbreviations
µS/cm = microsiemens per centimeter
ID = Identifer
mg/L = milligrams per liter
mV = millivolts
ng/L = nanograms per liter
NTU = nephelometric turbidity unit
WG = groundwater
WQ = field quality control sample
WS = surface water

Qualifiers
U = not detected at the limit of quantitation
J = estimated
J+ = estimated, high bias
J- = estimated, low bias
UJ = not detected, estimated

Table 2-6. Surface Water Baseline Analytical Data - Fall 2022

		[1]Sample Location	RD10		RD15		RD05		RD05		RD06		RD08B	
		Sample ID	0822RD10SW		0822RD15SW		0822RD05SW		0822RD99SW		0822RD06SW		0822RD08BSW	
		Sampling Date	8/28/2022		8/28/2022		8/28/2022		8/28/2022		8/28/2022		8/28/2022	
		Matrix	WS		WS		WS		WS		WS		WS	
Analyte	**Method**	**Units**		Q		Q		Q		Q		Q		Q
General Chemistry														
Total Dissolved Solids	160.1	mg/L	**85**		**71**		**250**		**270**		**82**		**97**	
Total Suspended Solids	160.2	mg/L	2	U	2.2		4.4		2.8		2	U	2.4	
Chloride	300.0	mg/L	**0.68**	J	**0.69**	J	**0.8**	J	**0.81**	J	**0.72**	J	**0.7**	J
Fluoride	300.0	mg/L	**0.2**	U	**0.2**	U	**0.15**	J	**0.2**	U	**0.2**	U	**0.2**	U
Sulfate	300.0	mg/L	**7.6**		**9**		**36**		**36**		**10**		**10**	
Alkalinity	310.1	mg/L	**73**		**72**		**240**		**240**		**75**		**82**	
Bicarbonate Alkalinity as CaCO3	310.1	mg/L	**73**		**72**		**240**		**240**		**75**		**82**	
Carbonate Alkalinity as CaCO3	310.1	mg/L	7	U	7	U	7	U	7	U	7	U	7	U
Nitrate Nitrite as N	353.2	mg/L	**0.21**	J+	**0.19**	J+	**0.1**	U	**0.1**	U	**0.19**	J+	**0.16**	J+
Metals														
Calcium	6010D	mg/L	**15**		**15**		**36**		**37**		**16**		**16**	
Magnesium	6010D	mg/L	**8.4**		**8.8**		**39**		**41**		**10**		**10**	
Potassium	6010D	mg/L	0.22	J	0.3	J	1.2	J	1.2	J	0.29	J	0.26	J
Sodium	6010D	mg/L	**1.4**		**1.5**		**9.6**		**10**		**1.9**		**1.8**	
Aluminum	6020B	mg/L	**0.045**		**0.065**		0.0064	J	**0.04**		**0.059**		**0.058**	
Antimony	6020B	mg/L	**0.0022**		**0.078**		**0.047**		**0.052**		**0.18**	J	**0.19**	J
Arsenic	6020B	mg/L	**0.0011**		**0.023**		**1.0**		**1.0**		**0.065**		**0.066**	
Barium	6020B	mg/L	**0.024**		**0.025**		**0.1**		**0.1**		**0.028**		**0.028**	
Beryllium	6020B	mg/L	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.0004	U
Cadmium	6020B	mg/L	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.0004	U
Chromium	6020B	mg/L	**0.00061**	J	**0.00067**	J	**0.00059**	J	**0.00046**	J	**0.00068**	J	**0.00065**	J
Cobalt	6020B	mg/L	**0.000065**	J	**0.000082**	J	**0.0052**		**0.0052**		**0.00016**	J	**0.00016**	J
Copper	6020B	mg/L	0.002	U	**0.0014**	J	0.002	U	**0.002**	U	0.00065	J	**0.00065**	J
Iron	6020B	mg/L	**0.12**		**0.21**		**2.5**		**2.5**		**0.23**		**0.22**	
Lead	6020B	mg/L	0.0004	U	**0.0004**	U	**0.00007**		**0.000057**	J	0.0004	U	**0.0004**	U
Manganese	6020B	mg/L	**0.014**		**0.019**		**0.3**		**0.31**		**0.025**		**0.026**	
Nickel	6020B	mg/L	**0.00038**	J	**0.00042**	J	**0.02**		**0.019**		**0.00084**	J	**0.00078**	J
Selenium	6020B	mg/L	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U
Silver	6020B	mg/L	0.000026	J+	0.0004	U	0.0004	U	0.0004	U	0.0004	U	0.0004	U
Thallium	6020B	mg/L	0.001	U	0.001	U	0.00004	J+	0.001	U	0.001	U	0.001	U
Vanadium	6020B	mg/L	0.00049	J	**0.00066**	J	0.004	U	**0.004**	U	0.00056	J	0.00056	J
Zinc	6020B	mg/L	0.007	U	0.0043	J	**0.0024**	J	0.0023	J	0.0016	J	**0.0018**	J
Mercury	7470A	mg/L	0.0003	U	0.0003	U	**0.0003**	U	0.0003	U	**0.0003**	U	**0.0003**	U
Low Level Mercury Analysis														
Mercury	EPA 1631E	ng/L	**3.6**		**290**		**20**		**18**		**100**		**2800**	
Field Water Quality Parameters														
Temperature	Field Measurement	Deg C	6.00		5.9		3.6		3.6		5.8		5.70	
pH	Field Measurement	pH Units	7.79		7.1		6.74		6.74		6.82		7.32	
Conductivity	Field Measurement	µS/cm	142.4		146.1		476.4		476.4		157.5		158.3	
Turbidity	Field Measurement	NTU	10.6		12.9		38.2		38.2		12.1		20	
Dissolved Oxygen	Field Measurement	mg/L	12.9		13.27		2.33		2.33		13.26		13.11	
Oxidation-Reduction Potential	Field Measurement	mV	173.7		259.7		121.6		121.6		263		253.2	

Notes

Bold font indicates a detection

- = not applicable

[1] Sample results are arranged from upstream to downstream.

Acronyms and Abbreviations

µS/cm = microsiemens per centimeter
ID = Identifer
mg/L = milligrams per liter
mV = millivolts
ng/L = nanograms per liter
NTU = nephelometric turbidity unit
Q = qualifiers
WG = groundwater
WQ = field quality control sample
WS = surface water

Qualifiers

U = not detected at the limit of quantitation
J = estimated
J+ = estimated, high bias
J- = estimated, low bias
UJ = not detected, estimated

ATTACHMENT 1. FIELD DOCUMENTATION

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ATTACHMENT 1.1 TAILGATE SAFETY FIELD FORMS

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Sundance Consulting Inc.

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name:	Red Devil Mine Monitoring		
Contract Number:	140L6321C0001	**Task Order:**	
Project Location:	Red Devil	**Date:** 6/1/2022	**Time:** 0730
PM:	Colleen Rust	**SSHO:**	
SUXOS:			

Weather

	AM	PM
Temperature	55	
Wind	light	
Humidity	low	
Comments	clear	

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used: trail clearing, water level survey

Hazards Related to Task: (check all that apply)

- ☐ Biological Hazards
- ☐ Chemicals
- ☐ Contaminant Exposure
- ☐ Dehydration
- ☐ Explosives
- ☐ Extreme Weather (heat/cold)
- ☐ Pinch
- ☐ Radiation
- ☒ Slip/Trip/Fall
- ☐ Spills
- ☒ Sun Exposure
- ☒ Vehicle Operations
- ☐ Weather (rain/snow/wind)
- ☒ Wildlife
- ☒ Other: Saw use

Additional Safety Topics or Discussions: Road Condition on trail

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance	
Nicholas Potter	Sundance	

Sundance Consulting Inc.

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: Red Devil Mine Annual Monitoring		
Contract Number: 140L6321C0001	**Task Order:** NA	
Project Location: Red Devil Mine	**Date:** 6/2/2022	**Time:** 0700
PM: Colleen Rust	**SSHO:** George Garner	
SUXOS:		

Weather

	AM	PM
Temperature	50s	70s
Wind	light	light
Humidity	low	low
Comments	clear	clear

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used: GW sampling

Hazards Related to Task: (check all that apply)

- ☐ Biological Hazards
- ☐ Chemicals
- ☒ Contaminant Exposure
- ☐ Dehydration
- ☐ Explosives
- ☐ Extreme Weather (heat/cold)
- ☐ Pinch
- ☐ Radiation
- ☒ Slip/Trip/Fall
- ☐ Spills
- ☒ Sun Exposure
- ☒ Vehicle Operations
- ☐ Weather (rain/snow/wind)
- ☒ Wildlife
- ☐ Other:

Additional Safety Topics or Discussions: Drink water.

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance	
Nicholas Potter	Sundance	

Sundance Consulting Inc.

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: Red Devil Mine Annual Monitoring		
Contract Number: 140L6321C0001	**Task Order:** NA	
Project Location: Red Devil Mine	**Date:** 6/3/22	**Time:** 0700
PM: Colleen Rust	**SSHO:** George Garner	
SUXOS:		

Weather

	AM	PM
Temperature	55	
Wind	light	
Humidity	low	
Comments	Clear	

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used: Groundwater sampling.

Hazards Related to Task: (check all that apply)

- ☐ Biological Hazards
- ☐ Chemicals
- ☐ Contaminant Exposure
- ☒ Dehydration
- ☐ Explosives
- ☐ Extreme Weather (heat/cold)
- ☐ Pinch
- ☐ Radiation
- ☒ Slip/Trip/Fall
- ☐ Spills
- ☒ Sun Exposure
- ☒ Vehicle Operations
- ☐ Weather (rain/snow/wind)
- ☒ Wildlife
- ☐ Other:

Additional Safety Topics or Discussions: Sun exposure

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance	
Nicholas Potter	Sundance	

Sundance Consulting Inc.

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: Red Devil Mine Annual Monitoring		
Contract Number: 140L6321C0001	**Task Order:** NA	
Project Location: Red Devil Mine	**Date:** 6/4/22	**Time:** 0700
PM: Colleen Rust	**SSHO:** George Garner	
SUXOS:		

Weather

	AM	PM
Temperature	30s	75
Wind	light	light
Humidity	low	low
Comments	clear	clear

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used: GW sampling, well redevelopment

Hazards Related to Task: (check all that apply)

- ☐ Biological Hazards
- ☐ Chemicals
- ☐ Contaminant Exposure
- ☒ Dehydration
- ☐ Explosives
- ☐ Extreme Weather (heat/cold)
- ☐ Pinch
- ☐ Radiation
- ☒ Slip/Trip/Fall
- ☐ Spills
- ☒ Sun Exposure
- ☒ Vehicle Operations
- ☐ Weather (rain/snow/wind)
- ☒ Wildlife
- ☐ Other:

Additional Safety Topics or Discussions:

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance	
Nicholas Potter	Sundance	

Sundance Consulting Inc.

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: Red Devil Mine Annual Monitoring		
Contract Number: 140L6321C0001	**Task Order:** NA	
Project Location: Red Devil Mine	**Date:** 6/5/22	**Time:** 0700
PM: Colleen Rust	**SSHO:** George Garner	
SUXOS:		

Weather

	AM	PM
Temperature	50	70s
Wind	light	light
Humidity	low	low
Comments		

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used: GW sampling, stream flow measurement

Hazards Related to Task: (check all that apply)

- ☐ Biological Hazards
- ☐ Chemicals
- ☐ Contaminant Exposure
- ☒ Dehydration
- ☐ Explosives
- ☐ Extreme Weather (heat/cold)
- ☐ Pinch
- ☐ Radiation
- ☒ Slip/Trip/Fall
- ☐ Spills
- ☒ Sun Exposure
- ☒ Vehicle Operations
- ☒ Weather (rain/snow/wind)
- ☒ Wildlife
- ☐ Other:

Additional Safety Topics or Discussions:

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance	
Nicholas Potter	Sundance	

Sundance Consulting Inc.

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: Red Devil Mine Annual Monitoring		
Contract Number: 140L6321C0001	**Task Order:** NA	
Project Location: Red Devil Mine	**Date:** 6/6/22	**Time:** 0700
PM: Colleen Rust	**SSHO:** George Garner	
SUXOS:		

Weather

	AM	PM
Temperature	50	80
Wind	light	light variable
Humidity	moderate	low/ moderate
Comments		scattered storms

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used: SW sampling, stream measurement, transducer data collection

Hazards Related to Task: (check all that apply)

- ☐ Biological Hazards
- ☐ Chemicals
- ☐ Contaminant Exposure
- ☒ Dehydration
- ☐ Explosives
- ☐ Extreme Weather (heat/cold)
- ☐ Pinch
- ☐ Radiation
- ☒ Slip/Trip/Fall
- ☐ Spills
- ☒ Sun Exposure
- ☒ Vehicle Operations
- ☒ Weather (rain/snow/wind)
- ☒ Wildlife
- ☐ Other:

Additional Safety Topics or Discussions:

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance	
Nicholas Potter	Sundance	

Sundance Consulting Inc.

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: Red Devil Mine Annual Monitoring		
Contract Number: 140L6321C0001	**Task Order:** NA	
Project Location: Red Devil Mine	**Date:** 8/22/2022	**Time:** 0700
PM: Colleen Rust	**SSHO:** George Garner	
SUXOS:		

Weather

	AM	PM
Temperature	40s	
Wind	light	
Humidity	100%	
Comments	foggy	

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used: GW survey, pump install

Hazards Related to Task: (check all that apply)

- ☐ Biological Hazards
- ☐ Chemicals
- ☒ Contaminant Exposure
- ☒ Dehydration
- ☐ Explosives
- ☐ Extreme Weather (heat/cold)
- ☐ Pinch
- ☐ Radiation
- ☒ Slip/Trip/Fall
- ☐ Spills
- ☐ Sun Exposure
- ☒ Vehicle Operations
- ☒ Weather (rain/snow/wind)
- ☒ Wildlife
- ☐ Other:

Additional Safety Topics or Discussions: Bear safety

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance	
Nicholas Potter	Sundance	

Sundance Consulting Inc.

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: Red Devil Mine Annual Monitoring		
Contract Number: 140L6321C0001	**Task Order:** NA	
Project Location: Red Devil Mine	**Date:** 8/23/22	**Time:** 0700
PM: Colleen Rust	**SSHO:** George Garner	
SUXOS:		

Weather

	AM	PM
Temperature	50s	
Wind	5-10 knts	
Humidity	high	
Comments	Cloudy	

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used: Groundwater sampling

Hazards Related to Task: (check all that apply)

- ☐ Biological Hazards
- ☐ Chemicals
- ☒ Contaminant Exposure
- ☐ Dehydration
- ☐ Explosives
- ☐ Extreme Weather (heat/cold)
- ☐ Pinch
- ☐ Radiation
- ☒ Slip/Trip/Fall
- ☐ Spills
- ☐ Sun Exposure
- ☒ Vehicle Operations
- ☒ Weather (rain/snow/wind)
- ☒ Wildlife
- ☐ Other:

Additional Safety Topics or Discussions: lifting

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance	
Nicholas Potter	Sundance	

Sundance Consulting Inc.

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: Red Devil Mine Annual Monitoring		
Contract Number: 140L6321C0001	**Task Order:** NA	
Project Location: Red Devil Mine	**Date:** 8/24/22	**Time:** 0730
PM: Colleen Rust	**SSHO:** George Garner	
SUXOS:		

Weather

	AM	PM
Temperature	40s	
Wind	calm	
Humidity	100%	
Comments	Dense fog	

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used: Groundwater sampling.

Hazards Related to Task: (check all that apply)

- ☐ Biological Hazards
- ☐ Chemicals
- ☒ Contaminant Exposure
- ☐ Dehydration
- ☐ Explosives
- ☐ Extreme Weather (heat/cold)
- ☐ Pinch
- ☐ Radiation
- ☒ Slip/Trip/Fall
- ☐ Spills
- ☒ Sun Exposure
- ☒ Vehicle Operations
- ☒ Weather (rain/snow/wind)
- ☒ Wildlife
- ☐ Other:

Additional Safety Topics or Discussions: Vehicle traffic, pets

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance	
Nicholas Potter	Sundance	

Sundance Consulting Inc.

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: Red Devil Mine Annual Monitoring		
Contract Number: 140L6321C0001	**Task Order:** NA	
Project Location: Red Devil Mine	**Date:** 8/25/22	**Time:** 0730
PM: Colleen Rust	**SSHO:** George Garner	
SUXOS:		

Weather

	AM	PM
Temperature	40s	
Wind	5-10	
Humidity	100%	
Comments	Rain	

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used: Groundwater sampling

Hazards Related to Task: (check all that apply)

- ☐ Biological Hazards
- ☐ Chemicals
- ☒ Contaminant Exposure
- ☐ Dehydration
- ☐ Explosives
- ☐ Extreme Weather (heat/cold)
- ☐ Pinch
- ☐ Radiation
- ☒ Slip/Trip/Fall
- ☐ Spills
- ☐ Sun Exposure
- ☒ Vehicle Operations
- ☒ Weather (rain/snow/wind)
- ☒ Wildlife
- ☐ Other:

Additional Safety Topics or Discussions: weather

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance	
Nicholas Potter	Sundance	

Sundance Consulting Inc.

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: Red Devil Mine Annual Monitoring		
Contract Number: 140L6321C0001	**Task Order:** NA	
Project Location: Red Devil Mine	**Date:** 8/26/22	**Time:** 0700
PM: Colleen Rust	**SSHO:** George Garner	
SUXOS:		

Weather

	AM	PM
Temperature	40s	
Wind	light / calm	
Humidity	100%	
Comments	rain	

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used: Groundwater sampling, well maintenance

Hazards Related to Task: (check all that apply)

- ☐ Biological Hazards
- ☐ Chemicals
- ☐ Contaminant Exposure
- ☒ Dehydration
- ☐ Explosives
- ☐ Extreme Weather (heat/cold)
- ☒ Pinch
- ☐ Radiation
- ☒ Slip/Trip/Fall
- ☐ Spills
- ☐ Sun Exposure
- ☒ Vehicle Operations
- ☒ Weather (rain/snow/wind)
- ☒ Wildlife
- ☐ Other:

Additional Safety Topics or Discussions: wildlife

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance	
Nicholas Potter	Sundance	

Sundance Consulting Inc.

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: Red Devil Mine Annual Monitoring		
Contract Number: 140L6321C0001	**Task Order:** NA	
Project Location: Red Devil Mine	**Date:** 8/27/22	**Time:** 0700
PM: Colleen Rust	**SSHO:** George Garner	
SUXOS:		

Weather

	AM	PM
Temperature	40s	
Wind	5-10	
Humidity	100%	
Comments	Cloudy / Fog	

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used: Surface water sampling, flow measurements

Hazards Related to Task: (check all that apply)

- ☐ Biological Hazards
- ☐ Chemicals
- ☒ Contaminant Exposure
- ☐ Dehydration
- ☐ Explosives
- ☐ Extreme Weather (heat/cold)
- ☐ Pinch
- ☐ Radiation
- ☒ Slip/Trip/Fall
- ☐ Spills
- ☐ Sun Exposure
- ☒ Vehicle Operations
- ☒ Weather (rain/snow/wind)
- ☒ Wildlife
- ☐ Other:

Additional Safety Topics or Discussions: Slips, buried debris

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance	
Nicholas Potter	Sundance	

Sundance Consulting Inc.

Tailgate Safety Meeting & Job Safety Analysis

Project & Personnel Information

Project Name: Red Devil Mine Annual Monitoring		
Contract Number: 140L6321C0001	**Task Order:** NA	
Project Location: Red Devil Mine	**Date:** 8/28/22	**Time:** 0730
PM: Colleen Rust	**SSHO:** George Garner	
SUXOS:		

Weather

	AM	PM
Temperature	50	
Wind	light	
Humidity	80 %	
Comments		

Activities, Hazards, Equipment & Safety

Activities to be Performed & Equipment Used: Surface water sampling, sample prep.

Hazards Related to Task: (check all that apply)

- ☐ Biological Hazards
- ☐ Chemicals
- ☒ Contaminant Exposure
- ☐ Dehydration
- ☐ Explosives
- ☐ Extreme Weather (heat/cold)
- ☐ Pinch
- ☐ Radiation
- ☒ Slip/Trip/Fall
- ☐ Spills
- ☐ Sun Exposure
- ☒ Vehicle Operations
- ☒ Weather (rain/snow/wind)
- ☒ Wildlife
- ☐ Other:

Additional Safety Topics or Discussions: Bear safety

Signatures

Personnel Name	Organization	Personnel's Signature
George Garner	Sundance	
Nicholas Potter	Sundance	

ATTACHMENT 1.2 MONITORING WELL INTEGRITY CHECKLISTS

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Monitoring Well Integrity Checklist

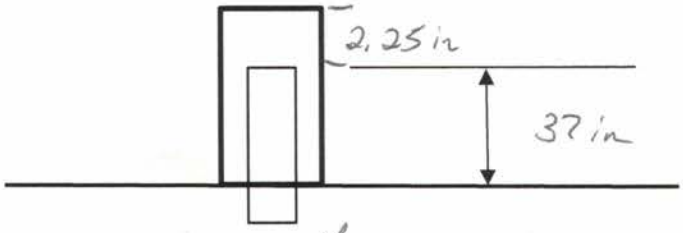
Well ID: MW01 Inspector's name: G.Garner

Date: 6/1/22

Time: 1034 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 39.25 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples? NA

Comments:

DTW = 17.97 ft

Monitoring Well Integrity Checklist

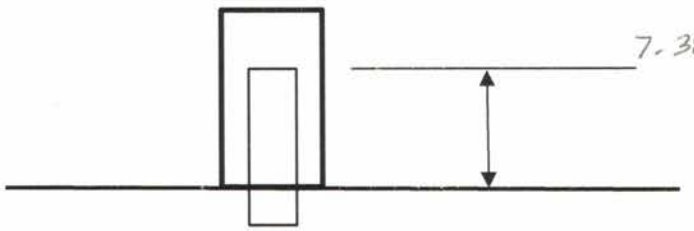
Well ID: MW03 Inspector's name: G. Garner

Date: 6/1/22

Time: 1247 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 33.75 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

DTW = 16.51 ft

Monitoring Well Integrity Checklist

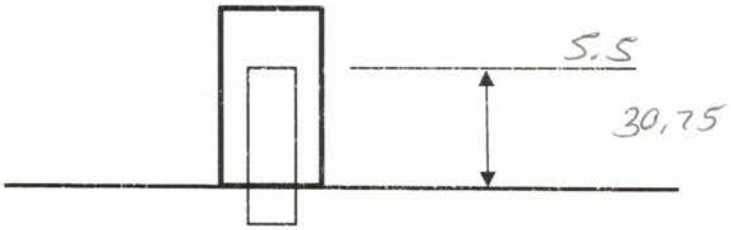
Well ID: MW06 Inspector's name: G. Garner

Date: 6/1/22

Time: 1337 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 36.25



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? No
3. Were there any issues in collecting samples? No

Comments:

DTW = 15.95 ft

Monitoring Well Integrity Checklist

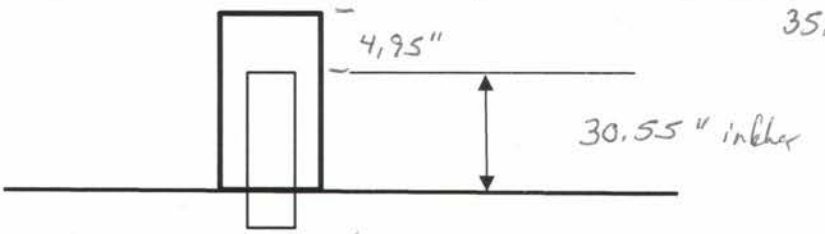
Well ID: MW 07 Inspector's name: G. Garner

Date: 6/1/2022

Time: 1051 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface No frost jacking apparent
   35.50 inches



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged?
2. Is vault flooded? Water visible below ~~vault~~ ground surface
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples? NA

Comments:

DTW = 20.63ft

Monitoring Well Integrity Checklist

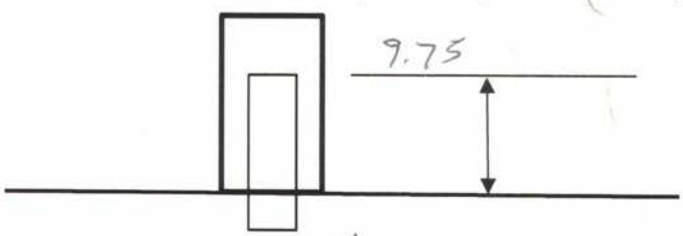
Well ID: MW 08 Inspector's name: G. Garner

Date: 6/1/22

Time: 1125 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 38.00 inches



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? No
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

DTW = 13.33 ft

Monitoring Well Integrity Checklist

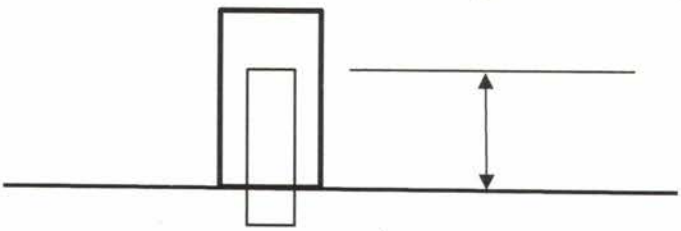
Well ID: MW09 Inspector's name: G. Garner

Date: 6/1/2022

Time: 1145 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes, operational
3. Were there any issues in collecting samples? No

Comments:

DTW = 25.42 ft

Monitoring Well Integrity Checklist

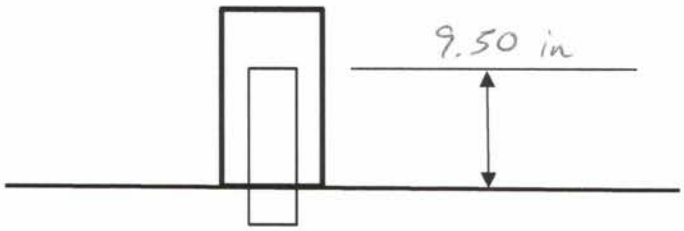
Well ID: MW10 Inspector's name: G. Garner

Date: 4/1/22

Time: 1140 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Frost jacked
2. Frost jacking measures: Stick up height from ground surface 35.75 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? NA
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

DTW = 26.28 ft

Monitoring Well Integrity Checklist

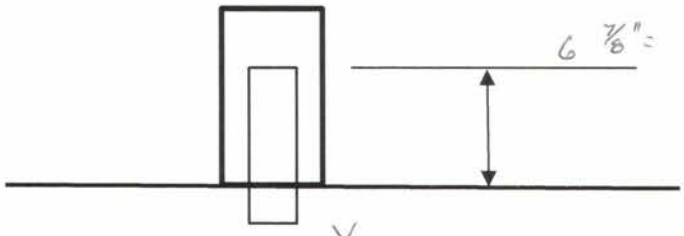
Well ID: MW11 Inspector's name: G. Garner

Date: 6/1/22

Time: 1134 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 36.13



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? NO

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

DTW - 19.21 ft

Monitoring Well Integrity Checklist

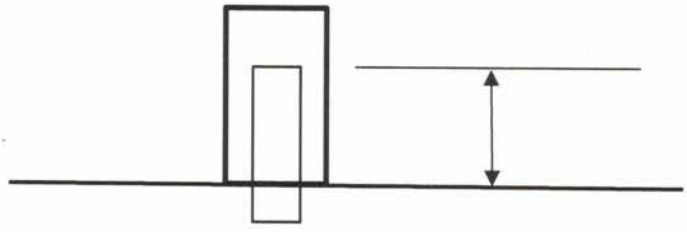
Well ID: MW 12 Inspector's name: G Garner

Date: 6/1/22

Time: 1191 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface Photo Jacked out at casing/stickup



3. Is the well lid/vault secure? _____
4. Is well clearly labeled? _____
5. Photographs of well closed _____

After removing lid before sampling well

1. Is gasket worn or damaged? _____
2. Is vault flooded? _____
3. Any odors? _____
4. Photographs of well with lid off _____
5. Transducer present? Condition? _____

During Groundwater Sampling

1. Is well operational? No
2. Dedicated pump present? Condition? _____
3. Were there any issues in collecting samples? NA

Comments: Not sampleable

Monitoring Well Integrity Checklist

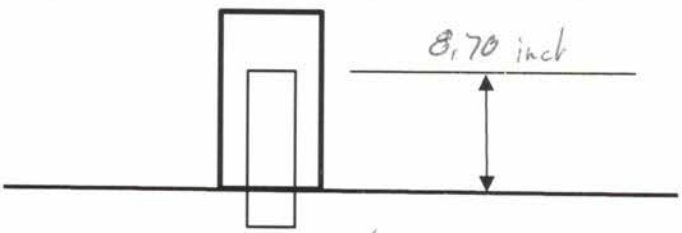
Well ID: MW13 Inspector's name: G. Garner

Date: 6/1/2022

Time: 1056 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 34.17



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples? NA

Comments:

DTW = 24.37 ft

Monitoring Well Integrity Checklist

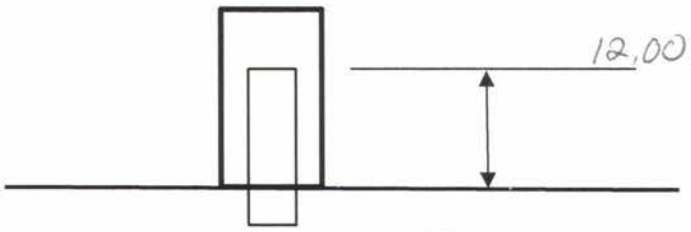
Well ID: MW16 Inspector's name: G. Garner

Date: 6/1/22

Time: 1242 Inspector's signature: [signature]

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 32.00



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? No
3. Were there any issues in collecting samples? No

Comments:

DTW = 7.15 ft

Monitoring Well Integrity Checklist

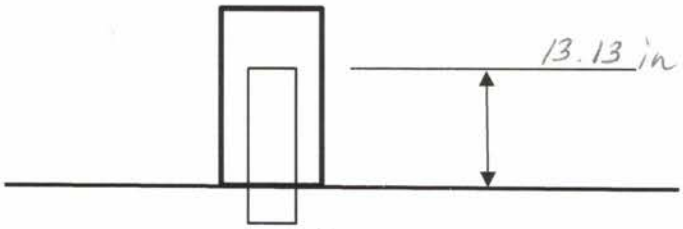
Well ID: MW17 Inspector's name: G. Garner

Date: 6/1/2022

Time: 1238 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Frost jacked
2. Frost jacking measures: Stick up height from ground surface 39.00 in



metal = 34.13 in
ground settled around concrete

3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged?
2. Is vault flooded?
3. Any odors?
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? N/A Yes
2. Dedicated pump present? Condition? No
3. Were there any issues in collecting samples? No

Comments:

DTW = 0.9.15

Monitoring Well Integrity Checklist

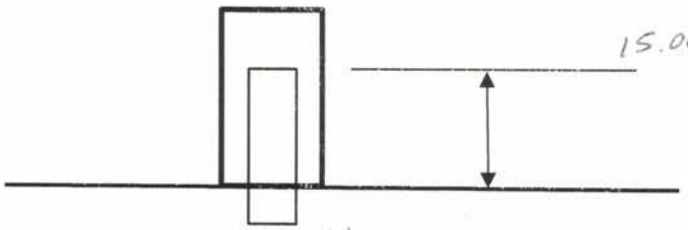
Well ID: MW18 Inspector's name: G. Garner

Date: 4/1/2022

Time: 1314 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 33.00 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

DTW = 21.80 ft

Monitoring Well Integrity Checklist

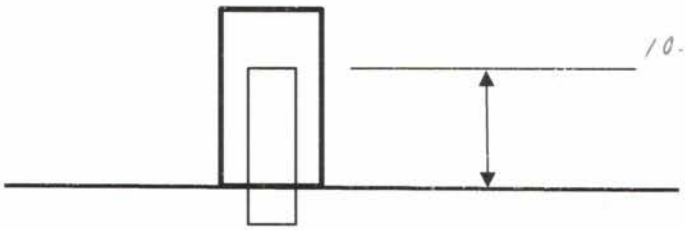
Well ID: MW19 Inspector's name: G. Gaiser

Date: 6/1/22

Time: 1308 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 28.38 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

DTW = 15.65 ft

Monitoring Well Integrity Checklist

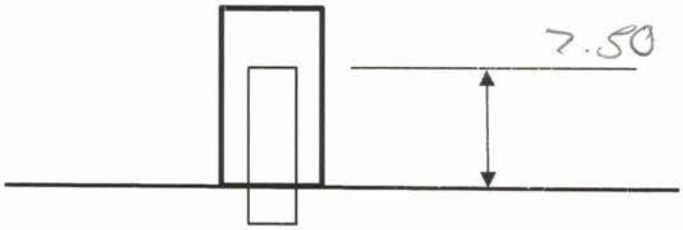
Well ID: MW20 Inspector's name: G. Garner

Date: 6/1/22

Time: 1252 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 37.13 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

DTW = 6.16 ft

Monitoring Well Integrity Checklist

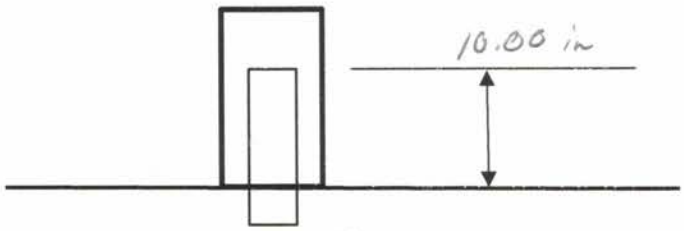
Well ID: MW21 Inspector's name: G. Garner

Date: 6/1/22

Time: 1257 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 30.00 in



5.5 between concrete and ground

3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off
5. Transducer present? Condition?

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

DTW = 7.97 ft

Monitoring Well Integrity Checklist

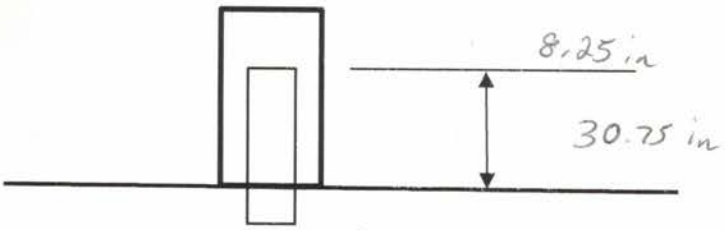
Well ID: MW22 Inspector's name: G. Garner

Date: 6/1/22

Time: 1302 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 39.00 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

DTW = 6.71 ft

Monitoring Well Integrity Checklist

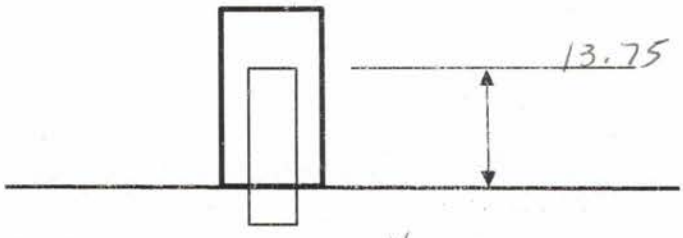
Well ID: MW23 Inspector's name: G. Garner

Date: 6/1/22

Time: 1749 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 30.50



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling NA

1. Is well operational?
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

DTW = 14.41 ft

Monitoring Well Integrity Checklist

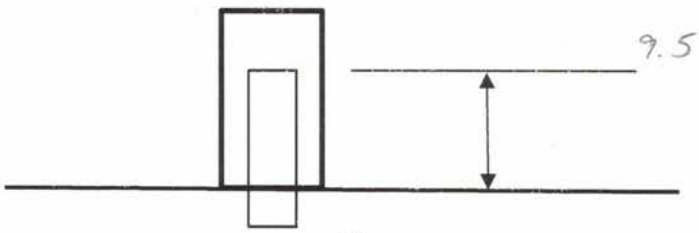
Well ID: MW 24 Inspector's name: G. Garner

Date: 6/1/22

Time: 1354 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 32.75 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? ~~Yes~~ #1 No
2. Is vault flooded? ~~Yes~~ #2 No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

DTW = 14.60 ft

Monitoring Well Integrity Checklist

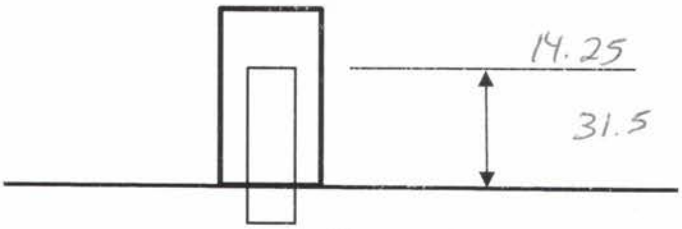
Well ID: MW25 Inspector's name: G. Garner

Date: 6/1/22

Time: 1351 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 35.75



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

DTW = 29.95

Monitoring Well Integrity Checklist

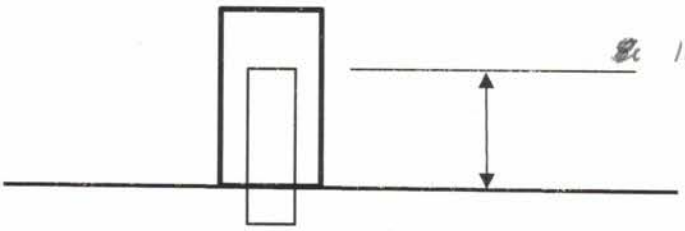
Well ID: MW 26 Inspector's name: G. Garner

Date: 6/1/22

Time: 1345 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 32.63 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes, non functional,
3. Were there any issues in collecting samples? Yes pump failed, Sampled with bailer,

Comments:

DTW = 30.99 ft

Monitoring Well Integrity Checklist

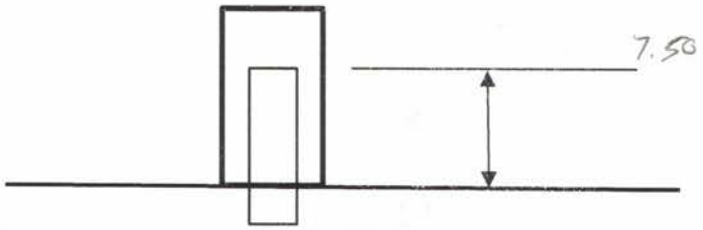
Well ID: MW27 Inspector's name: G. Garner

Date: 6/1/22

Time: 1401 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes, but separated from ground
2. Frost jacking measures: Stick up height from ground surface 32.00



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off
5. Transducer present? Condition? NO

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes, operational
3. Were there any issues in collecting samples? No

Comments:

DTW = 24.78 ft

Monitoring Well Integrity Checklist

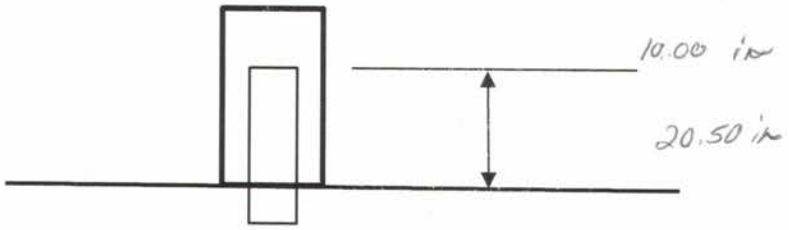
Well ID: MW28 Inspector's name: G. Garner

Date: 6/1/22

Time: 1404 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes, but loose from ground
2. Frost jacking measures: Stick up height from ground surface 30.50 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes, operational
3. Were there any issues in collecting samples? No

Comments:

DTW = 23.07 ft

Monitoring Well Integrity Checklist

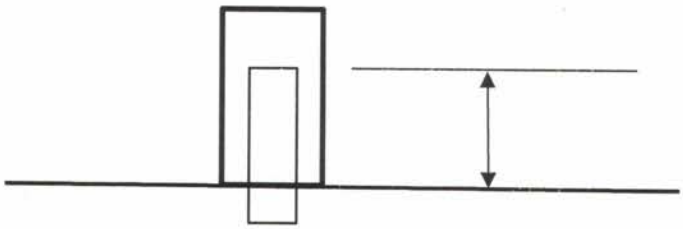
Well ID: MW 29 Inspector's name: G. Garner

Date: 6/1/22

Time: 1430 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes, operational
3. Were there any issues in collecting samples? No

Comments:

DTW = 63.49

Monitoring Well Integrity Checklist

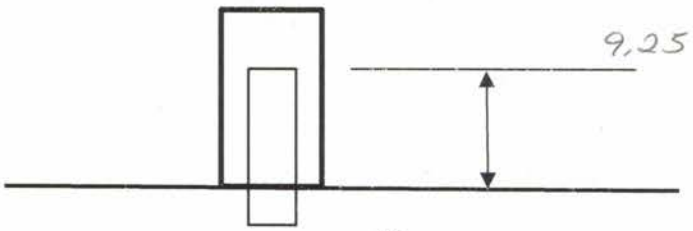
Well ID: MW30 Inspector's name: G. Garner

Date: 6/1/22

Time: 1445 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 28.25



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? ~~Yes~~ N/A No
2. Is vault flooded? ~~Yes~~ N/A No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

DTW = 50.56 ft

Monitoring Well Integrity Checklist

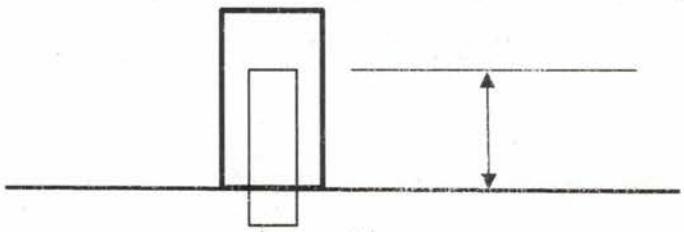
Well ID: MW31 Inspector's name: G. Garner

Date: 6/1/22

Time: 1650 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

DTW = 36.09 ft

Monitoring Well Integrity Checklist

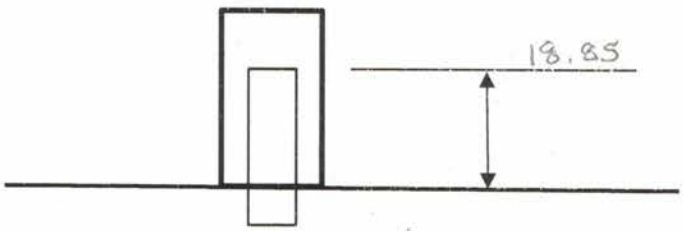
Well ID: MW32 Inspector's name: G. Gainer

Date: 6/1/22

Time: 1325 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 43.50



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

DTW = 17.75 ft

Monitoring Well Integrity Checklist

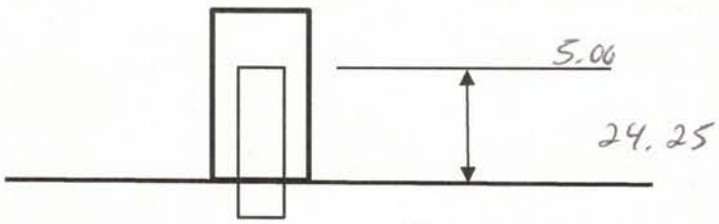
Well ID: MW 33 Inspector's name: G. Garner

Date: 6/1/22

Time: 1755 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 29.25 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? Yes
2. Is vault flooded? Not currently but was.
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? No
3. Were there any issues in collecting samples?
   Well was redeveloped and sampled 24 hrs later.

Comments:

Well flooded during break up. Obvious silt lining the well and on sample tubing.

DTW = 3.72 ft

Monitoring Well Integrity Checklist

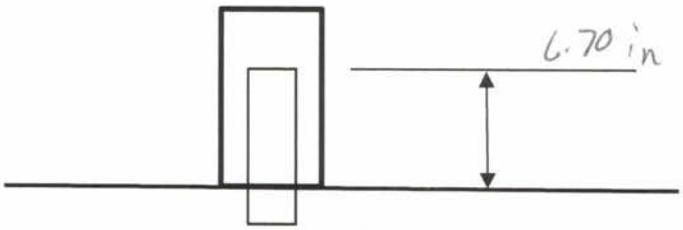
Well ID: MW 34 Inspector's name: G. Garing

Date: 6/1/22

Time: 1156 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 45.50 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

DTW = 26.84 ft

Monitoring Well Integrity Checklist

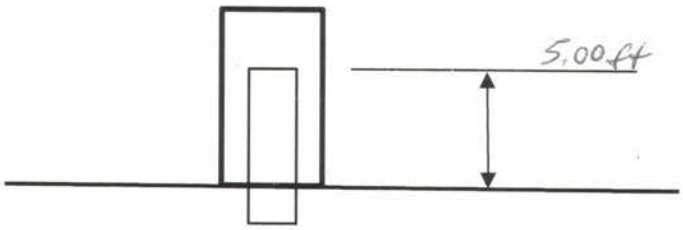
Well ID: MW35 Inspector's name: G. Garner

Date: 6/1/22

Time: 1201 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 46.00



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

DTW = 33.18 ft

Monitoring Well Integrity Checklist

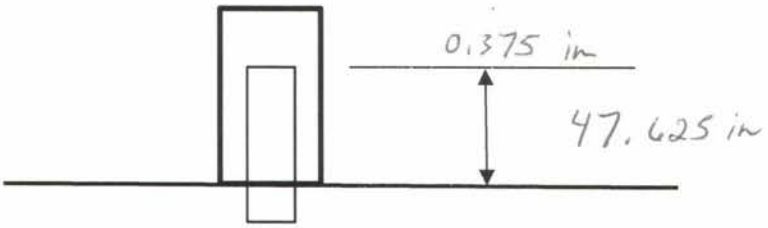
Well ID: MW36 Inspector's name: G. Garner

Date: 6/1/22

Time: 1205 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? No, frost jacked
2. Frost jacking measures: Stick up height from ground surface 48.00 in



3. Is the well lid/vault secure? No
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged?
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? No
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples? NA

Comments:

PTW = 15.46 ft

Monitoring Well Integrity Checklist

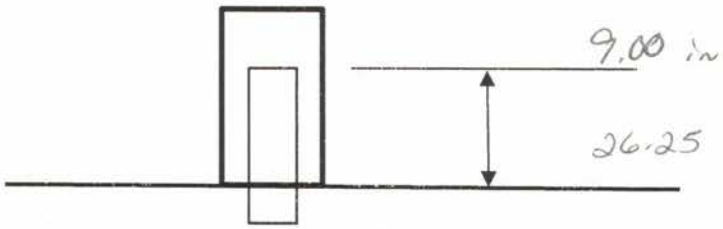
Well ID: MW 39 Inspector's name: G. Garner

Date: 6/1/22

Time: 1630 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? No, jacked up 6 inches
2. Frost jacking measures: Stick up height from ground surface 35.25 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? Yes no gasket.
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

DTW = 57.82 ft

Monitoring Well Integrity Checklist

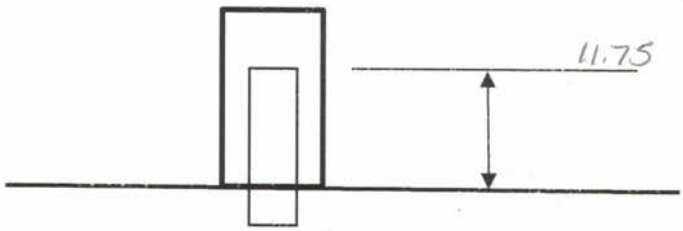
Well ID: MW40 Inspector's name: G. Garner

Date: 6/1/22

Time: 1618 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Cement is ~ 12 inches above grade
2. Frost jacking measures: Stick up height from ground surface 39.06



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes, operational
3. Were there any issues in collecting samples? No

Comments:

PTW - 125.78 ft

Monitoring Well Integrity Checklist

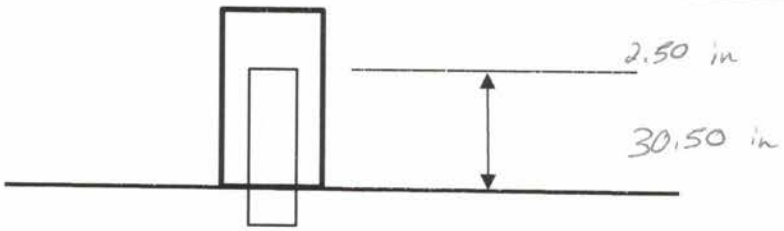
Well ID: MW42 Inspector's name: G. Garner

Date: 6/1/22

Time: 1418 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 33.00 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes,
2. Dedicated pump present? Condition? Yes, operational
3. Were there any issues in collecting samples?

