

**STATE OF UTAH
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY
SALT LAKE CITY, UTAH 84114-4870**

**GROUND WATER DISCHARGE PERMIT
Permit No. UGW210011**

In compliance with the provisions of the Utah Water Quality Act, Title 19, Chapter 5, Utah Code Annotated 1953, as amended, the Act,

**Utah Iron, LLC
6249 W. Gilbert Industrial Court
Hurricane, UT 84737**

hereafter, referred to as the Permittee, is granted a Ground Water Discharge Permit for the ore processing and tailings management operations at the Iron Mountain Mine in Iron County, Utah. The tailings storage locations are on the following tracts of land (Salt Lake Base and Meridian):

S $\frac{1}{2}$ of Section 30, Township 36 South, Range 13 West;
NE $\frac{1}{4}$ of Section 2, Township 37 South, Range 14 West;
NW $\frac{1}{4}$ of Section 1, Township 37 South, Range 14 West.

This permit is based on representation made by the Permittee and other information contained in the administrative record. It is the responsibility of the Permittee to read and understand all provisions of this permit.

The facility shall be constructed and operated in accordance with conditions set forth in the permit and the Utah Administrative Rules for Ground Water Quality Protection (Utah Admin. Code R317-6).

This permit shall become effective on _____, 2025

This permit and authorization to operate shall expire at midnight _____, 2030.

John K. Mackey, P.E.
Director
Utah Division of Water Quality

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PART I SPECIFIC PERMIT CONDITIONS

A. GROUND WATER CLASSIFICATION

Based on ground water quality data submitted in the permit application, ground water at the site is defined as Class II Drinking Water Quality Ground Water.

B. BACKGROUND GROUND WATER QUALITY

Table 1 provides background ground water quality data based on the accelerated background monitoring program described in Part I.H.1 of this permit.

Table 1: Background Ground Water Quality

Parameter	Blowout Pit Water	Blackhawk Pit Water	Upgradient Monitoring Well	Downgradient Monitoring Well
pH	7.7	7.6	7.2	6.5
Total Dissolved Solids	1031	1039	644	630
Bicarbonate (HCO ₃)	121	111	261	229
Alkalinity (as CaCO ₃)	121	111	261	229
Chloride	360	439	141	151
Fluoride	NA	NA	NA	NA
Sulfate	256	120	71.1	70.7
Nitrate as N	6.21	0.19	2.36	0.09
Arsenic	0.000760	0.00175	0.00146	0.00200
Barium	0.0464	0.212	0.0511	0.0795
Cadmium	0.000172	0.000183	0.000093	0.000119
Chromium	<0.00092	<0.00092	0.000425	<0.00092
Copper	0.00120	<0.00111	0.000398	<0.00111
Lead	<0.000588	<0.000588	<0.000588	<0.000588
Selenium	0.00146	0.00377	0.00194	0.00133
Zinc	0.00393	<0.00418	<0.00418	0.00398

NA = not analyzed

All units in mg/L, except pH

C. GROUND WATER PROTECTION LEVELS

Table 2 provides the ground water protection levels, compliance monitoring locations, and pit lake surface water that were established after completion of the accelerated background monitoring program in accordance with Part I.H.1 of this permit.

Table 2: Compliance Monitoring Protection Levels^(a) (mg/L)

Parameter	Blowout Pit Water	Blackhawk Pit Water	Upgradient Monitoring Well	Downgradient Monitoring Well
pH	6.5-8.5			
Total Dissolved Solids	1289	1308	804	858
Nitrate + Nitrite as N	10	10	2.95	2.50
Sulfate	500	500	116	118
Dissolved Metals:				
Antimony	0.00150	0.00270	0.00242	0.00150
Arsenic	0.0125	0.0125	0.0125	0.0125
Barium	0.500	0.500	0.500	0.500
Beryllium	0.00100	0.00100	0.00100	0.00100
Cadmium	0.00125	0.00125	0.00125	0.00125
Chromium	0.0250	0.0250	0.0250	0.0250
Copper	0.325	0.325	0.325	0.325
Lead	0.00375	0.00375	0.00375	0.00375
Mercury	0.000500	0.000500	0.000500	0.000500
Selenium	0.0125	0.0125	0.0125	0.0125
Silver	0.0250	0.0250	0.0250	0.0250
Thallium	0.000500	0.000500	0.000500	0.000500
Zinc	1.25	1.25	1.25	1.25

- a) Concentration protection levels equal the higher of 0.25 multiplied by the Ground Water Quality Standard, 1.25 multiplied by the mean concentration detected in background, or the mean concentration plus 2 standard deviations: not exceeding the Ground Water Quality Standard