No

Comments:

DTW = 121.49 ft

Monitoring Well Integrity Checklist

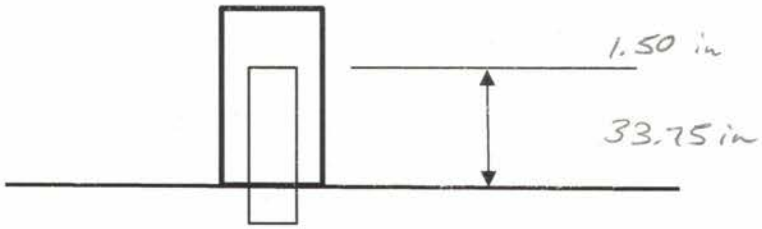
Well ID: MW43 Inspector's name: G. Garner

Date: 6/1/22

Time: 1426 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 35.25 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes, operational
3. Were there any issues in collecting samples? No

Comments:

DTW = 82.92 ft

Monitoring Well Integrity Checklist

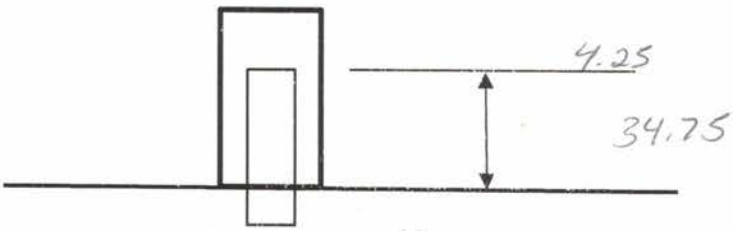
Well ID: MW44 Inspector's name: G. Garner

Date: 6/1/22

Time: 1506 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 38.00



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes, operational
3. Were there any issues in collecting samples? No

Comments:

DTW = 32.45 ft

Monitoring Well Integrity Checklist

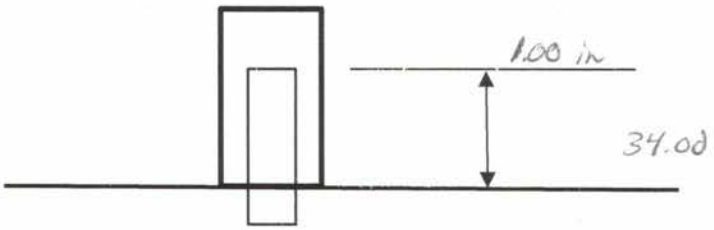
Well ID: MW45 Inspector's name: G. Garner

Date: 6/1/22

Time: 1532 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 35.00



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes, operat'n'd
3. Were there any issues in collecting samples? No

Comments:

DTW = 40.20 ft

Monitoring Well Integrity Checklist

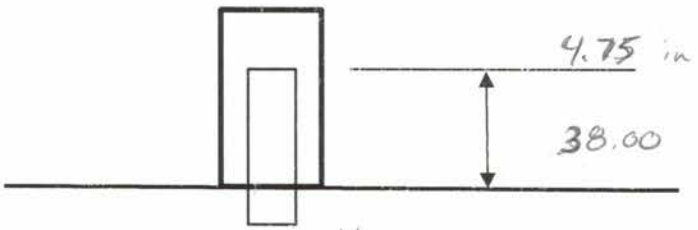
Well ID: MW46 Inspector's name: G. Garner

Date: 6/1/22

Time: 1539 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 42.75 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes operational
3. Were there any issues in collecting samples? No

Comments:

DTW = 32.01 ft

Monitoring Well Integrity Checklist

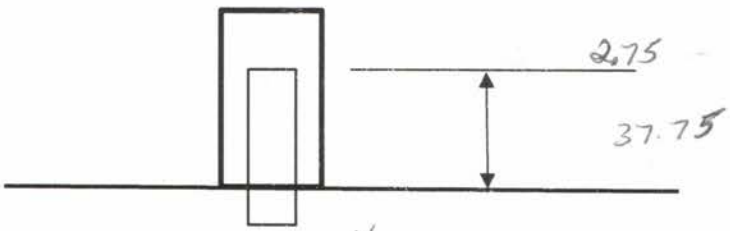
Well ID: MW 47 Inspector's name: G. Garner

Date: 6/1/22

Time: 1550 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 40, 50



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes, operational
3. Were there any issues in collecting samples? No

Comments:

DTW = 54.79 ft

Monitoring Well Integrity Checklist

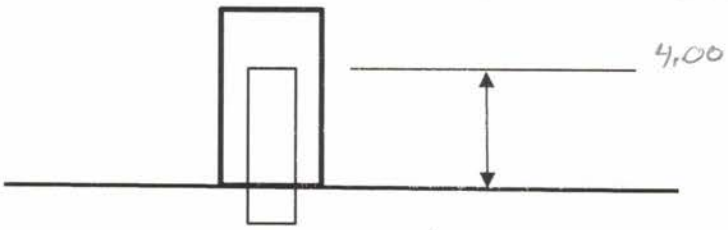
Well ID: MW48 Inspector's name: G. Garner

Date: 6/1/22

Time: 1458 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 38.00



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition? —
3. Were there any issues in collecting samples? —

Comments:

DTW = 18.96

Monitoring Well Integrity Checklist

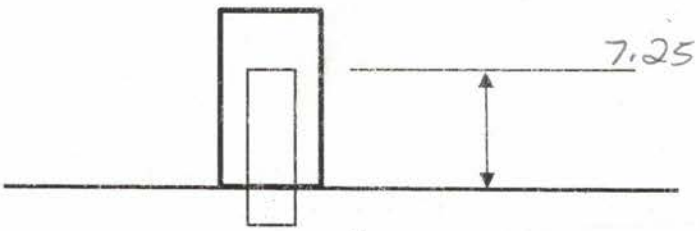
Well ID: MW49 Inspector's name: G. Garner

Date: 6/1/22

Time: 1740 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 41.50



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes operational
3. Were there any issues in collecting samples? No

Comments:

DTW = 27.57

Monitoring Well Integrity Checklist

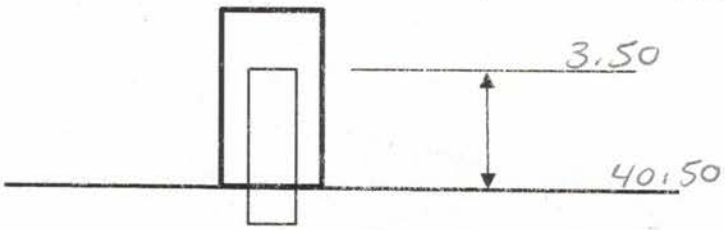
Well ID: MW50 Inspector's name: G. Garner

Date: 6/1/22

Time: 1701 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 44.00



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition?

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

DTW = 44.50 ft

Monitoring Well Integrity Checklist

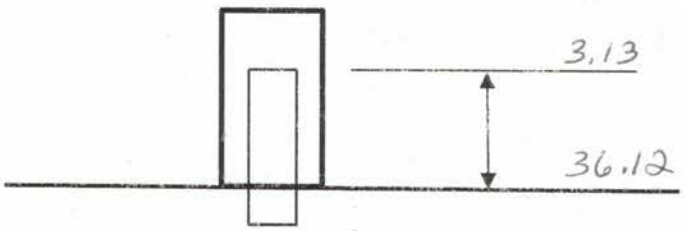
Well ID: MW51 Inspector's name: G. Garner

Date: 6/1/2022

Time: 1708 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 39.25



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? Yes

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes, operational
3. Were there any issues in collecting samples? No

Comments:

DTW = 37.11 ft

Monitoring Well Integrity Checklist

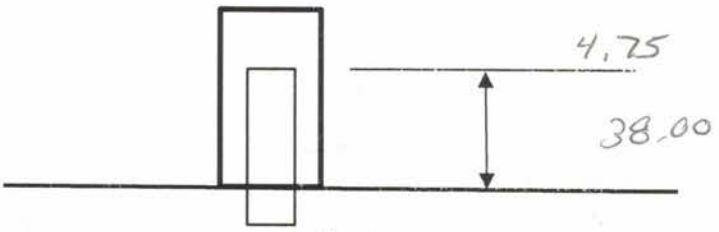
Well ID: MW52 Inspector's name: G. Garner

Date: 6/1/22

Time: 1558 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 42.75



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes.
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes.
2. Dedicated pump present? Condition? Yes, operational.
3. Were there any issues in collecting samples? No

Comments:

DTW = 28.74 ft

Monitoring Well Integrity Checklist

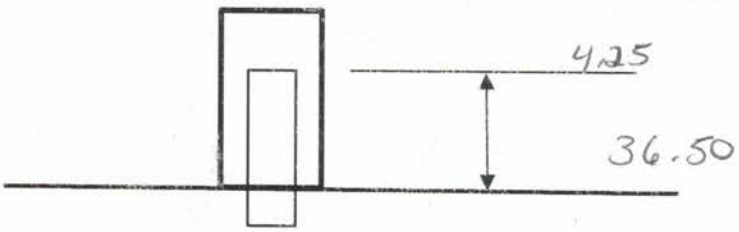
Well ID: MW53 Inspector's name: G. Gardner

Date: 6/1/22

Time: 1720 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 40.75



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? Yes

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes operational
3. Were there any issues in collecting samples? No

Comments:

DTW = 28.78 ft

Monitoring Well Integrity Checklist

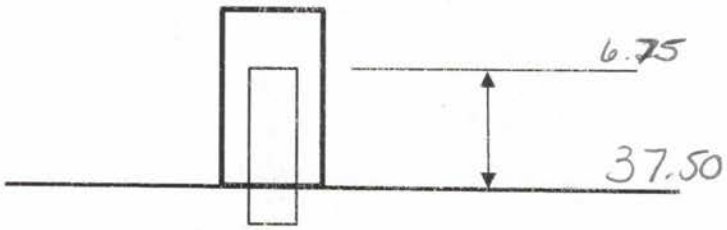
Well ID: MW54 Inspector's name: G. Garner

Date: 6/1/22

Time: 1714 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 44.25



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? Yes

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes, operational.
3. Were there any issues in collecting samples? No

Comments:

DTW = 28.30 ft

Well cap is installed too low. When the well is open, gravel can fall in the well. Well pump is likely unretrievable due to gravel falling into well.

Monitoring Well Integrity Checklist

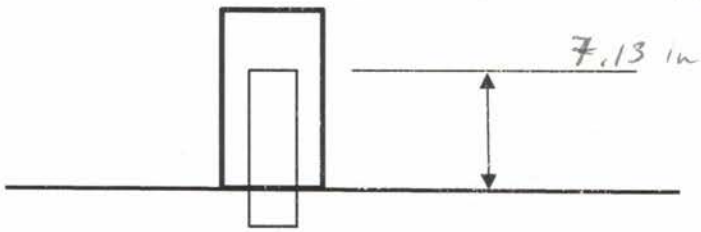
Well ID: MW55 Inspector's name: G. Garner

Date: 6/1/22

Time: 1606 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 41.75 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? No peristaltic pump
3. Were there any issues in collecting samples? No

Comments:

DTW = 11.66

Monitoring Well Integrity Checklist

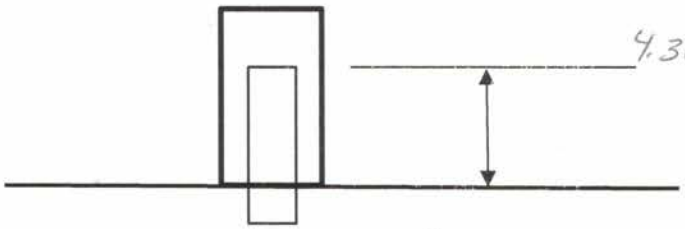
Well ID: MW56 Inspector's name: G. Garner

Date: 6/1/22

Time: 15 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 41.38 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? Yes, good condition

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes, operational
3. Were there any issues in collecting samples? No

Comments:

DTW = 32.35

Monitoring Well Integrity Checklist

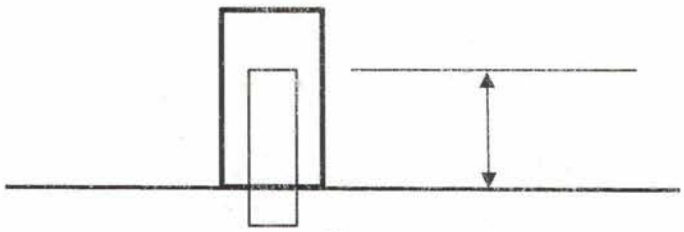
Well ID: MW57 Inspector's name: G. Garner

Date: 6/1/22

Time: 1643 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? Yes, good.

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes, operational
3. Were there any issues in collecting samples? No

Comments:

DTW = 30.52

Monitoring Well Integrity Checklist

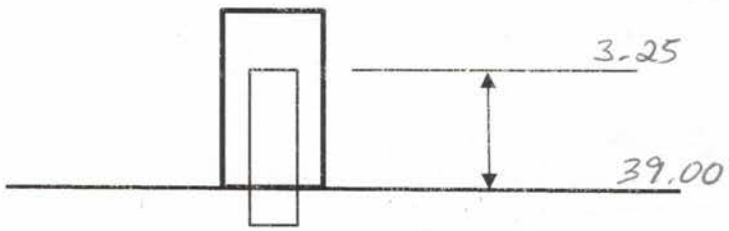
Well ID: MW58 Inspector's name: G. Garner

Date: 6/1/22

Time: 1728 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 42.25



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? Yes

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes operational
3. Were there any issues in collecting samples? No

Comments:

DTW = 29.81 ft

Monitoring Well Integrity Checklist

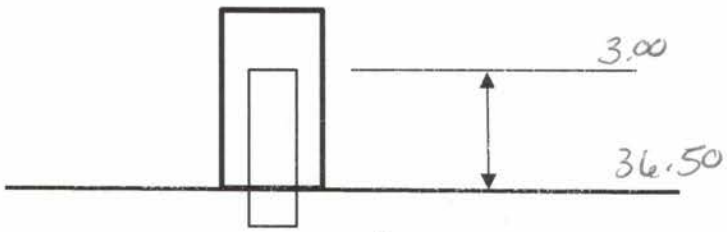
Well ID: MW59 Inspector's name: G. Garner

Date: 6/1/22

Time: 1633 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 39.50



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? Yes good operational condition.

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes, operational
3. Were there any issues in collecting samples? Several holes in airline. Repaired and functional.

Comments:

DTW = 132.56 ft

Monitoring Well Integrity Checklist

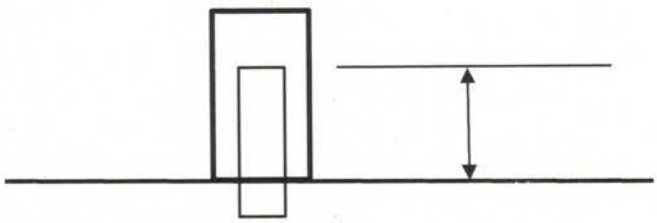
Well ID: MW01 Inspector's name: GG / NP

Date: 9/22/22

Time: 1006 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 39 1/4"



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples? NA

Comments:

Pump is lodged in well.

Monitoring Well Integrity Checklist

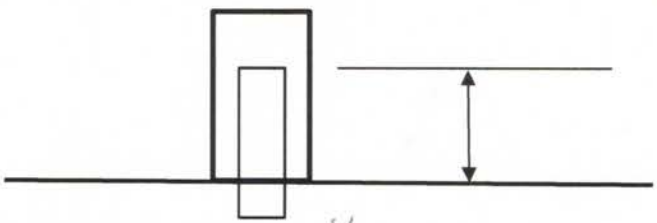
Well ID: MW03 Inspector's name: GG NP

Date: 8/22/22

Time: 0942 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 33.75 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples? NA

Comments:

Monitoring Well Integrity Checklist

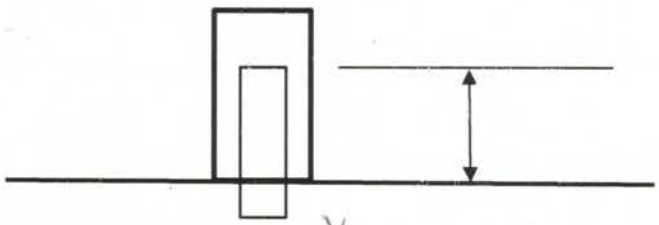
Well ID: MW04 Inspector's name: GG/NP

Date: 8/22/22

Time: 1147 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes but loose
2. Frost jacking measures: Stick up height from ground surface



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational?
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

Monitoring Well Integrity Checklist

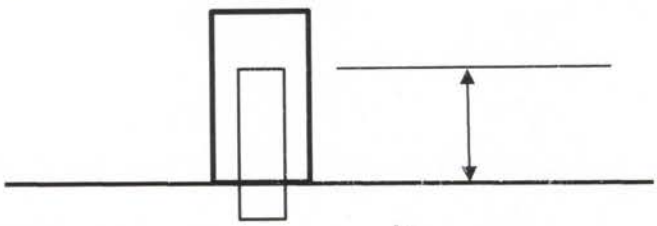
Well ID: MW06 Inspector's name: GG/NP

Date: 8/22/22

Time: 1117 Inspector's signature: _____

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 36.25



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? _____
2. Dedicated pump present? Condition? Yes Pump installed
3. Were there any issues in collecting samples?

Comments: Pump installed

Monitoring Well Integrity Checklist

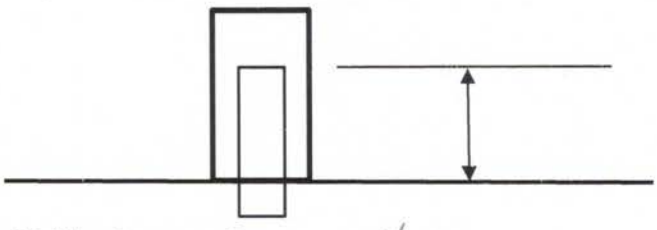
Well ID: MW07 Inspector's name: GG / NP

Date: 8/22/22

Time: 1050 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 35.5 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples? NA

Comments:

Monitoring Well Integrity Checklist

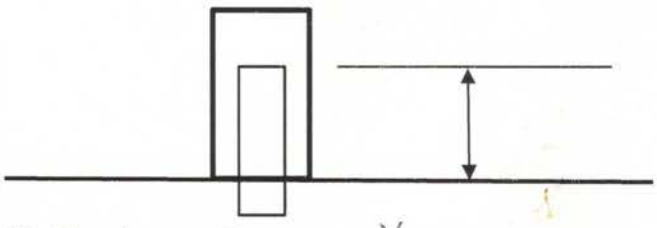
Well ID: MW08 Inspector's name: GG/NP

Date: 8/22/22

Time: 1043 Inspector's signature: _____

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 38 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? _____
2. Dedicated pump present? Condition? _____
3. Were there any issues in collecting samples?

_____

Comments:

_____

_____

_____

_____

Monitoring Well Integrity Checklist

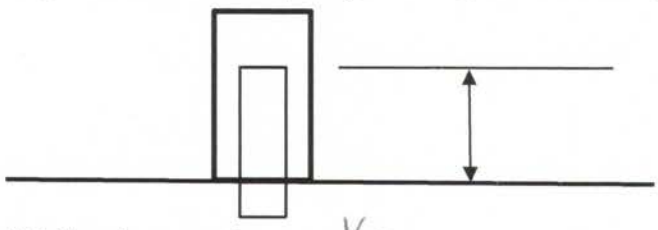
Well ID: MW09 Inspector's name: GG NP

Date: 8/22/22

Time: 1018 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples?

Comments:

Monitoring Well Integrity Checklist

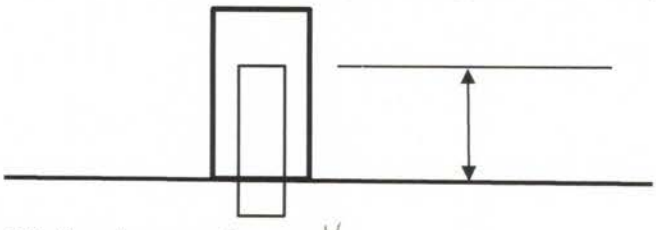
Well ID: MW10 Inspector's name: GG / NP

Date: 8/22/22

Time: 1016 Inspector's signature: GG / NP

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 35.75 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Concrete Base is above ground surface.

Monitoring Well Integrity Checklist

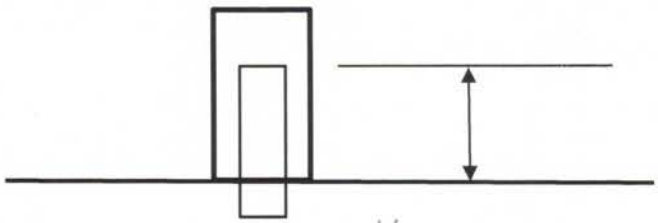
Well ID: MW11 Inspector's name: GG NP

Date: 8/22/22

Time: 1013 Inspector's signature: _____

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 36.1"



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition? —
3. Were there any issues in collecting samples? —

Comments:

Monitoring Well Integrity Checklist

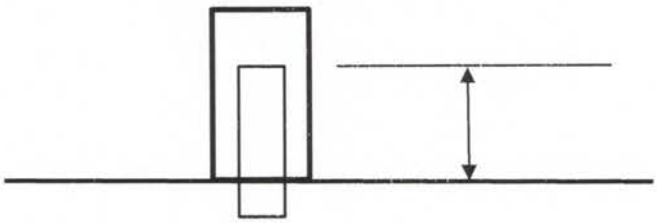
Well ID: MW13 Inspector's name: GG / NP

Date: 8/22/22

Time: 1054 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 34.25" in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples? NA

Comments:

Monitoring Well Integrity Checklist

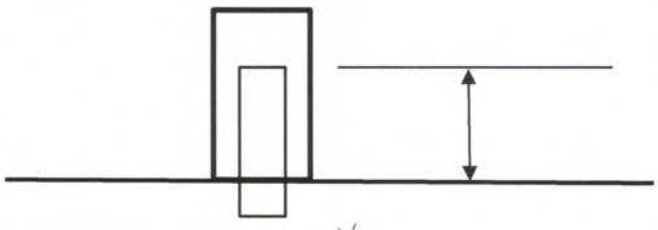
Well ID: MW16 Inspector's name: GG

Date: 9/22/22

Time: 0919 Inspector's signature: George Gerr

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 32 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational?
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

Pump installed, concrete base is seperating from ground surface

Monitoring Well Integrity Checklist

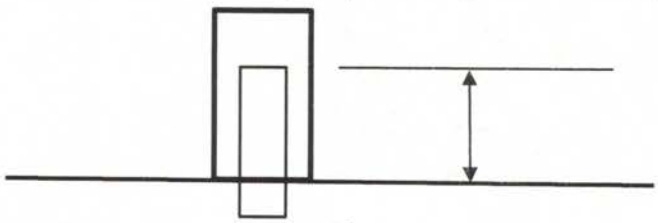
Well ID: MW17 Inspector's name: GG

Date: 8/22/22

Time: 0918 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes but jacked up.
2. Frost jacking measures: Stick up height from ground surface 39 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational?
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples?

Comments:

Pump installed, concrete base is seperating from the ground surface. Well Casing is wobbly but inner well is in good condition.

Monitoring Well Integrity Checklist

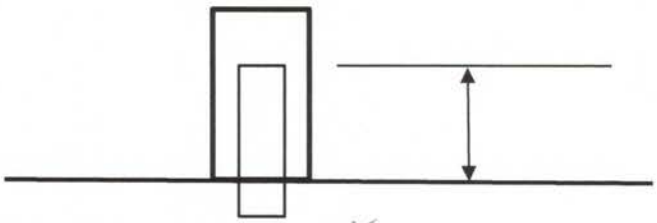
Well ID: MW18 Inspector's name: GG NP

Date: 8/02/22

Time: 0908 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 3



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? N
4. Photographs of well with lid off Yes
5. Transducer present? Condition?

During Groundwater Sampling

1. Is well operational? N/A
2. Dedicated pump present? Condition? —
3. Were there any issues in collecting samples? —

Comments:

Monitoring Well Integrity Checklist

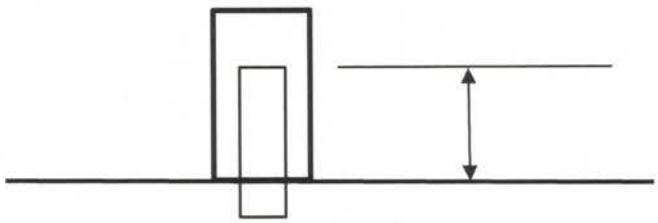
Well ID: MW 19 Inspector's name: BG/NP

Date: 8/22/22

Time: 0904 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 28.5 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition? —
3. Were there any issues in collecting samples? —

Comments:

Not sampled

Monitoring Well Integrity Checklist

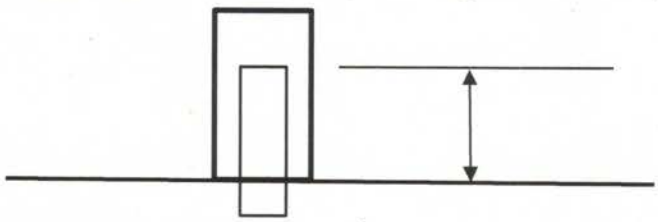
Well ID: MW 20 Inspector's name: GA NP

Date: 8/22/22

Time: 0946 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 37.25 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition? —
3. Were there any issues in collecting samples? NA

Comments:

Monitoring Well Integrity Checklist

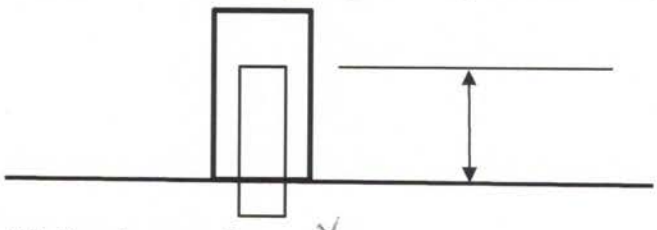
Well ID: MW21 Inspector's name: CG/NP

Date: 6/22/22

Time: 0950 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 30 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition? —
3. Were there any issues in collecting samples? NA

Comments:

Monitoring Well Integrity Checklist

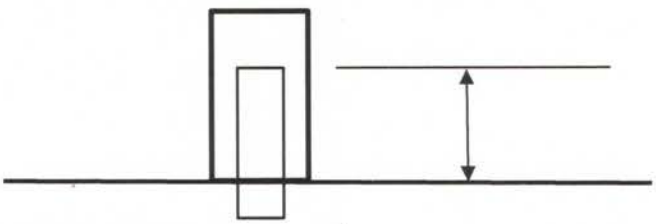
Well ID: MW 22 Inspector's name: GG/NP

Date: 9/22/22

Time: 0955 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 39



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition? —
3. Were there any issues in collecting samples? —

Comments:

Monitoring Well Integrity Checklist

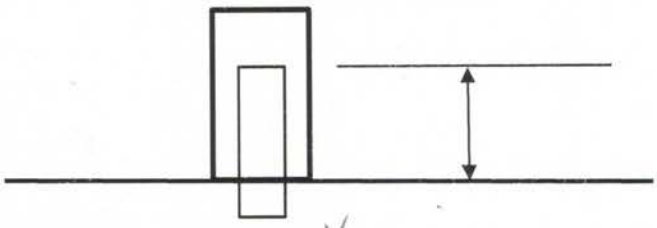
Well ID: MW23 Inspector's name: GG/NP

Date: 8/22/22

Time: 1111 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 30 1/2 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition? —
3. Were there any issues in collecting samples? —

Comments:

Monitoring Well Integrity Checklist

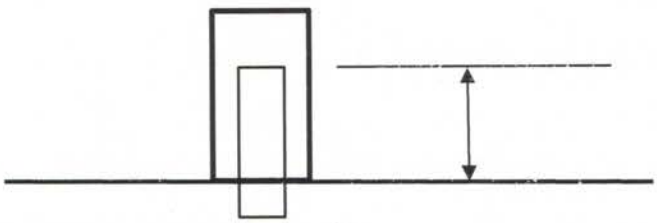
Well ID: MW24 Inspector's name: GG/NP

Date: 9/22/22

Time: 1127 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 32 3/4 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition? —
3. Were there any issues in collecting samples? —

Comments:

Monitoring Well Integrity Checklist

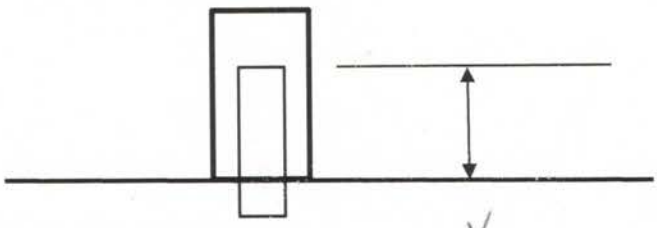
Well ID: MW 25 Inspector's name: GG/NP

Date: 8/22/22

Time: 1131 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 35.75 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition? —
3. Were there any issues in collecting samples? —

Comments:

Monitoring Well Integrity Checklist

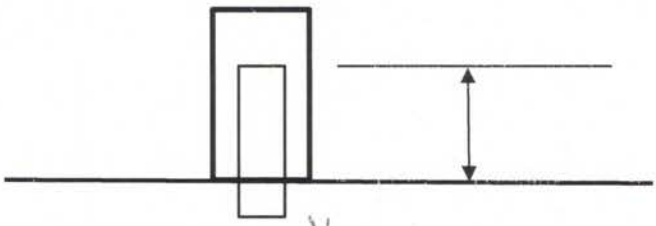
Well ID: MW26 Inspector's name: GG/NP

Date: 8/22/22

Time: 1134 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 32.75 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes, new pump installed.
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? Pump replaced

Comments:

Monitoring Well Integrity Checklist

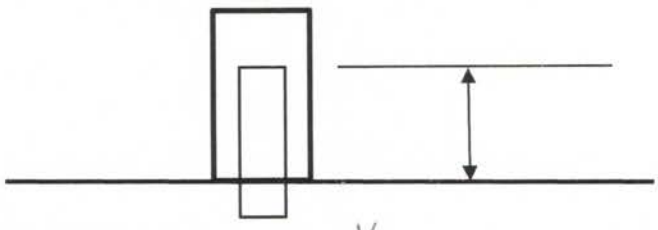
Well ID: MW27 Inspector's name: GG

Date: 8/22/22

Time: 1139 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 32 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Monitoring Well Integrity Checklist

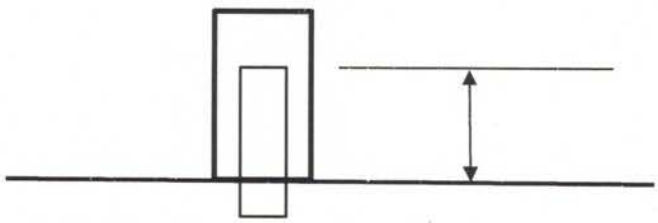
Well ID: MW 28 Inspector's name: GG

Date: 8/22/22

Time: 1141 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 30.5 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Monitoring Well Integrity Checklist

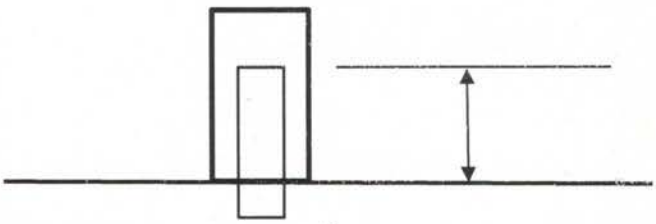
Well ID: MW29 Inspector's name: GG

Date: 8/22/22

Time: 1250 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Monitoring Well Integrity Checklist

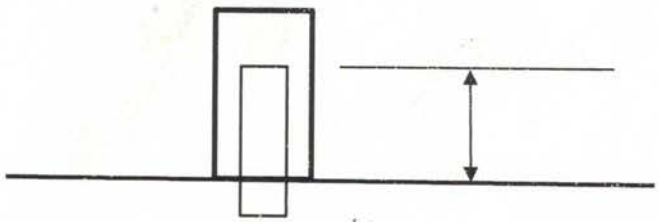
Well ID: MW30 Inspector's name: GG

Date: 8/22/22

Time: 1257 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 28.25 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition? NA
3. Were there any issues in collecting samples? NA

Comments:

Monitoring Well Integrity Checklist

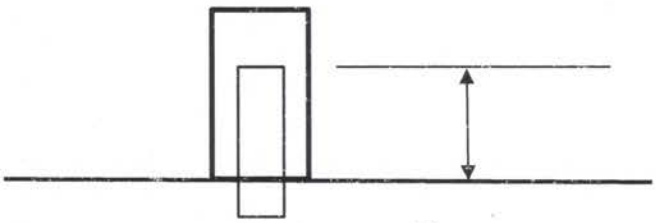
Well ID: MW31 Inspector's name: GG

Date: 8/22/22

Time: 38.50 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface _____



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition? —
3. Were there any issues in collecting samples? —

Comments:

Monitoring Well Integrity Checklist

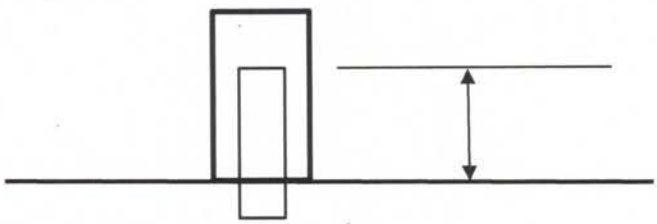
Well ID: MW32 Inspector's name: BG / NP

Date: 8/22/22

Time: 0855 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 43.5 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition? No
3. Were there any issues in collecting samples? None collected

Comments:

Monitoring Well Integrity Checklist

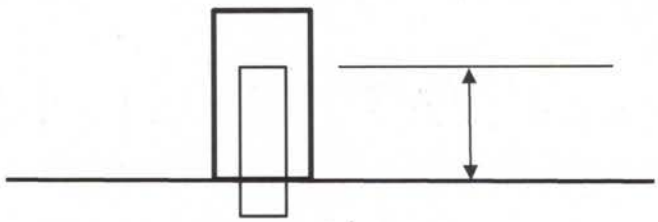
Well ID: MW 33 Inspector's name: GG / NP

Date: 5/22

Time: 0838 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 29.25 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Installed new pump @ 20 ft

Monitoring Well Integrity Checklist

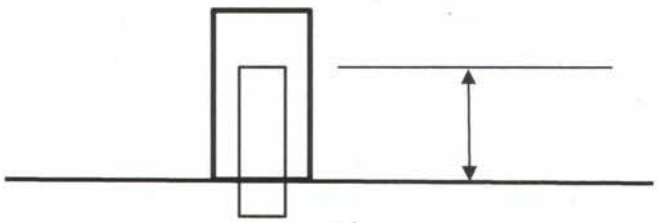
Well ID: MW-24 Inspector's name: GG/NP

Date: 8/22/22

Time: 1024 Inspector's signature: George Gu

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 45.5 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples? NA

Comments:

Monitoring Well Integrity Checklist

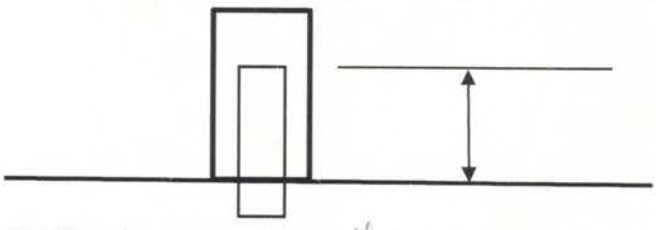
Well ID: MW 35 Inspector's name: GG/NP

Date: 8/22/22

Time: 1027 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 46.0 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition?
3. Were there any issues in collecting samples? NA

Comments:

Monitoring Well Integrity Checklist

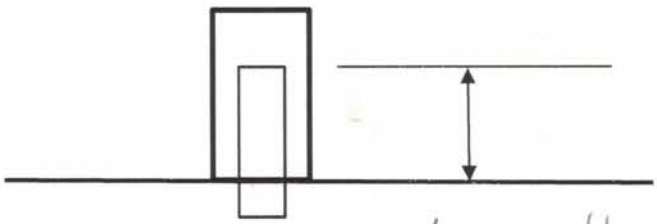
Well ID: MW36 Inspector's name: GG/NP

Date: 8/22/22

Time: 1031 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface jacked out of well



3. Is the well lid/vault secure? No, unable to close
4. Is well clearly labeled? Yes
5. Photographs of well closed N/A wont close

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? NA
2. Dedicated pump present? Condition? —
3. Were there any issues in collecting samples? NA

Comments:

Monitoring Well Integrity Checklist

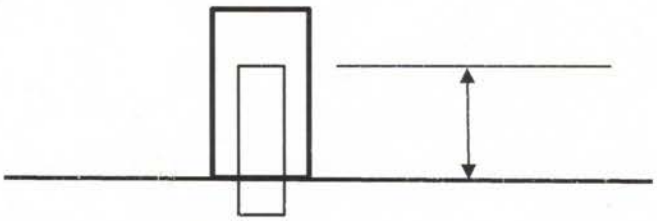
Well ID: MW 39 Inspector's name: GG

Date: 8/22/22

Time: 1416 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? _____
2. Frost jacking measures: Stick up height from ground surface _____



3. Is the well lid/vault secure? _____
4. Is well clearly labeled? _____
5. Photographs of well closed _____

After removing lid before sampling well

1. Is gasket worn or damaged? _____
2. Is vault flooded? _____
3. Any odors? _____
4. Photographs of well with lid off _____
5. Transducer present? Condition? _____

During Groundwater Sampling

1. Is well operational? _____
2. Dedicated pump present? Condition? _____
3. Were there any issues in collecting samples?

_____

Comments:

Barologger installed.

Monitoring Well Integrity Checklist

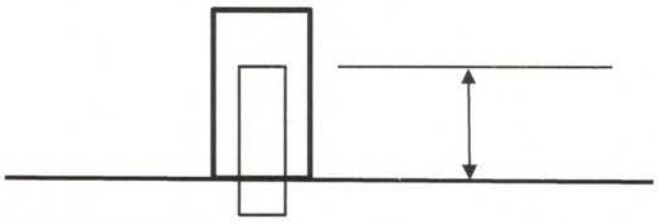
Well ID: MW40 Inspector's name: GG

Date: 2/22/22

Time: 1643 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes, but seperated from surface
2. Frost jacking measures: Stick up height from ground surface 39.0 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

ground surface seperating from concrete base.

Monitoring Well Integrity Checklist

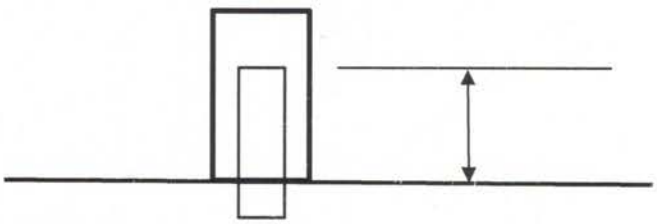
Well ID: MW42 Inspector's name: GG/NP

Date: 8/22/22

Time: 1204 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 33 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Monitoring Well Integrity Checklist

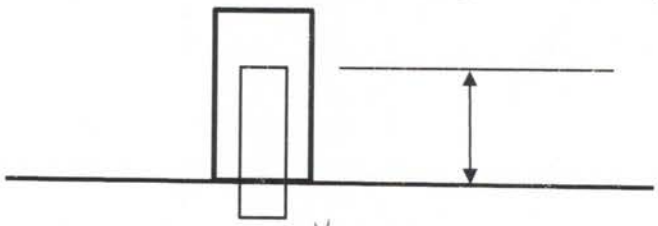
Well ID: MW43 Inspector's name: GG/NP

Date: 8/22/22

Time: 1155 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 35.25 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Monitoring Well Integrity Checklist

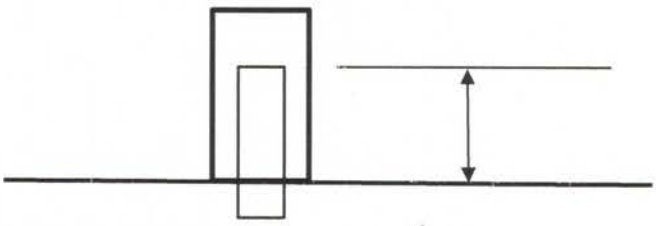
Well ID: MW44 Inspector's name: GG/MP

Date: 8/22/22

Time: 1311 Inspector's signature: _____

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 38 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Monitoring Well Integrity Checklist

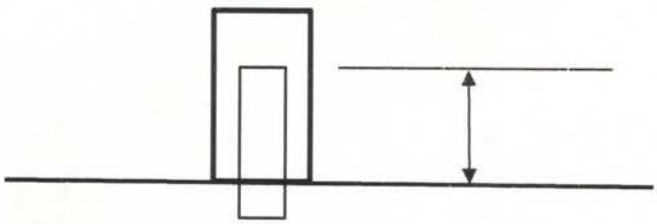
Well ID: MW45 Inspector's name: GG

Date: 8/22/22

Time: 1337 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 35 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Monitoring Well Integrity Checklist

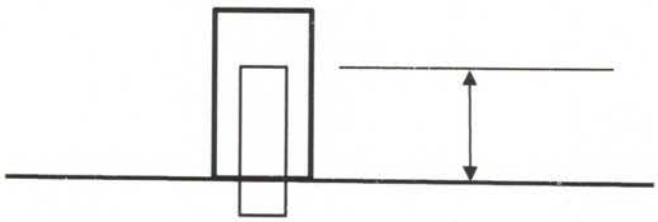
Well ID: MW 46 Inspector's name: GG

Date: 8/22/22

Time: 1342 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 42.75 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Monitoring Well Integrity Checklist

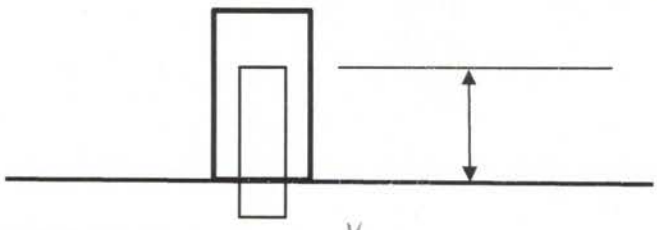
Well ID: MW47 Inspector's name: GG/NP

Date: 8/22/22

Time: 1340 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 40.5 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Monitoring Well Integrity Checklist

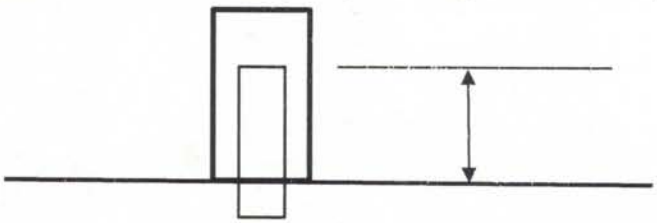
Well ID: MW48 Inspector's name: GG / NP

Date: 8/22/22

Time: 1304 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 38.0 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Sundance Consulting Inc. 15

Monitoring Well Integrity Checklist

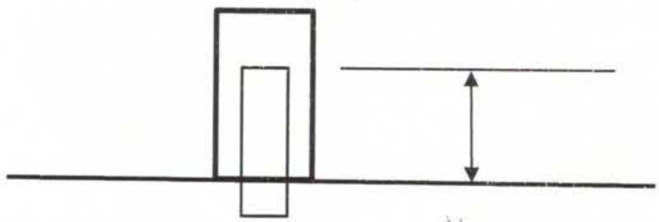
Well ID: MW49 Inspector's name: GG / NP

Date: 8/22/22

Time: 1244 Inspector's signature: [illegible]

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 41.5



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Monitoring Well Integrity Checklist

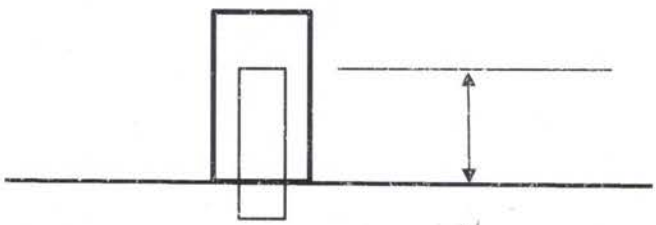
Well ID: MW50 Inspector's name: CG

Date: 8/22/22

Time: 1509 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? _____
2. Frost jacking measures: Stick up height from ground surface 44 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? Yes

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Monitoring Well Integrity Checklist

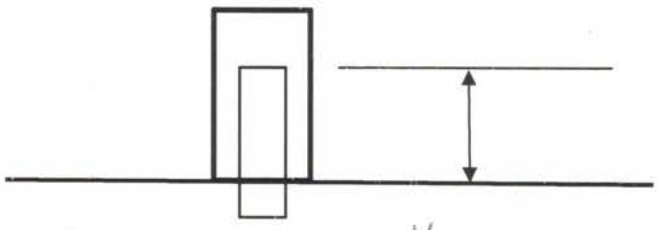
Well ID: MW51 Inspector's name: GG

Date: 8/22/22

Time: 1522 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 39.25 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? Yes

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Monitoring Well Integrity Checklist

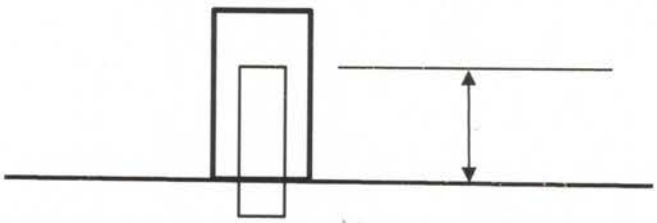
Well ID: MW 52 Inspector's name: GC / NP

Date: 8/22/22

Time: 1355 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 42.75 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? No

During Groundwater Sampling

1. Is well operational? ~~No~~ Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Monitoring Well Integrity Checklist

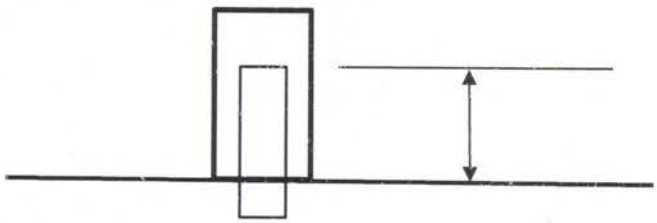
Well ID: MW53 Inspector's name: GG

Date: 8/22/22

Time: 1610 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 40.75



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? Yes

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Monitoring Well Integrity Checklist

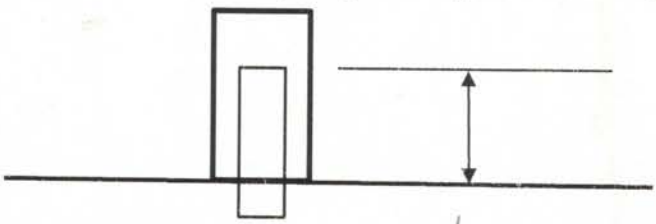
Well ID: MW55 Inspector's name: GG/NP

Date: 8/22/22

Time: 1405 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? ~~Yes~~ No

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

New pump installed

Monitoring Well Integrity Checklist

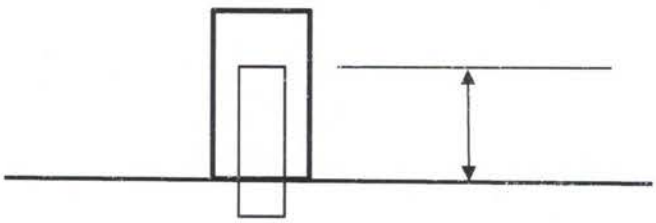
Well ID: MW57 Inspector's name: GG

Date: 8/22/22

Time: 1625 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? Yes

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Monitoring Well Integrity Checklist

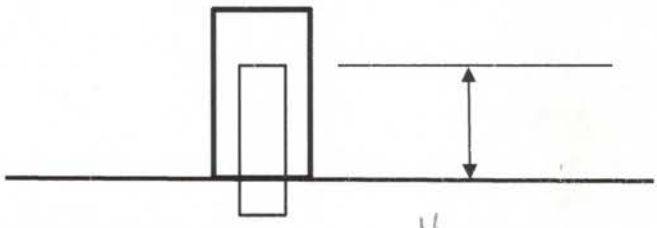
Well ID: MW 56 Inspector's name: GG

Date: 8/22/22

Time: 1318 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 41.5 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? Yes good

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Monitoring Well Integrity Checklist

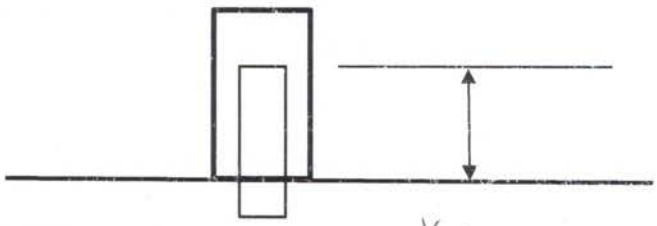
Well ID: MW58 Inspector's name: GG

Date: 8/22/22

Time: 1600 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 42.25 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? Yes

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Monitoring Well Integrity Checklist

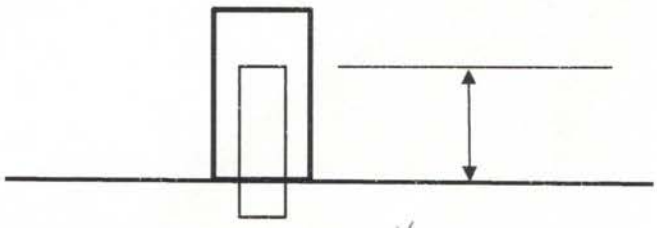
Well ID: MW59 Inspector's name: GG

Date: 8/22/22

Time: 1418 Inspector's signature:

Before Opening Monitoring Well

1. Is well cement pad or stickup in good condition? Yes
2. Frost jacking measures: Stick up height from ground surface 39.5 in



3. Is the well lid/vault secure? Yes
4. Is well clearly labeled? Yes
5. Photographs of well closed Yes

After removing lid before sampling well

1. Is gasket worn or damaged? No
2. Is vault flooded? No
3. Any odors? No
4. Photographs of well with lid off Yes
5. Transducer present? Condition? Yes Barologger.

During Groundwater Sampling

1. Is well operational? Yes
2. Dedicated pump present? Condition? Yes
3. Were there any issues in collecting samples? No

Comments:

Barologger moved to MW39 to collect barometric data

ATTACHMENT 1.3 FIELD NOTEBOOKS

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Location Red Devil Date 6/1/2022

Project / Client Red Devil Monitoring - BLM

50s Clear Sunny to 75 sunny

0700 Prep Gear
0730 Safety brief. Load out gear.
0745 Leave for mine. Clear trail along the route.
0940 Arrive at mine site.
0945 Scout out RD08 Surface water site.
0950 River has washed out RD08. Extensive ice scour along river and higher water levels at river than in 2021. Photos taken of scour and sign.
1000 Conduct evaluation of tailings area. Photos of scour and erosion features taken. Central gabions are being pushed into creek, narrowing channel.
1030 Begin collecting DTW measurements.
1800 Complete well survey. Return to lodge.
1825 Arrive at lodge.

Location Red Devil Date 6/2/2022

Project / Client Red Devil Monitoring BLM

50 clear to 75 sunny

0700 Safety brief.
0730 Load atv's for sampling
0830 Leave lodge.
0900 Arrive at mine and set up on MW10 and MW09 to begin sampling.
0940 Kinked hose in MW09, Pull and reset pump. Continue purging.
1210 Complete sampling MW10. (Dup, MS/MSD)
Sample time: 1115
Duplicate Sample time: 1118
1220 Move to MW42 (G) and MW27/28.
1250 Begin purging MW42 (G).
1415 Complete sampling at MW42. Move to MW43.
1520 Complete MW43, Move to MW29.
1555 Begin purging MW29.
1718 Complete sampling at MW29.
1720 Troubleshoot MW26 with Nick, Will attempt sampling again tomorrow.
1735 Leave for lodge.
1800 Arrive at lodge to calibrate equipment.

Rite in the Rain

Location Red Devil Date 6/3/2022

Project / Client Red Devil Monitoring - BCM

50s Clear to 75 clear

0700	Safety brief
0730	Leave for mine.
0800	Arrive at mine set up on MW26 and MW40.
0900	Unable to get MW26 purging. Move to MW59.
1012	Complete MW40. Move to MW50.
1030	Unable to get MW59 pumping. Move to MW51.
1200	Complete sampling at MW50. Move to MW57.
1220	Begin purging set up on MW57.
1322	Complete sampling at MW57. Move to MW53.
1450	Complete MW53. Move to MW58.
1510	Begin purging MW58.
1620	Complete MW58. Move to retrieve trailer and remaining sample cooler at MW53.
1630	Move to river to locate new SW location and repair signs.
1740	Leave site.
1800	Return to lodge.

Location Red Devil Date 6/4/22

Project / Client Red Devil Monitoring BCM

50s Clear to 75 clear

0700	Safety brief
0730	Leave for mine after loading.
0800	Arrive at Mine. Set up and surge/purge MW33 to remove river water/silt. Nick sets up on MW56.
0810	Set MW33 running at 0.25 L/min. Surged well to suspend and remove any river silt from flood.
0840	Set up on MW52 to purge and sample.
1045	Complete sampling on MW52. Replaced water line due to leaky freeze valve. Collected Duplicate ou22MW98GW.
1056	Turned off pump at MW33. Removed approximately ~41.5 L from well. We will allow for 24 recharge before we attempt sampling of MW33.
1105	Set up on MW47.
1250	Complete MW47. Move to MW59.
1500	Complete MW59. Move to MW26 to troubleshoot.
1630	Unable to get pump to work on MW26. →

35.62

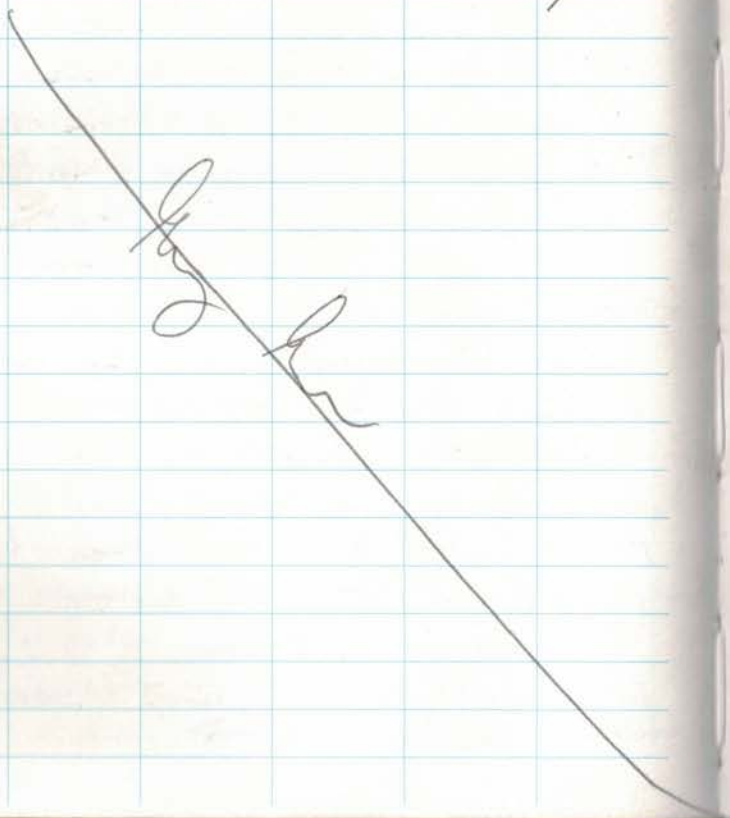
Location Red Devil Date 6/4/22

Project / Client Red Devil Monitoring - BLM

70s Partly Cloudy

1630 Cont'd
Replaced air and water lines at MW26. Disassembled pump and examined bladder. Bladder is creased and may not be re-expanding. Recommend replacing bladder. Will sample with bailer tomorrow.

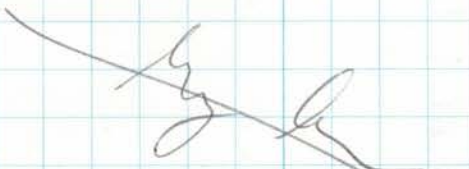
1645 Leave site for the day.



Location Red Devil Date 6/5/22

Project / Client Red Devil Monitoring - BLM

0700 Safety brief.
0710 Prep field gear.
0810 Leave for site. Attempted to call flight service to schedule early pickup on June 7th.
0840 Arrive at mine. Set up on MW16 + MW17.
0900 Return to lodge to contact air service and get battery.
0950 Return to MW49 to begin purge.
1000 Begin sampling and purging MW49.
1200 Complete MW49. Move to MW26.
1400 Complete bailing and sampling at MW26. Strong fuel odor in well (diesel).
1430 Complete trial of stream flow equipment. Leave site.
1500 Arrive at lodge.



Location Red Devil Date 6/6/22

Project / Client

30 clear

0700 Safety brief.
0730 Depart lodge,
0830 Arrive at RD 08B sample location for stream sampling,
0838 Collect 0622 RD08B SW sample at alternat location upstream outside of flood influenced area,

stream flow gauging; (6. ft wide)

Point	Depth ~~cm~~	Width (ft)	Flow ft/s
1	20 ~~cm~~	0.5ft	2.55
2	30 ~~cm~~	0.5	3.92
3	7 ~~cm~~	0.5	3.94
4	8.5 ~~cm~~	0.5	3.30
5	4.5 ~~cm~~	0.5	2.89
6	5.0 cm	0.5	2.65
7	5.5 ~~cm~~	0.5	1.98
8	4.0 cm	0.5	1.57
9	4.0 cm	0.5	2.57
10	4.0 cm	0.5	2.45
11	3.0 ~~cm~~	0.5	1.60
12	1.0 cm	0.5	0.78
13	Edge		

Depth in ~~ft~~ cm

0957 Move to RD06 to collect sample

Location Red Devil Date 6/6/22

Project / Client

1000 Move to RD06.
1010 Collect RD06 sample 0622RD06SW,

Stream Flow (5ft wide)

Point	Depth (~~cm~~ ft)	Width (ft)	V flow (ft/s)
1	4.0	0.5	2.14
2	12.0	0.5	2.62
3	10.0	0.5	1.82
4	11.0	0.5	3.24
5	6.0	0.5	3.14
6	6.5	0.5	2.81
7	8.5	0.5	2.50
8	3.5	0.5	1.82
9	1.0	0.5	0.42
10	EDge		

Depth in ~~(0.1 ft)~~ cm
max depth ~ 12cm

1058 Move to RD15 and RD05
1125 Collect RD15 and MS/MSD,
1145 Collect RD05 and duplicate 0622RD995W.
See next page for RD15.
RD05 Flow = 1.5 L/s

Location Red Devil Date 6/6/22

Project / Client Red Devil Mine Monitoring

0805 Clear Hot

1200 RD15 stream flow

Point	Depth (cm)	Width (ft)	Flow V ft/s
1	8	0.5	0.08
2	10	0.5	1.02
3	13	0.5	2.40
4	11.5	0.5	2.32
5	14.5	0.5	2.62
6	11.5	0.5	1.47
7	9	0.5	0.63
8	9	0.5	0.15
9	5	0.5	0.21
Edge	10	0	0

1240 Complete RD15 and RO5 sampling. Move to RD10.

1330 Arrive at RD10. Set survey rod at location to mark it more permanently.

1400 Go to download all transducer data that remains.

1530 Complete all transducer downloads.

1540 Return to lodge.

Location Red Devil Date 6/6/22

Project / Client Red Devil Mine Monitoring

RD10 stream flow

Pt	Depth cm	Width (ft)	Flow ft/s
1	7.0	0.5	0.21
2	6.0		0.65
3	8.5		1.47
4	10.5		1.83
5	10.5		1.56
6	7.5		1.47
7	7.0		1.06
8	7.5		0.64
9	6.5		0.42
10	9.0		0.51
11	Undercut Edge 2.5		0.23

Location Red Devil AK Date 6/10/21

Project / Client Red Devil Monitoring / BCM

50 cloudy

0630	Safety brief. Prep bottles for sampling.
0759	Leave for site.
0833	Arrive on site. Will start at River and work upstream for sampling.
0930	Complete sampling at SW08
0935	Move to sample at SW06.
1050	Complete all surface water sampling.
1130	Return to lodge for sample prep.
1200	Arrive at lodge.
1230	Receive notice that the charter flight needs to pick us up early. ETA 3 pm.
1500	Leave Red Devil via charter flight.

6/10/21

Location Red Devil mine Date 8/22/22

Project / Client Red Devil mine monitoring

Nicholas Potter

08:40 check water level of MW-33 06.67'. very moist & humid. It felt warmer due to the muggyness Bald Eagle was seen roosting tree by the mouth of Red Devil creek

0846 Installed bladder pump at MW-33. Easy installation

09:05 Georg is recording Depth to water

09:13 installing pumps @ MW 16 & MW 17

~~09~~ 33 pumps installed

09:43 MW 09

14:30 MW 59 132.2'

14:33 MW 51 42.33

14:36 MW 54 29.65'

14:54 MW 58 30.35'

16:13 MW 53 24.17'

16:20 MW 57 37.56

17:20 returned to lodge

17:28 building sample kits

Np

12 Location Red Devil, AK Date 08/23/22

Project / Client Red Devil mine monitoring, BLM

Nick Potter

07:20 Start prepping equitment

08:00 Leave for the mine

Set up on mw09

11:40 sampled MW09

Set up on mw33 by River

new pump working well

13:00 Cloudy today but no rain so far, the sun is even popping out now & then. Bug are ever present but not overwhelming

13:20 Sampled MW-33

13:30 lunch

14:09 Set up on MW06

14:30 MW06 is towing well

1455 Sampled MW06 @ 1455

1520 Set up on MW27

1600 Sampled MW 27

1628 Finished Packing Quad

Heading back to the lodge

17:00 returned to lodge

17:10 calibrating water qualty & turbidity meter).

NP

Location Red Devil, AK Date 082422

Project / Client Red Devil mine monitoring / BLM

Nick Potter

08:15 Arrive @ MW 26 & discuss sampling plan

0815 Arrive @ MW 29

Sampled MW 29

100 Set up on MW 44

1110 Sampled MW 44

1054 MW 44 has a slight leak in the Air fitting the brass connection to the downtube do not work consistantly well.

1045

1300 Sample MW 56

1336 Set up on MW 45

1410 Sample MW 45

1441 Set up on MW 46

1511 Sample MW 46

1537 Setting up on MW 47

15:57 MW 47 also need to have it's Air in blend

1622 Sampled MW 47

Up

Rite in the Rain.

Location Red Devil Date 08/25/22

Project / Client Red Devil mine monitoring / BLM

Nick Potter

Rainy & wet today

0900 Arive @ MW 49
had to pull tote tank lines
needs new cap

0915 Started pumping

0945 Sampled MW49.

Sampeped MW 49

1000 started on MW 52
to wet to climb & add tubing

1225 sampled MW 55

1314 pumping MW 50

Arrived around 1300

Sampled MW 50 13:33

1400 Arive @ MW 57

1444 Sample MW 57

Soaked through & becoming chilled heading back. will finish wells tomarow.

270

Location Red Devil Date 08/26/22

Project / Client Red Devil mine monitoring/BLM

Nick Potter

0835 set up on MW 58

0853 water is chunky & has Reddish percipitants

Sampled MW 58 @ 0941

returned to MW ~~44~~ 58 + add brass air port. winterization need to replace red quick conect

11:05 completed matinance @ MW 58 all WS in good working order.

1145 added MW cap to MW 29

1305 we returned back to base to QC samples & to prep for surface water the plan is to conduct maintinance tomarow

NP

16 Location Red Devil, AK Date 08/27/22

Project / Client Red Devil Biannual monitoring/BLM

rick Potter

0070 discussing sampling plan

SW008B

SW006

SW005/15

SW10

Lunch 1200

note on today are in the other field books.

Location Red Devil AK Date 8/22/2022

Project / Client Red Devil Monitoring BLM.

50s Rain

0700	Safety brief. Discuss bear activity.		
0800	Leave for mine.		
0830	Arrive at mine.		
0835	Begin GW measurments.		DTW
0838	MW 33	6.67 ft	DTW ☆
0855	MW 32	7.60 ft	DTW.
0904	MW 19	20.93 ft	DTW
0908	MW 18	28.72 ft	DTW
0917	MW 17	15.02 ft	DTW ☆
0919	MW 16	12.55 ft	DTW ☆
0942	MW03	20.15 ft	DTW
0946	MW 20	7.40 ft	DTW
0950	MW 21	8.64 ft	DTW
0955	MW 22	9.72 ft	DTW
1006	MW01	19.23 ft	DTW
1013	MW11	22.16 ft	DTW
1016	MW 10	27.04 ft	DTW
1020	MW 09	27.33 ft	
1024	MW 34	34.84 ft	
1027	MW 35	39.63 ft	
1031	MW-36	15.72 ft	
1043	MW08	13.70 ft	
1050	MW07	21.94 ft	
1054	MW13	30.90 ft	

Location Red Devil AK Date 8/22/22

Project / Client Red Devil Monitoring BLM

50s Rain

1059	MW12	Not measured / jacked.	
1111	MW23	16.31 ft	DTW
1117	MW06	19.06 ft	DTW ★
1127	MW 24	17.41 ft	DTW
1131	MW 25	31.93 ft	DTW
1134	MW 26	33.54 ft	DTW
1139	MW 27	30.01 ft	DTW
1141	MW 28	28.56 ft	DTW
1147	MW04	26.35 ft	DTW
1155	MW 43	88.90 ft	DTW
1204	MW 42	127.58 ft	DTW
1210	Land.		
1244	MW 49	31.56 ft	DTW
1250	MW 29	64.43 ft	DTW
1257	MW30	52.56 ft	DTW
1304	MW48	19.28 ft	DTW
1311	MW 44	35.01 ft	DTW
1318	MW56	34.66 ft	DTW
1337	MW 45	44.84 ft	DTW
1342	MW 46	34.00 ft	DTW
1348	MW 47	37.45 ft	DTW
1355	MW 52	32.40 ft	DTW
1405	MW 55	12.73 ft	DTW ★
1418	MW 59	122.20 ft	DTW

Location Red Devil AK Date 8/22/22

Project / Client Red Devil Annual Monitoring

50s Rain

1455	MW39	drop Barologger at
	3 ft btoc	removed Barologger
	from MW59.	
1501	MW39	84.87 ft DTW
	TD = 85.87 ft	
1509	MW50	49.50 ft DTW
1522	MW51	42.33 ft DTW
1533	MW54	29.65 ft DTW
1600	MW58	30.35 ft DTW
1610	MW53	34.17 ft DTW
1625	MW57	37.56 ft DTW
1632	MW31	38.50 ft DTW
1643	MW40	128.93 ft DTW
1650	Complete GW survey and transducer downloads. All 8 transducers downloaded successfully. Leave site.	
1720	Arrive at lodge for sample prep and calibration.	

Location Red Devil AK Date 8/23/2022

Project / Client Red Devil Annual Monitoring

50s Cloudy

0700	Safety brief.
0755	Complete load out and leave for mine.
0820	Arrive at Mine and set up on MW09 and MW10
1033	Collect MW10 sample.
1035	Collect MW98 duplicate @ MW10.
1130	Complete sampling at MW10. Move to MW16 and MW17.
1150	Begin set up on MW17 to purge for sampling.
1315	Complete sampling at MW17, Collect MS/MSD.
1330	Begin purging/sampling at MW16.
1410	Sample MW16.
1500	Complete MW16. Purge water using winterization kit.
1510	Set up on MW28.
1610	Collect sample at MW28.
1630	Complete sampling. Return to lodge.
1700	Arrive at lodge.

Rite in the Rain

Location Red Devil AK Date 8/24/22

Project / Client Red Devil Annual Monitoring BLM

SOS Foggy

0700	Safety brief
0745	Leave for mine after load out.
0820	Arrive at mine. Start with MW29 and MW42.
	Issue with air leak at fittings. Attempt to field repair with new fitting is unsuccessful. Field splice with tubing and zip ties to hold 60 psi.
0940	Begin purging MW42.
1045	Stabilized. Collect sample with sample time of 1100. 0822 MW42GW
1112	Complete sampling at MW42. Move to MW43.
1125	Set up on MW43.
1220	Collect 0822 MW43GW MS/MSD and duplicate 0822 MW98GW.
1250	Complete sampling at MW43.
1335	Set up on MW44. Begin purging.
1433	Complete MW44. Move to MW59.
1500	Set up on MW59.
	Troubleshoot loose air fitting. Replace with crimp fitting (non brass).
1550	Begin purging.

Location Red Devil AK Date 8/24/22

Project / Client Red Devil Annual Monitoring BL

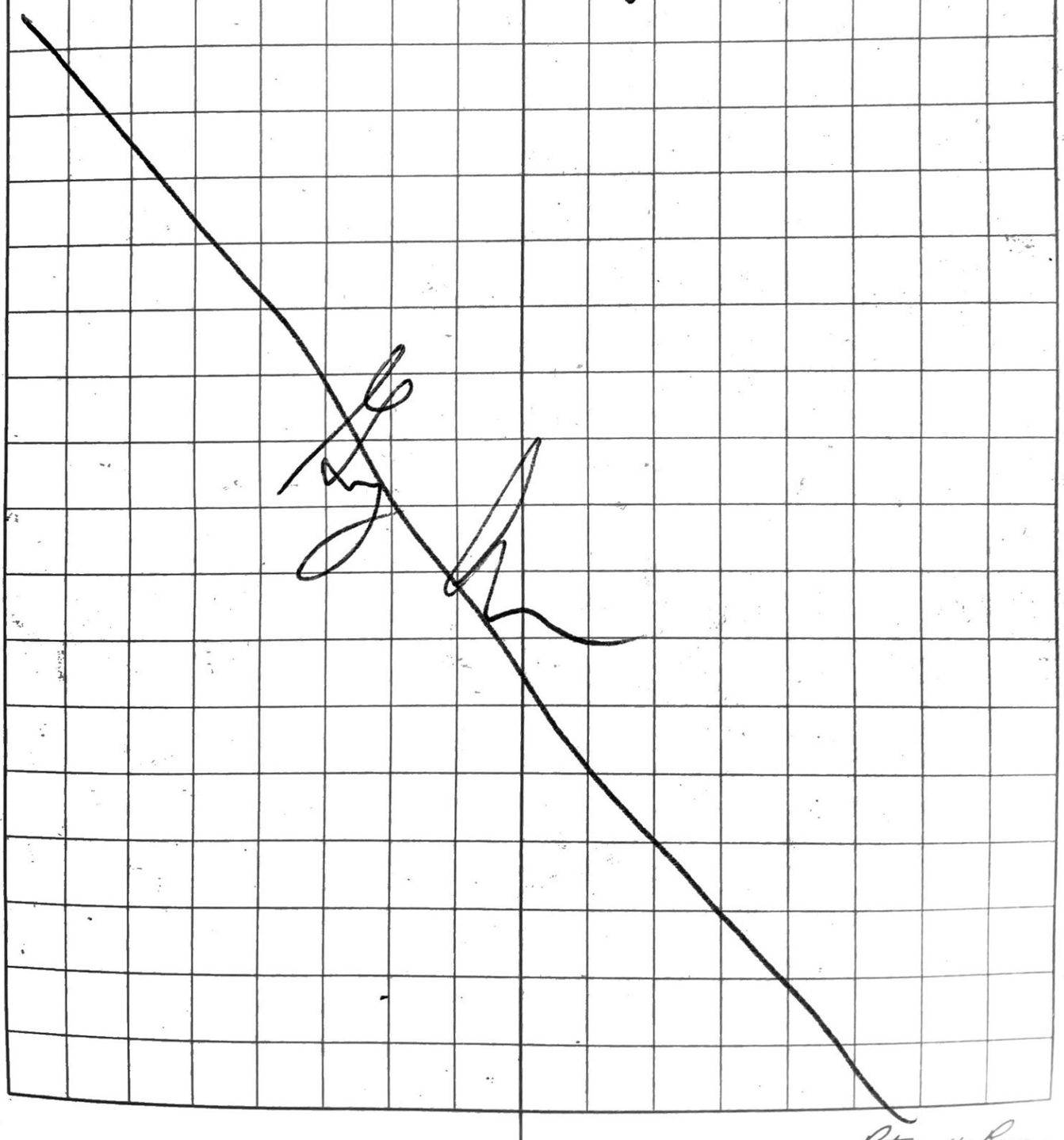
60s Clear

1505 Extremely turbid water during purge. (400+ NTU).

1712 Caplete sampling at MW59. Was able to fix air fitting with spare parts.

1725 Leave site.

1750 Arrive at lodge.



Rite in the Rain

Location Red Devil AK Date 8/25/22

Project / Client Red Devil Annual Monitoring BLR

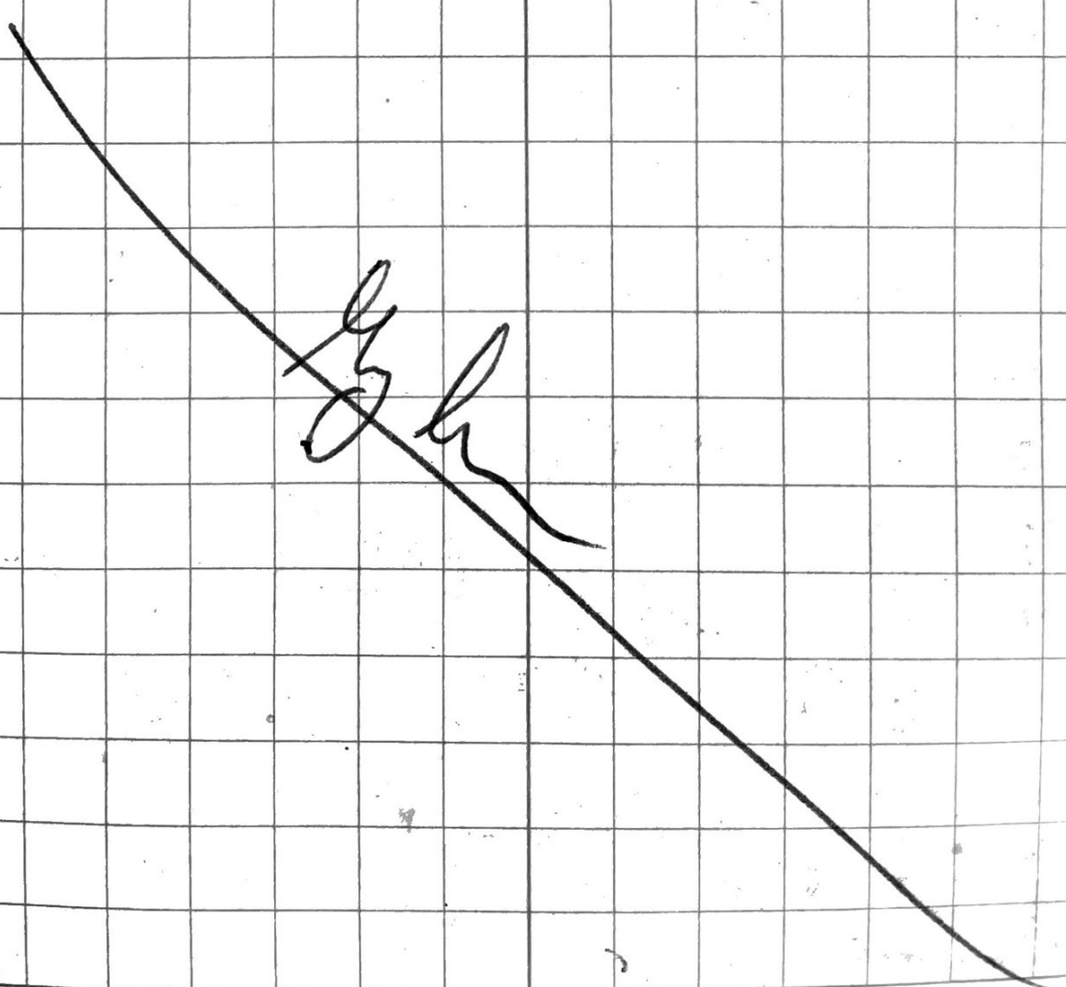
40s Rain

0700	Safety brief and load out.
0800	Contact AAT about earlier flight.
0820	Leave for mine.
0900	Set up on MW49 (NP) and MW40 (GG).
1042	Complete sampling at MW40.
1045	Move to MW51.
1150	Complete sampling at MW51.
1200	Move to MW54.
1310	Complete sampling at MW54. Collected duplicat (MW97) at MW54.
1330	Move to MW53.
1430	Complete sampling at MW53.
1500	Leave site for the day.
1530	Arrive at lodge.

Location Red Devil AK Date 8/25/22

Project / Client Red Devil Annual Monitoring BLM

0700 Safety brief. Begin load out.
0800 Leave for site.
0820 Arrive at mine. Set up at MW 26 and MW 58,
0845 Replace pump at MW 26.
1120 Collect sample at MW 26.
1230 Complete sampling at ~~MW 26~~ MW26.
1300 Return to lodge to QC samples.
1330 Field work complete for the day



Location Red Devil AK Date 8/27/22

Project / Client Red Devil Annual Monitoring

40s Cloudy windy

0730 Safety brief. Plan out maintenance.

0830 Load out for well maintenance and stream discharge.

0845 Leave lodge.

0915 Arrive at Mine to collect stream flow measurements. Beginning at RD08 and progressing upstream.

~~Str 0930~~
~~RD08~~

	RD08	Depth (ft)	Width (ft)	Flow (ft/s)
	edge	0	0	0
1	~~0.50~~ WP	0.10	1.0'	1.43
2		0.40	1.5	3.55
3		0.30	2.0	3.71
4		0.50	2.5	2.63
5		0.40	3.0	2.71
6		0.40	3.5	2.34
7		0.30	4.0	1.73
8		0.20	4.5	1.33
9		0.10	5.0	2.00
10		0.10	5.5	1.57
11		0.10	6.0	1.22
12	Edge	0	6.5	0
13				

Location Red Devil AK Date 8/27/22

Project / Client Red Devil Annual Monitoring

40s Foggy Mist

RD06	Depth (ft)	Width (ft)	Flow (cfs)
edge	0	0	0
	Not Taken		1.57
	0.5	0.5	1.57
	0.5	1	1.57
	0.6	1.5	1.94
	0.4	2.0	2.65
	0.4	2.5	1.64
	0.4	3.0	2.33
	0.2	3.5	1.40
	0.1	4.0	0.08
	0.1	4.5	0
edge	0	5	0

Location Red devil Date 08/27/22

Project / Client Red Devil Annual Monitoring BLM

width ft	depth ft	flow ft/s	SW1
0.5	0.2	-0.55	10:41
1.0	0.3	-0.09	
1.5	0.3	0.98	
2.0	0.4	2.14	
2.5	0.5	4.30	
3.0	0.3	3.71	
3.5	0.4	1.78	
4.0	0.2	0.47	
4.5	0.1	0.93	
5	0	0	edge

SW 05 (Seep) = 1 L/min

Location Red Devil Date 08/27/22

Project / Client Red Devil/Anual Monitoring/BLM

SW 10 (Beaver Pond)

11:20

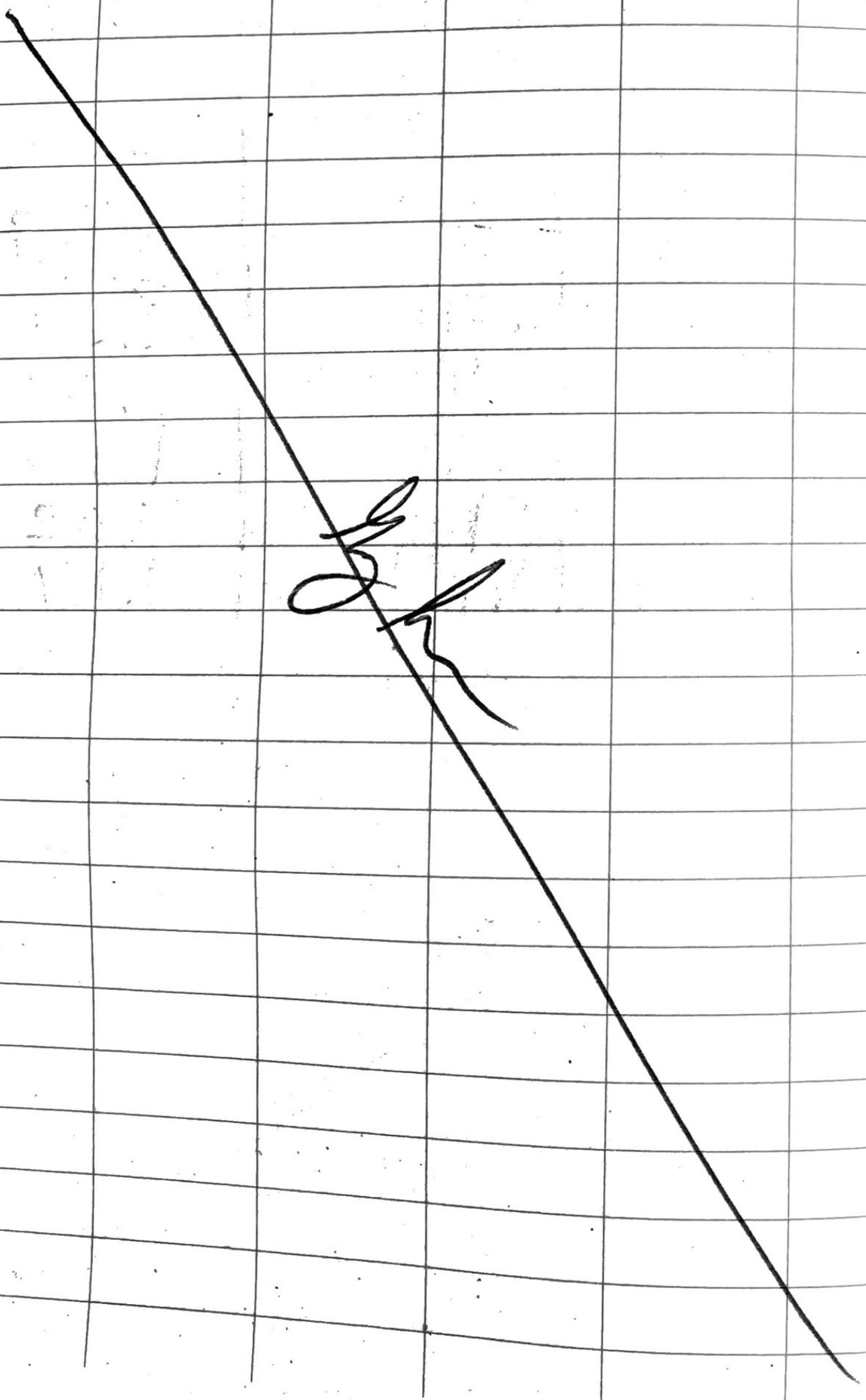
Width ft	depth ft	flow ft/s
0	0.3	0.66
0.5	0.2	0.85
1.0	0.3	2.20
1.5	0.4	3.36
2.0	0.5	2.29
2.5	0.4	2.29
3.0	0.4	1.54
3.5	0.2	1.10
4.0	0.1	0.02
4.5	0.1	0.19

Location Red Devil Date 8/27/2027

Project / Client Red Devil Mine Annual Monitoring

1230 Perform well maintenance on monitoring wells.

1500 Return to Lodge.



Location Red Devil Date 8/28/22

Project / Client Red Devil Annual Monitoring

0800	Safety brief and prep sample bottles.
0845	~~Arr~~ Leave for mine.
0910	Arrive at Mine to sample RD08Band work upstream.
0915	Collect RD08B.
0940	Complete RD08B.
0945	Move to RD04.
	Collect 0822 RD04SW.
1010	Move to RD05(seep) and RD15.
1015	Collect 0822 RD05SW and duplicate ~~at~~ 0822 RD99SW at 1018.
1030	Collect 0822 RD15SW ms/msd.
1105	Move to RD10.
1125	Collect RD10 sample.
1135	Complete sampling.
1145	Return to lodge for sample prep and QC.

Rito on the River

ATTACHMENT 1.3 FIELD NOTEBOOKS

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Location Red Devil Date 6/1/2022

Project / Client Red Devil Monitoring - BLM

50s Clear Sunny to 75 sunny

0700 Prep Gear
0730 Safety brief. Load out gear.
0745 Leave for mine. Clear trail along the route.
0940 Arrive at mine site.
0945 Scout out RD08 Surface water site.
0950 River has washed out RD08. Extensive ice scour along river and higher water levels at river than in 2021. Photos taken of scour and sign.
1000 Conduct evaluation of tailings area. Photos of scour and erosion features taken. Central gabions are being pushed into creek, narrowing channel.
1030 Begin collecting DTW measurements.
1800 Complete well survey. Return to lodge.
1825 Arrive at lodge.

Location Red Devil Date 6/2/2022

Project / Client Red Devil Monitoring BLM

50 clear to 75 sunny

0700 Safety brief.
0730 Load atv's for sampling
0830 Leave lodge.
0900 Arrive at mine and set up on MW10 and MW09 to begin sampling.
0940 Kinked hose in MW09, Pull and reset pump. Continue purging.
1210 Complete sampling MW10. (Dup, MS/MSD)
Sample time: 1115
Duplicate Sample time: 1118
1220 Move to MW42 (G) and MW27/28.
1250 Begin purging MW42 (G).
1415 Complete sampling at MW42. Move to MW43.
1520 Complete MW43, Move to MW29.
1555 Begin purging MW29.
1718 Complete sampling at MW29.
1720 Troubleshoot MW26 with Nick, Will attempt sampling again tomorrow.
1735 Leave for lodge.
1800 Arrive at lodge to calibrate equipment.

Rite in the Rain

Location Red Devil Date 6/3/2022

Project / Client Red Devil Monitoring - BCM

50s Clear to 75 clear

0700	Safety brief
0730	Leave for mine.
0800	Arrive at mine set up on MW26 and MW40.
0900	Unable to get MW 26 purging. Move to MW59.
1012	Complete MW40. Move to MW50.
1030	Unable to get MW59 pumping. Move to MW51.
1200	Complete sampling at MW50. Move to MW57.
1220	Begin purging set up on MW57.
1322	Complete sampling at MW57. Move to MW53.
1450	Complete MW53. Move to MW58.
1510	Begin purging MW58.
1620	Complete MW58. Move to retrisive trailer and remaining sample cooler at MW53.
1630	Move to river to locate new SW location and repair signs.
1740	Leave site.
1800	Return to lodge.

Location Red Devil Date 6/4/22

Project / Client Red Devil Monitoring BCM

50s Clear to 75 clear

0700	Safety brief
0730	Leave for mine after loading
0800	Arrive at Mine. Set up and surge/purge MW33 to remove river water/silt. Nick sets up on MW56.
0810	Set MW33 running at 0.25 L/min. Surge will to suspend and remove any river silt from flood.
0840	Set up on MW52 to purge and sample.
1045	Complete sampling on MW52. Replaced water line due to leaky freeze valve. Collected Duplicate 0622MW98GW.
1056	Turned off pump at MW33. Removed approximately ~41.5 L from well. We will allow for 24 recharge before we attempt sampling of MW33.
1105	Set up on MW47.
1250	Complete MW47. Move to MW59.
1500	Complete MW59. Move to MW26 to troubleshoot.
1630	Unable to get pump to work on MW26. →

35.62

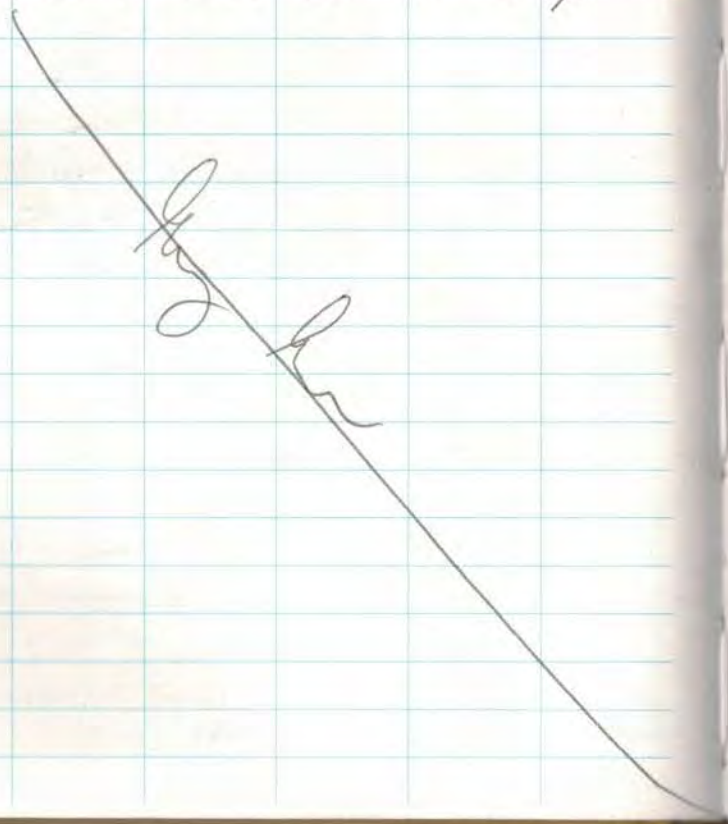
Location Red Devil Date 6/4/22

Project / Client Red Devil Monitoring - BLM

70s Partly Cloudy

1630 Cont'd
Replaced air and water lines at MW26. Disassembled pump and examined bladder. Bladder is creased and may not be re-expanding. Recommend replacing bladder. Will sample with bailer tomorrow.

1645 Leave site for the day.



Location Red Devil Date 6/5/22

Project / Client Red Devil Monitoring - BLM

0700 Safety brief.
0710 Prep field gear.
0810 Leave for site. Attempted to call flight service to schedule early pickup on June 7th.
0840 Arrive at mine. Set up on MW16 + MW17.
0900 Return to lodge to contact air service and get battery.
0950 Return to MW49 to begin purge.
1000 Begin sampling and purging MW49.
1200 Complete MW49. Move to MW26.
1400 Complete bailing and sampling at MW26. Strong fuel odor in well (diesel).
1430 Complete trial of stream flow equipment. Leave site.
1500 Arrive at lodge.

Location Red Devil Date 6/6/22

Project / Client

30 clear

0700 Safety brief.
0730 Depart lodge,
0830 Arrive at RD 08B sample location for stream sampling,
0838 Collect 0622 RD08B SW sample at alternat location upstream outside of flood influenced area,

stream flow gauging; (6. ft wide)

Point	Depth ~~cm~~	Width (ft)	Flow ft/s
1	20 ~~cm~~	0.5ft	2.55
2	30 ~~cm~~	0.5	3.92
3	7 ~~cm~~	0.5	3.94
4	8.5 ~~cm~~	0.5	3.30
5	4.5 ~~cm~~	0.5	2.89
6	5.0 cm	0.5	2.65
7	5.5 ~~cm~~	0.5	1.98
8	4.0 cm	0.5	1.57
9	4.0 cm	0.5	2.57
10	4.0 cm	0.5	2.45
11	3.0 ~~cm~~	0.5	1.60
12	1.0 cm	0.5	0.78
13	Edge		

Depth in ~~ft~~ cm

0957 Move to RD06 to collect sample

Location Red Devil Date 6/6/22

Project / Client

1000 Move to RD06.
1010 Collect RD06 sample 0622RD06SW,

Stream Flow (5ft wide)

Point	Depth (~~cm~~ ft)	Width (ft)	V flow (ft/s)
1	4.0	0.5	2.14
2	12.0	0.5	2.62
3	10.0	0.5	1.82
4	11.0	0.5	3.24
5	6.0	0.5	3.14
6	6.5	0.5	2.81
7	8.5	0.5	2.50
8	3.5	0.5	1.82
9	1.0	0.5	0.42
10	EDge		

Depth in ~~(0.1 ft)~~ cm
max depth ~ 12cm

1058 Move to RD15 and RD05
1125 Collect RD15 and MS/MSD,
1145 Collect RD05 and duplicate 0622RD995W.
See next page for RD15.
RD05 Flow = 1.5 L/s

Location Red Devil Date 6/6/22

Project / Client Red Devil Mine Monitoring

0805 Clear Hot

1200 RD15 stream flow

Point	Depth (cm)	Width (ft)	Flow V ft/s
1	8	0.5	0.08
2	10	0.5	1.02
3	13	0.5	2.40
4	11.5	0.5	2.32
5	14.5	0.5	2.62
6	11.5	0.5	1.47
7	9	0.5	0.63
8	9	0.5	0.15
9	5	0.5	0.21
Edge	10	0	0

1240 Complete RD15 and RO5 sampling. Move to RD10.

1330 Arrive at RD10. Set survey rod at location to mark it more permanently.

1400 Go to download all transducer data that remains.

1530 Complete all transducer downloads.

1540 Return to lodge.

Location Red Devil Date 6/6/22

Project / Client Red Devil Mine Monitoring

RD10 stream flow

Pt	Depth cm	Width (ft)	Flow ft/s
1	7.0	0.5	0.21
2	6.0		0.65
3	8.5		1.47
4	10.5		1.83
5	10.5		1.56
6	7.5		1.47
7	7.0		1.06
8	7.5		0.64
9	6.5		0.42
10	9.0		0.51
11	Undercut Edge 2.5		0.23

Location Red Devil AK Date 6/10/21

Project / Client Red Devil Monitoring / BCM

50 cloudy

0630	Safety brief. Prep bottles for sampling.
0759	Leave for site.
0833	Arrive on site. Will start at River and work upstream for sampling.
0930	Complete sampling at SW08
0935	Move to sample at SW06.
1050	Complete all surface water sampling.
1130	Return to lodge for sample prep.
1200	Arrive at lodge.
1230	Receive notice that the charter flight needs to pick us up early. ETA 3 pm.
1500	Leave Red Devil via charter flight.

6/10/21

Location Redwevil mine Date 8/22/22

Project / Client Red Devil mine monitoring

Nicholas Potter

08:40 check water level of MW-33 06.67'. very moist & humid. It felt warmer due to the muggyness Bald Eagle was seen roosting tree by the mouth of Red Devil creek

0846 Installed bladder pum at MW-33. Easy installation

09:05 Georg is recording Depth to water

09:13 installing pumps @ MW 16 & MW 17

~~09~~ 33 pumps installed

09:43 MW 09

14:30 MW 59 132.2'

14:33 MW 51 42.33

14:36 MW 54 29.65'

14:54 MW 58 30.35'

16:13 MW 53 24.17'

16:20 MW 57 37.56

17:20 returned to lodge

17:28 building sample Kits

Np

12 Location Red Devil, AK Date 08/23/22

Project / Client Red Devil mine monitoring, BLM

Nick Potter

07:20	Start preping equitment
08:00	Leave for the mine
	Set up on mw09
11:40	sampled MW09
	Set up on mw33 by River
	new pump working well
13:00	Cloudy today but no rain so far, the sun is even popping out now & then. Bug are ever present but not overwhelming
13:20	Sampled MW-33
13:30	lunch
14:09	Set up on MW06
14:30	MW06 is towing well
14:55	Sampled MW06 @ 1455
15:20	Set up on MW27
16:00	Sampled MW 27
16:28	Finished Packing Quad
Heading back to the lodge	
17:00	returned to lodge
17:10	calibrating water quality & turbidity meter).