D. BEST AVAILABLE TECHNOLOGY (BAT) STANDARD

1. Additional Documents –

- a. *Sampling and Analysis Plan* (Appendix A) addresses the objectives of water quality monitoring, designated sampling locations, standardized procedures for sample collection, analysis, and reporting of data, analytical laboratory QA/QC criteria, and data evaluation/validation.
- b. *Pipeline Monitoring and Spill Prevention Plan* (Appendix B) includes the pipeline and flow monitoring procedures, inspection, maintenance and repair procedures, and spill response and clean-up.
- c. *Ground Water Monitoring Plan* (Appendix C) describes the locations for upgradient and down-gradient monitoring wells, well construction specifications, development and sampling procedures.

2. Synthetic or clay liners will not be constructed or utilized for discharge into the open pits. The pit rock walls and floor are comprised of low-permeability quartz monzonite, limestone, and sandstone.
3. BAT Performance Monitoring - The Permittee shall sample ground water and process water discharge as described in Section E.

4. Land Application - The Permittee may select an area located on the facility's property for land application of water from the pit dewatering well or mine pit. Before land application occurs, the Permittee shall submit the required information as outlined in the compliance schedule (Part I.H.6).
 - a. Land application will be monitored for water quality and adjusted to prevent surface runoff. Only pit dewatering water that did not come in contact with water from other sources is permitted for land application.
 - b. The sprinkling area selected for land application shall have berms constructed around the perimeter to prevent surface runoff. At least one piezometer shall be installed to allow for the monitoring of perched or infiltrated water and its quality if found.
 - c. If ground water is present in the piezometer at the land application site, water quality sampling shall occur for the analytes listed in Table 2. Results will be submitted with the corresponding quarterly monitoring report.
 - d. Following the selection of the area for land application, a facility map shall be provided showing the land application area.
5. Pipeline Construction - Two HDPE pipelines were constructed, one for tailings discharge and one for returning process water from the pits for re-use at the concentration mill. Monitoring will include visual inspection of the above-ground pipelines and pipeline corridor to identify leakage and/or discharges to the ground surface.
6. Spill Containment - The Permittee shall design, maintain and construct all pipelines, storage tanks, and mill facilities with a spill containment system that shall:
 - a. Minimize any spills or leakage from contact with the ground surface or ground water.
 - b. Convey all spills or leakage to appropriate containment.

Pipeline spills and releases are reportable events. Any spill that does come into contact with the ground surface or ground water that causes pollution or has the potential to cause pollution to waters of the state shall be reported in accordance with Part II.I.

E. COMPLIANCE MONITORING REQUIREMENTS

1. All water quality monitoring shall be conducted in accordance with the general requirements described below at the frequency shown in Table 3.

Table 3: Compliance Monitoring Location and Frequency

Monitoring Point	Sample Frequency
Upgradient Monitoring Well	Biannually ^(a)
Downgradient Monitoring Well(s)	Quarterly ^(b)
Cross-Gradient Monitoring Well	Quarterly ^(b)
Blackhawk and Blowout Pit Lakes	Quarterly ^(b)
Tailings Pipeline	On Request ^(c)
Reclaim Water Pipeline	On Request ^(c)

- (a) Biannual monitoring shall be conducted in the Spring (March-April) and Fall (September-October).
- (b) For quarterly sampling monitoring points, sampling frequency may be decreased to bi-annually at the determination of the Director as discussed in Section E.3.
1. If there is insufficient water in the pit lakes to conduct sampling the Permittee shall provide photographic documentation to the Division demonstrating that sampling could not be conducted due to a lack of water. The monitoring well network shall remain, regardless of the status of water in the pit lakes, at the schedule listed in Table 3 unless the Director receives a written request and data indicates a sampling reduction is appropriate.
- (c) "On Request" samples shall be collected if analyte concentrations in the pit lakes show an increasing trend or exceed their protection levels as listed in Table 2.

2. Reduced Sampling - At the time of permit issuance, the mine facility and all associated processing activities have been idled and are not in operation. While the mine facility remains inactive, the Permittee is authorized to reduce the monitoring frequency at each compliance monitoring point to the frequency listed in Table 4. If the reduced sampling schedule listed in Table 4 is deemed insufficient upon review of the data provided, the Director reserves the right to adjust the schedule. Reduced sampling is approved under the following conditions:

- a. The Permittee shall notify the Division within 48 hours of the facility becoming active.
- b. If the Permittee begins operation within the first 2 months of a quarter, it is expected that they will resume the quarterly monitoring requirements as outlined in Table 3.
- c. Upon the resumption of facility operations, sampling must revert to the frequency outlined in Table 3. If mine operations are subsequently halted after initial operation resumption, the Permittee must submit a written request to the Division to reduce the sampling frequency. No further reduction in sampling will be authorized without the Director's written approval.
- d. While the facility remains non-operational, monitoring reporting is required to maintain compliance with this permit. Biannual monitoring reports shall be submitted to the corresponding due date based on the monitoring periods listed in Table 5.