MP

Location Red Devil, AK Date 082422 13

Project / Client Red Devil mine monitoring /BLM

Nick Patter

08:15 Arive @ MW 26 & discussed sampling plan

0815 Arive @ MW 29

Sampled MW29

100 Set up on MW44

1110 Sampled MW44

1054 MW 44 has a slight Leak in the Air in tup the brass connection to the down tube do not work consistantly well.

1045

1300 Sample MW56

1336 Set up on MW 45

1410 Sample MW 45

1441 Set up on MW46

1511 Sample MW46

1537 Seting up on MW 47

15:57 MW 47 also need to have it's Air in tltened

1622 sampled MW 47

NP

Rite in the Rain

Location Red Devil Date 08/26/22

Project / Client Red Devil mine moitoring / BLM

Nick Potter

Rainy & wet today

0900 Arive @ MW 49

had to pull tode (?) links lines

needs new cap

0915 Started pumping

0945 Sampled MW49.

sampeped MW 49

1000 started on MW 52

to wet to write & add tubes

1225 Sampled MW 55

1314 pumping MW 50

Arived around 1300

Sampled MW 50 13:33

1400 Arive @ MW 57

1444 Sample MW 57

Soaked throug & becoming chilled head-ing back. will finish wells tomarow.

NP

Location Red Devil Date 08/26/22

Project / Client Red Devil mine monitoring/BLM

Nick Potter

0835 set up on MW 58
0853 water is chunky & has Redish persipitants
Sampled MW 58 @ 0941

Returned to MW ~~44~~ 58 + add brass air port. winterization need to replace red quick conect
11:05 completed matinance @ 58 all was in good working order.
1145 added ~~N~~ cap to MW 29

1305 we returned back to base to QC samples & to prep for surface water the plan is to conduct maintinance tomarow

NP

Location Red Devil, AK Date 08/27/22

Project / Client Red Devil Biannual monitoring/BLM

Rick Potter

0070 discussing sampling plan

SW008B

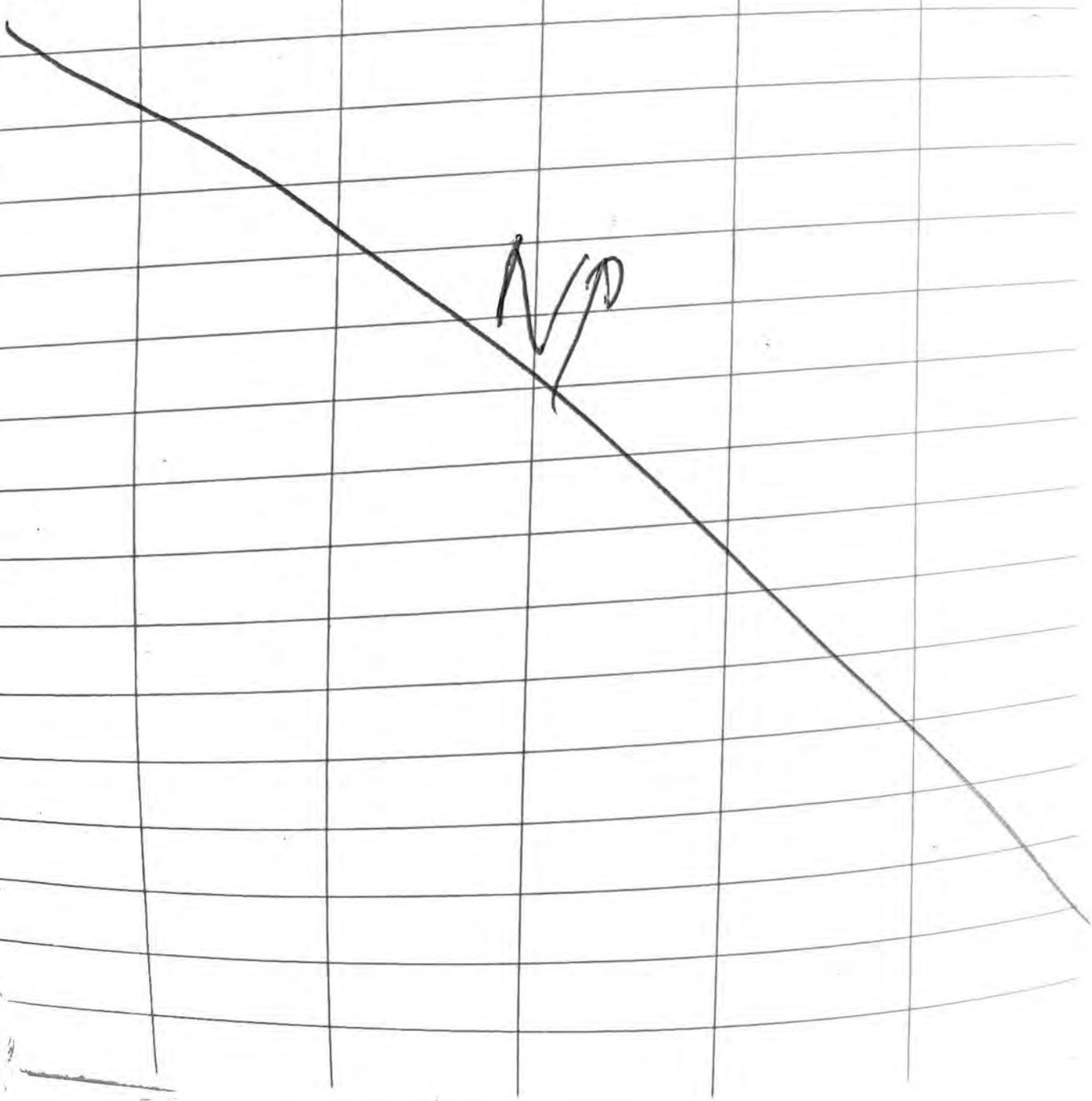
SW006

SW005/15

SW10

Lunch 1200

note on today are in the other field books.



Location Red Devil AK Date 8/22/2022

Project / Client Red Devil Monitoring BLM.

50s Rain

0700	Safety brief. Discuss bear activity.		
0800	Leave for mine.		
0830	Arrive at mine.		
0835	Begin GW measurments		DTW
0838	MW 33	6.67 ft	DTW ☆
0855	MW 32	7.60 ft	DTW.
0904	MW 19	20.93 ft	DTW
0908	MW 18	28.72 ft	DTW
0917	MW 17	15.02 ft	DTW ☆
0919	MW 16	12.55 ft	DTW ☆
0942	MW03	20.15 ft	DTW
0946	MW 20	7.40 ft	DTW
0950	MW 21	8.64 ft	DTW
0955	MW 22	9.72 ft	DTW
1006	MW01	19.23 ft	DTW
1013	MW11	22.16 ft	DTW
1016	MW 10	27.04 ft	DTW
1020	MW 09	27.33 ft	
1024	MW 34	34.84 ft	
1027	MW 35	39.63 ft	
1031	MW-36	15.72 ft	
1043	MW08	13.70 ft	
1050	MW07	21.94 ft	
1054	MW13	30.90 ft	

Location Red Devil AK Date 8/22/22

Project / Client Red Devil Monitoring BLM

50s Rain

1059	MW12	Not measured / jacked.	
1111	MW23	16.31 ft	DTW
1117	MW06	19.06 ft	DTW ★
1127	MW 24	17.41 ft	DTW
1131	MW 25	31.93 ft	DTW
1134	MW 26	33.54 ft	DTW
1139	MW 27	30.01 ft	DTW
1141	MW 28	28.56 ft	DTW
1147	MW 04	26.35 ft	DTW
1155	MW 43	88.90 ft	DTW
1204	MW 42	127.58 ft	DTW
1210	Lunch.		
1244	MW 49	31.56 ft	DTW
1250	MW 29	64.43 ft	DTW
1257	MW 30	52.56 ft	DTW
1304	MW 48	19.28 ft	DTW
1311	MW 44	35.01 ft	DTW
1318	MW 50	34.66 ft	DTW
1337	MW 45	44.84 ft	DTW
1342	MW 46	34.00 ft	DTW
1348	MW 47	37.45 ft	DTW
1355	MW 52	32.40 ft	DTW
1405	MW 55	12.73 ft	DTW ★
1418	MW 59	122.20 ft	DTW

Location Red Devil AK Date 8/22/22

Project / Client Red Devil Annual Monitoring

50s Rain

1455	MW39	drop Barologger at
	3 ft btoc	removed Barologger
	from MW59.	
1501	MW39	84.87 ft DTW
	TD = 85.87 ft	
1509	MW50	49.50 ft DTW
1522	MW51	42.33 ft DTW
1533	MW54	29.65 ft DTW
1600	MW58	30.35 ft DTW
1610	MW53	34.17 ft DTW
1625	MW57	37.56 ft DTW
1632	MW31	38.50 ft DTW
1643	MW40	128.93 ft DTW
1650	Complete GW survey and transducer downloads. All 8 transducers downloaded successfully. Leave site.	
1720	Arrive at lodge for sample prep and calibration.	

Location Red Devil AK Date 8/23/2022

Project / Client Red Devil Annual Monitoring

50s Cloudy

0700	Safety brief.
0755	Complete load out and leave for mine.
0820	Arrive at Mine and set up on MW09 and MW10
1033	Collect MW10 sample.
1035	Collect MW98 duplicate @ MW10.
1130	Complete sampling at MW10. Move to MW16 and MW17.
1150	Begin set up on MW17 to purge for sampling.
1315	Complete sampling at MW17, Collect MS/MSD.
1330	Begin purging/sampling at MW16.
1410	Sample MW16.
1500	Complete MW16. Purge water using winterization kit.
1510	Set up on MW28.
1610	Collect sample at MW28.
1630	Complete sampling. Return to lodge.
1700	Arrive at lodge.

Rite in the Rain

Location Red Devil AK Date 8/24/22

Project / Client Red Devil Annual Monitoring BLM

SOS Foggy

0700	Safety brief
0745	Leave for mine after load out.
0820	Arrive at mine. Start with MW29 and MW42.
	Issue with air leak at fittings. Attempt to field repair with new fitting is unsuccessful. Field splice with tubing and zip ties to hold 60 psi.
0940	Begin purging MW42.
1045	Stabilized. Collect sample with sample time of 1100, 0822 MW42GW
1112	Complete sampling at MW42. Move to MW43.
1125	Set up on MW43.
1220	Collect 0822 MW43GW MS/MSD and duplicate 0822 MW98GW.
1250	Complete sampling at MW43.
1335	Set up on MW44. Begin purging.
1433	Complete MW44. Move to MW59.
1500	Set up on MW59.
	Troubleshoot. loose air fitting. Replace with crimp fitting (non brass).
1550	Begin purging.

Location Red Devil AK Date 8/24/22

Project / Client Red Devil Annual Monitoring BL

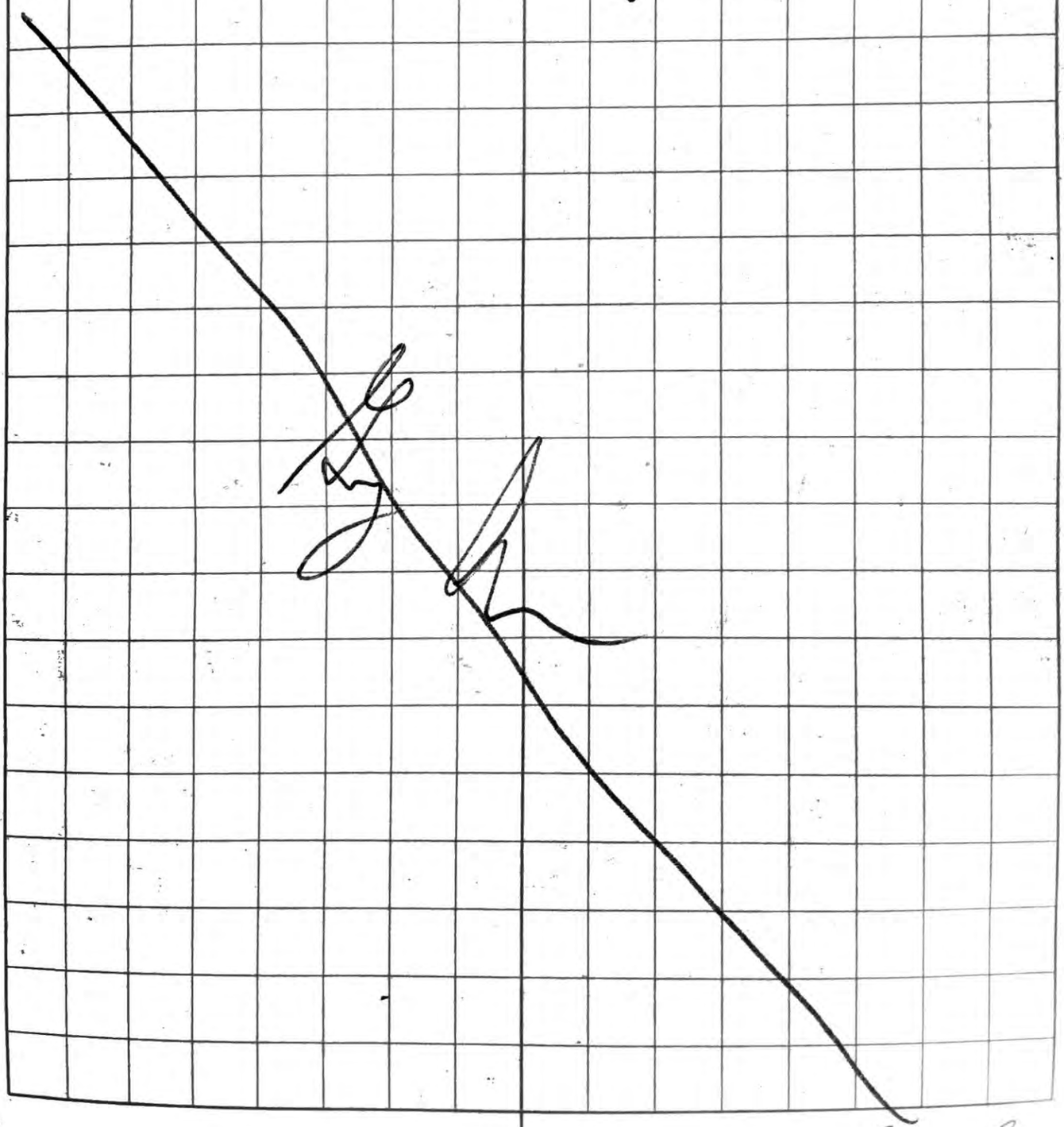
60s Clear

1505 Extremely turbid water during purge. (400+ NTU),

1712 Caplete sampling at MW59. Was able to fix air fitting with spare parts,

1725 Leave site.

1750 Arrive at lodge.



Rite in the Rain

Location Red Devil AK Date 8/25/22

Project / Client Red Devil Annual Monitoring BLR

40s Rain

0700	Safety brief and load out.
0800	Contact AAT about earlier flight.
0820	Leave for mine.
0900	Set up on MW49 (NP) and MW40 (GG).
1042	Complete sampling at MW40.
1045	Move to MW51.
1150	Complete sampling at MW51.
1200	Move to MW54.
1310	Complete sampling at MW54. Collected duplicat (MW97) at MW54.
1330	Move to MW53.
1430	Complete sampling at MW53.
1500	Leave site for the day.
1530	Arrive at lodge.

Location Red Devil AK Date 8/25/22

Project / Client Red Devil Annual Monitoring BLM

0700 Safety brief. Begin load out.

0800 Leave for site.

0820 Arrive at mine. Set up at MW 26 and MW 58,

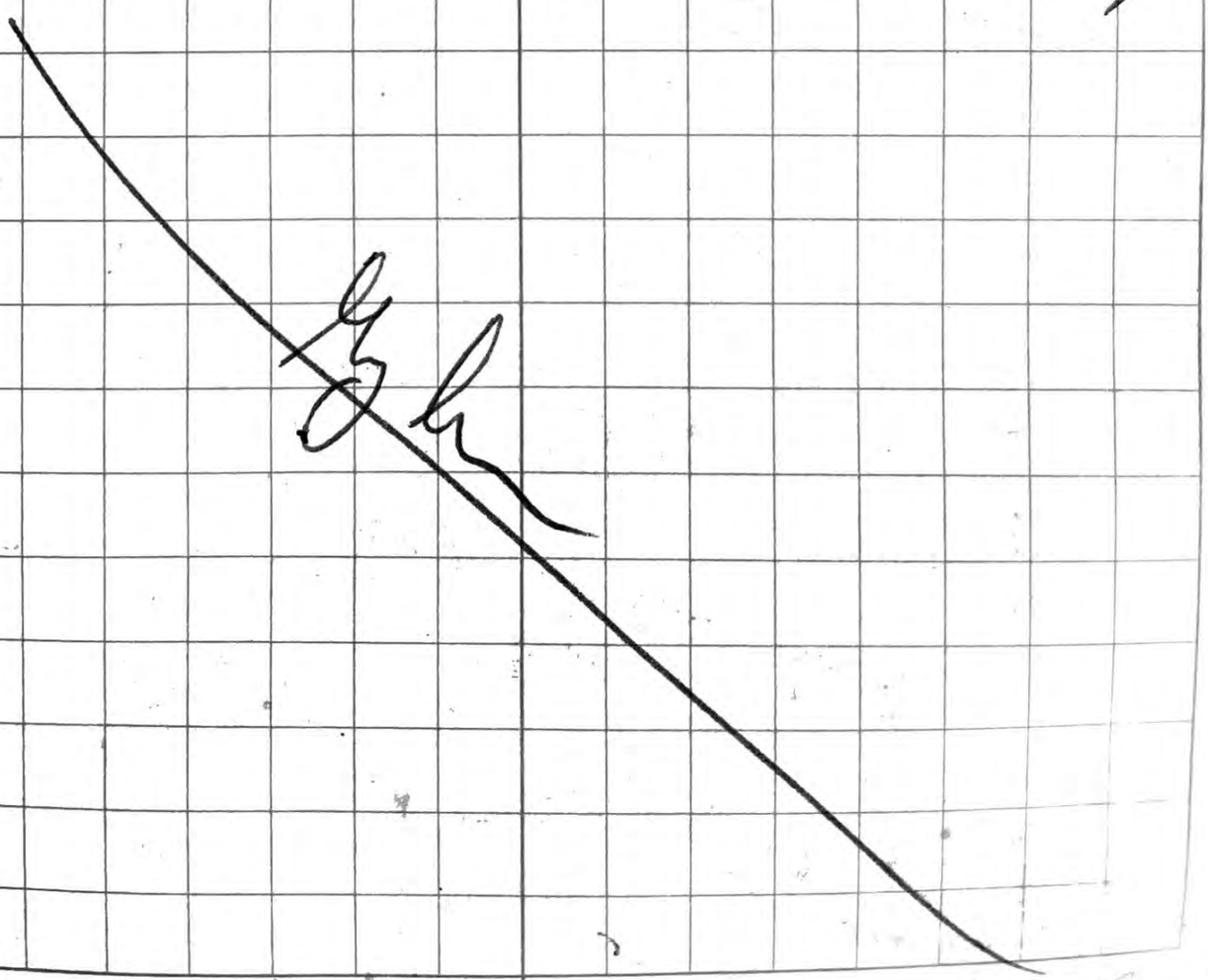
0845 Replace pump at MW 26.

1120 Collect sample at MW 26.

1230 Complete sampling at ~~MW 26~~ MW26.

1300 Return to lodge to QC samples.

1330 Field work complete for the day



Location Red Devil AK Date 8/27/22

Project / Client Red Devil Annual Monitoring

40s Cloudy windy

0730 Safety brief. Plan out maintenance.

0830 Load out for well maintenance and stream discharge.

0845 Leave lodge.

0915 Arrive at Mine to collect stream flow measurements. Beginning at RD08 and progressing upstream.

~~Str 0930~~
~~RD08~~

	RD08	Depth (ft)	Width (ft)	Flow (ft/s)
	edge	0	0	0
1	~~0.50~~ w/p	0.10	1.0'	1.43
2		0.40	1.5	3.55
3		0.30	2.0	3.71
4		0.50	2.5	2.63
5		0.40	3.0	2.71
6		0.40	3.5	2.34
7		0.30	4.0	1.73
8		0.20	4.5	1.33
9		0.10	5.0	2.00
10		0.10	5.5	1.57
11		0.10	6.0	1.22
12	Edge	0	6.5	0
13				

Location Red Devil AK Date 8/27/22

Project / Client Red Devil Annual Monitoring

40s Foggy Mist

RD06	Depth (ft)	Width (ft)	Flow (ft/s)
edge	0	0	0
	Not Recorded		1.57
	0.5	0.5	1.57
	0.5	1	1.57
	0.6	1.5	1.94
	0.4	2.0	2.65
	0.4	2.5	1.64
	0.4	3.0	2.33
	0.2	3.5	1.40
	0.1	4.0	0.08
	0.1	4.5	0
edge	0	5	0

Location Red devil Date 08/27/22

Project / Client Red Devil Annual Monitoring BLM

width ft	depth ft	flow ft/s		SW1
0.5	0.2	-0.55		10:41
1.0	0.3	-0.09		
1.5	0.3	0.98		
2.0	0.4	2.14		
2.5	0.5	4.30		
3.0	0.3	3.71		
3.5	0.4	1.78		
4.0	0.2	0.47		
4.5	0.1	0.93		
5	0	0	edge	

SW 05 (Seep) = 1 L/min

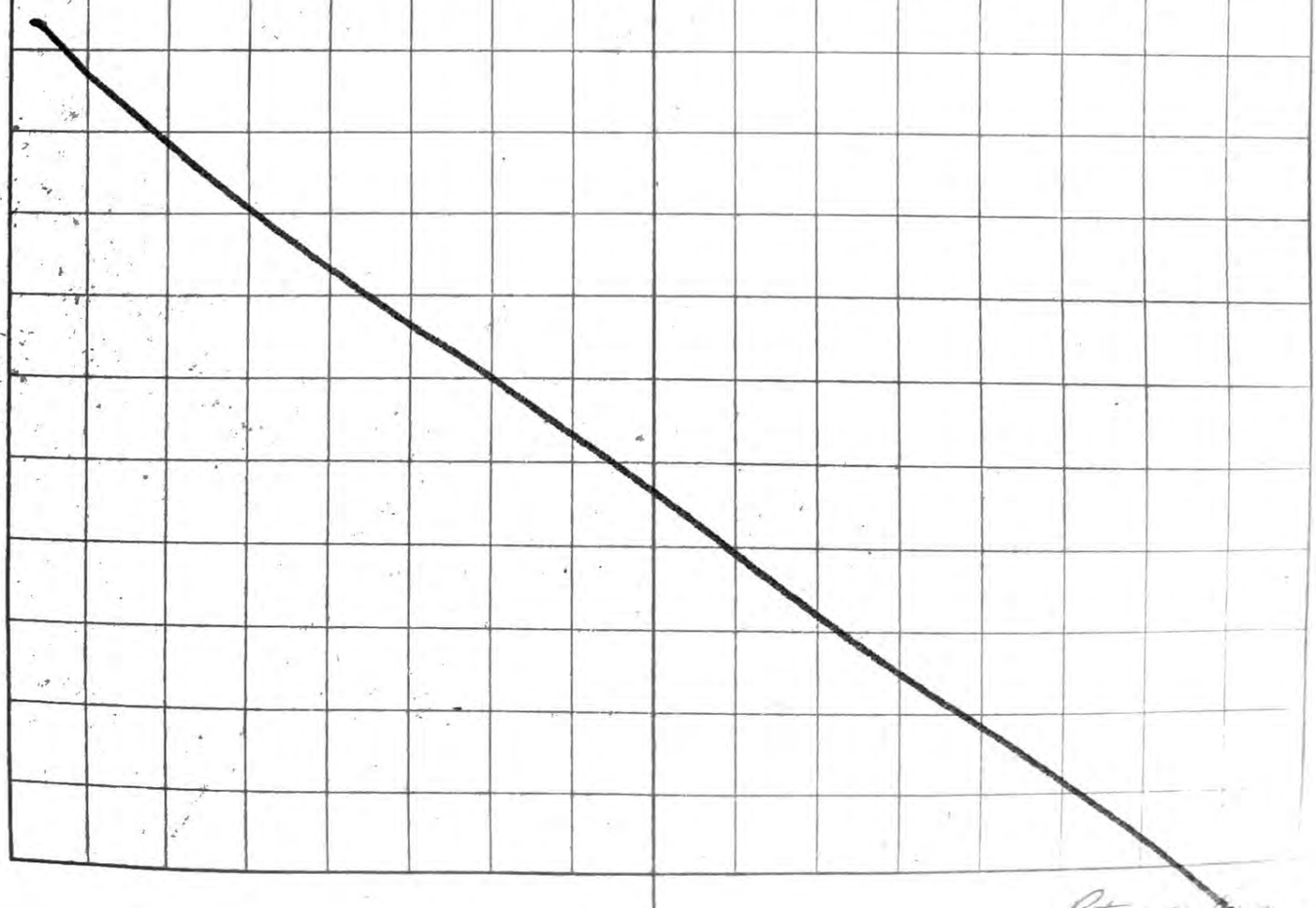
Location Red Devil Date 08/27/22

Project / Client Red Devil Annual Monitoring / BLM

SW 10 (Beaver Pond)

11:20

Width ft	depth ft	flow ft/s
0	0.3	0.66
0.5	0.2	0.85
1.0	0.3	2.20
1.5	0.4	3.36
2.0	0.5	3.29
2.5	0.4	2.29
3.0	0.4	1.54
3.5	0.2	1.10
4.0	0.1	0.02
4.5	0.1	0.19



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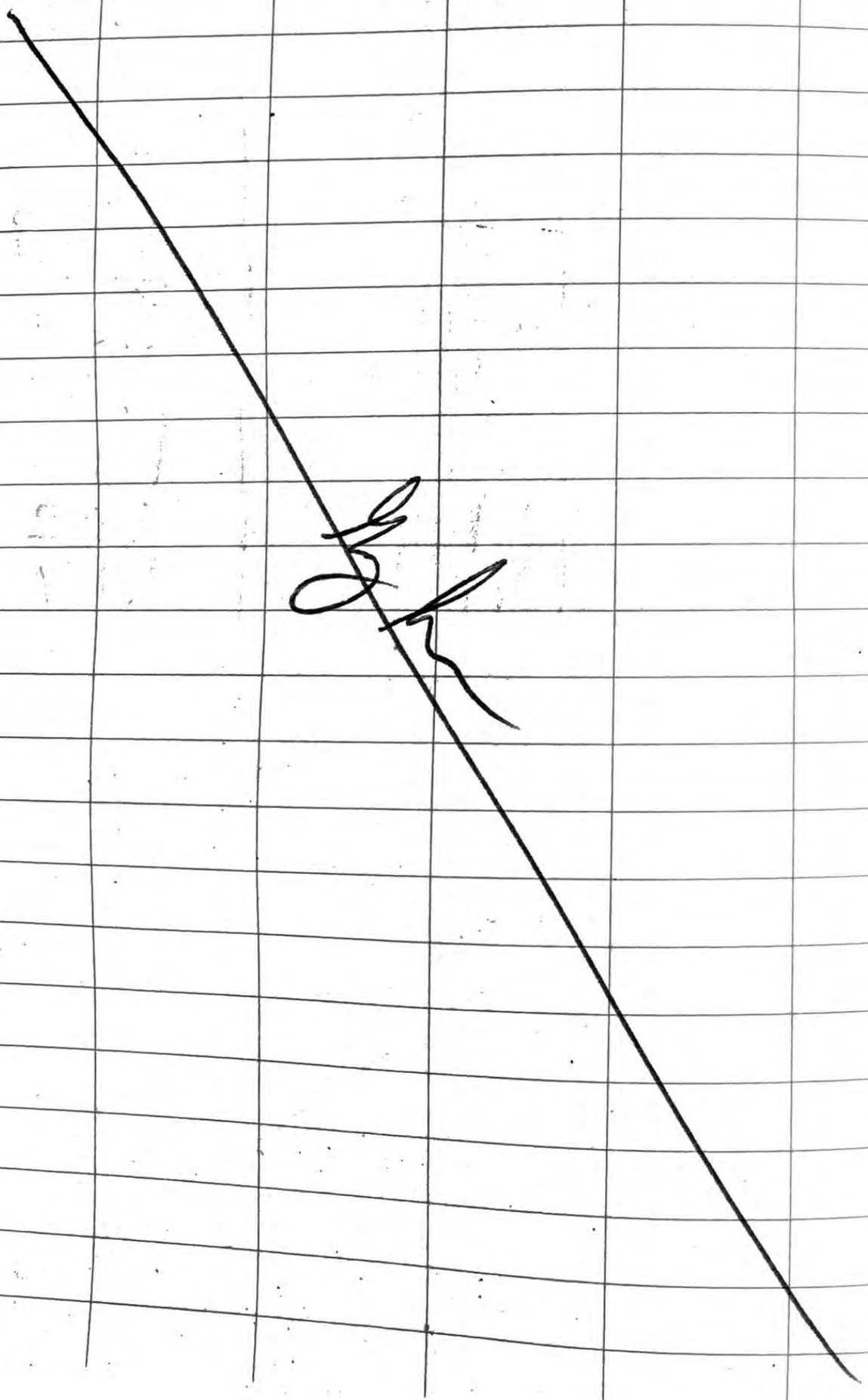
Location Red Devil Date 8/27/2021

Project / Client Red Devil Mine Annual Monitoring

1230 Perform well maintenance on monitoring wells.

1500 Return to Lodge.



Location Red Devil Date 8/28/22

Project / Client Red Devil Annual Monitoring

0800	Safety brief and prep sample bottles.
0845	~~Arr~~ Leave for mine.
0910	Arrive at Mine to sample RD08Band work upstream.
0915	Collect RD08B.
0940	Complete RD08B.
0945	Move to RD04.
	Collect 0822 RD04SW.
1010	Move to RD05(seep) and RD15.
1015	Collect 0822 RD05SW and duplicate ~~at~~ 0822 RD99SW at 1018.
1030	Collect 0822 RD15SW MS/MSD.
1105	Move to RD10.
1125	Collect RD10 sample.
1135	Complete sampling.
1145	Return to lodge for sample prep and QC.

Return to Reno

ATTACHMENT 1.4 GROUNDWATER SAMPLING FORMS

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Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW06
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	June 4th 5/6/22	**Samplers:**	Nick Potter
Time Start:	14:50		
Time Finish:	16:30	**Checked By:**	GG

Well & Purge Information

TD (ft. bTOC):	32.83 ft	**Screened Interval (ft.):**	13-23 ft
DTW (ft. bTOC):	16.29 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	11H100848
Water Level Meter:	Solinst 102	**Serial No.:**	29499
Turbidity Meter:	Micro TPW	**Serial No.:**	20200/903
Pump Type:	Alexis	**Serial No.:**	55451

Purge Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☑

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~WW~~ WP MW6	Sample ID: 0622-MW6-GW	Sample Time: 1600
Date:	Dup. Sample ID:	Dup. Sample Time:
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1454	START PURGING								≈100	
1459		5.77	398	1.60	6.57	34.2	10.60	16.20	100	
1504		6.13	390	1.38	6.68	32.0	11.88	"	"	
1509		6.01	386	1.46	6.70	32.9	14.87	"	"	
1514		5.97	381	1.41	6.75	33.8	10.81	"	"	
1519		5.98	378	1.41	6.74	34.0	11.99	"	"	
1524		6.09	377	1.36	6.76	33.3	10.30	16.22	"	
1529		6.13	376	1.33	6.77	33.5	7.21	"	"	
1534		6.13	375	1.28	6.78	33.9	6.54	"	"	
1539		6.07	375	1.34	6.79	33.1	7.34	"	"	
1544		6.12	374	1.33	6.79	33.6	6.80	"	"	
1549		6.09	373	1.32	6.80	33.3	7.67	"	"	stabilized sampled @ 1600

Sampled? : Yes ☑ No ☐

Initial of Sampler: NP

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW04
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	06/02/22	**Samplers:**	Nick Potter
Time Start:	0930		
Time Finish:	11:45	**Checked By:**	GG

Well & Purge Information

TD (ft. bTOC):	34.62 ft	**Screened Interval (ft.):**	20-30 ft
DTW (ft. bTOC):	NP ~~25.30~~ 25.50 ft		
Water Column:	NP ~~27~~ ft	TD-DTW=Water Column	
Liter/Foot:	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	11H100548
Water Level Meter:	Solinst water Level meter 102	**Serial No.:**	294991
Turbidity Meter:	MicroTPW	**Serial No.:**	20200793
Pump Type:	Dedicated bladder	**Serial No.:**	NA

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 14 Seconds Refill 1 Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 14 Seconds Refill 1 Seconds Discharge @ 40psi

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☑

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	NP
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	NP
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	NP

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW 09	**Sample ID:** 0622 MW09 GW		**Sample Time:** 1120
Date: 6/2/22	**Dup. Sample ID:**		**Dup. Sample Time:**

Notes: had to pull pum to refit connection

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
10:14	START PURGING									
10:17		5.91	184	6.20	6.39	92.5	27.16	26.22	.225	
10:24		6.28	184	4.04	6.48	80.0	29.67		.200	
10 29		6.85	190	4.20	6.53	75.2	~~30.~~	26.45	.150	Turb. ~~[illegible]~~ 30.92
10 34		7.10	197	3.96	6.53	67.7	28.30	26.51	.100	
10 39		7.23	206	4.10	6.5	63.7	21.16	26.68	11	
10 44		7.34	212	4.52	6.50	62.6	19.43	26.87	11	[illegible]
10 49		7.53	216	5.02	6.50	61.4	19.24	27.02	11	
10 54		7.47	218	4.49	6.56	61.6	15.39	27.11	11	
10 59		7.56	222	4.43	6.52	61.2	13.04	27.3	11	
11 04		7.53	225	4.38	6.52	59.2	10.91	27.37	11	
11 09		7.56	228	4.25	6.53	57.5	10.11	27.56	11	
11 14		7.52	231	4.15	6.54	56.2	9.07	27.70	11	stabillized begin samping
										samped at 1120

Sampled? : Yes ☑ No ☐

Initial of Sampler: [illegible]

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW10
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/2/22	**Samplers:**	G. Garner
Time Start:	0955		
Time Finish:	1210	**Checked By:**	GG

Well & Purge Information

TD (ft. bTOC):	55.23 to pump ft	**Screened Interval (ft.):**	50-60.0
DTW (ft. bTOC):	26.56 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	56.0 ft ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	06G2421
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	Micro TPW	**Serial No.:**	20140708I
Pump Type:	MP 50 Bladder/Solinst	**Serial No.:**	MP501365

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 12.5 Seconds Refill 2.5 Seconds Discharge @ 38 psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 12.5 Seconds Refill 2.5 Seconds Discharge @ 38 psi

Sample Collection Information

MS/MSD? : **Yes** ☒ **No** ☐

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	4	No	Nitric	6020B LL, 7470A	250 ml Plastic	GG
Total LL Mercury	4	No	HCl	1631 LL Hg	8oz Glass	GG
Dissolved LL Mercury	4	Yes	HCl	1631 LL Hg	8oz Glass	GG

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW10	**Sample ID:** 0622 MW10 GW	**Sample Time:** 1115
Date: 6/2/22	**Dup. Sample ID:** 0622 MW99 GW	**Dup. Sample Time:** 1118
Notes: Dup and MS/MSD collected		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1010	START PURGING									Adjust flow and check pump
1035	1.0	7.17	0.326	16.2	6.69	6.4	11.36	27.73	0.10	0.1 L/min @ 12.5-2.5 4CPM @ 38 psi
1040	1.5	7.41	0.319	14.1	6.79	9.3	9.29	27.73	0.10	
1045	2.0	7.50	0.318	13.1	6.93	6.3	6.45	27.79	0.10	
1055	3.0	7.74	~~0.316~~ 312	11.5	7.09	7.8	3.44	27.80	0.10	
1100	3.5	7.78	~~0.316~~ 312	10.8	7.14	3.4	2.63	27.80	0.10	
1105	4.0	7.82	~~0.316~~ 312	10.1	7.18	-1.7	2.52	27.80	0.10	
1110	4.5	7.91	212	9.8	7.21	-0.9	4.16	27.81	0.10	
1115	5.0								0.10	Collect sample @ 1115

Sampled? : Yes ☒ No ☐

Initial of Sampler: GG

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW16
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/4/21	**Samplers:**	Nick Potter
Time Start:	11:00 MP ~~8:[illegible] 6/4/21 MP~~		
Time Finish:	11:53	**Checked By:**	GG

Well & Purge Information

TD (ft. bTOC):	24.14	ft	**Screened Interval (ft.):**	11-21.0
DTW (ft. bTOC):	8.78	ft		
Water Column:		ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	~~8.6~~	L	Water Column x L/ft	
Three Well Volumes:		L	Liters in Well x 3	
Sample Depth:		ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	17H100848
Water Level Meter:	Solinst 102	**Serial No.:**	294991
Turbidity Meter:	Micro TPW	**Serial No.:**	20140708
Pump Type:	Alexis	**Serial No.:**	554511

Purge Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☑

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	NP
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	NP
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	NP

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW16	**Sample ID:** 0622MW16GW	**Sample Time:** 1131	
Date: 6/5/22	~~**Dup. Sample ID:**~~	~~**Dup. Sample Time:**~~	
Notes:			

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1105	START PURGING									
1110		9.31	450	2.65	6.23	138.6	0.00	9.45	0.100	
1115		9.26	448	1.91	6.28	61.7	0.00	9.72	0.100	
1120		9.29	448	2.04	6.29	60.3	0.00	9.87	0.100	
1125		8.82	450	2.00	6.28	57.9	~~0.00~~ ~~0.37~~	9.85	〃	← ~~turbity 0.37~~ NP 0.00 turbity; Stabilized, sampled 11:31
11~~30~~	NP									
11~~35~~	writing ahead									
~~11~~40										

Sampled? : Yes ☑ No ☐

Initial of Sampler: NP

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW17
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/5/22	**Samplers:**	Nick Potter
Time Start:	9:10		
Time Finish:	11:08	**Checked By:**	BG

Well & Purge Information

TD (ft. bTOC):	54.77 ft	**Screened Interval (ft.):**	41.5-51.5
DTW (ft. bTOC):	10.64 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI EXO2	**Serial No.:**	21H100848
Water Level Meter:	Solinst 102	**Serial No.:**	294991
Turbidity Meter:	MicroTPW	**Serial No.:**	20140781
Pump Type:	Alexis	**Serial No.:**	55451

Purge Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other: _____

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☑ ***No*** ☐

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	3	No	Nitric	6020B LL, 7470A	250 ml Plastic	
Total LL Mercury	3	No	HCl	1631 LL Hg	8oz Glass	
Dissolved LL Mercury	3	Yes	HCl	1631 LL Hg	8oz Glass	

Low-Flow Groundwater Sample & Stabilization Form

NP

Well ID: MW-17	Sample ID: ~~GW-17~~ 0622MW17GW	Sample Time: 1020
Date: 6/5/22	Dup. Sample ID:	Dup. Sample Time:
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
09:25	START PURGING								0.100	
09:30		8.30	206	11.70	6.81	82.8	0.00	10.64	11	
09 35		8.20	198	10.87	6.86	82.8	0.00	10.64	11	
09 40		8.36	197	10.36	6.93	82.7	0.00	11	11	
09 45		8.90	194	10.17	6.96	83.2	0.00	11	11	
09 50		8.78	193	9.75	6.98	83.0	0.00	11	11	
09 55		8.00	194	9.75	7.00	80.30	0.00	11	11	
10 00		7.81	193	9.78	7.01	78.9	0.00	11	11	
10 05		7.76	193	9.54	7.02	76.4	0.00	11	11	
10 10		7.80	192	9.58	7.04	74.7	0.00	11	11	
10 15		8.84	193	9.65	7.05	74.2	0.00	11	11	
1020										stabilized sampling

Sampled? : Yes ☑ No ☐

Initial of Sampler: NP

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Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW26
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/5/22	**Samplers:**	GG
Time Start:	1208		
Time Finish:	1400	**Checked By:**	GG

Well & Purge Information

TD (ft. bTOC):	45.00 ft	**Screened Interval (ft.):**	32.0-42.00
DTW (ft. bTOC):	32.21 ft		
Water Column:	12.79 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	7.74 L	Water Column x L/ft	
Three Well Volumes:	23.21 L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	06G2421
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	Micro TPW	**Serial No.:**	20200 7903
Pump Type:	NA	**Serial No.:**	NA

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☒ Other: Bailer

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☒ Other: Bailer

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	GG
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	GG
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	GG

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW26	Sample ID: 0622MW26GW	Sample Time: 1340
Date: 6/5/2022	Dup. Sample ID: —	Dup. Sample Time: —
Notes: Bailer sample		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Cond µS/cm	Color/Odor/Notes
1222	START PURGING										
1223	0.8	8.95	640	1.73	6.12	60.1	72.91	32.21	—	444	
1235	8.5	6.63	613	2.26	6.18	45.0	126.1	36.92	—	398	
1245	17.0	6.01	619	~~2.61~~ 1.88	6.37	-3.7	129.6	37.34	—	396	
1300	26.0	5.68	619	1.91	6.46	15.8	112.0	38.50	—	391	
1315	35.0	6.35	615	2.06	6.50	-0.9	93.84	40.32	—	399	
1331	45	6.21	600	2.07	6.57	-1.9	54.65	40.29	—	385	
1336	49	6.21	590	2.16	6.58	-10.8	59.37		—	381	
											collect sample @ 1340

Sampled? : Yes ☒ No ☐

Initial of Sampler: MA

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW 27
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	06/02/22	**Samplers:**	Nick Potter
Time Start:	13:53		
Time Finish:	14:10	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	35.65 ft	**Screened Interval (ft.):**	23.0 - 33.0
DTW (ft. bTOC):	25.15 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	11H100848
Water Level Meter:	Solinst water level meter	**Serial No.:**	294991
Turbidity Meter:	Micro TPW	**Serial No.:**	20200793
Pump Type:	Bladder	**Serial No.:**	N/A

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 12 Seconds Refill 7 Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 12 Seconds Refill 7 Seconds Discharge @ 2295

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☑

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	NP
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	NP
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	NP

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW27	Sample ID: 0622-MW27-GW	Sample Time: 14:55
Date: 06/22/22	Dup. Sample ID:	Dup. Sample Time:
Notes: forgot itial DTW		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1357	START PURGING									
1358										Pump mall fuction pulled working @ 14:02
1403										
1408	1.5	7.17	493	5.87	6.14	75.3	6.28	25.45	300	
1413	2.25	7.15	491	4.37	6.16	71.3	6.69	25.41	250	
1418	3.00	6.97	491	3.93	6.17	69.8	5.81	25.41	11	
1423	3.75	6.74	489	3.59	6.18	65.7	5.50	25.41	11	
1428	4.50	6.60	486	3.36	6.18	59.6	5.62	25.41	11	
1433	5.25	6.76	488	3.11	6.21	54.3	6.87	11	11	
1438	6.00	6.68	488	3.10	6.21	53.1	6.88	11	11	
1443	6.75	6.81	489	3.04	6.21	52.1	8.64	11	11	
1448	7.50	6.97	492	2.91	6.22	52.1	8.33	11	11	
1453		6.92	492	2.92	6.22	53.9	8.06	11	11	Stabilized begin sampling sampled 14:55

Sampled? : Yes ☑ No ☐

Initial of Sampler: [signature]

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW-28
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	06/02/22	**Samplers:**	Nick Potter
Time Start:	12:52		
Time Finish:	13:40	**Checked By:**	GG

Well & Purge Information

TD (ft. bTOC):	65.58 ft	**Screened Interval (ft.):**	53.0-63.0
DTW (ft. bTOC):	23.50 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	4" 2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	11H100848
Water Level Meter:	Solinst water level meter	**Serial No.:**	294991
Turbidity Meter:	MicroTPW	**Serial No.:**	20200793
Pump Type:	bladder	**Serial No.:**	NA

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 23 Seconds Refill 7 Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 23 Seconds Refill 7 Seconds Discharge @ 40 PSI

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☑

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	WP
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	ZP
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	ZP

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW28	**Sample ID:** 0622 MW28GW	**Sample Time:** 13:30	
Date: 06/02/22	~~**Dup. Sample ID:**~~	~~**Dup. Sample Time:**~~	

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
12 52	START PURGING							~~23.48~~	.200	No color
12 57		6.65	263	2.98	6.67	69.6	5.70	~~23.51~~	"	23.51 DTW
13 02		5.73	256	2.74	6.84	67.5	6.55	23.48	"	23.48 DTW
13 07		5.56	252	1.70	6.90	61.8	5.72	23.55	"	
13 12		5.51	251	1.71	6.91	56.5	3.55	23.55	"	
13 17		5.47	250	1.50	6.93	42.6	2.95	23.55	"	
13 22		5.59	250	1.47	6.93	41.3	2.56	23.50	"	
13 27		5.55	250	1.43	6.93	40.7	1.86	23.50	"	Stabilized started sampling at 13:30
	NP									
	writing ahead									

Sampled? : Yes ☑ No ☐

Initial of Sampler: NP

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW29
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/2/22	**Samplers:**	GG
Time Start:	1555		
Time Finish:	1720	**Checked By:**	GG

Well & Purge Information

TD (ft. bTOC):	71.50 ft	**Screened Interval (ft.):**	59-69
DTW (ft. bTOC):	50.05 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	06G2421
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	Micro TPW	**Serial No.:**	20140702I
Pump Type:	MP-50/ Solinst	**Serial No.:**	1365

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 23 Seconds Refill 7 Seconds Discharge @ 40 psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 23 Seconds Refill 7 Seconds Discharge @ 40 psi

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	GG
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	GG
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	GG

Low-Flow Groundwater Sample & Stabilization Form

Well ID:	MW29	Sample ID:	0622MW29GW	Sample Time:	1650
Date:	6/2/22	Dup. Sample ID:	—	Dup. Sample Time:	—
Notes:					

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	cond µS/cm	Color/Odor/Notes
1555	START PURGING										
1605	0.7	11.15	645	1.75	6.59	46.5	70.93	50.10	0.07	472	
1610	1.05	11.20	618	1.01	6.59	-4.5	65.73	50.11	0.07	455	
1615	1.40	11.71	564	0.80	6.58	-22.1	44.28	50.11	0.07	420	
1620	1.75	11.65	553	0.78	6.59	-29.4	35.64	50.11	0.07	411	
1625	2.10	11.48	548	0.58	6.60	-32.1	28.17	50.11	0.07	407	
1630	2.45	11.63	543	0.47	6.62	-32.3	30.16	50.11	0.07	404	
1635	2.80	11.43	541	0.45	6.63	-41.2	33.39	50.11	0.07	401	
1640	3.15	11.01	540	0.42	6.67	-46.6	34.98	50.11	0.07	395	
1645	3.50	10.59	538	0.42	6.66	-42.4	33.04	50.11	0.07	390	
1650											Collect samples @ 1650

Sampled? : Yes ☒ No ☐

Initial of Sampler: DM

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW33
Contract No.:	140L6321C0001	**Project No.:**	BU06-007 Nick Potter
Date:	~~7/50~~ 6/22	**Samplers:**	
Time Start:	1240		
Time Finish:	1340	**Checked By:**	GG

Well & Purge Information

TD (ft. bTOC):	24.40 ft	**Screened Interval (ft.):**	12-22.0
DTW (ft. bTOC):	4.40 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	12H200848
Water Level Meter:	Solinst 102	**Serial No.:**	294995
Turbidity Meter:	Micro TPW	**Serial No.:**	20140281
Pump Type:	Alexis	**Serial No.:**	55451

Purge Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☑

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW33	Sample ID: ~~06~~22MW33GW	Sample Time: 1320
Date: 6/5/22	Dup. Sample ID:	Dup. Sample Time:
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1250	START PURGING									
1255		12.11	224	12.21	6.19	145	0.00	4.40	~~1.00~~	
1300		11.33	207	10.19	6.37	100.0	0.00	"	"	
1305		11.29	207	10.32	6.37	82.2	0.00	"	"	
1310		10.91	203	10.18	6.45	82.2	"	"	"	
1315		11.37	202	9.65	6.44	82.1	"	"	"	Stabilized sampling
1320										

Sampled? : Yes ☑ No ☐

Initial of Sampler: [signature]

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW40
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/3/21	**Samplers:**	GG
Time Start:	0800		
Time Finish:	1012	**Checked By:**	GG

Well & Purge Information

TD (ft. bTOC):	top of pump 135.31 ft	**Screened Interval (ft.):**	119-139
DTW (ft. bTOC):	126.19 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	136.80 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	11H100848
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	Micro TPW	**Serial No.:**	20200 07903
Pump Type:	MP-50	**Serial No.:**	1365

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 35 Seconds Refill 25 Seconds Discharge @ 65 psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 35 Seconds Refill 25 Seconds Discharge @ 65 psi

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	GG
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	GG
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	GG

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW40	Sample ID: 0422 MW40 GW	Sample Time: 0910
Date: 6/3/22	Dup. Sample ID: ———	Dup. Sample Time: ———
Notes: Leaky air fitting. Needs replacement.		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Cond µS/cm	Color/Odor/Notes
0822	START PURGING										
0832	1.0	6.45	572	38.64	6.61	130.0	14.04	126.20	0.1	369	
0837	1.5	5.79	573	12.91	6.71	75.3	18.22	126.20	0.1	363	significant orange/brown particulates
0842	2.0	5.82	581	9.50	6.73	67.9	51.74	126.20	0.1	368	
0849	2.5										Pumped flow through cell to clear particulate
0852	3.0	6.84	591	5.09	6.86	61.4	19.46	126.20	0.1	386	
0857	3.5	7.13	590	4.78	6.88	62.4	14.27	126.20	0.1	389	
0902	4.0	7.57	590	3.95	6.90	61.0	9.69	126.20	0.1	394	
0907	4.5	8.03	591	3.64	6.91	58.6	7.08	126.20	0.1	400	
0910											Sample time @ 0910

Sampled? : Yes ☒ No ☐

Initial of Sampler: [signature]

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW42
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/2/22	**Samplers:**	GG
Time Start:	1240		
Time Finish:	1412	**Checked By:**	GG

Well & Purge Information

TD (ft. bTOC):	142.35 ft	**Screened Interval (ft.):**	119-139
DTW (ft. bTOC):	121.72 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	137.5 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	06G242
Water Level Meter:	Dipper T2	**Serial No.:**	6705
Turbidity Meter:	Micro TPW	**Serial No.:**	20140701
Pump Type:	MP50 / Solinst	**Serial No.:**	1365

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 45 Seconds Refill 15 Seconds Discharge @ ~70psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 45 Seconds Refill 15 Seconds Discharge ~70psi

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	GG
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	GG
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	GG

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW42	Sample ID: 0622 MW42 GW	Sample Time: 1345
Date: 6/2/22	Dup. Sample ID: ———	Dup. Sample Time: ———
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1250	START PURGING									
1300	0.7	7.65	281	9.3	6.28	56.0	13.44	121.90	0.07	
1305	1.05	6.95	290	11.9	6.46	-17.6	14.76	121.90	0.07	
1310	1.40	6.56	294	19.2	6.55	-14.7	9.43	121.90	0.07	
1315	1.75	6.33	296	17.4	6.61	31.6	7.36	121.72	0.07	
1320	2.10	6.40	297	15.2	6.66	49.2	9.44	121.72	0.07	suspended particles (tan/orange) in discharge
1325	2.45	6.24	297	14.1	6.68	48.7	9.89	121.76	0.07	
1330	2.80	6.29	298	2.0	6.75	26.5	11.18	121.76	0.07	YSI shut off
1335	3.15	6.21	299	2.6	6.72	-12.9	10.89	121.76	0.07	
1340	3.50	6.40	301	2.6	6.72	-20.6	14.24	121.76	0.07	
1345										1345 Collect sample.

Sampled? : Yes ☒ No ☐

Initial of Sampler: KH

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Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW43
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/2/2022	**Samplers:**	GG
Time Start:	1429		
Time Finish:	1520	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	120.78 ft	**Screened Interval (ft.):**	98-118
DTW (ft. bTOC):	83.07 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	06G2421
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	Micro TPW	**Serial No.:**	20140702I
Pump Type:	MP-50 / Solinst	**Serial No.:**	1365

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 20 Seconds Refill 10 Seconds Discharge @ 60 psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 20 Seconds Refill 10 Seconds Discharge @ 60 psi

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	GG
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	GG
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	GG

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW43	Sample ID: 0622 MW43 GW	Sample Time: 1518
Date: 6/2/22	Dup. Sample ID: —	Dup. Sample Time: —

Notes: 20s recharge / 10s discharge @ 60psi gives 0.1 L/min

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	~~Spec~~. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1440	START PURGING									
1445	0.5	6.26	192	7.90	6.01	23.1	5.89	83.11	0.1	
1450	1.0	5.43	176	3.10	6.24	-19.8	6.03	83.11	0.1	
1455	1.5	5.12	152	2.25	6.41	-25.4	8.53	83.11	0.1	
1500	2.0	4.99	148	1.97	6.47	-32.3	6.07	83.11	0.1	
1505	2.5	4.89	146	1.55	6.53	-38.2	5.57	83.11	0.1	
1510	3.0	4.89	146	1.37	6.56	-41.9	4.42	83.11	0.1	
1515	3.5	4.85	146	1.10	6.59	-53.3	3.77	83.11	0.1	
										1518 collect sample

Sampled?: Yes ☒ No ☐

Initial of Sampler: GG

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Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW 44
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	~~15:40 MP~~ 6/3/22	**Samplers:**	Nick Potter
Time Start:	15 40		
Time Finish:	17 20	**Checked By:**	GG

Well & Purge Information

TD (ft. bTOC):	ft	**Screened Interval (ft.):**	
DTW (ft. bTOC):	32.84 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	06G 2421 B3
Water Level Meter:	Solist 102	**Serial No.:**	294 941
Turbidity Meter:	MicroTPW	**Serial No.:**	2014 07081
Pump Type:	Bladder	**Serial No.:**	N/A

12/3, @ 35 psi 145+ 2 ...

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 12 Seconds Refill 3 Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 12 Seconds Refill 3 Seconds Discharge @ 35

Sample Collection Information

MS/MSD? : Yes ☐ No ☑

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	NP
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	NP
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	NP

Low-Flow Groundwater Sample & Stabilization Form

Well ID:	MW 44	Sample ID:	0622 MW 44 GW	Sample Time:	17 15
Date:	06/03/22	Dup. Sample ID:		Dup. Sample Time:	
Notes:					

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1550	START PURGING									
1555		6.09	428	4.71	6.88	59.6	10.64	32.91	.200	
1600		6.37	406	1.58	7.08	-39.1	90.24	"	.150	
1605		5.15	409	0.87	7.14	-46.5	63.89	"	"	
1610		4.97	407	0.66	7.15	-47.8	38.30	"	"	
~~1615~~	16:15	4.76	406	0.55	7.17	-46.9	24.90	"	"	
~~1620~~	16:20	4.81	403	0.59	7.16	-46.5	13.54	"	"	
~~1625~~	16:25	~~4.80~~	~~406~~	0.61	7.16	-45.0	14.53	"	"	
1630		4.77	404	0.71	7.16	-46.4	10.82	"	"	
1635		4.72	403	0.65	7.16	-45.7	10.62	"	"	
1640		4.82	404	0.56	7.17	-44.5	6.57	"	"	
1645		4.75	404	0.55	7.15	-41.1	7.65	"	"	
1650		4.81	405	0.51	7.15	-40.6	8.44	"		
1655		4.79	404	0.46	7.19	-41.7	5.07	"	"	
1700		4.71	404	0.47	7.16	-42.9	4.81	"	"	
1705		4.55	404	0.46	7.17	-42.4	5.28	"	"	Stabilized. Sampling @ sample 1715

Sampled? : Yes ☑ No ☐

Initial of Sampler: [signature]

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Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW45
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/4/22	**Samplers:**	Nick Potter
Time Start:	09:50		
Time Finish:	10:30	**Checked By:**	[illegible]

Well & Purge Information

TD (ft. bTOC):	79.4 ft	**Screened Interval (ft.):**	61-81
DTW (ft. bTOC):	42.64 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556MPS	**Serial No.:**	11H100848
Water Level Meter:	Solinst 102	**Serial No.:**	294491
Turbidity Meter:	MicroFlow	**Serial No.:**	20200703
Pump Type:	bladder	**Serial No.:**	N9

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other: 9, 6, 40 [illegible]

☑ Bladder Pump : Optimum Flow Rate Set at 9 Seconds Refill 6 Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 9 Seconds Refill 6 Seconds Discharge @ 40 PSi

Sample Collection Information

MS/MSD? : Yes ☐ No ☑

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	NP
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	NP
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	NP

Low-Flow Groundwater Sample & Stabilization Form

Well ID:	MW 45	**Sample ID:**	0622MW45GW	**Sample Time:**	1020
Date:	6/4/22	**Dup. Sample ID:**		**Dup. Sample Time:**	
Notes:					

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
955	START PURGING								0.15	
1000		3.54	2.15	11.5	6.28	39.4	1.97	44.90	0.15	
1005		3.72	2.13	9.92	6.34	39.4	1.77	11	11	
1010		3.77	2.18	9.09	6.43	38.2	1.40	44.95	11	
1015		3.78	2.18	8.80	6.46	38.0	1.89	11	11	Stabilized Sampled @ 1020
1020										

Sampled? : Yes ☑ No ☐

Initial of Sampler: NP

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW 46
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/4/22	**Samplers:**	Nick Potter
Time Start:	11:00		
Time Finish:	12:00	**Checked By:**	SH

Well & Purge Information

TD (ft. bTOC):	59.71	ft	**Screened Interval (ft.):**	36-56
DTW (ft. bTOC):	32.73	ft		
Water Column:		ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:		L	Water Column x L/ft	
Three Well Volumes:		L	Liters in Well x 3	
Sample Depth:		ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	11H1008483
Water Level Meter:	Solinst 102	**Serial No.:**	294997
Turbidity Meter:	Micro TPW	**Serial No.:**	20200903
Pump Type:	Bladder	**Serial No.:**	N/A

Purge Method: 10, 5, 26 last year

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 6 Seconds Refill 5 Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 10 Seconds Refill 15 Seconds Discharge 2.5 PSI

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☐

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW 46	**Sample ID:** 0622-MW46-GW	**Sample Time:** 1140
Date: 6/4/22	**Dup. Sample ID:**	**Dup. Sample Time:**
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1110	START PURGING									
1115		4.17	151	12.74	6.23	26.9	6.17	32.82	.60	
1120		4.03	138	11.82	6.32	27.1	5.74	32.82	.200	
1125		3.79	131	11.27	6.41	26.5	5.22	32.80	"	
1130		3.79	129	11.01	6.46	25.8	5.38	"	"	stabilized sample at 1140
1140		3.90	130	10.74	6.49	25.4	4.35	32.83	"	

Sampled? : Yes ☑ No ☐

Initial of Sampler: VP

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW47
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/14/22	**Samplers:**	B. Garner
Time Start:	1115		
Time Finish:	1250	**Checked By:**	MB

Well & Purge Information

TD (ft. bTOC):	Top of pump 57.31 ft	**Screened Interval (ft.):**	46-66
DTW (ft. bTOC):	35.62 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	06G2421
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	Micro TPW	**Serial No.:**	20140708
Pump Type:	MP-50 / Solinst	**Serial No.:**	1365

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 9 Seconds Refill 6 Seconds Discharge @ 35 psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 9 Seconds Refill 6 Seconds Discharge @ 35 psi

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	MB
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	MB
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	MB

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW47	Sample ID: 0622 MW47 GW	Sample Time: 1225
Date: 6/4/22	Dup. Sample ID: ———	Dup. Sample Time: ———
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Cond µS/cm	Color/Odor/Notes
1136	START PURGING										
1146	0.5	7.65	194	12.70	6.49	24.5	3.84	35.64	0.05	129	
1151	0.75	7.60	190	9.60	6.57	10.5	2.29	35.64	0.05	127	
1156	1.00	7.62	190	8.97	6.60	8.4	3.40	35.64	0.05	127	
1201	1.25	8.10	188	8.13	6.63	7.5	3.50	35.64	0.05	127	
1206	1.50	8.56	186	7.53	6.65	7.8	2.90	35.64	0.05	128	
1211	1.75	9.06	185	7.38	6.64	9.0	0.79	35.64	0.05	129	
1216	2.00	9.14	186	8.00	6.67	10.2	1.69	35.64	0.05	130	
1221	2.25	9.21	186	7.61	6.66	10.7	1.67	35.64	0.05	130	
											collect sample @ 1225

Sampled? : Yes ☒ No ☐

Initial of Sampler: NA

Sundance Consulting Inc. 15 YEARS

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW49
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/5/22	**Samplers:**	GG
Time Start:	1000		
Time Finish:	1200	**Checked By:**	GG

Well & Purge Information

TD (ft. bTOC):	63.75 ft	**Screened Interval (ft.):**	40-60
DTW (ft. bTOC):	27.95 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See "***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	06G 2421
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	Micro TPW	**Serial No.:**	202007903
Pump Type:	MP-50 / Solinst	**Serial No.:**	1345

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 10 Seconds Refill 5 Seconds Discharge @ 30psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 10 Seconds Refill 5 Seconds Discharge @ 30 psi

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	2	No	Nitric	6020B LL, 7470A	250 ml Plastic	GG
Total LL Mercury	2	No	HCl	1631 LL Hg	8oz Glass	GG
Dissolved LL Mercury	2	Yes	HCl	1631 LL Hg	8oz Glass	GG

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW49	**Sample ID:** 0622 MW49GW	**Sample Time:** 1115
Date: 6/15/22	**Dup. Sample ID:** 0622 MW97GW	**Dup. Sample Time:** 1120
Notes: Pulled pump due to kinked hose. Black staining on pump + tubing.		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Cond µS/cm	Color/Odor/Notes
1015	START PURGING										
1020	0.75	5.69	162	13.40	5.51	23.1	44.90	28.00	0.15	102	
1025	1.50	4.91	128	9.15	5.59	-0.8	66.90	28.00	0.15	079	
1030	2.25	4.72	122	8.29	5.61	-0.9	65.87	28.00	0.15	75	
1035	3.00	4.53	119	7.98	5.64	0.4	84.27	28.00	0.15	73	
1040	3.75	4.48	119	7.86	5.67	1.1	93.02	28.00	0.15	72	
1045	4.50	4.54	117	7.72	5.75	2.0	92.99	28.00	0.15	72	
1050	5.25	4.44	117	7.75	5.81	4.5	95.29	28.00	0.15	71	
1055	6.00	4.47	116	8.44	5.86	3.9	77.03	28.00	0.15	70	
1100	6.75	4.62	115	8.31	5.87	4.3	72.69	28.00	0.15	70	
1105	7.50	4.54	115	8.40	5.87	4.2	69.68	28.00	0.15	69	
1110	8.25	4.54	114	8.24	5.88	4.1	71.24	28.00	0.15	70	
1115	9.00	4.59	114	8.24	5.89	4.1	67.99	28.00	0.15	69	Collect sample @ 1115

Sampled?: Yes ☒ No ☐

Initial of Sampler: JJS

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW50
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/3/22	**Samplers:**	GG
Time Start:	1025		
Time Finish:	1200	**Checked By:**	GG

Well & Purge Information

TD (ft. bTOC):	82.00 ft	**Screened Interval (ft.):**	71-91
DTW (ft. bTOC):	44.65 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	11 H1 00848
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	Micro TPW	**Serial No.:**	2020 07903
Pump Type:	MP-50	**Serial No.:**	1365

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 17 Seconds Refill 3 Seconds Discharge @ 45 psi 3 cpm

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 17 Seconds Refill 3 Seconds Discharge @ 45 psi 3 cpm

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	GG
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	GG
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	GG

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW50	Sample ID: 0622 MW50GW	Sample Time: 1145
Date: 6/3/22	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Cond µS/cm	Color/Odor/Notes
1030	START PURGING										
1040	1.0	6.27	688	38.45	6.68	50.9	27.86	44.70	0.1	442	
1045	1.5	6.03	687	14.15	6.65	50.5	61.13	45.02	0.1	438	
1050	2.0	5.92	686	8.18	6.69	50.2	61.67	45.03	0.1	436	tan/brown chunks in line
1055	2.5	5.59	682	5.39	6.71	37.6	85.73	45.03	0.1	429	
1100	3.0	5.52	682	4.80	6.71	37.9	118.0	45.03	0.1	428	
1102	—										Emptied flow cell to drain sediment
1110	4.0	5.95	671	4.75	6.71	40.1	52.27	45.03	0.1	427	
1115	4.5	6.07	671	4.57	6.73	43.2	45.16	45.03	0.1	429	
1120	5.0	6.10	676	4.57	6.74	44.4	34.88	45.03	0.1	432	
1125	5.5	6.16	678	4.50	6.76	46.6	32.76	45.03	0.1	433	
1130	6.0	6.22	676	4.42	6.77	49.7	23.20	45.03	0.1	433	
1135	6.5	6.24	676	4.39	6.77	50.8	24.89	45.03	0.1	434	
1140	7.0	6.26	676	4.45	6.79	51.9	22.71	45.03	0.1	434	
1145	7.5	6.32	673	4.22	6.78	52.1	16.36	45.03	0.1		Collect sample @ 1145

Sampled? : Yes ☒ No ☐

Initial of Sampler: JA

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW51
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/3/22	**Samplers:**	Nick Potts
Time Start:	11:41		
Time Finish:	13:45	**Checked By:**	GG

Well & Purge Information

TD (ft. bTOC):	79.5 ft	**Screened Interval (ft.):**	56-76
DTW (ft. bTOC):	77.4 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	06G2421BB
Water Level Meter:	Solist 102	**Serial No.:**	294991
Turbidity Meter:	Mir TPW	**Serial No.:**	20140708 1
Pump Type:	Bladder	**Serial No.:**	NA

Purge Method: 12, 3, 75 last year

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 12 Seconds Refill 3 Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 12 Seconds Refill 3 Seconds Discharge @ 35 PSI

Sample Collection Information

MS/MSD? : Yes ☐ No ☑

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	NP
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	NP
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	NP

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW 51	**Sample ID:** 0622 MW51 GW	**Sample Time:** 13:20
Date: 6/21/22	**Dup. Sample ID:**	**Dup. Sample Time:**
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
11:55		START PURGING							0.150	
12:00		6.10	188	7.04	6.16	-0.4	5.69	37.60	"	
12:05		5.38	188	6.22	6.32	11.0	4.26	37.60	"	
12:10		5.62	181	5.54	6.34	18.9	28.81	"	"	
12:15		5.94	186	5.28	6.35	22.6	22.79	"	"	
12:20		5.91	190	5.10	6.35	25.0	17.11	"	"	
12:25		5.95	195	~~6.76~~	6.37	23.8	13.14	"	"	DO 4.90
12:30		6.09	197	4.77	6.35	20.0	10.15	"	"	
12:34		6.57	200	6.30	6.27	14.5	~~14.37~~	"	"	turbity 17.54
12:40		6.71	200	4.78	6.32	10.9	9.39	"	"	
12:45		6.83	203	4.60	6.34	6.4	8.70	"	"	
12:50		6.88	205	4.56	6.33	8.70	6.42	"	"	
12:55		6.97	207	4.48	6.36	6.5	5.25	"	"	
13:00		7.13	210	4.47	6.36	6.5	4.70	"	"	
13:05		7.20	213	4.34	6.37	1.8	2.00	"	"	
13:10		7.27	213	4.34	6.36	0.7	2.02	"	"	
13:15		7.33	216	4.38	6.40	0.6	6.80	"	"	stabilized & sampled 1320

Sampled? : Yes ☑ No ☐

Initial of Sampler: [signature]

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW52
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/4/22	**Samplers:**	GG
Time Start:	0845		
Time Finish:	1043	**Checked By:**	GG

Well & Purge Information

TD (ft. bTOC):	59.33	ft	**Screened Interval (ft.):**	35-55
DTW (ft. bTOC):	29.19	ft		
Water Column:		ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:		L	Water Column x L/ft	
Three Well Volumes:		L	Liters in Well x 3	
Sample Depth:	45.70	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	06G 2421
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	Micro TPW	**Serial No.:**	20140708I
Pump Type:	MP-50 / Solinst	**Serial No.:**	1365

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 10.5 Seconds Refill 4.5 Seconds Discharge 4cpm @ 30psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 10.5 Seconds Refill 4.5 Seconds Discharge 4cpm @ 30psi

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	2	No	Nitric	6020B LL, 7470A	250 ml Plastic	GG
Total LL Mercury	2	No	HCl	1631 LL Hg	8oz Glass	GG
Dissolved LL Mercury	2	Yes	HCl	1631 LL Hg	8oz Glass	GG

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW52	Sample ID: 0622 MW52 GW	Sample Time: 1020
Date: 6/14/22	Dup. Sample ID: 0622 MW 98 GW	Dup. Sample Time: 1025
Notes: Removed pump and replaced water line. Broken freeze fitting.		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Cond µS/cm	Color/Odor/Notes
0933	START PURGING										
0943	1.5	5.25	137	12.90	5.46	10.0	42.47	~~29.00~~	0.15	84	Gray staining on tube and in water
0948	2.25	5.05	119	12.52	5.57	11.0	51.55	29.40	0.15	74	
0953	3.00	5.08	111	12.23	5.65	12.8	55.98	29.40	0.15	68	
0958	3.75	4.96	106	12.00	5.73	13.0	55.76	29.40	0.15	65	
1003	4.50	5.01	104	11.98	5.78	13.1	59.00	29.40	0.15	65	
1008	5.25	4.97	103	11.97	5.81	13.1	51.45	29.40	0.15	64	
1013	6.00	4.94	103	11.97	5.85	13.0	42.39	29.40	0.15	63	
1018	6.75	4.92	103	11.85	5.87	12.7	36.29	29.40	0.15	63	
											Collect sample and duplicate. 1020 1025.

Sampled? : Yes ☒ No ☐

Initial of Sampler: DS

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW53
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/3/22	**Samplers:**	G. Garner
Time Start:	1345		
Time Finish:	1450	**Checked By:**	KB

Well & Purge Information

TD (ft. bTOC):	Top of pump 51.4 ft	**Screened Interval (ft.):**	41-61
DTW (ft. bTOC):	29.06 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	11H100848
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	Micro TPW	**Serial No.:**	20200903
Pump Type:	MP-50	**Serial No.:**	1365

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 12 Seconds Refill 3 Seconds Discharge @ ~30psi 4cpm

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 12 Seconds Refill 3 Seconds Discharge @ ~30psi 4cpm

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	GA
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	GA
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	GA

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW53	Sample ID: 0622MW53GW	Sample Time: 1425
Date: 6/3/22	Dup. Sample ID: —	Dup. Sample Time: —
Notes: Loose air fitting		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Cond µS/cm	Color/Odor/Notes
1355	START PURGING										
1400	0.5	9.85	207	9.40	6.37	72.4	0.00	29.10	0.1	146	
1405	1.0	9.11	185	8.60	6.45	68.3	0.00	29.10	0.1	129	
1410	1.5	8.31	172	8.51	6.49	65.5	0.00	29.10	0.1	118	
1415	2.0	7.89	168	8.44	6.52	62.9	0.00	29.10	0.1	113	
1420	2.5	7.75	169	8.33	6.53	62.6	0.00	29.10	0.1	113	
1425	3.0										Collect sample @ 1425

Sampled? : Yes ☒ No ☐

Initial of Sampler: GS

Sundance Consulting Inc. 15 YEARS

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW54
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/7/22	**Samplers:**	Nick Potter
Time Start:	14:10		
Time Finish:	15:38	**Checked By:**	GZ

Well & Purge Information

TD (ft. bTOC):	53.00 est ft	**Screened Interval (ft.):**	29-49
DTW (ft. bTOC):	28.44 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	06G2421BB
Water Level Meter:	Solist 102	**Serial No.:**	294991
Turbidity Meter:	MicroTPW	**Serial No.:**	20140708
Pump Type:	MP Bladder	**Serial No.:**	Na

Purge Method: 1st year 17.5, 2.5 @ 28 psi

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 17.5 Seconds Refill 2.5 Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 17.5 Seconds Refill 2.5 Seconds Discharge @ 28 psi

Sample Collection Information

MS/MSD? : Yes ☐ No ☑

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	NP
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	NP
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	NP

Low-Flow Groundwater Sample & Stabilization Form

Well ID:	MW 54	**Sample ID:**	0622 MW 54 GW	**Sample Time:**	15 10
Date:	6/3/22	**Dup. Sample ID:**		**Dup. Sample Time:**	

Notes: Pump stuck but functional

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1410	START PURGING									
1415		6.78	472	5.06	6.92	50.8	105.6	28.44	0.150	
1420		6.08	460	2.30	6.94	-29.6	148.7	28.50	"	
1425		5.95	450	1.76	6.99	-34.6	77.93	28.53	"	
1430		5.81	449	1.21	7.00	-32.5	36.81	28.54	"	
1435		5.77	447	1.10	7.04	-28.7	22.61	"	"	
1445		5.87	447	1.10	7.01	-31.4	22.88	28.60	"	Turbity 19.74
		6.04	447	0.92	7.01	-30.1	16.58	28.58	"	
		6.02	448	0.80	7.01	-32.2	13.07	28.59	"	
		6.12	450	0.72	7.04	-37.0	12.24	28.6	"	
		6.22	450	0.70	7.03	-39.6	11.14	"	"	
		6.24	452	0.67	7.02	-38.0	10.79	"	"	Stabilized Sampled 15:10

Sampled? : Yes ☑ No ☐

Initial of Sampler: MF

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW55
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	~~13:00~~ 6/4/22	**Samplers:**	Nick Potter
Time Start:	17:00		
Time Finish:	14:15	**Checked By:**	JH

Well & Purge Information

TD (ft. bTOC):	22.57	ft	**Screened Interval (ft.):**	10-20
DTW (ft. bTOC):	12.14	ft		
Water Column:		ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:		L	Water Column x L/ft	
Three Well Volumes:		L	Liters in Well x 3	
Sample Depth:		ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI EXO2 MPS	**Serial No.:**	21H100848
Water Level Meter:	Solinst 102	**Serial No.:**	224991
Turbidity Meter:	microTPW	**Serial No.:**	20600903
Pump Type:	AEX1 Peristaltic pump	**Serial No.:**	55451

Purge Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☑ Peristaltic Pump ☐ Inertial ☐ Other:

☐ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☑

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	NP
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	NP
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	NP

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW55	**Sample ID:** 0622 MW55 GW	**Sample Time:** 1405
Date: 6/4/22	**~~Dup. Sample ID:~~**	**~~Dup. Sample Time:~~**
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1300	START PURGING									
13 05		6.21	356	2.72	6.17	26.2	35.08	12.70	1.00	
13 10		6.28	347	2.46	6.26	31.7	25.44	11	11	
13 15		6.20	342	2.40	6.37	~~32.99~~	22.99	12.75	11	ORP = 34.1
13 20		6.04	336	2.28	6.37	33.5	15.65	11	11	
13 25		6.28	327	2.17	6.38	33.8	17.69	11	11	
13 30		6.34	321	2.40	6.42	32.5	13.64	11	11	
13 35		6.48	312	2.13	6.45	32.3	13.65	11	11	
1340		6.04	310	2.16	6.47	31.0	13.67	11	11	
1345		5.72	306	2.04	6.46	31.8	13.95	11	11	
1350		5.57	298	2.00	6.48	33.7	13.50	11	11	
14:00		5.64	292	1.98	6.49	33.7	12.32	11	11	stabilized sample
14:05										

Sampled? : Yes ☑ No ☐

Initial of Sampler: [signature]

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	~~MW-4~~ NP MW-56
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	~~6/3/22~~ NP 6/4/22	**Samplers:**	Nick Potter
Time Start:	0800		
Time Finish:	0930	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	78.65 NP	ft	**Screened Interval (ft.):**	55 - 75
DTW (ft. bTOC):	33.1 ~~32.20~~	ft		
Water Column:		ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:		L	Water Column x L/ft	
Three Well Volumes:		L	Liters in Well x 3	
Sample Depth:		ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556 MPS	**Serial No.:**	17H100848
Water Level Meter:	Solinst 102	**Serial No.:**	294991
Turbidity Meter:	Micro TPW	**Serial No.:**	202007903
Pump Type:	bladder	**Serial No.:**	NA

Purge Method: ~~40, 10 @ 70 last year~~ NP 12/3/@ 40 last year

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 12 Seconds Refill 3 Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 12 Seconds Refill 3 Seconds Discharge @ 40 PSI

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☑

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	

MW56

Low-Flow Groundwater Sample & Stabilization Form

Well ID: ~~MW 59~~ NP	Sample ID: 0622 MW56 GW	Sample Time: 0919	
Date: ~~6/3/22~~ 6/4/22	~~Dup. Sample ID:~~	~~Dup. Sample Time:~~	
Notes:			

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
0825	START PURGING								0.150	
0830		4.63	482	5.90	6.96	~~[illegible]~~	4.56	33.40	0.150	59.0 ORP
35		4.08	482	3.96	6.52	54.7	2.89	33.48	"	
40		3.93	485	3.70	6.57	54.2	3.29	33.59	"	
45		3.98	490	4.00	6.60	54.0	3.46	33.55	"	
50		3.98	492	3.88	6.61	53.5	2.32	33.58	"	
55		4.00	496	3.66	6.63	52.8	1.86	33.59	"	
00		3.95	501	3.37	6.65	54.6	2.71	33.61	"	
05		4.01	501	3.24	6.66	54.6	0.91	33.63	"	
10		4.04	502	3.17	6.68	51.7	0.74	33.66	"	Stabilized, sampled 9:19

Sampled? : Yes ☒ No ☐

Initial of Sampler: ____________

Sundance Consulting Inc. 15 YEARS

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW57
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/3/22	**Samplers:**	GG
Time Start:	1220		
Time Finish:	1322	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	top of pump 47.89 ft	**Screened Interval (ft.):**	37.5-57.5
DTW (ft. bTOC):	30.93 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	11 MI 00848
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	Micro TPW	**Serial No.:**	2020 07903
Pump Type:	MP-50	**Serial No.:**	1365

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 12 Seconds Refill 3 Seconds Discharge @ ~22 psi 4 cpm

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 12 Seconds Refill 3 Seconds Discharge @ ~22 psi 4 cpm

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	GG
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	GG
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	GG

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW57	Sample ID: 0622 MW57 GW	Sample Time: 1310
Date: 6/3/22	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	cond µS/cm	Color/Odor/Notes
1230	START PURGING									Adjusted flow & pressure	
1240	0.5	7.40	119	17.10	6.03	65.6	0.00	31.00	0.1	76	
1245	1.0	6.63	97	13.48	6.00	64.5	0.00	31.00	0.1	62	
1250	1.5	6.25	74	12.50	6.03	64.9	0.00	31.00	0.1	47	
1255	2.0	6.09	66	12.01	6.06	62.9	0.00	31.00	0.1	42	
1300	2.5	5.95	63	11.96	6.08	62.3	0.00	31.01	0.1	40	
1305	3.0	6.02	62	11.77	6.11	61.8	0.00	31.01	0.1	39	
1310		5.95	62	11.70	6.13	61.6	0.00	31.01	0.1	39	Collect sample @ 1310

Sampled? : Yes ☒ No ☐

Initial of Sampler: JDJ

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW58
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/3/22	**Samplers:**	GG
Time Start:	1500		
Time Finish:	1640	**Checked By:**	AH

Well & Purge Information

TD (ft. bTOC):	top of pump 47.11 ft	**Screened Interval (ft.):**	36.62-56.62
DTW (ft. bTOC):	30.00 ft		
Water Column:	ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	L	Water Column x L/ft	
Three Well Volumes:	L	Liters in Well x 3	
Sample Depth:	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	11.H100848
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	Micro TPW	**Serial No.:**	20200 7903
Pump Type:	MP-50	**Serial No.:**	1365

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 26 Seconds Refill 4 Seconds Discharge @ 32 psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 26 Seconds Refill 4 Seconds Discharge @ 32 psi

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	AH
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	AH
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	AH

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW58	Sample ID: 0622 MW58GW	Sample Time: 1620
Date: 6/2/22	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Cond µS/cm	Color/Odor/Notes
1510	START PURGING									Adjusted pressure and flow	
1520	0.7	10.20	315	5.68	7.11	59.4	24.34	30.05	0.07	215	
1525	1.05	9.06	307	2.75	7.21	47.6	35.99	30.05	0.07	213	
1530	1.40	8.68	301	1.78	7.30	41.6	247.8	30.05	0.07	207	orange sediment
1535	1.75	8.65	301	1.40	7.34	40.2	637.6	30.05	0.07	207	thick orange sediment (Dump flow cell)
1545	2.45	8.45	301	1.91	7.19	42.5	165.8	30.05	0.07	206	
1550	2.80	8.45	301	1.90	7.37	39.3	125.0	30.05	0.07	207	slowly clearing
1555	3.15	8.14	304	1.44	7.37	37.7	96.75	30.05	0.07	206	
1600	3.50	8.10	303	1.53	7.38	37.8	89.62	30.05	0.07	206	
1605	3.85	8.11	303	1.31	7.37	37.5	63.54	30.05	0.07	205	
1610	4.20	7.86	303	1.28	7.37	38.3	33.27	30.05	0.07	204	
1615	4.55	8.05	303	1.25	7.38	35.5	27.32	30.05	0.07	205	
1620											Collect sample at 1620

Sampled? : Yes ☒ No ☐

Initial of Sampler: GG

Sundance Consulting Inc. 15 YEARS

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW59
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	6/4/22	**Samplers:**	GG
Time Start:	1320		
Time Finish:	1510	**Checked By:**	AH

Well & Purge Information

TD (ft. bTOC):	top of pump 151.05	ft	**Screened Interval (ft.):**	140-160
DTW (ft. bTOC):	132.21	ft		
Water Column:		ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:		L	Water Column x L/ft	
Three Well Volumes:		L	Liters in Well x 3	
Sample Depth:		ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI 556	**Serial No.:**	06G 2421
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	MicroTPW	**Serial No.:**	2014 07081
Pump Type:	MP-50 Solinst	**Serial No.:**	1365

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 38 Seconds Refill 22 Seconds Discharge @ ~70psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 38 Seconds Refill 22 Seconds Discharge @ ~70 psi

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	AH
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	AH
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	AH

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW59	Sample ID: 0622 MW59GW	Sample Time: 1430
Date: 6/4/22	Dup. Sample ID:	Dup. Sample Time:
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Cond µS/cm	Color/Odor/Notes
1320	0.0	START PURGING								Varied Flow	
1340	~~0.036~~	11.95	596	11.43	7.03	43.8	30.56	132.25	0.03		
1345	0.25	11.38	610	11.50	6.96	25.5	54.85	82.25	0.03	449	
1350	0.90	10.85	611	10.69	6.94	17.6	58.51	132.25	0.03	446	
1355	1.05	11.19	608	7.19	6.94	8.6	69.20	132.25	0.03	447	
1400	1.20	11.77	606	5.31	6.93	6.3	66.20	132.25	0.03	453	
1405	1.35	12.03	606	4.53	6.93	5.9	64.95	132.25	0.03	456	
1410	1.50	12.15	610	3.66	6.93	5.2	59.49	132.25	0.03	449	
1415	1.65	11.73	612	3.45	6.92	3.0	61.36	132.25	0.03	447	
1420	1.80	11.55	609	3.06	6.93	-1.8	58.27	132.25	0.03	452	
1425	1.95	11.35	609	2.89	6.92	-3.5	58.22	132.25	0.03	450	
											1430 Sample Time

Sampled? : Yes ☒ No ☐

Initial of Sampler: GG

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW 16
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	14:05 08/23/22	**Samplers:**	ZP
Time Start:			
Time Finish:	1510	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	26.12	ft	**Screened Interval (ft.):**	13.0-23.0
DTW (ft. bTOC):	19.05	ft		
Water Column:	7.07	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.28	L	Water Column x L/ft	
Three Well Volumes:	12.83	L	Liters in Well x 3	
Sample Depth:	24	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	21C104221
Water Level Meter:	Solinst-model 102	**Serial No.:**	29499
Turbidity Meter:	2100P Turbidimeter	**Serial No.:**	16804
Pump Type:	Bladder	**Serial No.:**	N/A

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
Dissolved mercury	1	HCl		80z amber	
Total Mercury	1	HCl		80z amber	
Total Metals	1	Nitric		250 mL poly	

Low-Flow Groundwater Sample & Stabilization Form

Well ID:	MW06	Sample ID:	08 22 MW 06 GW	Sample Time:	14:55
Date:	08/22/22	Dup. Sample ID:		Dup. Sample Time:	
Notes:					

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1412			mS	START PURGING						
1417	0.75	11.3	0.3965	14.00	6.62	-9.0	20.0	19.16	0.15	
1422	1.50	6.0	0.3252	1.60	6.71	-13.9	18.3	19.20	11	
1427	2.25	5.7	0.3241	0.93	6.72	-14.6	11.6	11	4	
1432	3.00	5.9	0.3233	0.99	6.72	-14.6	6.48	11	11	
1437	3.75	6.2	0.3232	0.49	6.71	-14.0	4.36	11	11	
1442	4.50	6.0	0.3222	0.43	6.71	-13.4	3.34	11	4	Stabilized & Sampled

Sampled? : Yes ☒ No ☐

Initial of Sampler: [signature]

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW09
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	08/23/22	**Samplers:**	Nick Potter
Time Start:	09:20		
Time Finish:	12:45	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	34.62 ft	**Screened Interval (ft.):**	14.0–16.0
DTW (ft. bTOC):	27.74 ft		
Water Column:	6.88 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.16 L	Water Column x L/ft	
Three Well Volumes:	12.49 L	Liters in Well x 3	
Sample Depth:	30 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	21C104221
Water Level Meter:	Solinst 102	**Serial No.:**	294901
Turbidity Meter:	2100P Turbidimeter	**Serial No.:**	16604
Pump Type:	bladder	**Serial No.:**	~1

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 5 Seconds Refill 10 Seconds Discharge @ 30 PSI

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
mercury total		HCl		8 oz amber	
mercury dissolved		HCl		8 oz amber	
metals		Nitric		250 mL poly	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW-09	Sample ID: 0822MW09 GW	Sample Time: 1140
Date: 8/23/22	Dup. Sample ID:	Dup. Sample Time: —

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
10:25			ms	3.50 START PURGING					0.10	
10:30	.50	08.0	0.3539	~~30.6~~	6.28	8.8	21.2	27.74	0.10	~~Smells like gas~~ NO (bottle use for flowing what smells)
10:35	~~1.00~~	8.2	0.3234	2.19	6.47	1.1	25.1	27.82	0.1	1.00 L
10:40	~~1.75~~	6.9	0.2900	1.42	6.53	-4.5	32.6	28.02	0.15	1.75 L
10:45	2.50	6.7	0.2870	1.41	6.58	-6.8	36.7	28.16	0.15	2.50 L
10:50	3.75	6.8	0.2861	1.33	6.57	-6.4	36.8	28.30	0.15	
10:55	4.50	6.7	0.2953	2.57	6.55	-4.3	25.9	28.43	0.15	DTW 28.43
11:00	5.25	7.1	0.3031	3.07	6.51	-3.4	16.5	28.59	〃	
11:05	6.00	6.7	0.3093	2.46	6.56	-6.1	14.2	28.76	〃	
11:10	6.75	6.8	0.3116	2.02	6.60	-8.3	11.5	28.90	〃	
11:15	7.50	6.8	0.3166	1.56	6.64	-9.9	11.1	29.05	〃	
1120	8.25	7.0	0.3190	1.37	6.66	-11.2	8.82	29.17	〃	
1125	9.00	6.8	0.3230	1.19	6.67	-12.0	8.82	29.37	〃	
1130	9.75	6.9	0.3241	1.09	6.68	-12.5	8.55	29.50	〃	stabilized sampling

Sampled? : Yes ☑ No ☐

Initial of Sampler: MP

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW10
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	8/23/2022	**Samplers:**	GG
Time Start:	0850		
Time Finish:	1130	**Checked By:**	VP

Well & Purge Information

TD (ft. bTOC):	63.53 ft	**Screened Interval (ft.):**	50-60
DTW (ft. bTOC):	27.49 ft		
Water Column:	36.04 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	21.8 L	Water Column x L/ft	
Three Well Volumes:	65.4 L	Liters in Well x 3	
Sample Depth:	~60 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	102222
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	HACH 2100P	**Serial No.:**	11741
Pump Type:	Bladder	**Serial No.:**	

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 7.5 Seconds Refill 7.5 Seconds Discharge @ ~28 psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 7.5 Seconds Refill 7.5 Seconds Discharge @ ~30 psi

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	2	No	Nitric	6020B LL, 7470A	250 ml Plastic	GG
Total LL Mercury	2	No	HCl	1631 LL Hg	8oz Glass	GG
Dissolved LL Mercury	2	Yes	HCl	1631 LL Hg	8oz Glass	GG
Duplicate 0822 MW99 GW						

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW10	Sample ID: 0822 MW10GW	Sample Time: 1033
Date: 8/23/22	Dup. Sample ID: 0822 MW99 GW	Dup. Sample Time: 1035
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C. min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1000	START PURGING								0.05	7.5 / 7.5 @ ~30 psi
1005	0.25	8.9	318.4	0.76	7.09	61.4	0.54	28.13	0.05	
1010	0.50	9.1	318.3	0.69	7.15	53.5	0.27	28.13	0.05	
1015	0.75	9.3	318.9	0.64	7.19	44.4	0.63	28.13	0.05	
1020	1.00	9.5	316.7	0.72	7.20	42.7	0.37	28.13	0.05	
1025	1.25	9.5	317.3	0.75	7.25	39.7	0.87	28.13	0.05	
1030	1.50	9.4	318.9	0.72	7.23	38.4	0.28	28.13	0.05	
1033										Collect sample.