Table 4. Reduced Sampling Schedule While Operations Are Suspended

Monitoring Point	Sample Frequency
Upgradient Monitoring Well	Biannually ^(a)
Downgradient Monitoring Well(s)	Quarterly/biannually ^(c)
Cross-Gradient Monitoring Well	Biannually ^(a)
Blackhawk and Blowout Pit Lakes	Biannually ^(a)
Tailings Pipeline	On Request ^(b)
Reclaim Water Pipeline	On Request ^(b)

^(a) Biannual monitoring shall be conducted in the Spring (March-April) and Fall (September-October).

^(b) “On Request” samples may be requested by the Division if analyte concentrations in the pit lakes show an increasing trend or exceed their protection levels as listed in Table 2. The Permittee shall provide photographic documentation to the Division demonstrating that sampling could not be conducted due to a lack of water.

^(c) Downgradient monitoring wells will remain on a quarterly sampling schedule until water is no longer present in Blackhawk and Blowout pit lakes. Prior to reducing the sampling frequency from quarterly to biannually for downgradient monitoring wells the Permittee shall provide photographic evidence that both pit lakes are empty.

1) If there is insufficient water in the pit lakes to conduct sampling, the permittee shall provide photographic documentation to the Division demonstrating that sampling could not be completed due to lack of water.

3. Monitoring Location Requirements

a. Ground Water Monitoring

- 1) Compliance Monitoring – water samples from compliance monitoring locations shall be analyzed for the parameters specified in Table 2 at the frequency specified in Table 4. For any new compliance monitoring location established during the term of this permit, an accelerated monitoring program (See Part I.H.3) shall commence upon completion of well installation and development.
- 2) Water Level Measurements – water level measurements shall be collected in each monitoring well prior to well purging or collection of ground water samples. These measurements will be made from a surveyed permanent reference point clearly demarcated on the top of the well or surface casing. Water level measurements will be made to the nearest 0.01 foot.

4. Process Water Monitoring

- a. The Director may request monitoring of the process water pipelines if monitoring of the Blackhawk and Blowout pit lakes and monitoring well network results in an exceedance of a compliance monitoring protection level in Table 2. If the Director requests monitoring of the process water pipelines, it shall be completed as stated below.
 - 1) Reclaim water pipeline – The sample shall be collected from the reclaim water pipeline at the concentrate facility prior to mixing with any other water source. Samples shall be analyzed for the parameters specified in Table 2.

- 2) Tailings pipeline – A representative sample shall be collected from a designated location along the pipeline (described in Appendix A) for the parameters specified in Table 2 on request by the Director.

5. Surface Water Monitoring

- a. Blackhawk and Blowout Pit Lakes – a representative sample shall be collected quarterly. Samples shall be analyzed for the parameters specified in Table 2 at the frequency listed in Table 3. Pit lake sampling frequency may be decreased to bi-annually at the determination of the Director after sufficient data on nitrate and sulfate concentration increases can be determined.

6. Analytical Procedures

- a. Analysis by Certified Laboratories - analysis of all process water, surface water, and ground water samples shall be performed by a laboratory certified by the Utah Department of Health.
- b. Water Analytical Methods - methods used to analyze ground water samples must comply with the following:
 - 1) Methods cited in Utah Admin. Code R317-6-6.3L, and
 - 2) Method detection limits are less than Ground Water Protection Levels in Part I.C Table 2.

7. Analysis Parameters - the following analyses will be conducted on all ground water, surface water, and process water samples collected:

- a. Field Parameters - pH, temperature, and specific conductance.
- b. Laboratory Parameters – including:
 - 1) Alkalinity, bicarbonate, chloride
 - 2) Sodium, calcium, magnesium, and potassium
 - 3) Protection Level Parameters in Part I.C Table 2.

F. NON-COMPLIANCE STATUS

1. Probable Out-of-Compliance Status - The Permittee shall evaluate results of each ground water sampling event to determine any exceedance(s) of the Ground Water Protection Levels found in Part I.C above. Probable Out-of Compliance exists if the resulting value of a compliance parameter in any compliance monitoring event exceeds the applicable Ground Water Protection Level. Upon determination that a Ground Water Protection Level has been exceeded, the Permittee shall:
 - a. Immediately re-sample the monitoring well or source(s) found to be in

probable out-of-compliance status for laboratory analysis of the exceeded protection level parameter(s). Submit the analytical results thereof, and notify the Director of the probable out-of-compliance status within 30 days of the initial detection.