Sampled? : Yes ☒ No ☐

Initial of Sampler: RA

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW16
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	8/23/2022	**Samplers:**	CB
Time Start:	1330		
Time Finish:	1500	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	24.08 ft	**Screened Interval (ft.):**	11-21
DTW (ft. bTOC):	12.42 ft		
Water Column:	11.66 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	7.05 L	Water Column x L/ft	
Three Well Volumes:	21.16 L	Liters in Well x 3	
Sample Depth:	22 ft ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	102222
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	HACH 2100P	**Serial No.:**	11741
Pump Type:	Bladder	**Serial No.:**	

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at ~~12~~ 13 Seconds Refill ~~3~~ 2 Seconds Discharge @ ~20 psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at ~~12~~ 13 Seconds Refill ~~3~~ 2 Seconds Discharge @ ~20 psi

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW 16	Sample ID: 0822 MW16GW	Sample Time: 1410
Date: 8/23/22	Dup. Sample ID: NA	Dup. Sample Time:
Notes: Adjusted pressure due to drawdown several times. First use of bladder pump in this well.		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1335	START PURGING									
1345	0.5	8.3	751	0.87	6.31	59.3	52.8	14.48	0.05	
1350	0.75	8.4	753	0.70	6.31	57.5	29.0	14.48	0.05	
1355	1.00	8.6	754	0.51	6.31	55.5	15.7	14.48	0.05	
1400	1.25	8.6	756	0.48	6.31	54.8	10.9	14.48	0.05	
1405	1.50	8.4	756	0.45	6.31	54.0	8.81	14.48	0.05	
1410	1.75	8.4	760	0.43	6.31	52.8	7.20	14.48	0.05	Collect sample @ 1410

Sampled? : Yes ☒ No ☐

Initial of Sampler: MB

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Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW17
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	9/23/22	**Samplers:**	GG
Time Start:	1150		
Time Finish:	1325	**Checked By:**	VP

Well & Purge Information

TD (ft. bTOC):	54.77 ft	**Screened Interval (ft.):**	41.5 - 51.5
DTW (ft. bTOC):	15.10 ft		
Water Column:	39.67 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	24.0 L	Water Column x L/ft	
Three Well Volumes:	72.0 L	Liters in Well x 3	
Sample Depth:	50 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	102222
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	HACH 2100P	**Serial No.:**	11741
Pump Type:	Bladder	**Serial No.:**	

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 10 Seconds Refill 5 Seconds Discharge 30 psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 10 Seconds Refill 5 Seconds Discharge @ 30 psi

Sample Collection Information

MS/MSD? : ***Yes*** ☒ ***No*** ☐

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	3	No	Nitric	6020B LL, 7470A	250 ml Plastic	GG
Total LL Mercury	3	No	HCl	1631 LL Hg	8oz Glass	GG
Dissolved LL Mercury	3	Yes	HCl	1631 LL Hg	8oz Glass	GG

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW17	Sample ID: 0822 MW17 GW	Sample Time: 1230
Date: 8/23/22	Dup. Sample ID: —	Dup. Sample Time: —
Notes: First sample collected with new Bladder pump system		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1158	START PURGING									
1203	0.375	7.4	254.7	9.38	6.57	164.9	5.92	15.25	0.075	
1208	0.75	7.5	249.9	9.28	6.67	164.1	2.80	15.25	0.075	
1213	1.125	7.2	235.8	9.32	6.83	163.9	2.28	15.25	0.075	
1218	1.500	7.2	232.1	9.18	6.91	163.9	1.76	15.25	0.075	
1223	1.875	7.2	232.7	9.10	6.94	163.7	1.45	15.25	0.075	
1228	2.25	7.5	232.0	8.97	6.95	164.1	1.31	15.25	0.075	
1230										collect sample and MS/MSD

Sampled? : Yes ☒ No ☐

Initial of Sampler: GB

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW26
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	8/26/2022	**Samplers:**	GG
Time Start:	0830		
Time Finish:	1230	**Checked By:**	MP

Well & Purge Information

TD (ft. bTOC):	45.00	ft	**Screened Interval (ft.):**	32-42
DTW (ft. bTOC):	34.01	ft		
Water Column:	10.99	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	6.65	L	Water Column x L/ft	
Three Well Volumes:	19.95	L	Liters in Well x 3	
Sample Depth:	40.9	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	102222
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	HACH 2100 P	**Serial No.:**	11741
Pump Type:	Geopump Bladder	**Serial No.:**	—

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 12 Seconds Refill 3 Seconds Discharge 25psi = 0.025 L/min

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 12 Seconds Refill 3 Seconds Discharge @ 25psi 0.025 L/min

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	GG
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW26	Sample ID: 0822 MW26GW	Sample Time: 1120
Date: 8/26/2022	Dup. Sample ID: —	Dup. Sample Time: —

Notes: Installed new pump

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1030	START PURGING									
1035	0.125	8.6	679	1.43	6.16	70.9	242	34.42	0.025	brown, cloudy strong fuel odor
1040	0.25	8.7	677	1.07	6.18	65.7	310	34.42	0.025	
1045	0.375	8.6	671	1.03	6.22	60.1	201	34.42	0.025	
1050	0.50	8.9	667	0.96	6.23	57.3	184	34.42	0.025	
1055	0.625	9.1	664	0.84	6.25	54.2	144	34.42	0.025	
1100	0.75	9.6	663	0.89	6.26	51.1	130	34.42	0.025	
1105	0.875	9.4	667	0.86	6.28	48.9	110	34.42	0.025	
1110	1.00	9.7	670	0.82	6.29	46.8	103	34.42	0.025	
1115	1.125	9.3	677	0.87	6.30	44.5	92.6	34.42	0.025	
										Collect sample

Sampled? : Yes ☒ No ☐

Initial of Sampler: [signature]

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW27
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	08/23/22	**Samplers:**	VP
Time Start:	1520		
Time Finish:	1628	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	34.65 ft	**Screened Interval (ft.):**	23.0 - 33.0
DTW (ft. bTOC):	30.01 ft		
Water Column:	5.64 ft	TD-DTW=Water Column	
Liter/Foot:	3 4 tap 0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	3.41 L	Water Column x L/ft	
Three Well Volumes:	10.23 L	Liters in Well x 3	
Sample Depth:	~~30~~ ~34 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	21G04321
Water Level Meter:	Solinst model 102	**Serial No.:**	M2494E 294991
Turbidity Meter:	2100N Turbidimeter	**Serial No.:**	16694
Pump Type:	Bladder	**Serial No.:**	NA

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
Dissolved Mercury	1	HCl		8 oz amb-hr	
Total Mercury	1	HCl		8 oz amb-hr	
Total Metals	1	Nitric		250 mL poly	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW-27	Sample ID: 0822-MW-27-GW	Sample Time: 16:00
Date: 08/22/22	Dup. Sample ID:	Dup. Sample Time:

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1527	START PURGING									
1532	0.75	15.8	0.0011	4.4	6.27	10.6	1.15	30.18	0.75	
1537	1.50	14.9	0.0009	6.9	6.09	20.7	0.53	30.27	1	
1542	2.25	16.1	0.0008	5.9	6.52	28.9	0.46	30.20	1	
1547	3.00	16.7	0.0007	0.49	5.85	35.0	0.50	30.18	1	
1552	3.75	16.1	0.0006	0.48	5.76	39.0	0.49	30.17	1	Stabilized sampling

Sampled? : Yes ☑ No ☐

Initial of Sampler: KT

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW28
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	9/23/2020	**Samplers:**	GG
Time Start:	1520		
Time Finish:	1630	**Checked By:**	MD

Well & Purge Information

TD (ft. bTOC):	65.58	ft	**Screened Interval (ft.):**	53-63
DTW (ft. bTOC):	26.54	ft		
Water Column:	39.04	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	23.62	L	Water Column x L/ft	
Three Well Volumes:	70.86	L	Liters in Well x 3	
Sample Depth:	~60	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	102222
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	HACH 2100P	**Serial No.:**	11741
Pump Type:	Bladder	**Serial No.:**	

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 13.5 Seconds Refill 1.5 Seconds Discharge @ 30 psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 13.5 Seconds Refill 1.5 Seconds Discharge @ 30 psi

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	MH
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	MH
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	MH

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW28	Sample ID: 0822 MW28 GW	Sample Time: 1605
Date: 8/23/22	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1530	START PURGING									
1535	0.25	8.2	428.5	1.35	6.67	167.9	2.97	26.58	0.05	
1540	0.50	7.8	424.1	1.27	6.72	131.2	0.46	26.58	0.05	
1545	0.75	7.8	422.7	0.96	6.74	105.9	0.47	26.58	0.05	
1550	1.00	7.9	422.6	0.84	6.76	93.3	0.38	26.58	0.05	
1555	1.25	7.9	419.9	0.82	6.78	82.7	0.64	26.58	0.05	
1600	1.50	8.0	419.6	0.86	6.78	84.6	0.34	26.58	0.05	
1605	1.75							26.58	0.05	sampled

Sampled? : Yes ☒ No ☐

Initial of Sampler: BB

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW-29
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	8/24/22	**Samplers:**	
Time Start:	08:20		
Time Finish:	09:40	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	71.25	ft	**Screened Interval (ft.):**	59.0 – 69.0
DTW (ft. bTOC):	64.13	ft		
Water Column:	7.12	ft	TD-DTW=Water Column	
Liter/Foot:	(4.3) 0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:		L	Water Column x L/ft	
Three Well Volumes:	12.92	L	Liters in Well x 3	
Sample Depth:	~69	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	21C104221
Water Level Meter:	Solinist model 102	**Serial No.:**	294991
Turbidity Meter:	2100P Turbidity	**Serial No.:**	16604
Pump Type:	Bladder	**Serial No.:**	NA

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 5 Seconds Refill 10 Seconds Discharge psi 42

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☐

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
Total mercury	1	HCl		8oz glass	
Dissolved mercury	1	HCl		8oz glass	
Total Metals	1	Nitric		250mL poly	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW-29	Sample ID: 0822 MW29 GW	Sample Time: 0915
Date: 08/24	Dup. Sample ID:	Dup. Sample Time:
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
~~0835~~	START PURGING		MS							
09:45	1	4.3	0.548	6.5	6.7	4.8	262	64.36	0.2	DO 0.84 mg/L
09:50	2	4.4	0.547	0.72	6.73	0.7	262	64.46	11	
09:55	3	4.2	0.545	0.58	6.47	-1.4	256	64.44	11	
10:00	4	4.4	0.543	0.55	6.48	-2.1	247	64.50	11	
10:05	5	4.4	0.543	0.53	6.44	-2.5	247	64.51	11	stabilized sampling sampled 0915

Sampled? : Yes ☑ No ☐

Initial of Sampler: [signature]

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW 33
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	08/23/22	**Samplers:**	KG
Time Start:	12:48		
Time Finish:	13:30	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	6.92 ft	← 24.40	**Screened Interval (ft.):** 12-22
DTW (ft. bTOC):	12 ft		
Water Column:	14.48 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	8.76 L	Water Column x L/ft	
Three Well Volumes:	26.28 L	Liters in Well x 3	
Sample Depth:	22' ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI ProQuatro	**Serial No.:**	21C104221
Water Level Meter:	Solinst model 102	**Serial No.:**	294981
Turbidity Meter:	2100P Turb'd/meter	**Serial No.:**	16E104
Pump Type:	Bladder	**Serial No.:**	NA

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
Mercury total	1	HCl		80z amber	
Mercury dissolved	1	HCl		80z amber	
Methods total Hg	1	Nitric		250ml Poly	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW33	**Sample ID:** 0822 MW33 GW		**Sample Time:** 13:20
Date: 08/29/22	**Dup. Sample ID:** —		**Dup. Sample Time:** —
Notes:			

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
12:42	START PURGING									
12:47	0.75	7.8	0.0017	5.93	6.42	1.6	42.2	7.05	.15	
12:52	1.50	7.4	0.0015	6.05	6.40	2.5	38.6	6.95	0.15	
12:57	2.25	7.0	0.0013	6.07	6.39	3.2	23.4	6.96	"	
13:02	3.06	6.9	0.0012	6.06	6.38	3.8	23.4	"	"	
13:07	3.25	7.0	0.0011	6.18	6.38	3.8	6.72	"	"	Stable sampling

Sampled? : Yes ☑ No ☐

Initial of Sampler: NP

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW40
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	8/25/2022	**Samplers:**	GC
Time Start:	0900		
Time Finish:	1035	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	142.35	ft	**Screened Interval (ft.):**	119 – 139
DTW (ft. bTOC):	128.70	ft		
Water Column:	13.65	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	8.26	L	Water Column x L/ft	
Three Well Volumes:	24.8	L	Liters in Well x 3	
Sample Depth:	~138	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	102222
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	HACH 2100P	**Serial No.:**	11741
Pump Type:	Bladder	**Serial No.:**	

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 35 Seconds Refill 25 Seconds Discharge @ 65 psi = 0.05 L/min

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 35 Seconds Refill 25 Seconds Discharge @ 65 psi

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	GC
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW40	Sample ID: 0622 MW 40 GW	Sample Time: 1015
Date: 6/25/2022	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
0925	START PURGING									0.05 L/min @ 25/25 @ 65 psi
0930	0.25	6.6	641	4.13	6.49	224.2	17.5	128.75	0.05	
0935	0.50	6.4	568	2.50	6.83	210.0	20.7	128.75	0.05	
0940	0.75	6.3	558	2.20	6.85	206.2	18.7	128.75	0.05	
0945	1.00	6.2	543	1.90	6.87	197.8	11.7	128.75	0.05	
0950	1.25	6.0	533	1.78	6.87	182.1	9.85	128.75	0.05	
0955	1.50	6.1	523	1.68	6.87	172.4	10.0	128.75	0.05	
1000	1.75	5.9	520	1.46	6.87	158.8	13.3	128.75	0.05	
1005	2.00	6.0	516	1.41	6.87	146.3	11.3	128.75	0.05	
1010	2.25	6.1	516	1.26	6.89	137.2	10.3	128.75	0.05	
										Called sample

Sampled? : Yes ☒ No ☐

Initial of Sampler: MF

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW42
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	8/24/2022	**Samplers:**	GG
Time Start:	0940		
Time Finish:	1112	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	142.45	ft	**Screened Interval (ft.):**	119 - 139
DTW (ft. bTOC):	127.50	ft		
Water Column:	14.95	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	9.04	L	Water Column x L/ft	
Three Well Volumes:	27.12	L	Liters in Well x 3	
Sample Depth:	135	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	102222
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	HACH 2100P	**Serial No.:**	11741
Pump Type:	Bladder	**Serial No.:**	

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 40 Seconds Refill 20 Seconds Discharge @ 70 psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 40 Seconds Refill 20 Seconds Discharge @ 70 psi

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	GG
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW42	Sample ID: 0822 MW42GW	Sample Time: 1100
Date: 8/24/2022	Dup. Sample ID: ———	Dup. Sample Time: ———
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
0940	START PURGING									
0955	0.375	6.2	515	1.19	6.49	195.6	2.55	127.50	0.025	
1000	0.50	6.2	499	1.80	6.55	191.3	5.97	127.50	0.025	
1005	0.625	6.3	469	1.56	6.57	178.8	9.64	127.50	0.025	
1010	0.750	6.4	442.3	1.24	6.59	159.7	11.9	127.50	0.025	
1015	0.875	6.4	432.2	1.03	6.60	134.9	14.8	127.50	0.025	
1020	1.125	5.0	399.6	0.73	6.61	106.6	24.6	127.50	0.05	increased to 20 psi
1025	1.375	4.9	396.4	0.65	6.61	120.1	24.7	127.50	0.05	dipped flow through due to large particles
1030	1.625	5.1	394.4	0.60	6.61	106.6	28.1	127.50	0.05	
1035	1.875	5.2	393.0	0.44	6.62	94.3	19.3	127.50	0.05	
1040	2.125	5.2	395.3	0.41	6.62	89.9	18.1	127.5	0.05	
1045	2.375	5.3	395.6	0.40	6.62	87.4	15.3	127.5	0.05	
										Collect sample

Sampled? : Yes ☒ No ☐

Initial of Sampler: JJR

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW73
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	9/24/2022	**Samplers:**	GG
Time Start:	1123		
Time Finish:	1300	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	120.70	ft	**Screened Interval (ft.):**	98 - 118
DTW (ft. bTOC):	88.87	ft		
Water Column:	31.83	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	19.26	L	Water Column x L/ft	
Three Well Volumes:	57.8	L	Liters in Well x 3	
Sample Depth:	~115	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	102222
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	HACH 2100P	**Serial No.:**	11741
Pump Type:	Bladder	**Serial No.:**	—

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 200 Seconds Refill 10 Seconds Discharge @ 60 psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 200 Seconds Refill 10 Seconds Discharge @ 60 psi

Sample Collection Information

MS/MSD? : Yes ☒ No ☐

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	4	No	Nitric	6020B LL, 7470A	250 ml Plastic	GG
Total LL Mercury	4	No	HCl	1631 LL Hg	8oz Glass	
Dissolved LL Mercury	4	Yes	HCl	1631 LL Hg	8oz Glass	GG

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW43	Sample ID: 0822MW43GW	Sample Time: 1220
Date: 8/24/2022	Dup. Sample ID: 0822 MW98GW	Dup. Sample Time: 1225
Notes: Duplicate and MS/MSD		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1130	START PURGING									Adjust flow
1140	1.5	4.1	248.6	1.29	6.36	145.9	1.77	88.90	0.15	0.15 L/min @ 2cycles 20s/10s @ 60psi
1145	2.25	4.1	252.8	0.77	6.48	106.5	7.75	88.90	0.15	
1150	3.00	4.0	260.7	0.63	6.51	96.2	3.17	88.90	0.15	
1155	3.75	4.1	264.1	0.55	6.53	88.2	1.18	88.90	0.15	
1200	4.50	4.1	266.5	0.47	6.54	81.3	0.61	88.90	0.15	
1205	5.25	4.1	266.7	0.44	6.55	76.6	0.41	88.90	0.15	
1210	6.00	4.0	267.7	0.39	6.56	72.4	0.42	88.90	0.15	✓
										Collect sample

Sampled? : Yes ☒ No ☐

Initial of Sampler: [signature]

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW44
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	8/24/2022	**Samplers:**	GG
Time Start:	1335		
Time Finish:	1433	**Checked By:**	JM

Well & Purge Information

TD (ft. bTOC):	71.15	ft	**Screened Interval (ft.):**	48-68
DTW (ft. bTOC):	34.78	ft		
Water Column:	36.37	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	22.0	L	Water Column x L/ft	
Three Well Volumes:	66.0	L	Liters in Well x 3	
Sample Depth:	~60	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	102222
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	HACH 2100P	**Serial No.:**	11741
Pump Type:	Bladder	**Serial No.:**	—

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 11 Seconds Refill 4 Seconds Discharge @ 35 psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 11 Seconds Refill 4 Seconds Discharge @ 35 psi

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	GG
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	GG
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	GG

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW44	Sample ID: 0822MW44GW	Sample Time: 1415
Date: 8/24/2022	Dup. Sample ID: —	Dup. Sample Time: —

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1335	START PURGING									
1345	1.0	4.8	419.5	1.55	6.81	154.5	20.5	34.80	0.1	
1350	1.5	4.8	412.6	0.87	6.89	118.5	20.8	34.80	0.1	
1355	2.0	4.6	414.0	0.73	6.72	103.7	15.3	34.80	0.1	
1400	2.5	4.5	414.1	0.60	6.95	89.0	14.2	34.80	0.1	
1405	3.0	4.4	414.4	0.58	6.97	79.0	11.1	34.80	0.1	
1410	3.5	4.5	414.0	0.54	6.99	72.2	9.34	34.80	0.1	
1415	4.0	—								Collect sample

Sampled? : Yes ☒ No ☐

Initial of Sampler: JJ

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW-46
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	08/24	**Samplers:**	MP
Time Start:	1336		
Time Finish:	1428	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	79.40 ft	**Screened Interval (ft.):**	61 - 81
DTW (ft. bTOC):	44.47 ft		
Water Column:	34.97 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	21.16 L	Water Column x L/ft	
Three Well Volumes:	63.47 L	Liters in Well x 3	
Sample Depth:	~75 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	21C104221
Water Level Meter:	solinst model 102	**Serial No.:**	~~2149M~~ ~~2149~~ 294991
Turbidity Meter:	2100 hybidimeter	**Serial No.:**	16604
Pump Type:	bladder	**Serial No.:**	N9

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 5 Seconds Refill 10 Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
Dissolved mercury	1	HCl		8oz glass	
Total mercury	1	HCl		8 oz glass	
Total Metals	1	Nitric		250 mL poly	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW 45	Sample ID: 0822 MW 45 GW	Sample Time: 14 10
Date: 08 24 22	Dup. Sample ID: NA	Dup. Sample Time: NA
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
13 38	START PURGING									
~~1343~~	~~0.75~~	~~4.2~~	~~0.1926~~					~~44.60~~	~~0.15~~	
1343	0.75	4.2	0.1926	8.50	6.67	-12.1	21.2	44.60	0.15	
1348	1.50	3.9	0.1939	7.36	6.60	-8.8	14.9	44.67	"	
1353	2.25	3.8	0.1950	7.04	6.59	-8.1	10.4	44.68	"	
1358	3.00	3.7	0.1949	6.70	6.58	-7.8	7.96	"	"	
1403	3.75	3.6	0.1947	6.71	6.58	-7.6	7.51	"	"	stabilized sampling

Sampled? : Yes ☑ No ☐

Initial of Sampler: [signature]

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW46
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	1445 08/24/22	**Samplers:**	
Time Start:			
Time Finish:	1525	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	59.71 ft	**Screened Interval (ft.):**	36 - 56
DTW (ft. bTOC):	34.31 ft		
Water Column:	25.40 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	15.37 L	Water Column x L/ft	
Three Well Volumes:	46.10 L	Liters in Well x 3	
Sample Depth:	~45 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	21C104221
Water Level Meter:	Solinst model 102	**Serial No.:**	2944901
Turbidity Meter:	2100P Tabidimeter	**Serial No.:**	T6604
Pump Type:	Bladder	**Serial No.:**	N9

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 5 Seconds Refill 10 Seconds Discharge 29 psi

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☑

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
Total Mercury	1	HCl		8 oz glass	
Dissolved mercury	1	HCl		8 oz glass	
total metals	1	Nitric		250 ML poly	

Low-Flow Groundwater Sample & Stabilization Form

Well ID:	MW46	**Sample ID:**	0822MW46GW	**Sample Time:**	1511
Date:	08/24/22	**Dup. Sample ID:**	—	**Dup. Sample Time:**	—

Notes:

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1442	START PURGING (mS)									
1447	.75	4.1	0.1454	8.74	6.70	-44.4	27.6	34.27	0.15	
1452	1.50	4.0	0.1463	8.48	6.69	-13.3	15.0	34.28	"	
1457	2.25	3.9	0.1459	8.59	6.68	-12.9	13.9	"	"	
1502	3.00	3.7	0.1454	8.48	6.67	-12.6	10.2	"	"	stabilized sampling

Sampled? : Yes ☒ No ☐

Initial of Sampler: NP

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW47
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	08/24/22	**Samplers:**	TP
Time Start:	15:38		
Time Finish:	16:35	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	69.44 ft	**Screened Interval (ft.):**	46 - 66
DTW (ft. bTOC):	37.50 ft		
Water Column:	31.94 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	19.32 L	Water Column x L/ft	
Three Well Volumes:	57.97 L	Liters in Well x 3	
Sample Depth:	~60 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI ProQuatro	**Serial No.:**	21C104221
Water Level Meter:	Solinst model 102	**Serial No.:**	2944991
Turbidity Meter:	2100P Turbidit	**Serial No.:**	16604
Pump Type:	bladder	**Serial No.:**	N/A

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☑

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
Total mercury	1	HCl		8oz glass	
Dissolved mercury	1	HCl		8oz glass	
Total metals	1	Nitric		250 ml poly	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW 47	Sample ID: 0822MW47GW	Sample Time: 1627
Date: 08 24 22	Dup. Sample ID:	Dup. Sample Time:
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
~~14:48~~	START PURGING									start time 15:54
~~15:53~~	1.00	5.8	0.191	5.7	6.84	-21.5	14.6	9458	.20	time = 16:00
~~15:58~~	2	5.2	0.2022	4.73	6.87	-23.3	10.3	11	11	time = 16:05
16:10	3	5.3	0.2026	4.23	6.81	-24.2	9.29	11	11	
16:15	4	5.3, 5	0.2094	4.23 5	6.89 5	-24.2 5	5.96	11	11	stabilized sampling

Sampled? : Yes ☑ No ☐

Initial of Sampler: _____

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW-9
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	08/25/22	**Samplers:**	NP
Time Start:	0800		
Time Finish:	0954	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	29.95 NP	ft	63.75 **Screened Interval (ft.):**	40-60
DTW (ft. bTOC):		ft		
Water Column:	43.80	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	26.45	L	Water Column x L/ft	
Three Well Volumes:	79.50	L	Liters in Well x 3	
Sample Depth:	~55	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI ProQuatro	**Serial No.:**	21C104221
Water Level Meter:	Solinst model 122	**Serial No.:**	249091
Turbidity Meter:	2100P turbidimeter	**Serial No.:**	16.6 OK
Pump Type:	Bladder	**Serial No.:**	N/A

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	NP
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	NP
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	NP

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW 49	**Sample ID:** 0622 MW 49 GW	**Sample Time:** 0945
Date: 06/24/22	**Dup. Sample ID:** ———	**Dup. Sample Time:** ——→
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
0910	START PURGING									
0920	0.75	5.2	1379	6.27	5.71	38.2	348	30.91	0.15	
0925	1.50	5.4	1314	5.82	5.77	36.2	306	31.01	11	
0930	2.25	5.2	1311	5.56	5.78	35.6	316	31.02	11	
		5.2	1317	5.6	5.78	35.5	310			Right 2nd sampling

Sampled? : Yes ☑ No ☐

Initial of Sampler: ———

Pa

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW50
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	08/25/22	**Samplers:**	[illegible]
Time Start:	1250		
Time Finish:	1512	**Checked By:**	[illegible]

Well & Purge Information

TD (ft. bTOC):	95.26	ft	**Screened Interval (ft.):**	71.91
DTW (ft. bTOC):	49.08	ft		
Water Column:	46.28	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	28.00	L	Water Column x L/ft	
Three Well Volumes:	84.6	L	Liters in Well x 3	
Sample Depth:	~85	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI ProQuatro	**Serial No.:**	21C104221
Water Level Meter:	Solinst model 102	**Serial No.:**	244991
Turbidity Meter:	2100P Turbidimeter	**Serial No.:**	16604
Pump Type:	Bladder	**Serial No.:**	[illegible]

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☐

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	[illegible]
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	[illegible]
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	[illegible]

Low-Flow Groundwater Sample & Stabilization Form

Well ID:	MW 50	**Sample ID:**	0822 MW 50 GW	**Sample Time:**	1333
Date:	08 25 22	**Dup. Sample ID:**	—	**Dup. Sample Time:**	—
Notes:					

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1305	START PURGING									
1310	0.75	5.3	665	1.13	6.61	-9.5	32	49.4	0.15	
1315	1.5	3.9	676	1.40	6.64	-11.5	34	45[illegible]	"	
1320	2.25	3.9	676	1.32	6.64	-11.5	28	49.60	"	
1325	3.0	3.9	675	1.27	6.64	-11.5	26	49.5	"	stable sample [illegible]

Sampled? : Yes ☑ No ☐

Initial of Sampler: [illegible]

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Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW51
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	8/25/22	**Samplers:**	GG
Time Start:	1100		
Time Finish:	1150	**Checked By:**	NP

Well & Purge Information

TD (ft. bTOC):	77 ~~79.5~~	ft	**Screened Interval (ft.):**	56 - 76
DTW (ft. bTOC):	42.10	ft		
Water Column:	37.4	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	22.63	L	Water Column x L/ft	
Three Well Volumes:	67.9	L	Liters in Well x 3	
Sample Depth:	66.10	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro	**Serial No.:**	102222
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	HACH 2100P	**Serial No.:**	11741
Pump Type:	Bladder	**Serial No.:**	

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 12 Seconds Refill 3 Seconds Discharge @ 35 psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 12 Seconds Refill 3 Seconds Discharge @ 35 psi

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL. 7470A	250 ml Plastic	
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW 51	Sample ID: 0822 MW51GW	Sample Time: 1150
Date: 8/25/2022	Dup. Sample ID: ~~———~~	Dup. Sample Time: ~~———~~
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1100	START PURGING									
1105	0.25	6.2	201.5	8.43	6.38	174.1	14.8	42.10	0.05	
1110	0.50	6.1	196.1	8.39	6.38	174.5	12.2	42.10	0.05	
1115	0.75	5.7	191.4	7.89	6.39	177.2	11.3	42.10	0.05	
1120	1.00	5.6	195.7	7.52	6.42	181.4	7.80	42.10	0.05	
1125	1.25	5.5	199.5	7.23	6.44	183.4	5.95	42.10	0.05	
										collect sample

Sampled? : Yes ☒ No ☐

Initial of Sampler: JJZ

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW52
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	08 25 22	**Samplers:**	
Time Start:	1510		
Time Finish:	1130	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	59.33 ft	**Screened Interval (ft.):**	35-55
DTW (ft. bTOC):	34.80 ft		
Water Column:	24.53 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	14.84 L	Water Column x L/ft	
Three Well Volumes:	44.52 L	Liters in Well x 3	
Sample Depth:	~50 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	21C104221
Water Level Meter:	Solinst Model 102	**Serial No.:**	2124991
Turbidity Meter:	2100P Turbidimeter	**Serial No.:**	16h0c1
Pump Type:	Bladder	**Serial No.:**	NA

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☐

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW52	Sample ID: 0822 MW52 GW	Sample Time: 1110
Date: 08 25 22	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1020	START PURGING									
1025	0.75	4.3	3585	4.32	6.80	-20.4	36.9	14.97	0.75	
1030	1.50	4.3	4101	0.84	6.97	-27.5	24.4	11	11	
1035	2.25	4.3	4202	0.44	6.96	-28.6	18.2	11	11	
1040	3.00	4.2	3317	5.25	6.58	-7.7	8.18	11	11	
1045	3.75	4.2	2057	8.60	6.34	4.6	8.18	11	11	S= 9246
1050	4.5	4.2	1813	8.60	6.27	8.8	4.00	11	4	
	5.25	4.3	1780	8.74	6.24	10.5	5.31	11	11	Stabilized samples

Sampled? : Yes ☑ No ☐

Initial of Sampler: [signature]

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW53
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	1350 8/25/22	**Samplers:**	CB
Time Start:	1330		
Time Finish:	1430	**Checked By:**	JP

Well & Purge Information

TD (ft. bTOC):	65.00	ft	**Screened Interval (ft.):**	41 - 61
DTW (ft. bTOC):	33.78	ft		
Water Column:	31.22	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	18.89	L	Water Column x L/ft	
Three Well Volumes:	56.66	L	Liters in Well x 3	
Sample Depth:	~60	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	102222
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	HACH 2100P	**Serial No.:**	11741
Pump Type:	Bladder	**Serial No.:**	—

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 12 Seconds Refill 3 Seconds Discharge @ 30 psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 12 Seconds Refill 3 Seconds Discharge @ 30 psi

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	CB
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW53	Sample ID: 0822MW53GW	Sample Time: 1405
Date: 8/25/2022	Dup. Sample ID: ———	Dup. Sample Time: ———
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1330	START PURGING									
1340	1.0	5.2	181.3	8.77	6.27	176.0	1.68	34.21	0.1	
1345	1.5	5.3	175.8	8.57	6.34	174.9	1.07	34.21	0.1	
1350	2.0	5.4	172.4	7.91	6.43	179.4	0.64	34.21	0.1	
1355	2.5	5.2	178.3	7.56	6.48	182.5	0.52	34.21	0.1	
1400	3.0	5.2	180.7	7.47	6.51	185.2	0.80	34.21	0.1	
1405										Collect sample

Sampled? : Yes ☒ No ☐

Initial of Sampler: JH

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW54
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	8/25/22	**Samplers:**	
Time Start:	1210		
Time Finish:	1310	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	53.1 ft	**Screened Interval (ft.):**	29-49
DTW (ft. bTOC):	29.72 ft		
Water Column:	23.38 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	14.14 L	Water Column x L/ft	
Three Well Volumes:	42.4 L	Liters in Well x 3	
Sample Depth:	~48 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	102222
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	HACH 2100P	**Serial No.:**	11741
Pump Type:	Bladder	**Serial No.:**	—

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 10 Seconds Refill 5 Seconds Discharge @ 30 PSI

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 10 Seconds Refill 5 Seconds Discharge @ 30 PSI

Sample Collection Information

MS/MSD? : Yes ☐ No ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	2	No	Nitric	6020B LL, 7470A	250 ml Plastic	
Total LL Mercury	2	No	HCl	1631 LL Hg	8oz Glass	
Dissolved LL Mercury	2	Yes	HCl	1631 LL Hg	8oz Glass	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW54	**Sample ID:** 0822 MW54GW	**Sample Time:** 1245
Date: 8/25/2022	**Dup. Sample ID:** 0822 MW97 GW	**Dup. Sample Time:** 1250
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1210	START PURGING									
1215	1.25	3.3	469.8	1.50	6.80	92.4	40.62	29.80	0.25	
1220	2.50	3.3	470.8	1.07	6.82	92.7	21.5	29.80	0.25	
1225	3.75	3.2	479.7	1.09	6.85	82.9	14.3	29.80	0.25	
1230	5.00	3.2	479.5	0.95	6.86	75.4	9.13	29.80	0.25	
1235	6.25	3.7	475.1	1.21	6.88	71.8	7.26	29.80	0.25	
1240	7.50	3.8	474.2	1.60	6.87	69.9	8.36	29.80	0.25	
										Collect Sample at 1245

Sampled? : Yes ☒ No ☐

Initial of Sampler: JH

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW4
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	08/25/22	**Samplers:**	MP
Time Start:	11:35		
Time Finish:	12:40	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	22.57 ft	**Screened Interval (ft.):**	10-20
DTW (ft. bTOC):	14.93 ft		
Water Column:	7.64 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	4.62 L	Water Column x L/ft	
Three Well Volumes:	13.86 L	Liters in Well x 3	
Sample Depth:	~20 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	21C104221
Water Level Meter:	solinst model 102	**Serial No.:**	2160991
Turbidity Meter:	2100P Turbidimeter	**Serial No.:**	16604
Pump Type:	Bladder	**Serial No.:**	W9

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☑

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	MP
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	MP
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	MP

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW 55	**Sample ID:** 0822 MW55 GW	**Sample Time:** 12 25	
Date: 8/25/22	**Dup. Sample ID:**	**Dup. Sample Time:** —	
Notes:			

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1142	START PURGING									
11 47	1	4.7	4400	1.20	6.21	11.6	207	15.3	0.2	
11 52	2	4.4	4300	0.54	6.24	9.8	207	15.45	0.2	
11 57	2.75	4.7	4495	0.48	6.29	7.6	125	"	0.15	
12:02	3.50	4.8	4077	0.44	6.3	6.5	110	"	"	
12 07	4.25	4.7	3856	0.42	6.32	5.0	96.3	14.5	"	
12 12	5	4.7	3892	0.43	6.33	5.0	[illegible]	14.3	"	Stabilized / Sampling

Sampled? : Yes ☑ No ☐

Initial of Sampler: ________

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW 56
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	08/24/22	**Samplers:**	NP
Time Start:	10:45		
Time Finish:	13:10	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	78.65 ft	**Screened Interval (ft.):**	55-75
DTW (ft. bTOC):	34.60 ft		
Water Column:	44.05 ft	TD-DTW=Water Column	
Liter/Foot:	0.605 L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	26.64 L	Water Column x L/ft	
Three Well Volumes:	79.95 L	Liters in Well x 3	
Sample Depth:	~70 ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	21C104221
Water Level Meter:	Solist model 102	**Serial No.:**	2949991
Turbidity Meter:	2100P Turbidimeter	**Serial No.:**	16604
Pump Type:	Bladder	**Serial No.:**	NA

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at 5 Seconds Refill 10 Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
Dissolved mercury	1	HCl		8oz glass	
Total mercury	1	HCl		8oz glass	
Total mercury	1	HCl		250 mL poly	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW56	Sample ID: 0822 MW56 GW	Sample Time: 1300	
Date: 08/24/22	Dup. Sample ID:	Dup. Sample Time:	
Notes: loose air intake, was fixed			

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1145			mS	START PURGING						
1200	1.0	4.6	0.3737	2.90	6.82	-20.6	216	34.60	0.2	
1205	2.0	4.0	0.3520	2.74	6.80	-19.6	185	35.00	"	
1210	3.0	4.6	0.3831	2.42	6.79	-18.9	99.4	34.96	"	
1215	4.0	4.3	0.3903	2.31	6.78	-18.2	108	34.98	"	
1220	5	4.4	0.4000	2.08	6.77	-18.0	97.0	35.00	"	
1225	6	4.4	0.4058	1.96	6.77	-18.0	60.1	35.04	"	
1230	7	4.4	0.4119	1.80	6.77	-17.9	50.6	35.10	"	
1235	8	4.5	0.4161	1.64	6.77	-17.9	35.5	35.09	"	
1240	9	4.5	0.4197	1.54	6.77	-17.9	29.4	35.10	"	
		4.7	0.4218	1.44	6.77	-18.0	21.2	35.09	"	Stabilized sampling

Sampled? : Yes ☑ No ☐

Initial of Sampler: [signature]

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	NW 57
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	08/24/22	**Samplers:**	NP
Time Start:	1400		
Time Finish:	1500	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	60.04	ft	**Screened Interval (ft.):**	37.5-57.5
DTW (ft. bTOC):	37.60	ft		
Water Column:	22.49	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	13.61	L	Water Column x L/ft	
Three Well Volumes:	40.82	L	Liters in Well x 3	
Sample Depth:	~55	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI ProQuatro	**Serial No.:**	21C104221
Water Level Meter:	Solinst Model 101	**Serial No.:**	249091
Turbidity Meter:	2100P Turbidimeter	**Serial No.:**	16014
Pump Type:	bladder	**Serial No.:**	N9

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW57	Sample ID: 0822 MW57GW	Sample Time: 1444
Date: 08 25 22	Dup. Sample ID: —	Dup. Sample Time: —
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) *± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1411	START PURGING									
1415	0.5	4.4	1077	8.52	6.30	7	27.1	3772	0.5	
1421	1.5	4.4	1093	8.13	6.37	8.6	14.5	3774	1.1	
1426	2.25	4.3	1087	7.90	6.46	~~1.64~~	10.4	3771		ORP = 0.1 ; stabilized sampling

Sampled? : Yes ☑ No ☐

Initial of Sampler: [signature]

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW 58
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	08/26/22	**Samplers:**	
Time Start:	08:35		
Time Finish:	1000	**Checked By:**	

Well & Purge Information

TD (ft. bTOC):	60.39	ft	**Screened Interval (ft.):**	36.62-56.62
DTW (ft. bTOC):	30.63	ft		
Water Column:	29.76	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	18.00	L	Water Column x L/ft	
Three Well Volumes:	54.00	L	Liters in Well x 3	
Sample Depth:	~55	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
2"	0.605
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	21C104221
Water Level Meter:	Solinst meter 201	**Serial No.:**	249491
Turbidity Meter:	2100P Turbidimeter	**Serial No.:**	16604
Pump Type:	b/p 2w	**Serial No.:**	

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☑ Bladder Pump : Optimum Flow Rate Set at _____ Seconds Refill _____ Seconds Discharge

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☑

Parameter	# Containers (fill in for each well)	Preservative	Method	Container Type	Note
Dissolved Mercury	1	HCl		80z glass	
Total Mercury	1	HCl		8oz glass	
Total metals	1	Nitric		250ml poly	

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW-58	Sample ID: 0822-MW-58-GW	Sample Time: 0941
Date: 08-25-22	Dup. Sample ID: ———	Dup. Sample Time: ———
Notes:		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
08:50	START PURGING									
09:55		5.2	2911	1.07	6.76	1.8	711	30.95	0.10	cloudy L= 0.5-0
09:00	1.0	5.0	2867	0.48	6.55	-6.8	377	30.99	1	
09 05	1.5	4.8	2840	0.37	6.75	-18.1	282	31.10	1	
09 10	2.0	4.9	2949	0.33	6.78	-19.4	242	31.09	1	
09:15	2.5	4.7	2857	0.37	6.82	-21.8	210	31.12	1	
09 20	3.0	4.7	2849	0.36	6.85	-24.0	176	31.13	1	
09 25	3.5	4.7	2901	0.31	6.89	-23.8	94.8	31.16		stabilized

Sampled? : Yes ☑ No ☐

Initial of Sampler: [signature]

Low-Flow Groundwater Sampling & Stabilization Form

Client/Site:	BLM Red Devil Mine	**Well ID.:**	MW58
Contract No.:	140L6321C0001	**Project No.:**	BU06-007
Date:	8/24/2022	**Samplers:**	GG
Time Start:	1500		
Time Finish:	1711	**Checked By:**	NP

Well & Purge Information

TD (ft. bTOC):	164.1	ft	**Screened Interval (ft.):**	140 - 160
DTW (ft. bTOC):	132.30	ft		
Water Column:	31.8	ft	TD-DTW=Water Column	
Liter/Foot:	0.605	L/ft	See ***Well Volume Calculation*** table	
Liters in Well:	19.24	L	Water Column x L/ft	
Three Well Volumes:	57.72	L	Liters in Well x 3	
Sample Depth:	158	ft	Depth of Pump Intake	

Well Volume Calculation	
Well Diameter	L/ft
5/8"	0.06
(2")	(0.605)
4"	2.47

Field Equipment

Multiparameter Water Quality Meter:	YSI Pro Quatro	**Serial No.:**	102222
Water Level Meter:	Dipper T2	**Serial No.:**	0705
Turbidity Meter:	HACH 2100P	**Serial No.:**	11741
Pump Type:	Bladder	**Serial No.:**	—

Purge Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 30 Seconds Refill 30 Seconds Discharge @ 90 psi

Sampling Method:

☐ Peristaltic Pump ☐ Inertial ☐ Other:

☒ Bladder Pump : Optimum Flow Rate Set at 30 Seconds Refill 30 Seconds Discharge @ 90 psi

Sample Collection Information

MS/MSD? : ***Yes*** ☐ ***No*** ☒

Parameter	# Containers	Filtered?	Preservative	Method	Container Type	Initials
TAL Metals	1	No	Nitric	6020B LL, 7470A	250 ml Plastic	GG
Total LL Mercury	1	No	HCl	1631 LL Hg	8oz Glass	GG
Dissolved LL Mercury	1	Yes	HCl	1631 LL Hg	8oz Glass	GG

Low-Flow Groundwater Sample & Stabilization Form

Well ID: MW59	Sample ID: 0822 MW 59 GW	Sample Time: 1655
Date: 8/24/2022	Dup. Sample ID: —	Dup. Sample Time: —
Notes: Rust staining on tubing. Very turbid during purging.		

Purging and *Stabilization Data

Time (24 hrs)	Volume Removed (L)	Temp *± 3% °C, min ± 0.2°C	Spec. Cond. (µS/cm) * ± 3%	DO (mg/L) *± 10%	pH *± 0.1	ORP (mV) *± 10 mV	Turbidity (NTU) *± 10%	DTW (ft)	Flow Rate L/min	Color/Odor/Notes
1550	START PURGING									
1555	0.25	7.1	612	6.61	6.97	197.8	6.41	132.30	0.05	
1600	0.50	6.6	606	2.85	6.81	188.3	213	132.30	0.05	
1605	0.75	6.4	606	1.10	6.84	150.3	464	132.30	0.05	
1610	1.00	6.3	605	0.93	6.87	127.8	515	132.30	0.05	
1615	1.25	6.4	604	0.77	6.90	110.2	440	132.30	0.05	
1620	1.50	6.8	602	0.67	6.92	93.6	421	132.30	0.05	
1625	1.75	6.8	601	0.65	6.92	87.7	385	132.30	0.05	
1630	2.00	6.8	602	0.59	6.93	78.9	374	132.30	0.05	
1635	2.25	6.9	603	0.68	6.94	76.1	337	132.30	0.05	
1640	2.50	6.3	603	0.62	6.95	72.6	348	132.30	0.05	
1645	2.75	6.5	597	0.70	7.01	67.3	340	132.30	0.05	
1650	3.00	6.5	599	0.61	6.98	66.6	284	132.30	0.05	
1655	—									Collect Sample

Sampled? : Yes ☒ No ☐

Initial of Sampler: ZD

ATTACHMENT 1.5 SURFACE WATER SAMPLING FORMS

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Surface Water
Sample Collection Log

Project Name: Red Devil Mine
Project No.: BU06-007
Sample Type: SW
Pump Type: NA
Sample Team: GG/NP

Sample Location: RD 05
Sample ID: 0622RD05SW
Date: 6/6/22
Time: 1140
COC #:
Trip Blank ID: TB02

Methods (listed in prioritized order)	Sample Volume	Bottle Count	Bottle Type	Filtered/ Unfiltered	Preservative	Temperature	Hold Time	Initials
TAL Metals	250 mL	2	plastic	Unfiltered	Nitric	ambient	180 days/ 28 days*	GG
Total LL Mercury	8 oz	2	glass	Unfiltered	HCl	4° C	90 days	GG
TSS and TDS**	1 L	2	plastic	Unfiltered	None	4° C	7 days	GG
Inorganic Ions (Cl, F, SO_4) and Alkalinity***	250 mL	2	plastic	Unfiltered	None	4° C	28 days/ 14 days	GG
Nitrate-Nitrite	250 mL	2	plastic	Unfiltered	Sulfuric	4° C	28 days	GG

Comments: * The TAL Hg analyzed by EPA Method 7470A has a 28 day hold time
**The TSS andTDS are sampled together in a 1 L container.
***The Inorganic Ions and Alkalinity are sampled together in a 250 ml container.

Logged By: GG

Reviewed By: GG

Time	Temp °C	Spec Con µS/cm	DO mg/L	pH	ORP	Turb. NTU	Notes
1140	3.65	321	3.13	6.86	41.6	11.12	Dup @ 1145

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Surface Water
Sample Collection Log

Project Name: Red Devil Mine
Project No.: BU06-007
Sample Type: SW
Pump Type: Peri
Sample Team: GG/NP

Sample Location: RD06
Sample ID: 0622RD06 SW
Date: 6/16/22
Time: 1010
COC #:
Trip Blank ID: TB03

Methods (listed in prioritized order)	Sample Volume	Bottle Count	Bottle Type	Filtered/ Unfiltered	Preservative	Temperature	Hold Time	Initials
TAL Metals	250 mL	1	plastic	Unfiltered	Nitric	ambient	180 days/ 28 days*	GG
Total LL Mercury	8 oz	1	glass	Unfiltered	HCl	4° C	90 days	GG
TSS and TDS**	1 L	1	plastic	Unfiltered	None	4° C	7 days	GK
Inorganic Ions (Cl, F, SO_4) and Alkalinity***	250 mL	1	plastic	Unfiltered	None	4° C	28 days/ 14 days	K L
Nitrate-Nitrite	250 mL	1	plastic	Unfiltered	Sulfuric	4° C	28 days	GG

Comments: * The TAL Hg analyzed by EPA Method 7470A has a 28 day hold time
**The TSS andTDS are sampled together in a 1 L container.
***The Inorganic Ions and Alkalinity are sampled together in a 250 ml container.

Logged By: GG
Reviewed By: GK

Time	Temp °C	Spec Con µS/cm	DO mg/L	pH	ORP	Turb. NTU	Notes
1010	4.99	156	15.20	7.28	481	9.58	

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Surface Water
Sample Collection Log

Project Name: Red Devil Mine
Project No.: BU06-007
Sample Type: SW
Pump Type: Peri
Sample Team: GG/NP

Sample Location: RD 08B (Alternate)
Sample ID: 0622RD~~08~~SW
Date: 6/6/22
Time: 0838
COC #:
Trip Blank ID: TB03

Methods (listed in prioritized order)	Sample Volume	Bottle Count	Bottle Type	Filtered/ Unfiltered	Preservative	Temperature	Hold Time	Initials
TAL Metals	250 mL	1	plastic	Unfiltered	Nitric	ambient	180 days/ 28 days*	GG
Total LL Mercury	8 oz	1	glass	Unfiltered	HCl	4° C	90 days	GG
TSS and TDS**	1 L	1	plastic	Unfiltered	None	4° C	7 days	GG
Inorganic Ions (Cl, F, SO_4) and Alkalinity***	250 mL	1	plastic	Unfiltered	None	4° C	28 days/ 14 days	GG
Nitrate-Nitrite	250 mL	1	plastic	Unfiltered	Sulfuric	4° C	28 days	GG

Comments: * The TAL Hg analyzed by EPA Method 7470A has a 28 day hold time
**The TSS andTDS are sampled together in a 1 L container.
***The Inorganic Ions and Alkalinity are sampled together in a 250 ml container.

Logged By: GG

Reviewed By: GG

Time	Temp °C	Spec Con µS/cm	DO mg/L	pH	ORP	Turb. NTU	Notes
0838	4.73	159	15.51	7.20	74.5	4.45	

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Surface Water
Sample Collection Log

Project Name: Red Devil Mine
Project No.: BU06-007
Sample Type: SW
Pump Type:
Sample Team: GG/NP

Sample Location: RD 10
Sample ID: 0622RD10 SW
Date: 6/6/22
Time: 1330
COC #:
Trip Blank ID: TB03

Methods (listed in prioritized order)	Sample Volume	Bottle Count	Bottle Type	Filtered/ Unfiltered	Preservative	Temperature	Hold Time	Initials
TAL Metals	250 mL	1	plastic	Unfiltered	Nitric	ambient	180 days/ 28 days*	GG
Total LL Mercury	8 oz	1	glass	Unfiltered	HCl	4° C	90 days	GG
TSS and TDS**	1 L	1	plastic	Unfiltered	None	4° C	7 days	GG
Inorganic Ions (Cl, F, SO_4) and Alkalinity***	250 mL	1	plastic	Unfiltered	None	4° C	28 days/ 14 days	GG
Nitrate-Nitrite	250 mL	1	plastic	Unfiltered	Sulfuric	4° C	28 days	GG

Comments: * The TAL Hg analyzed by EPA Method 7470A has a 28 day hold time
**The TSS andTDS are sampled together in a 1 L container.
***The Inorganic Ions and Alkalinity are sampled together in a 250 ml container.

Logged By: GG

Reviewed By: GG

Time	Temp °C	Spec Con µS/cm	DO mg/L	pH	ORP	Turb. NTU	Notes
1330	7.60	137	15.49	7.52	53.3	2.19	

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Surface Water
Sample Collection Log

Project Name: Red Devil Mine
Project No.: BU06-007
Sample Type: SW
Pump Type: Peri
Sample Team: GG/NP

Sample Location: RD 15
Sample ID: 0622RD15SW
Date: 6/4/22
Time: 1125
COC #:
Trip Blank ID: TB03

Methods (listed in prioritized order)	Sample Volume	Bottle Count	Bottle Type	Filtered/ Unfiltered	Preservative	Temperature	Hold Time	Initials
TAL Metals	250 mL	3	plastic	Unfiltered	Nitric	ambient	180 days/ 28 days*	GG
Total LL Mercury	8 oz	3	glass	Unfiltered	HCl	4° C	90 days	GG
TSS and TDS**	1 L	3	plastic	Unfiltered	None	4° C	7 days	GG
Inorganic Ions (Cl, F, SO_4) and Alkalinity***	250 mL	3	plastic	Unfiltered	None	4° C	28 days/ 14 days	GG
Nitrate-Nitrite	250 mL	3	plastic	Unfiltered	Sulfuric	4° C	28 days	GG

Comments: * The TAL Hg analyzed by EPA Method 7470A has a 28 day hold time
**The TSS andTDS are sampled together in a 1 L container.
***The Inorganic Ions and Alkalinity are sampled together in a 250 ml container.

Logged By: GG
Reviewed By: GG

Time	Temp °C	Spec Con µS/cm	DO mg/L	pH	ORP	Turb. NTU	Notes
1125	5.97	132	13.56	7.60	38.76	2.89	MS/MSD

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Surface Water
Sample Collection Log

Project Name: Red Devil Mine
Project No.: BU06-007
Sample Type: SW
Pump Type: Peri
Sample Team: GG/NP

Sample Location: RD 05 (Seep)
Sample ID: 0822RD05 SW
Date: 8/28/22
Time: 1015
COC #:
Trip Blank ID: TB04

Methods (listed in prioritized order)	Sample Volume	Bottle Count	Bottle Type	Filtered/ Unfiltered	Preservative	Temperature	Hold Time	Initials
TAL Metals	250 mL	1/ 1	plastic	Unfiltered	Nitric	ambient	180 days/ 28 days*	
Total LL Mercury	8 oz	1/1	glass	Unfiltered	HCl	4° C	90 days	
TSS and TDS**	1 L	1/1	plastic	Unfiltered	None	4° C	7 days	
Inorganic Ions (Cl, F, SO_4) and Alkalinity***	250 mL	1/ 1	plastic	Unfiltered	None	4° C	28 days/ 14 days	
Nitrate-Nitrite	250 mL	1/ 1	plastic	Unfiltered	Sulfuric	4° C	28 days	

Comments: * The TAL Hg analyzed by EPA Method 7470A has a 28 day hold time
**The TSS andTDS are sampled together in a 1 L container.
***The Inorganic Ions and Alkalinity are sampled together in a 250 ml container.
Duplicate 0822 RD995W @ 1018

Logged By: GG

Reviewed By:

Time	Temp °C	Spec Con µS/cm	DO mg/L	pH	ORP	Turb. NTU	Notes
1015	3.6	476.4	2.33	6.74	121.6	38.2	

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Surface Water Sample Collection Log

Project Name: Red Devil Mine
Project No.: BU06-007
Sample Type: SW
Pump Type: Peri
Sample Team: GG/NP

Sample Location: RD 06
Sample ID: 0822RD06SW
Date: 8/28/22
Time: 0955
COC #:
Trip Blank ID:

Methods (listed in prioritized order)	Sample Volume	Bottle Count	Bottle Type	Filtered/ Unfiltered	Preservative	Temperature	Hold Time	Initials
TAL Metals	250 mL	1	plastic	Unfiltered	Nitric	ambient	180 days/ 28 days*	GG
Total LL Mercury	8 oz	1	glass	Unfiltered	HCl	4° C	90 days	
TSS and TDS**	1 L	1	plastic	Unfiltered	None	4° C	7 days	
Inorganic Ions (Cl, F, SO_4) and Alkalinity***	250 mL	1	plastic	Unfiltered	None	4° C	28 days/ 14 days	
Nitrate-Nitrite	250 mL	1	plastic	Unfiltered	Sulfuric	4° C	28 days	

Comments: * The TAL Hg analyzed by EPA Method 7470A has a 28 day hold time
**The TSS andTDS are sampled together in a 1 L container.
***The Inorganic Ions and Alkalinity are sampled together in a 250 ml container.

Logged By: GG

Reviewed By:

Time	Temp °C	Spec Con µS/cm	DO mg/L	pH	ORP	Turb. NTU	Notes
0955	5.8	157.5	~~11.03~~ 13.26	~~5.64~~ 6.82	263.0	12.1	

Sundance Consulting Inc. 15 YEARS

Surface Water
Sample Collection Log

Project Name: Red Devil Mine
Project No.: BU06-007
Sample Type: SW
Pump Type: Peri
Sample Team: GG/NP

Sample Location: RD08B
Sample ID: 0822RD08BSW
Date: 8/28/22
Time: 0915
COC #:
Trip Blank ID:

Methods (listed in prioritized order)	Sample Volume	Bottle Count	Bottle Type	Filtered/ Unfiltered	Preservative	Temperature	Hold Time	Initials
TAL Metals	250 mL	1	plastic	Unfiltered	Nitric	ambient	180 days/ 28 days*	GG
Total LL Mercury	8 oz	1	glass	Unfiltered	HCl	4° C	90 days	GG
TSS and TDS**	1 L	1	plastic	Unfiltered	None	4° C	7 days	GG
Inorganic Ions (Cl, F, SO_4) and Alkalinity***	250 mL	1	plastic	Unfiltered	None	4° C	28 days/ 14 days	GG
Nitrate-Nitrite	250 mL	1	plastic	Unfiltered	Sulfuric	4° C	28 days	GG

Comments: * The TAL Hg analyzed by EPA Method 7470A has a 28 day hold time
**The TSS andTDS are sampled together in a 1 L container.
***The Inorganic Ions and Alkalinity are sampled together in a 250 ml container.

Logged By: GG/NP

Reviewed By:

Time	Temp °C	Spec Con µS/cm	DO mg/L	pH	ORP	Turb. NTU	Notes
0915	5.7	158.3	13.11	7.32	253.2	20.0	

Surface Water
Sample Collection Log

Project Name: Red Devil Mine
Project No.: BU06-007
Sample Type: SW
Pump Type: Peri
Sample Team: GG/NP

Sample Location: RD 10
Sample ID: 0822RD10SW
Date: 8/28/22
Time: 1125
COC #:
Trip Blank ID: TB04

Methods (listed in prioritized order)	Sample Volume	Bottle Count	Bottle Type	Filtered/ Unfiltered	Preservative	Temperature	Hold Time	Initials
TAL Metals	250 mL	1	plastic	Unfiltered	Nitric	ambient	180 days/ 28 days*	
Total LL Mercury	8 oz	1	glass	Unfiltered	HCl	4° C	90 days	
TSS and TDS**	1 L	1	plastic	Unfiltered	None	4° C	7 days	
Inorganic Ions (Cl, F, SO_4) and Alkalinity***	250 mL	1	plastic	Unfiltered	None	4° C	28 days/ 14 days	
Nitrate-Nitrite	250 mL	1	plastic	Unfiltered	Sulfuric	4° C	28 days	

Comments: * The TAL Hg analyzed by EPA Method 7470A has a 28 day hold time
**The TSS andTDS are sampled together in a 1 L container.
***The Inorganic Ions and Alkalinity are sampled together in a 250 ml container.

Logged By: GG

Reviewed By:

Time	Temp °C	Spec Con µS/cm	DO mg/L	pH	ORP	Turb. NTU	Notes
1125	6.0	142.4	12.90	7.79	173.7	10.6	

Sundance Consulting Inc.

Surface Water
Sample Collection Log

Project Name: Red Devil Mine
Project No.: BU06-007
Sample Type: SW
Pump Type: Peri
Sample Team: GG/NP

Sample Location: RD15
Sample ID: 0822RD15 SW
Date: 8/28/22
Time: 1030
COC #:
Trip Blank ID: TB04

Methods (listed in prioritized order)	Sample Volume	Bottle Count	Bottle Type	Filtered/ Unfiltered	Preservative	Temperature	Hold Time	Initials
TAL Metals	250 mL	3	plastic	Unfiltered	Nitric	ambient	180 days/ 28 days*	GG
Total LL Mercury	8 oz	3	glass	Unfiltered	HCl	4° C	90 days	
TSS and TDS**	1 L	3	plastic	Unfiltered	None	4° C	7 days	GG
Inorganic Ions (Cl, F, SO_4) and Alkalinity***	250 mL	3	plastic	Unfiltered	None	4° C	28 days/ 14 days	
Nitrate-Nitrite	250 mL	3	plastic	Unfiltered	Sulfuric	4° C	28 days	

Comments: * The TAL Hg analyzed by EPA Method 7470A has a 28 day hold time
**The TSS andTDS are sampled together in a 1 L container.
***The Inorganic Ions and Alkalinity are sampled together in a 250 ml container.

Logged By: GG

Reviewed By:

Time	Temp °C	Spec Con µS/cm	DO mg/L	pH	ORP	Turb. NTU	Notes
1030	5.9	146.1	13.27	7.10	259.7	12.9	

ATTACHMENT 1.6 CALIBRATION LOGS

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Turbidity Calibration Log

Model: Micro TPW

Serial Number: 202007803

Date & Time & Temp	Manufacturer Calibration Standard	Calibration Reading	Acceptable (✓)
Date: 6/1/22	1000	~~1000~~ 1001	✓
	10.0	~~10.0~~ 9.90	✓
Time: 1858	0.02	0.02	✓
Date: 6/2/22	1000	1000	✓
	10.0	10.0	✓
Time: 1814	0.02	0.02	✓
Date: 6/3/22	1000	1000	✓
	10.0	10.0	✓
Time: 1832	0.02	0.02	✓
Date: 6/4/22	1000	1000	✓
	10.0	10.04	✓
Time: 1733	0.02	0.03	✓
Date: 6/5/22	1000	~~1000~~ 999.4	✓
	10.0	10.0	✓
Time: 1522	0.02	0.02	✓
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
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Time:			
Date:			
Time:			
Date:			
Time:			

Turbidity Calibration Log

Model: Micro TPW

Serial Number: 20140708l

Date & Time & Temp	Manufacturer Calibration Standard	Calibration Reading	Acceptable (✓)
Date: 6/1/22	1000	1000	✓
	10.0	10.0	✓
Time: 1857	0.02	0.02	✓
Date: 6/2/22	1000	998.3	✓
	10.0	10.0	✓
Time: 1815	0.02	0.02	✓
Date: 6/3/22	1000	1000	✓
	10.0	10.0	✓
Time: 1835	0.02	0.02	✓
Date: 6/4/22	1000	1000	✓
	10.0	10.0	✓
Time: 1740	0.02	0.02	✓
Date:			
Time:			
Date:			
Time:			
Date:			
Time:			
Date:			
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Time:			

Sundance Consulting 15

Water Quality Meter Calibration Log

Model: YSI 556 MPS

Serial Number: 06G2421BB

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 6/1/22	pH (4.0)	3.85	4.01
	pH (7.0)	7.09	7.00
Time: 17:20	pH (10.0)	10.23	10.04
	Spec Cond (µS/cm)	~~1878 NP~~	~~1316 NP 1293~~
Temp: 21°C	DO (mg/L)	7.88	8.65
	ORP (mV)	234.2	240.1
Date: 6/2/22	pH (4.0)	3.99	4.01
	pH (7.0)	7.09	7.00
Time: 16:15	pH (10.0)	10.02	10.01
	Spec Cond (µS/cm)	1365	1413
Temp: 25.0	DO (mg/L)	7.34	8.16
	ORP (mV)	234.2	240.0
Date: 6/3/22	pH (4.0)	4.16	4.01
	pH (7.0)	7.04	7.00
Time: 18:30	pH (10.0)	10.01	10.01
	Spec Cond (µS/cm)	1405	1413
Temp: 2333	DO (mg/L)	8.20	8.40
	ORP (mV)	~~NP 245.1~~ 1294	240
Date: 6/4/22	pH (4.0)	4.037	4.01
	pH (7.0)	6.91	7.00
Time: 17:00	pH (10.0)	10.00	10.01
	Spec Cond (µS/cm)	1421	1413
Temp: 23.06	DO (mg/L)	8.74	8.42
	ORP (mV)	244.5	240.0
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		

NP

mS/cm 1.414/1.41 NP

Sundance Consulting Inc. 15

Water Quality Meter Calibration Log

Model: YSI 556 MPS

Serial Number: 11H000848

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 6/1/22	pH (4.0)	4.0	4.01
	pH (7.0)	7.00	7.00
Time: 19:20	pH (10.0)	10.16	10.04
	Spec Cond ~~(µS/cm)~~ mS/cm	~~1861~~ 1.032	~~131~~ 1.413
Temp: 21°C	DO (mg/L)	8.2	8.64
	ORP (mV)	234.3	240.0
Date: 6/2/22	pH (4.0)	4.00	4.01
	pH (7.0)	7.04	7.00
Time: 18:15	pH (10.0)	9.80	9.99
	Spec Cond (µS/cm)	1.386	1.413
Temp: 23.7	DO (mg/L)	7.91	8.18
	ORP (mV)	2264	240.0
Date: 6/3/22	pH (4.0)	4.13	4.01
	pH (7.0)	6.98	7.00
Time: 18:30	pH (10.0)	10.08	10.01
	Spec Cond (µS/cm)	1402	1413
Temp: 23.38	DO (mg/L)	7.84	8.44
	ORP (mV)	242.2	240.0
Date: 6/4/22	pH (4.0)	4.02	4.01
	pH (7.0)	7.02	7.00
Time: 17:00	pH (10.0)	9.91	10.01
	Spec Cond (µS/cm)	1445	1413
Temp: 23.65	DO (mg/L)	8.17	8.75
	ORP (mV)	240.3	240.0
Date: 6/5/22	pH (4.0)	3.87	3.98
	pH (7.0)	7.03	7.02
Time: 15:20	pH (10.0)	9.99	10.01
	Spec Cond (µS/cm)	1362	1413
Temp: 23.25	DO (mg/L)	8.49	8.18
	ORP (mV)	234	240.0
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		

WP

Turbidity Calibration Log

Model: 2100P TURBIDIMETER

Serial Number: 16604

Date & Time & Temp	Manufacturer Calibration Standard	Calibration Reading	Acceptable (✓)
Date: 08/23/22 Time: 18:05	>0.1, 20 100 800	✓ ✓ ✓	
Date: 08/24/22 Time: 18:10	>0.1, 20 100 800	✓ ✓ ✓	
Date: 08/25/22 Time: 16:35	>0.1 20 800	✓ ✓ ✓	
Date: 08/27/22 Time: 1028	>0.1, 20 100 800	✓	
Date: Time:			
Date: Time:			
Date: Time:			
Date: Time:			
Date: Time:			
Date: Time:			
Date: Time:			
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Date: Time:			
Date: Time:			
Date: Time:			
Date: Time:			
Date: Time:			

Turbidity Calibration Log

Model: 2100P Turbidimeter

Serial Number: 11741

Date & Time & Temp	Manufacturer Calibration Standard	Calibration Reading	Acceptable (✓)
Date: 08/23/22 Time: 18:05	>0.1, 20 100 800	✓ ✓ ✓	
Date: 08/24/22 Time: 18:10	>0.1, 20 100 800	✓ ✓ ✓	
Date: 08/25/22 Time: 16:35	>0.1, 20 200 800	✓ ✓ ✓	
Date: Time:			
Date: Time:			
Date: Time:			
Date: Time:			
Date: Time:			
Date: Time:			
Date: Time:			
Date: Time:			
Date: Time:			
Date: Time:			
Date: Time:			
Date: Time:			
Date: Time:			
Date: Time:			

Sundance Consulting Inc. 15

Water Quality Meter Calibration Log

Model: YSI ProQuatro

Serial Number: 20L102222

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 08/23/22	pH (4.0)	3.93	3.93
	pH (7.0)	6.88	6.86
Time: 1710	pH (10.0)	9.87	9.90
	Spec Cond (µS/cm)	1376	1419
Temp: 18.8	DO (mg/L)	100.8	99.4
	ORP (mV)	245.3	240
Date: 08/24/22	pH (4.0)	4.00	4.00
	pH (7.0)	6.99	7.00
Time: 1746	pH (10.0)	10.03	10.00
	Spec Cond (µS/cm)	1426	1413
Temp: 18.10	DO (mg/L)	100.09	99.3
	ORP (mV)	241.5	240.00
Date: 08/25/22	pH (4.0)	3.99	4.00
	pH (7.0)	7.11	7.00
Time: 16:03	pH (10.0)	10.16	10.01
	Spec Cond (µS/cm)	1381	1413
Temp: 17.2	DO (mg/L)	98.19	99.0
	ORP (mV)	245.6	240
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		

Water Quality Meter Calibration Log

Model: YSI ProQuatro

Serial Number: 21C104221

Date & Time & Temp	Calibration Information	Initial Calibration Readings	Final Calibration Readings
Date: 08/23/22	pH (4.0)	~~4.02~~ NP 3.97	4.00
	pH (7.0)	6.94	6.94
Time: 1710	pH (10.0)	9.99	10.00
	Spec Cond (µS/cm)	100.9	99.3
Temp: 18.8	DO (mg/L)	1595	1413
	ORP (mV)	248.7	240
Date: 08/24/22	pH (4.0)	4.01	4.00
	pH (7.0)	~~7.03~~	7.00
Time: 1740	pH (10.0)	10.01	10.01 NP
	Spec Cond (µS/cm)	1301	~~1301~~ 1413
Temp: 18.1 °C	DO (mg/L)	91.2%	99.3%
	ORP (mV)	243.9	240.00
Date: 08/25/22	pH (4.0)	4.03	4.00
	pH (7.0)	7.06	7.00
Time: 1603	pH (10.0)	10.37	10.01
	Spec Cond (µS/cm)	1347	1413
Temp: 17.2	DO (mg/L)	1028	99.0
	ORP (mV)	239.6	240
Date: 08/27/22	pH (4.0)	4.07	4.00
	pH (7.0)	7.03	7.00
Time: 1430	pH (10.0)	9.95	~~10.01~~
	Spec Cond (µS/cm)	1535	1417
Temp: 18.5	DO (mg/L)	94.7	98.5
	ORP (mV)	234.5	240
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		
Date:	pH (4.0)		
	pH (7.0)		
Time:	pH (10.0)		
	Spec Cond (µS/cm)		
Temp:	DO (mg/L)		
	ORP (mV)		

ATTACHMENT 2. PHOTOGRAPH DOCUMENTATION

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Attachment 2. Table of Contents

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Photograph 2-1. MW33 with new bladder pump system installed 22 August 2022.

Photograph 2-2. MW12, frost jacked with collapsed PVC. 22 August 2022.

Photograph 2-3. MW10, Collection of a filtered sample. 22 August 2022.

Photograph 2-4. RD05 Seep location with precipitate delta, August 2022.

Photograph 2-5. RD15, Stream sample collection setup August 2022.

Photograph 2-6. Erosion features adjacent to MW16 and MW17, August 2022.

Photograph 2-7. Soil stockpile overview in August 2022.

Photograph 2-8. Reworked Red Devil Creek stream channel with gabions, August 2022.

Photograph 2-9. MW10 well gauging. 22 August 2022.

Photograph 2-10. MW10 settling around concrete base August 2022.

Photograph 2-11. High river levels covering RD08 sampling location.

Photograph 2-12. RD08B replacement sampling location 100 feet upstream of RD08.

ATTACHMENT 3. SUPPLEMENTAL DATA

(Provided on a CD)

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ATTACHMENT 4. ANALYTICAL LABORATORY REPORTS

(Provided on a CD)

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ATTACHMENT 5. DATA VALIDATION REPORTS

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ATTACHMENT 5.1 2022 SPRING DATA VALIDATION REPORT

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I. Project Information

File Name:	580-114638-1 DV Report.0_Metals_GenChem				
Analysis:	MT, WC				
SDG#:	580-114638-1 (Rev1)	Reviewer:	KKOL	Rev Date:	08/26/2022
Matrix:	Surface Water Groundwater	2nd Rev:	CTD	2nd Rev Date:	11/8/2022
Validation Level:	Stage2B/Stage4	# Samples:	42	# RE/DL:	0

II. Secondary Review List

Narrative:	**Form Is:**
Qualifications in text match Form Is	"U" / "J" lab codes carried over
Spell check	Appropriate qual codes used
Pagination, appropriate headers/footers	Form I IDs match sample ID table
Correct project site name/manager on cover and introduction pages	

Required Edits/Changes:

Add comprehensive table of qualifiers

Add X qualifier definition

Add Overall Assessment section

Revision (include revision #, date and reason):

Revision 0

Validator Signature:

Review Signature:

Data Validation Report

Red Devil Mine, Alaska

Sample Delivery Group

580-114638-1

Prepared for

Sundance Consulting, Inc.
8210 Louisiana Blvd NE Suite C
Albuquerque, NM 87113
Attention:
Colleen Rust, PG

11/10/2022

Table of Contents

Tables

III. Acronyms and Abbreviations

°C	Celsius
%	Percent
%D	percent difference
CCAL	continuing calibration
CCB	continuing calibration blank
CCV	continuing calibration verification
COC	chain of custody
CLP	Contract Laboratory Program
DL	detection limit
DISS	dissolved
EPA	US Environmental Protection Agency
EB	equipment blank
FB	field blank
FD	field duplicate
GW	ground water
ICAL	initial calibration
ICB	initial calibration blank
ICV	initial calibration verification
IS	internal standard
J	estimated value
LCS	laboratory control sample
LL Hg	low level mercury
LOD	limit of detection
LOQ	limit of quantification
MB	method blank
MS	matrix spike
MSD	matrix spike duplicate
ND	nondetect
QAPP	Quality Assurance Program Plan
QC	quality control
QSM	Quality Systems Manual
R	Rejected
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
SDG	sample delivery group
TB	trip blank
TDS	total dissolved solids
TSS	total suspended solids
SW	surface water
U	not detected
UJ	not detected; associated value is an estimate

IV. Introduction

Project Name: Red Devil Mine
Sample Delivery Group: 580-114638-1
Client Project Manager: Colleen Rust
Matrix: Surface Water
QC Level: Stage 2B/Stage 4
No. of Samples: 42
Laboratory: Eurofins TestAmerica Seattle

Table 1 – Sample Summary

Sample Count	Field Sample ID	Lab Sample ID	Matrix	Collection	Method	Validation Level
1	0622MW33GW 0622MW33GW DISS	580-114638-1	GW	6/05/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 4
2	0622MW09GW 0622MW09GW DISS	580-114638-2	GW	6/02/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
3	0622MW10GW 0622MW10GW DISS	580-114638-3	GW	6/02/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
4	0622MW16GW 0622MW16GW DISS	580-114638-4	GW	6/05/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
5	0622MW17GW 0622MW17GW DISS	580-114638-5	GW	6/05/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B

Sample Count	Field Sample ID	Lab Sample ID	Matrix	Collection	Method	Validation Level
6	0622MW99GW 0622MW99GW DISS	580-114638-6	GW	6/02/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
7	0622MW26GW 0622MW26GW DISS	580-114638-7	GW	6/05/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
8	0622MW27GW 0622MW27GW DISS	580-114638-8	GW	6/02/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
9	0622MW98GW 0622MW98GW DISS	580-114638-9	GW	6/04/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
10	0622MW28GW 0622MW28GW DISS	580-114638-10	GW	6/02/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
11	0622TB01	580-114638-11	TB	6/01/2022	1631E	Stage 2B

Sample Count	Field Sample ID	Lab Sample ID	Matrix	Collection	Method	Validation Level
12	0622MW29GW 0622MW29GW DISS	580-114638-12	GW	6/02/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
13	0622MW06GW 0622MW06GW DISS	580-114638-13	GW	6/04/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
14	0622MW40GW 0622MW40GW DISS	580-114638-14	GW	6/03/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
15	0622MW42GW 0622MW42GW DISS	580-114638-15	GW	6/02/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
16	0622MW43GW 0622MW43GW DISS	580-114638-16	GW	6/02/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
17	0622MW44GW 0622MW44GW DISS	580-114638-17	GW	6/03/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B

Sample Count	Field Sample ID	Lab Sample ID	Matrix	Collection	Method	Validation Level
18	0622MW45GW 0622MW45GW DISS	580-114638-18	GW	6/04/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
19	0622MW46GW 0622MW46GW DISS	580-114638-19	GW	6/04/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 4
20	0622MW47GW 0622MW47GW DISS	580-114638-20	GW	6/04/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
21	0622MW97GW 0622MW97GW DISS	580-114638-21	GW	6/05/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
22	0622MW49GW 0622MW49GW DISS	580-114638-22	GW	6/03/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
23	0622MW50GW 0622MW50GW DISS	580-114638-23	GW	6/03/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
24	0622TB02	580-114638-24	TB	6/01/2022	1631E	Stage 2B

Sample Count	Field Sample ID	Lab Sample ID	Matrix	Collection	Method	Validation Level
25	0622RD05SW	580-114638-25	SW	6/06/2022	6020B, 6010D, 7470A, 1631E, 353.2, 310.1, 160.1, 160.2	Stage 2B
26	0622RD99SW	580-114638-26	SW	6/06/2022	6020B, 6010D, 7470A, 1631E, 353.2, 310.1, 160.1, 160.2	Stage 2B
27	0622MW51GW 0622MW51GW DISS	580-114638-27	GW	6/03/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
28	0622MW52GW 0622MW52GW DISS	580-114638-28	GW	6/04/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
29	0622MW53GW 0622MW53GW DISS	580-114638-29	GW	6/03/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B

Sample Count	Field Sample ID	Lab Sample ID	Matrix	Collection	Method	Validation Level
30	0622MW54GW 0622MW54GW DISS	580-114638-30	GW	6/03/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
31	0622MW55GW 0622MW55GW DISS	580-114638-31	GW	6/04/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 4
32	0622MW56GW 0622MW56GW DISS	580-114638-32	GW	6/04/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
33	0622MW57GW 0622MW57GW DISS	580-114638-33	GW	6/03/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
34	0622MW58GW 0622MW58GW DISS	580-114638-34	GW	6/03/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
35	0622MW59GW 0622MW59GW DISS	580-114638-35	GW	6/04/2022	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B

Sample Count	Field Sample ID	Lab Sample ID	Matrix	Collection	Method	Validation Level
36	0622TB03	580-114638-36	TB	6/01/2022	1631E	Stage 2B
37	0622EB01GW	580-114638-37	EB	6/05/2022	6020B, 6010D, 7470A, 1631E	Stage 2B
38	0622EB02GW	580-114638-38	EB	6/05/2022	6020B, 6010D, 7470A, 1631E	Stage 2B
39	0622RD06SW	580-114638-39	SW	6/06/2022	6020B, 6010D, 7470A, 1631E, 353.2, 310.1, 160.1, 160.2	Stage 4
40	0622RD08BSW	580-114638-40	SW	6/06/2022	6020B, 6010D 7470A, 1631E, 353.2, 310.1, 160.1, 160.2	Stage 2B
41	0622RD15SW	580-114638-41	SW	6/06/2022	6020B, 6010D, 7470A, 1631E, 353.2, 310.1, 160.1, 160.2	Stage 2B

Sample Count	Field Sample ID	Lab Sample ID	Matrix	Collection	Method	Validation Level
42	0622RD10SW	580-114638-42	SW	6/06/2022	6020B, 6010D, 7470A, 1631E, 353.2, 310.1, 160.1, 160.2	Stage 2B

V. Sample Management

The case narrative, the sample receiving checklist, chain-of-custody (COC) records for sample delivery group (SDG) 580-114638-1 were reviewed and the review findings are listed below.

- The laboratory's Login Sample Receipt Checklist and the COCs noted all coolers were received within the temperature limits of ≤6°C and ≥0°C, with the following exception: The cooler which contained the wet chemistry testing samples (nitrate+nitrite, TDS, TSS, alkalinity and anions) arrived outside temp limits at 7.8/8.0°C.
- The samples were received intact, and properly preserved, as applicable, with the cooler temperature exception listed above.
- Sample receipt exceptions:
    - The metals samples are required to be preserved to a pH of <2. The following sample was received with insufficient preservation at a pH >2: 0622MW59GW (580-114638-35). The sample was preserved to the appropriate pH in the laboratory on 6/10/22 at1350 (Reagent: 3097392).
    - The container label for the following samples did not match the information listed on the COC: 0622MW09GW (580-114638-2), 0622MW16GW (580-114638-4) and 0622MW40GW (580-114638-14).
    - Sample -2: The sample had two different times given across the COCs. The time which was consistent with the containers was used for login (1120).
    - Sample -4: One of the containers for 1631 had a label which gave the time of collection as 1020. The remaining containers matched the COC.
    - Sample -14: The date of collection for sample -14 given on the COC is 6/22/22, which was incorrect as samples were received on 6/9/22. The date of 06/03/22 on the containers was used for login.
- The COC information agrees with the laboratory report for requested field samples and tests, as applicable, with the COC exceptions listed above.
- The laboratory's Sample Receiving Checklists note that the cooler's custody seal, if present, is intact.
- Total and dissolved volumes were received at the lab for the ground water (GW) low level mercury (LL Hg) sample analyses performed by Method 1631E. The dissolved sample volumes were field filtered.
- The samples for nitrate+nitrite by Method 353.2 were subcontracted to the Eurofins Lancaster, PA Laboratory.
- Field and laboratory personnel signed and dated the COCs.

Table 2 - Data Qualifier Definitions

Qualifier	Definition
U	The analyte was analyzed for but was not detected above the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may inaccurate or imprecise.
NJ	The analyte has been "tentatively identified" or “presumptively” as present and the associated numerical value is the estimated concentration in the sample.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

VI. SW-846 Methods 6020B, 6010D AND 7470A — Metals and Mercury

K. Okonzak-Lowry of Oak Services reviewed the SDG August 26, 2022.

VI.1. Holding Times

Analytical holding times, 28 days for mercury and six months for the remaining metals, were met.

VI.2. Tuning and Calibration

All 6020B ICP/MS tuning criteria were met. Mass calibrations were ≤0.1 atomic mass unit (amu) from the true value. Resolution was <0.9 amu full width at 10% peak height and all %RSDs were ≤5%.
A blank and five standards were used in the initial calibration. Correlation coefficients were ≥0.995. The range of the ICP/MS calibration curves is low. The high standard for a number of trace analytes is 100 ppb. The lab reported results above the linear curve range and did not analyze a high linear range check standard. Sample detects reported above the high standard in the calibration curve for antimony, aluminum, barium, iron, nickel, manganese and arsenic were qualified as estimated, J.

It should be noted that a Stage 4 validation was not performed for the 6010D ICP analyses for calcium (Ca), potassium (K), magnesium (Mg) and sodium (Na). The ICP raw data provided by the laboratory did not include the initial calibration curve calculation information. The calibration check standards, blanks, lab QC samples and field sample raw data is reported in mg/L. The raw instrument readings are not shown in the raw data. It could not be determined which standards were used in the initial calibration. The Form 13, Analysis Run Logs, indicate that the calibration curve was reprocessed to analyze and report Na for several of the field samples in the data package.

Table 3 - Metals and Mercury Tuning and Calibration

Issue	Analyte	Qualifier	Samples
Sample detects reported above the calibration curve linear range	Antimony	J	580-114638-1 580-114638-4 580-114638-7 580-114638-15 580-114638-39 580-114638-40
	Aluminum	J	580-114638-21 580-114638-22
	Barium	J	580-114638-2 580-114638-7 580-114638-12 580-114638-14 580-114638-15 580-114638-16 580-114638-23 580-114638-26 580-114638-29 580-114638-30 580-114638-31 580-114638-34 580-114638-35
	Iron	J	580-114638-2 580-114638-7 580-114638-12 580-114638-13 580-114638-14 580-114638-16 580-114638-21 580-114638-22 580-114638-23 580-114638-30 580-114638-31 580-114638-34
	Nickel	J	580-114638-14
	Manganese	J	580-114638-2 580-114638-3 580-114638-4 580-114638-6 580-114638-7

Issue	Analyte	Qualifier	Samples
			580-114638-8 580-114638-10 580-114638-12 580-114638-13 580-114638-14 580-114638-15 580-114638-16 580-114638-17 580-114638-21 580-114638-22 580-114638-23 580-114638-25 580-114638-26 580-114638-27 580-114638-29 580-114638-30 580-114638-31 580-114638-32 580-114638-34 580-114638-35
	Arsenic	J	580-114638-3 580-114638-4 580-114638-6 580-114638-7 580-114638-14 580-114638-15 580-114638-16 580-114638-23 580-114638-25 580-114638-26

For all ICP/MS analytes the reported ICV and CCV recoveries were within 90-110% and the low-level CCV recoveries were within 80-120%.

For all ICP analytes the reported ICV and CCV recoveries were within 90-110% and the low-level CCV (CCVL) recoveries were within 80-120%, with the exception of two bracketing CCVL check standards for Na. Sample qualifications were not required for the high CCVL recoveries

A blank and 5 non-zero standards were used for the CVAA calibration. The initial (ICV) and continuing calibration recoveries (CCV) were within 90-110%.

VI.3. Laboratory Quality Control Samples

VI.3.1. Calibration blanks and Method Blanks

No target analytes were reported in the method blanks (MB) or bracketing calibration blanks (ICB/CCB) of sufficient concentration to warrant qualification of site sample results except as noted in the table below. For the positive blank concentrations, associated detected sample results that were below the reporting limit (RL) were qualified as nondetect (U) at the RL. Associated detected sample results that were greater than RL and <5× the blank concentration were qualified as estimated with high bias (J+) using professional judgement.

Table 4 - Metals and Mercury Calibration Blanks and Method Blanks

Analyte	Blank concentration	Qualified Samples
Antimony	0.205 J µg/L (CCB 580-396030/40)	580-114638-12
Thallium	0.191 J to 0.0.532 J ug/L (7/05/22 and 7/06/22 Analytical Run ICBs and CCBs)	580-114638-1 through -13, 580-114638-18 through -22, 580-114638-29 through -32, 114638-39 through -42
Lead	0.041 J ug/L (7/05/22 ICB)	580-114638-1, -3, -5, -6, -9, -10, -13, -14, -15, -18, -23, -25, -28 and -29
Potassium	0.199 J to 0.435 J mg/L (Analytical Run ICBs and CCBs)	580-114638-1 through -6, 280-114638-8 through -35, 580-114638-39 through -42

VI.3.2. Interference Check Samples

Interference Check Samples (ICSA/B): ICSAB recoveries were within the control limits of 80-120% or ±2× the reporting limit, whichever is greater. One or more interferents were present in several samples at concentrations comparable to those of the ICSAs. As noted in the table below, non-spiked analytes zinc, silver, lead, barium and nickel were present in the ICSAs at greater than MDL. For analytes with positive ICSA results, associated detected results which were <10× the ICSA concentration were qualified as estimated with high bias (J+). The ICP/MS ICS interferent levels were at 10,000 µg/L; therefore,the samples were assessed based on interferents being present at ≥10,000 µg/L in the samples. The ICP samples did not have interferents at concentrations comparable to the ICP ICSA solution, and sample qualifications were not required.

Table 5 - Metals Interference Check Samples

Analyte	ICSA Concentration ICSA 580-396030/11	Qualified Samples
Zinc	1.08 J µg/L	580-114638-25, -26,
Silver	0.041 J µg/L	580-114638-1, -2, -3, -4, -5, -7, -8, -13, -21, -25, -27, -28, -29, -34, -35
Lead	0.041 J µg/L	580-114638-12
Zinc	1.65 J µg/L	580-114638-39, -40, -41
Analyte	**ICSA Concentration ICSA 580-396099/11**	**Qualified Samples**
Silver	0.041 J µg/L	580-114638-39, -41
Nickel	0.172 J µg/L	580-114638-39, -40, -41, -42
Barium	0.450 J µg/L	580-114638-20

VI.3.3. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

Target analytes were recovered within the control limits of 70-130% recovery (%R), and the relative percent difference (RPDs) were ≤20%. The ICP/MS LCS/LCSD analyses were performed at 20× due to the calibration range.

VI.3.4. Laboratory Duplicates

Laboratory duplicate analyses were performed on samples 580-114638-3, 580-114638-17 and 580-114638-41 for ICP/MS metals and 580-114638-3, 580-114638-5, and 580-114638-41 for Hg and ICP. Original and duplicate sample values ≥5× the RL were within the control limit of 20% Relative Percent Difference (RPD). The control limit of ±RL was met when the sample or duplicate result was <5× the RL. All results were within control limit criteria.

VI.3.5. Matrix Spike/Matrix Spike Duplicate

MS/MSD analyses were performed on samples 580-114638-3, 580-114638-5, and 580-114638-41 for metals and Hg and 580-114638-17 for ICP/MS only. MS recoveries were not assessed when the parent sample concentrations were more than 4× the spike amount. Recoveries for all target analytes met control limits of 75-125%R, and the RPDs were ≤20%. For the ICP/MS analysis, the parent samples were analyzed undiluted, and the MS/MSD samples were analyzed at a 20× dilution due to instrument calibration range. Sample qualifications were not assigned.

VI.3.6. Post Digestion Spike

The laboratory performed ICP/MS post digestion spike (PDS) analyses for samples 580-114638-3, 580-114638-17 and 580-114638-41 for all reported analytes, and the recoveries were within control limit criteria. The ICP/MS PDS analyses were performed at 20× due to the calibration range.

VI.3.7. Serial Dilution

ICP/MS serial dilution analysis was performed on samples 580-114638-3, 580-114638-17 and 580-114638-41. ICP serial dilution analysis was performed on samples 580-114638-3, 580-114638-5 and 580-114638-41. Results were not assessed unless the parent sample concentration was >50× the MDL. The control limit of ≤10% difference (%D) of the original sample results was met for all target analytes, with the exception of the ICP Ca serial dilution result for Sample 280-114638-5. The parent sample result was qualified as estimated, J.

VI.3.8. Internal Standards Performance

According to the raw data sample results, all ICPMS sample internal standard intensities were within the control limits of 60-125% of the calibration blank. Sample qualifications were not required.

VI.3.9. Sample Result Verification

Sample results were verified for the Level 4 validation, with the exception of the ICP analysis, for samples 580-114638-1, 580-114638-19, 580-114638-31 and 580-114638-39. Sample result verification is not applicable for Level 2B validation samples. Detects below the RL were qualified as estimated (J). Nondetects are valid to the RL.

VI.4. Field QC Samples

Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. The remaining detects were used to evaluate the associated site samples. Findings associated with field QC samples are summarized below.

VI.4.1. Field Blanks and Equipment Blanks

Field blank samples were not identified in this SDG for these analyses.

Equipment blank samples 0622EB01GW and 0622EB02GW were collected and associated with the GW samples as listed in the table below:

Table 6 - Metals and Mercury Equipment Blank Association

Equipment Blanks		
Blank ID	0622EB01GW	0622EB02GW
Water Level Meter	Solinst	Dipper T2
Associated Samples	0622MW06GW	0622MW10GW
	0622MW09GW	0622MW26GW
	0622MW17GW	0622MW29GW
	0622MW16GW	0622MW40GW
	0622MW27GW	0622MW42GW
	0622MW28GW	0622MW43GW
	0622MW33GW	0622MW47GW
	0622MW44GW	0622MW49GW
	0622MW45GW	0622MW50GW
	0622MW46GW	0622MW52GW
	0622MW51GW	0622MW53GW
	0622MW54GW	0622MW57GW
	0622MW55GW	0622MW58GW
	0622MW56GW	0622MW59GW
		0622MW99GW
		0622MW97GW
		0622MW98GW

Aluminum, antimony, barium, chromium, iron, manganese, nickel and zinc were detected in 0622EB01GW at 0.0077 J, 0.00018 J, 0.00034 J, 0.00025 J, 0.017 J, 0.00069 J, 0.00018 J and 0.0017 J mg/L, respectively. Aluminum, antimony, chromium, iron, manganese and zinc were detected in 0622EB02GW at 0.0094 J, 0.00024 J, 0.00023 J, 0.023 J, 0.0010 J and 0.0015 J mg/L, respectively.

For EB detects, associated detected sample results that were below the reporting limit (RL) were qualified as nondetect (U) at the RL. Associated detected sample results that were greater than RL and <5× the blank concentration were qualified as estimated with high bias (J+).

Table 7 - Metals and Mercury Equipment Blank Qualifiers

Analyte	EB Blank concentration (mg/L)	Qualified Samples
Aluminum	0.0077 J (EB01)	580-114638-5, -10, -13, -27, -30, -31, -32
Barium	0.00034 J (EB01)	580-114638-18, -19
Antimony	0.00018 J (EB01)	580-114638-17, -18, -19, -27,
Chromium	0.00025 J (EB01)	580-114638-1, -2, -4, -5, -10, -13, -17, -18, -19, -27, -30, -31, -32
Iron	0.017 J (EB01)	580-114638-5, -18, -32
Manganese	0.00069 J (EB01)	580-114638-5, -18, -19
Nickel	0.00018 J (EB01)	580-114638-1, -5, -17, -18, -19, -27
Zinc	0.0017 J (EB01)	580-114638-1, -5, -10, -13, -17, -19, -27, -30, -31, -32
Chromium	0.00023 J (EB02)	580-114638-3, -6, -14, -15, -16, -20, -23, -29, -33, -34
Aluminum	0.0094 J (EB02)	580-114638-3, -6, -14, -20
Antimony	0.00024 J (EB02)	580-114638-3, -9, -21, -22, -28, -29, -33, -34, -35
Zinc	0.0015 J (EB02)	580-114638-3, -6, -9, -12, -14, -15, -16, -20, -23, -28, -29, -33, -34, -35
Iron	0.023 J (EB02)	580-114638-20, -29, -33
Manganese	0.0010 J (EB02)	580-114638-20, -33

VI.4.2. Field Duplicates

Samples 0622MW10GW and 0622MW99GW, 0622MW49GW and 0622MW97GW, 0622MW52GW and 0622MW98GW and 0622RD05SW and 0622RD99SW. The control limits of ≤30% for all target analytes greater than 5x RL and ±RL for all results <5x RL were met except as noted in the table below. Associated results in the field duplicate pair were qualified as estimated (J) for detects and (UJ) for nondetects.

Table 8 - Metals and Mercury Field Duplicates

Field duplicate samples	Analyte	RPD/±RL
0622MW10GW/0622MW99GW	Hg (0.0003U/0.00037 mg/L)	>±RL

VII. EPA Method 1631, Revision E – Total and Dissolved Mercury

K. Okonzak-Lowry of Oak Services reviewed the SDG on September 5, 2022

VII.1. Holding Times

Sample preservation and analytical holding times were met. The samples analyzed for dissolved mercury were filtered in the field. The water samples were preserved (oxidized with BrCl) in the sample bottles within 28 days of collection by Eurofins Seattle laboratory personnel on 6/10/2022.

VII.2. Calibration

A blank and 5 non-zero standards were used for the cold vapor atomic fluorescence spectrometry calibration. Calibration criteria were met. ICV and CCV %Rs were within the laboratory control limits of 77-123%R.

VII.3. Laboratory QC Samples

VII.3.1. Calibration Blanks and Method Blanks

No mercury reported in the method blanks (MB) or bracketing calibration blanks (ICB/CCB) of sufficient concentration to warrant qualification of site sample results except as noted in the table below. MB 580-393383/88 had a Hg trace level detect at 0.0940 J ng/L. It was determined at validation that no sample qualifications were required. For the positive blank concentrations, associated detected sample results that were below the reporting limit (RL)were qualified as nondetect (U) at the RL. Associated detected sample results that were greater than RL and <5× the blank concentration were qualified as estimated with high bias (J+).

Table 9 - Method 1631 Calibration Blanks and Method Blanks

Analyte	Blank concentration (ng/L)	Qualified Samples
Mercury	7/07/22 Analytical Run: ICB 580-396386/10 (0.118 J)	580-114638-11 (0622TB01) 0.50 U 580-114638-16 (Diss) 0.50 U
	7/08/22 Analytical Run	580-114638-24 (0622TB02) 0.50 U
	CCB 580-396548/34 (0.148 J)	NA

VII.3.2. Laboratory Control Sample/Laboratory Control Sample Duplicate

Target analytes were recovered within the laboratory control limits of 77-123% recovery, and the RPDs were ≤24%. Sample qualification was not required.

VII.3.3. Matrix Spike/Matrix Spike Duplicate

MS/MSD analyses were performed on Samples 580-114638-3 (Total and Diss), 580-114638-5 (Total and Diss), 580-114638-6 (Diss), 580-114638-14 (Diss), 580-114638-20 (Total), 580-114638-26 (Total), 580-114638-27 (Total), 114638-32 (Total), 580-114638-41 (Total) from this SDG. For Sample 580-114638-3 (Total) the MS was recovered above control limits at 144%. For Sample 580-114638-5 (Total) the MSD was recovered above control limits at 127%. For Sample 580-114638-3 (Diss) the MSD was recovered below control limits at 66%. The Sample 580-114638-3 and 580-114638-5 Total mercury detects were qualified as estimated with a potential high bias (J+). The Sample 580-114638-3 Diss mercury detect was qualified as estimated with a potential low bias (J-). The remaining recoveries and RPDs were within the laboratory established control limits of 71-125%R and 24% RPD.

VII.4. Field QC Samples

Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. The remaining detects were used to evaluate the associated site samples. Findings associated with field QC samples are summarized below.

VII.4.1. Field Blanks, Equipment Blanks, and Trip Blanks

Field blank samples were not identified in this SDG for these analyses.
Equipment blank samples 0622EB01GW and 0622EB02GW were collected and associated with the GW samples as listed in the table below.

Table 10 - Method 1631 Equipment Blank Association

Equipment Blanks		
Blank ID	0622EB01GW	0622EB02GW
Water Level Meter	Solinst	Dipper T2
Associated Samples	0622MW06GW	0622MW10GW
	0622MW09GW	0622MW26GW
	0622MW17GW	0622MW29GW
	0622MW16GW	0622MW40GW
	0622MW27GW	0622MW42GW
	0622MW28GW	0622MW43GW
	0622MW33GW	0622MW47GW
	0622MW44GW	0622MW49GW
	0622MW45GW	0622MW50GW
	0622MW46GW	0622MW52GW
	0622MW51GW	0622MW53GW
	0622MW54GW	0622MW57GW
	0622MW55GW	0622MW58GW
	0622MW56GW	0622MW59GW
		0622MW99GW
		0622MW97GW
		0622MW98GW

Table 11 - Method 1631 Equipment Blank Qualifications

Analyte	Equipment Blank concentration (ng/L)	Qualified Samples
Mercury	0622EB01GW (0.38 J ng/L)	580-114638-13 (DISS) 0.64 J+ 580-114638-17 (DISS) 0.53 J+ 580-114638-27 (DISS) 0.52 J+ 580-114638-32 (DISS) 0.65 J+

Trip blank samples 0622TB01, 0622TB02 and 0622TB03 were shipped with the low level mercury samples. Each trip blank was associated with the samples shipped in the same cooler.

Table 12 - Method 1631 Trip Blank Association

Trip Blanks			
Blank ID	0622TB01GW (Total and Diss)	0622TB02GW (Total and Diss)	0622TB03GW (Total and Diss)
Cooler ID	Cooler 1	Cooler 2	Cooler 3
Associated Samples (Total and Dissolved)	0622MW33GW	0622MW29GW	0622MW51GW
	0622MW09GW	0622MW06GW	0622MW52GW
	0622MW10GW	0622MW40GW	0622MW53GW
	0622MW16GW	0622MW42GW	0622MW54GW
	0622MW17GW	0622MW43GW	0622MW55GW
	0622MW99GW	0622MW44GW	0622MW56GW
	0622MW26GW	0622MW45GW	0622MW57GW
	0622MW27GW	0622MW46GW	0622MW58GW
	0622MW98GW	0622MW47GW	0622MW59GW
	0622MW28GW	0622MW97GW	0622RD06SW
		0622MW49GW	0622RD08BSW
		0622MW50GW	0622RD15SW
		0622RD05SW	0622RD10SW
		0622RD99SW	

There were no sample qualifications required for trip blank detects. The reported trace level Hg detects for trip blanks 0622TB01 and 0622TB02 were subsequently qualified as nondetect at the RL, 0.50 U ng/L, due to associated ICB/CCB Hg detects. Hg was detected in trip blank 0622TB03 at 0.14 J µg/L, but additional blank qualifications were not required for the associated field samples.

VII.4.2. Field Duplicates

Samples 0622MW10GW and 0622MW99GW, 0622MW49GW and 0622MW97GW, 0622MW52GW and 0622MW98GW and 0622RD05SW (total and dissolved) and 0622RD99SW (total) were identified as field duplicate pairs. The control limits of ≤30% for all target analytes greater than 5x RL and ±RL for all results <5x RL were met except as noted in the table below. Associated results in the field duplicate pair were qualified as estimated (J) for detects.

Table 13 - Method 1631 Mercury Field Duplicates

Field duplicate samples	Analyte	RPD/±RL
0622RD05SW/0622RD99SW	Hg (950 / 85 ng/L)	167%RPD
0622MW10GW/06222MW99GW (DISS)	Hg (3.4 / 2.2 ng/L)	>±RL

VII.5. Sample Result Verification and Reported Detection Limits

The laboratory analyzed for low level mercury by EPA Method 1631E. Total mercury was analyzed for six surface water (SW) samples. Total and dissolved mercury was analyzed for the groundwater (GW) samples.
Mercury quantification was verified for the Level 4 validation samples. Sample result verification is not applicable for Level 2B validation samples. Detects reported below the RL were qualified as estimated (J).

Nondetects are valid to the RL. Multiple samples were analyzed at dilutions to bring detects within the calibration linear range due to the level of mercury found in the samples.

VIII. Various EPA Methods – General Minerals

K. Okonzak-Lowry of Oak Services reviewed the SDG on September 7, 2022.

VIII.1. Holding Times and Sample Management

The cooler which contained the wet chemistry testing samples (nitrate+nitrite (NO3+NO2), TDS, TSS, alkalinity and anions) arrived outside temp limits at 7.8/8.0°C. Since the samples were received the day after shipping at a temperature >6°C but ≤10°C, professional judgement was used, and the sample analyses were not qualified for temperature.

Table 14 - General Minerals Analytical Method Holding Times

Analytical Method	Analysis Holding Time (days)
353.2 (NO3+NO2 as N)	28
300.0 (anions SO4, Cl-, F-)	28
310.1 (alkalinity)	14
Total Dissolved Solids (TDS)	7
Total Suspended Solids (TSS)	7

The analytical holding times were met except as noted in the table below. Reported detects are qualified as estimated (J). Reported nondetects are qualified as estimated (UJ).

Table 15 - General Minerals Holding Time Qualifications

Analyte	Days to Analysis	Qualified Samples
Method 300.0 SO4, Cl- and F-	29 Days	580-114638-25, 580-114638-26, 580-114638-39, 580-114638-40, 580-114638-41, 580-114638-42

VIII.2. Calibration

The correlation coefficients (r) were ≥0.995. ICV and CCV recoveries associated with reported sample results were within the laboratory control limits.

VIII.3. Laboratory QC Samples

VIII.3.1. Calibration Blanks and Method Blanks

No reported detects in the method blanks (MB) or bracketing calibration blanks (ICB/CCB) were of sufficient concentration to warrant qualification of site sample results.

VIII.3.2. Laboratory Control Samples

LCS and LCSD (as appropriate) recoveries and RPDs were within laboratory control limits.

VIII.3.3. Laboratory Duplicates

Laboratory duplicate analyses were performed on Sample 580-105705-15 from this SDG. RPDs were within laboratory control limits.

VIII.3.4. Matrix Spike/Matrix Spike Duplicate

MS/MSD analyses were performed on Samples 580-114638-41 for Methods 300.0 and 353.2 and 580-114638-26 for Method 300.0. The spike recoveries and RPDs were within laboratory control limits except for Method 353.2 NO3+NO2. The Sample 580-114638-41 MS/MSD recoveries were 138% and 110%, respectively. It was determined that the surface water samples are of similar matrix; therefore, the nitrate + nitrite detects were qualified as estimated with a high bias (J+) for samples 580-114638-39, 580-114638-40, 580-114638-41 and 580-114638-42.

VIII.4. Sample Result Verification

Result quantification was verified for the Level 4 validation Sample 580-114638-39. Sample result verification is not applicable for Level 2B validation samples. Detects reported below the RL were qualified as estimated (J). Nondetects are valid to the RL.

VIII.5. Field QC Samples

Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. The remaining detects were used to evaluate the associated site samples. Findings associated with field QC samples are summarized below.

VIII.5.1. Field Blanks and Equipment Blanks

Field blank or equipment blank samples were not analyzed for these surface water sample analyses.

VIII.5.2. Field Duplicates

Samples 580-1114638-25 and 580-114638-26 were identified as the field duplicate pair. The control limits of ≤30% for all target analytes greater than 5x RL and ±RL for all results <5x RL were met.

IX. Overall Assessment

Samples required qualification due to quality control exceedances and procedural issues. The Ca, Mg, K and Na sample analyses were originally analyzed and reported by 6020B ICP/MS. This sample data was unusable due to major quality control and procedural issues. The lab was instructed to reanalyze the four analytes by 6010D ICP. The ICP/MS Ca, Mg, K and Na results were rejected, R, as unusable. The more technically correct ICP results are reported for these four analytes.

As noted in Section VI.2, a Stage 4 validation was not performed for the 6010D ICP analyses for calcium (Ca), potassium (K), magnesium (Mg) and sodium (Na) due to missing calibration information in the laboratory raw data package.

X. Data Qualification Summary

Table 16 - Data Qualification Summary Table

Sample	Analyte	Qualifier	Reason
All metals samples in the SDG	ICP/MS Ca, Mg, K and Na resuls	R – rejected as unusable	The ICP/MS results were rejected to report the more technically correct ICP results
580-114638-1, -4, -7, -15, -39 and -40	Antimony	J (detects)	Sample detects > calibration range
580-114638-21 and -22	Aluminum	J (detects)	Sample detects > calibration range
580-114638-2, -7, -12, -14, -15, -16, -23, -26, -29, -30, -31, -34, and -35	Barium	J (detects)	Sample detects > calibration range
580-114638-2, -7, -12, -13, -14, -16, -21, -22, -23, -30, -31 and -34	Iron	J (detects)	Sample detects > calibration range
580-114638-14	Nickel	J (detects)	Sample detects > calibration range
580-114638-2, -3, -4, -6, -7, -8, -10, 12, -13, -14, -15, -16, -17, -21, -22, -23, -25, -26, -27, -29, -30, -31, -32, -34 and -35	Manganese	J (detects)	Sample detects > calibration range
580-114638-3, -4, -6, -7, -14, -15, -16, -23, -25 and -26	Arsenic	J (detects)	Sample detects > calibration range
580-114638-12	Antimony	U at RL (detects < RL)	CCB detect

Sample	Analyte	Qualifier	Reason
580-114638-1 through -13, 580-114638-18 through -22, 580-114638-29 through -32, 114638-39 through -42	Thallium	U at RL (detects < RL)	ICB and CCB detects
580-114638-1, -3, -5, -6, -9, -10, -13, -14, -15, -18, -23, -25, -28 and -29	Lead	U at RL (detects < RL)	ICB detect
580-114638-1 through -6, 280-114638-8 through -35, 580-114638-39 through -42	Potassium	U at RL (detects < RL)	ICB and CCB detects
580-114638-25, -26, 580-114638-39, -40, -41	Zinc	J+ (detects < 10x the ICSA detect)	ICSA detect > MDL
580-114638-1, -2, -3, -4, -5, -7, -8, -13, -21, -25, -27, -28, -29, -34, -35, 580-114638-39, -41	Silver	J+ (detects < 10x the ICSA detect)	ICSA detect > MDL
580-114638-12	Lead	J+ (detects < 10x the ICSA detect)	ICSA detect > MDL
580-114638-20	Barium	J+ (detects < 10x the ICSA detect)	ICSA detect > MDL
580-114638-39, -40, -41, -42	Nickel	J+ (detects < 10x the ICSA detect)	ICSA detect > MDL
280-114638-5	Calcium	J (detects)	Serial dilution > 10%D
580-114638-5, -10, -13, -27, -30, -31, -32 580-114638-3, -6, -14, -20	Aluminum	U at RL (detects < RL)	EB01 and EB02 detect
580-114638-18, -19	Barium	U at RL (detects < RL)	EB01 detect
580-114638-17, -18, -19, -27, 580-114638-3, -9, -21, -22, -28, -29, -33, -34, -35	Antimony	U at RL (detects < RL) J+ (detects > RL)	EB01 and EB02 detects
580-114638-1, -2, -4, -5, -10, -13, -17, -18, -19, -27, -30, -31, -32, 580-114638-3, -	Chromium	U at RL (detect < RL) J+ (detects > RL)	EB01 and EB02 detects

Sample	Analyte	Qualifier	Reason
6, -14, -15, -16, -20, -23, -29, -33, -34			
580-114638-5, -18, -32, 580-114638-20, -29, -33	Iron	U at RL (detect < RL)	EB01 and EB02 detects
580-114638-5, -18, -19, 580-114638-20, -33	Manganese	U at RL (detect < RL) J+ (detects > RL)	EB01 and EB02 detects
580-114638-1, -5, -17, -18, -19, -27	Nickel	U at RL (detect < RL)	EB01 detect
580-114638-1, -5, -10, -13, -17, -19, -27, -30, -31, -32, 580-114638-3, -6, -9, -12, -14, -15, -16, -20, -23, -28, -29, -33, -34, -35	Zinc	U at RL (detect < RL) J+ (detects > RL)	EB01 and EB02 detects
0622MW10GW and 0622MW99GW	Mercury	J (detect) UJ (nondetect)	FD results >±RL
580-114638-11 (0622TB01) 580-114638-16 (Diss), 580-114638-24 (0622TB02)	LL Mercury	U at RL (detects < RL)	Bracketing ICB and CCB detects
580-114638-3 (Total) 580-114638-5 (Total)	LL Mercury	J+ (detects)	MS/MSD high recovery
580-114638-3 (Diss)	LL Mercury	J- (detect)	MS/MSD low recovery
580-114638-13(DISS), 580-114638-17 (DISS) 580-114638-27 (DISS) 580-114638-32 (DISS)	LL Mercury	J+ (detects)	EB01 detect
0622RD05SW and 0622RD99SW 0622MW10GW and 06222MW99GW (DISS)	LL Mercury	J (detects)	FD results >±RL or >RPD limit
580-114638-25, 580-114638-26, 580-114638-39, 580-114638-40, 580-114638-41, 580-114638-42	Method 300.0 SO4, Cl- and F-	J (detects) UJ (nondetects)	HT exceedance
580-114638-39, 580-114638-40, 580-114638-41 and 580-114638-42, 580-	Method 353.2 NO3+NO2	J+- (detects)	High MS %R

XI. References

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ATTACHMENT 5.2 2022 FALL DATA VALIDATION REPORT

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I. Project Information

File Name:	580-117490-1 DV Report.0_Metals_GenChem				
Analysis:	MT, WC				
SDG#:	580-117490-1	Reviewer:	KKOL	Rev Date:	11/10/2022
Matrix:	Surface Water Groundwater	2nd Rev:	CTD	2nd Rev Date:	11/14/2022
Validation Level:	Stage2B/Stage4	# Samples:	42	# RE/DL:	0

II. Secondary Review List

Narrative:	**Form Is:**
Qualifications in text match Form Is	"U" / "J" lab codes carried over
Spell check	Appropriate qual codes used
Pagination, appropriate headers/footers	Form I IDs match sample ID table
Correct project site name/manager on cover and introduction pages	
Required Edits/Changes: NA	
Revision (include revision #, date and reason): Revision 0	
Validator Signature: Kathryn K. Okonzak-Lowry Digitally signed by Kathryn K. Okonzak-Lowry Date: 2022.11.15 10:27:11 -07'00'	
Review Signature: 	

Draft Data Validation Report

Red Devil Mine, Alaska

Sample Delivery Group

580-117490-1

Prepared for

Sundance Consulting, Inc.
8210 Louisiana Blvd NE Suite C
Albuquerque, NM 87113
Attention:
Colleen Rust, PG

11/10/2022

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Tables

III. Acronyms and Abbreviations

°C	Celsius
%	Percent
%D	percent difference
CCAL	continuing calibration
CCB	continuing calibration blank
CCV	continuing calibration verification
COC	chain of custody
CLP	Contract Laboratory Program
DL	detection limit
DISS	dissolved
EPA	US Environmental Protection Agency
EB	equipment blank
FB	field blank
FD	field duplicate
GW	ground water
ICAL	initial calibration
ICB	initial calibration blank
ICV	initial calibration verification
IS	internal standard
J	estimated value
LCS	laboratory control sample
LL Hg	low level mercury
LOD	limit of detection
LOQ	limit of quantification
MB	method blank
MS	matrix spike
MSD	matrix spike duplicate
ND	nondetect
QAPP	Quality Assurance Program Plan
QC	quality control
QSM	Quality Systems Manual
R	Rejected
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
SDG	sample delivery group
TB	trip blank
TDS	total dissolved solids
TSS	total suspended solids
SW	surface water
U	not detected
UJ	not detected; associated value is an estimate

IV. Introduction

Project Name: Red Devil Mine
Sample Delivery Group: 580-117490-1
Client Project Manager: Colleen Rust
Matrix: Groundwater and Surface Water
QC Level: Stage 2B/Stage 4
No. of Samples: 43
Laboratory: Eurofins TestAmerica Seattle

Table 1 – Sample Summary

Sample Count	Field Sample ID	Lab Sample ID	Matrix	Collection	Method	Validation Level
1	0822MW09GW 0822MW09GW DISS	580-117490-1	GW	8/23/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 4
2	0822MW10GW 0822MW10GW DISS	580-117490-2	GW	8/23/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
3	0822MW16GW 0822MW16GW DISS	580-117490-3	GW	8/23/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
4	0822MW17GW 0822MW17GW DISS	580-117490-4	GW	8/23/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B

Sample Count	Field Sample ID	Lab Sample ID	Matrix	Collection	Method	Validation Level
5	0822MW99GW 0822MW99GW DISS	580-117490-5	GW	8/23/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
6	0822MW26GW 0822MW26GW DISS	580-117490-6	GW	08/26/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
7	0822MW27GW 0822MW27GW DISS	580-117490-7	GW	08/23/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
8	0822MW98GW 0822MW98GW DISS	580-117490-8	GW	08/24/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
9	0822MW28GW 0822MW28GW DISS	580-117490-9	GW	08/23/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
10	0822TB01GW	580-117490-10	GW	08/23/22	1631E	Stage 2B

Sample Count	Field Sample ID	Lab Sample ID	Matrix	Collection	Method	Validation Level
11	0822MW29GW 0822MW29GW DISS	580-117490-11	GW	08/24/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
12	0822MW06GW 0822MW06GW DISS	580-117490-12	GW	08/23/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
13	0822MW40GW 0822MW40GW DISS	580-117490-13	GW	08/25/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
14	0822MW42GW 0822MW42GW DISS	580-117490-14	GW	08/24/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
15	0822MW43GW 0822MW43GW DISS	580-117490-15	GW	08/24/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
16	0822MW44GW 0822MW44GW DISS	580-117490-16	GW	08/24/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B

Sample Count	Field Sample ID	Lab Sample ID	Matrix	Collection	Method	Validation Level
17	0822MW47GW 0822MW47GW DISS	580-117490-17	GW	08/24/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
18	0822MW97GW 0822MW97GW DISS	580-117490-18	GW	08/24/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
19	0822MW49GW 0822MW49GW DISS	580-117490-19	GW	08/25/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 4
20	0822MW50GW 0822MW50GW DISS	580-117490-20	GW	08/25/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
21	0822TB02GW	580-117490-21	TB	08/23/22	1631E	Stage 2B
22	0822RD05SW	580-117490-22	SW	08/28/22	6020B, 6010D, 7470A, 1631E, 353.2, 310.1, 160.1, 160.2	Stage 2B

Sample Count	Field Sample ID	Lab Sample ID	Matrix	Collection	Method	Validation Level
23	0822RD08BSW	580-117490-23	SW	08/28/22	6020B, 6010D, 7470A, 1631E, 353.2, 310.1, 160.1, 160.2	Stage 2B
24	0822TB04SW	580-117490-24	TB	08/23/22	1631E	Stage 2B
25	0822RD06SW	580-117490-25	SW	08/28/22	6020B, 6010D, 7470A, 1631E, 353.2, 310.1, 160.1, 160.2	Stage 4
26	0822RD10SW	580-117490-26	SW	08/28/22	6020B, 6010D, 7470A, 1631E, 353.2, 310.1, 160.1, 160.2	Stage 2B
27	0822RD15SW	580-117490-27	SW	08/28/22	6020B, 6010D, 7470A, 1631E, 353.2, 310.1, 160.1, 160.2	Stage 2B
28	0822RD99SW	580-117490-28	SW	08/28/22	6020B, 6010D, 7470A, 1631E, 353.2, 310.1, 160.1,	Stage 2B

Sample Count	Field Sample ID	Lab Sample ID	Matrix	Collection	Method	Validation Level
					160.2	
29	0822MW46GW 0822MW46GW DISS	580-117490-29	GW	08/24/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
30	0822MW45GW 0822MW45GW DISS	580-117490-30	GW	08/24/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
31	0822MW33GW 0822MW33GW DISS	580-117490-31	GW	08/23/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 4
32	0822MW51GW 0822MW51GW DISS	580-117490-33	GW	08/25/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
33	0822MW52GW 0822MW52GW DISS	580-117490-34	GW	08/25/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B

Sample Count	Field Sample ID	Lab Sample ID	Matrix	Collection	Method	Validation Level
34	0822MW53GW 0822MW53GW DISS	580-117490-35	GW	08/25/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
35	0822MW54GW 0822MW54GW DISS	580-117490-36	GW	08/25/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
36	0822MW55GW 0822MW55GW DISS	580-117490-37	GW	08/25/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
37	0822MW56GW 0822MW56GW DISS	580-117490-38	GW	08/24/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
38	0822MW57GW 0822MW57GW DISS	580-117490-39	GW	08/25/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B

Sample Count	Field Sample ID	Lab Sample ID	Matrix	Collection	Method	Validation Level
39	0822MW58GW 0822MW58GW DISS	580-117490-40	GW	08/26/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 4
40	0822MW59GW 0822MW59GW DISS	580-117490-41	GW	08/24/22	6020B, 6010D, 7470A, 1631E 1631E	Stage 2B
41	0822TB03GW	580-117490-42	TB	08/23/22	1631E	Stage 2B
42	0822EB01GW	580-117490-43	EB	08/26/22	6020B, 6010D, 7470A, 1631E	Stage 2B
43	0822EB02GW	580-117490-44	EB	08/26/22	6020B, 6010D, 7470A, 1631E	Stage 2B

V. Sample Management

The case narrative, the sample receiving checklist, chain-of-custody (COC) records for sample delivery group (SDG) 580-117490-1 were reviewed and the review findings are listed below.

- The laboratory's Login Sample Receipt Checklist and the COCs noted all coolers were received within the temperature limits of ≤6°C and ≥0°C.
- The samples were received intact, and properly preserved, as applicable.
- The sample containers associated with coolers #3 (6/7) and #5(2/7) were delayed in shipping and arrived 9/1/22 at 0940. Both coolers were received within required temperature range.
- Sample receipt exceptions:
    - On 9/15/22 the client confirmed by email that the method on COC was incorrect for Ca, Mg, K, Na. These were run by method 6010D instead.
    - The sample ID on the container label for the following sample did not match the information listed on the Chain-of-Custody (COC): 0822TB01GW (580-117490-10). The container labels list 0822TB01GW, while the COC lists 0822TB01GW. The sample was logged per the container label.
    - The Chain-of-Custody (COC) was incomplete as received. No sample date time is provided on COC associated with the 1631 LL Mercury containers for the following sample: 0822MW97GW (580-117490-18). The sample date/time was taken from the COC associated with the Total Metals container and confirmed on the LL Hg containers.
    - The sample time on the metals container label for the following sample did not match the information listed on the Chain-of-Custody (COC): 0822MW47GW (580-117490-17). The container labels list 1622, while the COC lists 1022. The COC associated with the LL mercury containers for this sample lists 1622 therefore the sample was logged by the LL Hg COC/container time.
    - The COC was incomplete as received. The COC associated with the 335.2. 160.1, 160.2 containers lack sample times. These container sample times was verified against the COC associated with the LL Hg containers.0822RD05SW (580-117490-22), 0822RD08SW (580-117490-23), 0822RD06SW (580-117490-25), 0822RD10SW (580-117490-26), 0822RD15SW (580-117490-27), 0822RD15SW (580-117490-27[MS]), 0822RD15SW (580-117490-27[MSD]) and 0822RD99SW (580-117490-28).
    - The sample time on the metals container label for the following sample did not match the information listed on the COC: 0822MW49GW (580-117490-19). The container labels list 0945, while the COC lists 0905. The sample time on the COC associated with the LL Hg containers lists 0945. Since this time matches the container labels the sample time used for this sample was 0945.
    - The sample ID on the container labels for the following sample did not match the information listed on the COC: 0822RD08SW (580-117490-23). The container labels list 0822RD08BSW, while the COC lists 0822RD08SW. Client confirmed the sample ID on the COC was correct.
    - The sample ID on the container labels for the following sample did not match the

information listed on the COC: 0822MW33GW (580-117490-31). The container labels list 08MW22GW, while the COC lists 0822MW22GW. Client confirmed that the correct sample ID for this sample is actually 0822MW33GW.

- The following sample appears on 2 COCs associated with 2 different coolers listing LL Hg analysis: 0822MW29GW (580-117490-11). These containers were received in cooler #7 and logged as 580-117490-11. The 2nd occurrence of 580-117490-32 has no containers or analyses associated. The laboratory did not assign a field sample to the lab ID 580-117490-32.

- The COC information agrees with the laboratory report for requested field samples and tests, as applicable, with the COC exceptions listed above.
- The laboratory's Sample Receiving Checklists note that the cooler's custody seal, if present, is intact.
- Total and dissolved volumes were received at the lab for the ground water (GW) low level mercury (LL Hg) sample analyses performed by Method 1631E. The dissolved sample volumes were field filtered.
- The samples for nitrate+nitrite by Method 353.2 were subcontracted to the Eurofins Lancaster, PA Laboratory. The subcontract Sample Receiving Checklist notes that the custody seal was not applicable.
- Field and laboratory personnel signed and dated the COCs.

Table 2 – Data Qualifier Definitions

Qualifier	Definition
U	The analyte was analyzed for but was not detected above the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may inaccurate or imprecise.
NJ	The analyte has been "tentatively identified" or “presumptively” as present and the associated numerical value is the estimated concentration in the sample.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

VI. SW-846 Methods 6020B, 6010D AND 7470A — Metals and Mercury

K. Okonzak-Lowry of Oak Services reviewed the SDG November 11, 2022.

VI.1. Holding Times

Analytical holding times, 28 days for mercury and six months for the remaining metals, were met.

VI.2. Tuning and Calibration

All 6020B ICP/MS tuning criteria were met. Mass calibrations were ≤0.1 atomic mass unit (amu) from the true value. Resolution was <0.9 amu full width at 10% peak height and all %RSDs were ≤5%.
A blank and five standards were used in the initial calibration. Correlation coefficients were ≥0.995. The range of the ICP/MS calibration curves is low. The high standard for a number of trace analytes is 100 ppb. The lab reported results above the linear curve range and did not analyze a high linear range check standard. Sample detects reported above the high standard in the calibration curve for antimony, aluminum, barium, iron, manganese and arsenic were qualified as estimated, J.

It should be noted that a Stage 4 validation was not performed for the 6010D ICP analyses for calcium (Ca), potassium (K), magnesium (Mg) and sodium (Na). The ICP raw data provided by the laboratory did not include the initial calibration curve calculation information. The calibration check standards, blanks,

lab QC samples and field sample raw data is reported in mg/L. The raw instrument readings are not shown in the raw data. It could not be determined which standards were used in the initial calibration.

Table 3 – Metals and Mercury Tuning and Calibration

Issue	Analyte	Qualifier	Samples
Sample detects reported above the calibration curve linear range	Antimony	J	580-117490-3, -14, -23, -25, -31
	Aluminum	J	580-11749-19, -41
	Barium	J	580-117490-1, -6, -8, -13, -14, -15, -18, -20, -35, -36, -37, -38, -40, -41
	Iron	J	580-117490-1, -3, -6, -8, -11, -12, -14, -15, -18, -19, -20, -22, -28, -36, -37, -40, -41
	Manganese	J	580-117490-1, -2, -3, -5, -6, -7, -8, -9, -11, -12, -13, -14, -15, -16, -18, -19, -20, -22, -28, -33, -36, -37, -38, -41
	Arsenic	J	580-117490-3, -6, -8, -9, -13, -14, -15, -20, -22, -28, -37, -41

For all ICP/MS analytes the reported ICV and CCV recoveries were within 90-110% and the low-level CCV recoveries were within 80-120%.

For all ICP analytes the reported ICV and CCV recoveries were within 90-110% and the low-level CCV (CCVL) recoveries were within 80-120%, with the exception of three bracketing CCVL check standards for Na (127%R, 129%R, 124%R) and one bracketing CCVL check standard for Mg (78%). No results required qualification because all samples had detections greater than the CCVL.

A blank and 5 non-zero standards were used for the CVAA calibration. The initial (ICV) and continuing calibration recoveries (CCV) were within 90-110%.

VI.3. Laboratory Quality Control Samples

VI.3.1. Calibration blanks and Method Blanks

No target analytes were reported in the method blanks (MB) or bracketing calibration blanks (ICB/CCB) of sufficient concentration to warrant qualification of site sample results except as noted in the table below. For the positive blank concentrations, associated detected sample results that were below the reporting limit (RL) were qualified as nondetect (U) at the RL. Associated detected sample results that were greater than RL and <5× the blank concentration were qualified as estimated with high bias (J+) using professional judgement.

Table 4 – Metals and Mercury Calibration Blanks and Method Blanks

Analyte	Blank concentration	Qualified Samples
Thallium MB 404391/22-A	0.0000630 mg/L	0822MW09GW (580-117490-1) – 0.0010 U 0822MW10GW (580-117490-2) – 0.0010 U 0822MW16GW (580-117490-3) – 0.0010 U
Thallium MB 404461/22-A	0.0000710 mg/L	0822MW99GW (580-117490-5) – 0.0010 U 0822MW26GW (580-117490-6) – 0.0010 U 0822MW98GW (580-117490-8) – 0.0010 U 0822MW28GW (580-117490-9) – 0.0010 U 0822MW43GW (580-117490-15) – 0.0010 U
Thallium MB 404459/22-A	0.000030 mg/L	0822MW49GW (580-117490-19) – 0.0010 U
Potassium CCB 404409/27 Potassium CCB 404409/27	0.210 J mg/L 0.189 J mg/L	0822MW58GW (580-117490-40) – 3.3 U 0822MW59GW (580-117490-41) – 3.3 U

VI.3.2. Interference Check Samples

Interference Check Samples (ICSA/B): ICSAB recoveries were within the control limits of 80-120% or ±2× the reporting limit, whichever is greater. One or more interferents were present in several samples at concentrations comparable to those of the ICSAs. As noted in the table below, non-spiked analytes zinc, silver, lead, barium and nickel were present in the ICSAs at greater than MDL. For analytes with positive ICSA results, associated detected results which were <10× the ICSA concentration were qualified as estimated with high bias (J+). The ICP/MS ICS interferent levels were at 10,000 µg/L; therefore,the samples were assessed based on interferents being present at ≥10,000 µg/L in the samples. The ICP samples did not have interferents at concentrations comparable to the ICP ICSA solution, and sample qualifications were not required.

Table 5 – Metals Interference Check Samples

Analyte	ICSA Number	Qualified Samples (units mg/L)
Lead	ICSA 580-404711/11	0822MW09GW (580-117490-1) 0.00015 J+ 0822MW16GW (580-117490-3) 0.00024 J+ 0822MW43GW (580-117490-15) 0.000047 J+
Silver	ICSA 580-404711/11	0822MW43GW (580-117490-15) 0.000033 J+
Silver	ICSA 580-404740/11	0822MW49GW (580-117490-19) 0.000030 J+ 0822MW42GW (580-117490-14) 0.000045 J+ 0822MW44GW (580-117490-16) 0.000025 J+ 0822MW17GW (580-117490-4) 0.000030 J+ 0822MW27GW (580-117490-7) 0.000043 J+ 0822MW98GW (580-117490-8) 0.000092 J+ 0822MW28GW (580-117490-9) 0.000096 J+
Silver	ICSA 580-404910/11	0822RD10SW (580-117490-26) 0.000026 J+ 0822MW53GW (580-117490-35) 0.000036 J+ 0822MW59GW (580-117490-41) 0.00018 J+

Analyte	ICSA Number	Qualified Samples (units mg/L)
Thallium	ICSA 580-404910/11	0822RD05SW (580-117490-22) 0.000040 J+ 0822MW58GW (580-117490-40) 0.000044 J+ 0822MW59GW (580-117490-41) 0.00012 J+

VI.3.3. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

Target analytes were recovered within the control limits of 70-130% recovery (%R), and the relative percent difference (RPDs) were ≤20%. The ICP/MS LCS/LCSD analyses were performed at 20× due to the calibration range.

VI.3.4. Laboratory Duplicates

Laboratory duplicate analyses were performed on samples 580-117490-1, 580-117490-15 and 580-117490-27 for ICP/MS and ICP metals and 580-117490-2, 580-117490-15 and 580-117490-27 for Hg. Original and duplicate sample values ≥5× the RL were within the control limit of 20% Relative Percent Difference (RPD). The control limit of ±RL was met when the sample or duplicate result was <5× the RL. All results were within control limit criteria.

VI.3.5. Matrix Spike/Matrix Spike Duplicate

MS/MSD analyses were performed on samples 580-117490-1 for ICP and ICP/MS, 580-117490-4 and 580-117490-15 and 580-117490-27 for metals and Hg and 580-117490-2 for Hg only. MS recoveries were not assessed when the parent sample concentrations were more than 4× the spike amount. Recoveries for all target analytes met control limits of 75-125%R, and the RPDs were ≤20%. For the ICP/MS analysis, the parent samples were analyzed undiluted, and the MS/MSD samples were analyzed at a 20× dilution due to instrument calibration range. Sample qualifications were not assigned.

VI.3.6. Post Digestion Spike

The laboratory performed ICP/MS and ICP post digestion spike (PDS) analyses for Samples 580-117490-1, 580-117490-15 and 580-117490-27 for all reported analytes, and the recoveries were within control limit criteria. The ICP/MS PDS analyses were performed at 20× due to the calibration range.

VI.3.7. Serial Dilution

ICP/MS and ICP serial dilution analysis was performed on Samples 580-117490-1, 580-117490-15 and 580-117490-27. Results were not assessed unless the parent sample concentration was >50× the MDL. The control limit of ≤10% difference (%D) of the original sample results was met for all target analytes, with the exception of the ICP Ca serial dilution result for Sample 580-117490-27. The parent sample result was qualified as estimated, J.

VI.3.8. Internal Standards Performance

According to the raw data sample results, all ICP and ICPMS sample internal standard intensities were within thecontrol limits of 60-125% of the calibration blank. Sample qualifications were not required.

VI.3.9. Sample Result Verification

Sample result verification is not applicable for Stage 2B validation samples. Detects below the RL were qualified as estimated (J). Nondetects are valid to the RL. Sample verification will be performed for Stage 4 validation submitted with the final version of this DVR.

VI.4. Field QC Samples

Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. The remaining detects were used to evaluate the associated site samples. Findings associated with field QC samples are summarized below.

VI.4.1. Field Blanks and Equipment Blanks

Field blank samples were not identified in this SDG for these analyses.

Equipment blank samples 0822EB01GW and 0822EB02GW were collected and associated with the GW samples as listed in the table below:

Table 6 – Metals and Mercury Equipment Blank Association

Equipment Blanks		
Blank ID	0822EB01GW	0822EB02GW
Water Level Meter	Solinst	Dipper T2
Associated Samples	0822MW06GW	0822MW10GW
	0822MW09GW	0822MW16GW
	0822MW27GW	0822MW17GW
	0822MW29GW	0822MW26GW
	0822MW33GW	0822MW28GW
	0822MW45GW	0822MW40GW
	0822MW46GW	0822MW42GW
	0822MW47GW	0822MW43GW
	0822MW49GW	0822MW44GW
	0822MW50GW	0822MW51GW
	0822MW52GW	0822MW53GW
	0822MW55GW	0822MW54GW
	0822MW56GW	0822MW59GW
	0822MW57GW	0822MW97GW
	0822MW58GW	0822MW98GW
		0822MW99GW

Chromium, iron, and nickel were detected in 0822EB01GW at 0.00048 J, 0.015 J, 0.00053 J mg/L, respectively. Arsenic and chromium were detected in 0822EB02GW at 0.00020 J and 0.00048 J mg/L, respectively.

For EB detects, associated detected sample results that were below the reporting limit (RL) were qualified as nondetect (U) at the RL. Associated detected sample results that were greater than RL and <5× the

blank concentration were qualified as estimated with high bias (J+).

Table 7 – Metals and Mercury Equipment Blank Qualifiers

Analyte	EB Blank concentration	Qualified Samples
		EB01
Chromium	0.00048 J mg/L	0822MW09GW – 0.00080 U 0822MW27GW – 0.00080 U 0822MW06GW – 0.00080 U 0822MW47GW – 0.00080 U 0822MW50GW – 0.00080 U 0822MW46GW – 0.00080 U 0822MW45GW – 0.00080 U 0822MW51GW – 0.00080 U 0822MW57GW – 0.00091 J+ 0822MW58GW – 0.00082 J+
Iron	0.015 J mg/L	0822MW47GW – 0.10 U 0822MW46GW – 0.10 U 0822MW45GW – 0.10 U 0822MW57GW – 0.10 U
Nickel	0.00053 J mg/L	0822MW09GW – 0.0030 U 0822MW47GW – 0.0030 U 0822MW46GW – 0.0030 U 0822MW45GW – 0.0030 U 0822MW33GW – 0.0030 U 0822MW58GW – 0.0030 U
		EB02
Arsenic	0.00020 J mg/L	0822MW53GW – 0.0010 U
Chromium	0.00048 J mg/L	0822MW10GW – 0.00080 U 0822MW16GW – 0.00080 U 0822MW17GW – 0.00080 U 0822MW99GW – 0.00080 U 0822MW98GW – 0.00080 U 0822MW28GW – 0.00080 U 0822MW40GW – 0.00080 U 0822MW42GW – 0.00080 U 0822MW43GW – 0.00080 U 0822MW44GW – 0.00080 U 0822MW97GW – 0.00080 U 0822MW52GW – 0.00082 J+ 0822MW53GW – 0.00080 U 0822MW54GW – 0.00080 U

VI.4.2. Field Duplicates

Samples 0822MW10GW and 0822MW99GW, 0822MW43GW and 0822MW98GW, 0822MW54GW and 0822MW97GW and 0822RD05SW and 0822RD99SW. The control limits of ≤30% for all target analytes greater than 5x RL and ±RL for all results <5x RL were met except as noted in the table below. Associated results in the field duplicate pair were qualified as estimated (J) for detects and (UJ) for nondetects.

Table 8 – Metals and Mercury Field Duplicates

Field duplicate samples	Analyte	RPD/±RL
0822MW10GW/0822MW99GW	Antimony (0.00029 J / 0.0014 J mg/L)	>±RL

VII. EPA Method 1631, Revision E – Total and Dissolved Mercury

K. Okonzak-Lowry of Oak Services reviewed the SDG on November 13, 2022

VII.1. Holding Times

Sample preservation and analytical holding times were met. The samples analyzed for dissolved mercury were filtered in the field.

VII.2. Calibration

A blank and 5 non-zero standards were used for the cold vapor atomic fluorescence spectrometry calibration. Calibration criteria were met. ICV and CCV %Rs were within the laboratory control limits of 77-123%R.

VII.3. Laboratory QC Samples

VII.3.1. Calibration Blanks and Method Blanks

No mercury reported in the method blanks (MB) or bracketing calibration blanks (ICB/CCB) of sufficient concentration to warrant qualification of site sample results except as noted in the table below. For the positive blank concentrations, associated detected sample results that were below the reporting limit (RL) were qualified as nondetect (U) at the RL. Associated detected sample results that were greater than RL and <5× the blank concentration were qualified as estimated with high bias (J+).

Table 9 – Method 1631 Calibration Blanks and Method Blanks

Analyte	Blank concentration (ng/L)	Qualified Samples
Mercury	LL Hg MB 403830-17 0.117	0822MW43GW DISS (580-117490-15DISS) – 0.50 U 0822TB02GW (580-117490-21) – 0.50 U 0822TB04SW (580-117490-24) – 0.50 U
	LL Hg CCB 580-403548/115 0.123J	0822MW98GW DISS (580-117490-8 DISS) – 0.50 U
	LL Hg CCB 580-403691/87 0.130J	0822MW44GW DISS (580-117490-16 DISS) – 0.50 U
	LL Hg CCB 580-403830/57 0.235J	0822MW40GW DISS (580-117490-13 DISS) – 0.81 J+
	LL Hg CCB 580-404098/58 0.423J	0822MW56GW DISS (580-117490-38 DISS) – 1.4 J+ 0822TB03GWGW (580-117490-42) – 0.58 J+

Analyte	Blank concentration (ng/L)	Qualified Samples
		0822EB01GW (580-117490-43) – 1.6 J+ 0822EB02GW (580-117490-44) – 0.50 U

VII.3.2. Laboratory Control Sample/Laboratory Control Sample Duplicate

Target analytes were recovered within the laboratory control limits of 77-123% recovery, and the RPDs were ≤24%. Sample qualification was not required.

VII.3.3. Matrix Spike/Matrix Spike Duplicate

MS/MSD analyses were performed on Samples 580-117490-2 (diss), 580-117490-4 (total and diss), 580-117490-15 (total and diss), 580-117490-8 (total), 580-117490-27 (total), 580-117490-38 (total), 580-117490-40 (total) from this SDG. The recoveries and RPDs were within the laboratory established control limits of 71-125%R and 24% RPD.

VII.4. Field QC Samples

Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. The remaining detects were used to evaluate the associated site samples. Findings associated with field QC samples are summarized below.

VII.4.1. Field Blanks, Equipment Blanks, and Trip Blanks

Field blank samples were not identified in this SDG for these analyses.
Equipment blank samples 0822EB01GW and 0822EB02GW were collected and associated with the GW samples as listed in the table below.

Table 10 – Method 1631 Equipment Blank Association

Equipment Blanks		
Blank ID	0822EB01GW	0822EB02GW
Water Level Meter	Solinst	Dipper T2
Associated Samples	0822MW06GW	0822MW10GW
	0822MW09GW	0822MW16GW
	0822MW27GW	0822MW17GW
	0822MW29GW	0822MW26GW
	0822MW33GW	0822MW28GW
	0822MW45GW	0822MW40GW
	0822MW46GW	0822MW42GW
	0822MW47GW	0822MW43GW
	0822MW49GW	0822MW44GW
	0822MW50GW	0822MW51GW
	0822MW52GW	0822MW53GW
	0822MW55GW	0822MW54GW
	0822MW56GW	0822MW59GW
	0822MW57GW	0822MW97GW

Equipment Blanks		
Blank ID	0822EB01GW	0822EB02GW
Water Level Meter	Solinst	Dipper T2
	0822MW58GW	0822MW98GW
		0822MW99GW

There were sample qualifications required for the 0822EB01GW detect as listed in the table below. The reported trace level Hg detect for 0822EB02GW (0.23 J ng/L) was subsequently qualified as nondetect at the RL, 0.50 U ng/L, due to an associated CCB Hg detect.

Table 11 – Method 1631 Equipment Blank Qualifications

Analyte	Equipment Blank concentration (ng/L)	Qualified Samples
Mercury	0822EB01GW (1.6 ng/L)	0822MW06GW DISS (1.9 J+) 0822MW47GW TOT/DISS (1.6U each) 0822MW46GW (7.7 J+) 0822MW46GW DISS (1.9 J+) 0822MW45GW (7.4 J+) 0822MW45GW DISS (4.9 J+) 0822MW50GW DISS (3.3J+) 0822MW52GW DISS (3.3 J+) 0822MW56GW DISS (1.6 U) 0822MW58GW DISS (2.4 J+)

Trip blank samples 0822TB01GW, 0822TB02GW, 0822TB03GW and 0822TB04SW were shipped with the low level mercury samples. Each trip blank was associated with the samples shipped in the same cooler.

Table 12 – Method 1631 Trip Blank Association

Trip Blanks				
Blank ID	0822TB01GW (Total and Diss)	0822TB02GW (Total and Diss)	0822TB03GW (Total and Diss)	0822TB04SW (Total and Diss)
Qualified TB Result (ng/L)	0.12 J	0.50 U	0.58 J	0.50 U
Associated Samples (Total and Dissolved)	0822MW09GW	0822MW06GW	0822MW51GW	0822MW29GW
	0822MW10GW	0822MW40GW	0822MW52GW	0822MW46GW
	0822MW16GW	0822MW42GW	0822MW53GW	0822MW45GW
	0822MW17GW	0822MW43GW	0822MW54GW	0822MW33GW
	0822MW99GW	0822MW44GW	0822MW55GW	0822RD05SW
	0822MW26GW	0822MW47GW	0822MW56GW	0822RD06SW
	0822MW27GW	0822MW49GW	0822MW57GW	0822RD08SW
	0822MW98GW	0822MW50GW	0822MW58GW	0822RD10SW
	0822MW28GW	0822MW97GW	0822MW59GW	0822RD15SW
				0822RD99SW

Table 13 – Method 1631 Trip Blank Qualifications

Analyte	Equipment Blank concentration (ng/L)	Qualified Samples
Mercury	0822TB03GW (0.58 J)	0822MW54GW DISS (0.58 U) 0822MW58GW DISS (2.4 J+)

There were two sample qualifications required for the 0822TB03GW detect as listed in the table above. The reported trace level Hg detects for trip blanks 0822TB02GW and 0822TB04SW were subsequently qualified as nondetect at the RL, 0.50 U ng/L, due to an associated MB Hg detect. Hg was detected in trip blank 0822TB01GW at 0.12 J µg/L, but additional blank qualifications were not required for the associated field samples.

VII.4.2. Field Duplicates

Samples 0822MW10GW and 0822MW99GW, 0822MW43GW and 0822MW98GW, 0822MW54GW and 0822MW97GW (total and dissolved) and 0822RD05SW and 0822RD99SW (total) were identified as field duplicate pairs. The control limits of ≤30% for all target analytes greater than 5x RL and ±RL for all results <5x RL were met except as noted in the table below. Associated results in the field duplicate pair were qualified as estimated (J) for detects.

Table 14 – Method 1631 Mercury Field Duplicates

Field duplicate samples	Analyte	RPD/±RL
0822MW10GW / 0822MW99GW	Hg (49 / 8.5 ng/L)	141%RPD
0822MW43GW / 0822MW98GW	Hg (1.2 / 34 ng/L)	186%RPD
0822MW54GW / 0822MW97GW	Hg (14 / 6.9 ng/L)	68%RPD

VII.5. Sample Result Verification and Reported Detection Limits

The laboratory analyzed for low level mercury by EPA Method 1631E. Total mercury was analyzed for six surface water (SW) samples. Total and dissolved mercury was analyzed for the groundwater (GW) samples.
Mercury quantification was verified for the Level 4 validation samples. Sample result verification is not applicable for Level 2B validation samples. Detects reported below the RL were qualified as estimated (J). Nondetects are valid to the RL. Multiple samples were analyzed at dilutions to bring detects within the calibration linear range due to the level of mercury found in the samples.

VIII. Various EPA Methods – General Minerals

K. Okonzak-Lowry of Oak Services reviewed the SDG on November 14, 2022.

VIII.1. Holding Times and Sample Management

The samples for nitrate+nitrite by Method 353.2 were subcontracted to the Eurofins Lancaster, PA Laboratory.

Table 15 – General Minerals Analytical Method Holding Times

Analytical Method	Analysis Holding Time (days)
353.2 (NO3+NO2 as N)	28
300.0 (anions SO4, Cl-, F-)	28
310.1 (alkalinity)	14
Total Dissolved Solids (TDS)	7
Total Suspended Solids (TSS)	7

The analytical holding times were met for all sample analyses. No qualifications were required.

VIII.2. Calibration

ICV and CCV recoveries associated with reported sample results were within the laboratory control limits.

VIII.3. Laboratory QC Samples

VIII.3.1. Calibration Blanks and Method Blanks

No reported detects in the method blanks (MB) or bracketing calibration blanks (ICB/CCB) were of sufficient concentration to warrant qualification of site sample results.

VIII.3.2. Laboratory Control Samples

LCS and LCSD (as appropriate) recoveries and RPDs were within laboratory control limits.

VIII.3.3. Laboratory Duplicates

Laboratory duplicate analyses were performed on Sample 0822RD15SW (580-117490-27). for Methods 310.1, 160.1, 160.2 and 353.2. RPDs were within laboratory control limits.

VIII.3.4. Matrix Spike/Matrix Spike Duplicate

MS/MSD analyses were performed on Sample 0822RD15SW (580-117490-27) for Methods 300.0 and 353.2. The spike recoveries and RPDs were within laboratory control limits except for Method 353.2 NO3+NO2. The Sample 0822RD15SW MS/MSD recoveries were 118% and 110%, respectively. It was determined that the surface water samples are of similar matrix; therefore, the nitrate + nitrite detects were qualified as estimated with a high bias (J+) for samples 0822RD15SW, 0822RD08BSW, 0822RD06SW and 0822RD10SW.

VIII.4. Sample Result Verification

Sample result verification is not applicable for Level 2B validation samples. Detects reported below the RL were qualified as estimated (J). Nondetects are valid to the RL.

VIII.5. Field QC Samples

Field QC samples were evaluated, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. The remaining detects were used to evaluate the associated site samples. Findings associated with field QC samples are summarized below.

VIII.5.1. Field Blanks and Equipment Blanks

Field blank or equipment blank samples were not analyzed for these surface water sample analyses.

VIII.5.2. Field Duplicates

Samples 0822RD05SW and 0822RD99SW were identified as the field duplicate pair. The control limits of ≤30% for all target analytes greater than 5x RL and ±RL for all results <5x RL were met.

IX. Overall Assessment

Samples required qualification due to quality control exceedances and procedural issues. No samples were rejected in this SDG. Stage 2B validation was performed on all samples for this draft. The final version of the DVR will include the completed Stage 4 validation results for methods for which the required documentation is available.

As noted in Section VI.2, a Stage 4 validation was not performed for the 6010D ICP analyses for calcium (Ca), potassium (K), magnesium (Mg) and sodium (Na).

X. Data Qualification Summary

Table 16 – Data Qualification Summary Table

Sample	Analyte	Qualifier	Reason
580-117490-3, -14, -23, -25, -31	Antimony	J (detects)	Sample detects > calibration range
580-11749-19, -41	Aluminum	J (detects)	Sample detects > calibration range
580-117490-1, -6, -8, -13, -14, -15, -18, -20, -35, -36, -37, -38, -40, -41	Barium	J (detects)	Sample detects > calibration range
580-117490-1, -3, -6, -8, -11, -12, -14, -15, -18, -19, -20, -22, -28, -36, -37, -40, -41	Iron	J (detects)	Sample detects > calibration range
580-117490-1, -2, -3, -5, -6, -7, -8, -9, -11, -12, -13, -14, -15, -16, -18, -19, -20, -22, -28, -33, -36, -37, -38, -41	Manganese	J (detects)	Sample detects > calibration range
580-117490-3, -6, -8, -9, -13, -14, -15, -20, -22, -28, -37, -41	Arsenic	J (detects)	Sample detects > calibration range
580-117490-1, -2, -3, -5, -6, -8, -9, -15, -19	Thallium	U at RL (detects < RL)	MB detects

Sample	Analyte	Qualifier	Reason
580-117490-40, -41	Potassium	U at RL (detects < RL)	CCB detects
580-117490-15, -19, -14, -16, -4, -7, -8, -9, -26, -35, -41	Silver	J+ (detects < 10x the ICSA detect)	ICSA detect > MDL
580-117490-22, -40, -41	Thallium	J+ (detects < 10x the ICSA detect)	ICSA detect > MDL
580-117490-1, -3, -15	Lead	J+ (detects < 10x the ICSA detect)	ICSA detect > MDL
580-117490-27	Calcium	J (detects)	Serial dilution > 10%D
580-117490-1, -7, -12, -17, -2, -29, -30, -33, -39, -40, -2, -3, -4, -5, -8, -9, -13, -14, -15, -16, -18, -34, -35, -36	Chromium	U at RL (detects < RL) J+ (detects > RL)	EB01 and EB02 detect
580-117490-17, -29, -30, -39	Iron	U at RL (detects < RL)	EB01 detect
580-117490-1, -17, -29, -30, -31, -40	Nickel	U at RL (detects < RL)	EB01 detect
580-117490-35	Arsenic	U at RL (detect < RL)	EB02 detect
0822MW10GW and 0822MW99GW	Antimony	J (detects)	FD results >±RL
580-117490-15 (Diss) 580-117490-21 (0822TB02GW) 580-117490-24 (0822TB04SW)	LL Mercury	U at RL (detects < RL)	MB detect
580-117490-8 (Diss), -16 (DISS), -13 (Diss), -38 (Diss), -42 (0822TB03GW), -43 (0822EB01GW), -44 (0822EB02GW))	LL Mercury	U at RL (detects < RL) J+ (detects)	Bracketing CCB detects
580-117490-12 (Diss) -17 (Total and Diss), -29 (Total and Diss),	LL Mercury	U at RL (detects < RL) U at EB01 detect level (detects > RL and <EB)	EB01 detect > RL at 1.6 ng/L

Sample	Analyte	Qualifier	Reason
-30 (Total and Diss), -20 (Diss), -34 (Diss), -38 (Diss), -40 (Diss)		J+ (detects > EB01)	
580-117490-36 (Diss) 580-117490-40 (Diss)	LL Mercury	U at TB03 detect level (detect > RL and <EB) J+ (detect > TB03)	TB03 detect > RL at 0.58J ng/L
0822MW10GW and 0822MW99GW, 0822MW43GW and 0822MW98GW, 0822MW54GW and 0822MW97GW	LL Mercury	J (detects)	FD results >RPD limit
580-117490-27, -23, -25, -26	Method 353.2 NO3+NO2	J+- (detects)	High MS %R

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