- b. Upon exceedance of any one parameter listed in Table 2 for two consecutive sampling events, immediately implement an accelerated schedule of monthly sampling analysis, consistent with the requirements of this permit. This monthly sampling will continue for at least two months or until the compliance status can be determined by the Director. Reports of the results of this sampling will be submitted to the Director as soon as they are available, but no later than 30 days from each date of sampling.

2. Out-of-Compliance Status Based on Confirmed Exceedance of Permit Ground Water Protection Levels

- a. Out of Compliance Status shall be defined as follows: For parameters that have been defined as detectable in the ground water and for which protection levels have been established, out-of-compliance shall be defined as two consecutive samples exceeding the protection level.
- b. Notification and Accelerated Monitoring - upon determination by the Permittee or the Director, in accordance with Utah Admin. Code R317-6-6.17, that an out-of-compliance status exists, the Permittee shall:
 - 1) Verbally notify the Director of the out-of-compliance status within 24 hours of receipt of data and provide written notice within 5 days of the determination.
 - 2) Implement an accelerated schedule of monthly monitoring for at least two months and continue monthly monitoring until the facility is brought into compliance, or as determined by the Director.
- c. Source and Contamination Assessment Study Plan - within 30 days after the written notice to the Director required in Part I.F.2.b., above, the Permittee shall submit an assessment study plan and compliance schedule for review by the Director. The Source and Contamination Assessment Study plan shall contain the following;
 - 1) Assessment of the source or cause of the contamination, and determination of steps necessary to correct the source;
 - 2) Assessment of the extent of the ground water contamination and any potential dispersion;
 - 3) Evaluation of potential remedial actions to restore and maintain ground water quality and ensure that the ground water standards will not be exceeded at the compliance monitoring locations;
 - 4) After approval of the Source and Contamination Assessment Study Plan the Permittee shall implement the study plan and provide a report

on relevant findings.

3. Out-of-Compliance Status Based Upon Failure To Maintain Best Available Technology - In the event that BAT monitoring indicates a violation of any of the construction or performance standards outlined in Part I.D of this permit, the Permittee shall submit to the Director a notification and description of the violation in accordance with Part II.I of this permit.
4. Contamination Investigation - If, after review of ground water monitoring data, the Source and Contamination Assessment Report, and other relevant information, the Director determines that utilization of the pit lakes or facility operations have caused an exceedance of ground water protection levels at any compliance monitoring point, the Permittee shall conduct a Contamination Investigation to determine the extent and severity of contamination present. The Permittee shall submit a proposed Contamination Investigation Plan including a schedule for review by the Director within 30 days of request. The Permittee shall prepare a Contamination Investigation Report that adheres to the criteria and timelines outlined in R317-6-6.15.D of Utah Administrative Code.

After the review of the results of the Contamination Investigation Report, the Director may require the Permittee to develop a Corrective Action Plan to remediate any contamination identified in the Contamination Investigation Report.

G. REPORTING REQUIREMENTS

1. Water Monitoring - The monitoring requirements specified in Part I.E shall be reported according to the schedule in Table 5 below, unless modified by the Director.

Table 5. Compliance Monitoring Report Schedule

<u>Period</u>	<u>Report Due Date</u>
1 st (January, February, March)	April 30 th
2 nd (April, May, June)	July 31 st
3 rd (July, August, September)	October 31 st
4 th (October, November, December)	January 31 st

2. Water Level Measurements - water level measurements from ground water monitoring wells will be reported as measured depth to ground water from the surveyed casing measuring point, and ground water elevations as converted by casing measuring point elevations.
3. Ground Water Quality Sampling - reporting will include:
 - a. Field Data Sheets - or copies thereof, including the field measurements required in Part I.E.8.a and other pertinent field data, such as: sampling location name/number, date and time, names of sampling crew, type of sampling (pump or grab), volume of water purged before sampling.
 - b. Laboratory Analytical Results - including date sampled, date received; and the results of analysis for each parameter, including: value or

concentration, units of measurement, reporting limit (minimum detection limit for the examination), analytical method, and the date of the analysis.

4. Pipeline spills and releases are reportable events. Refer to Part II.I for compliance reporting requirements.
5. Electronic Filing Requirements - the Permittee shall electronically submit the required ground water monitoring data using a transmittal mechanism and format approved by the Director. If requested by the Director, hard copies shall also be submitted.
6. Monitoring Well As-Built Report - For each constructed monitoring well, the Permittee shall submit diagrams and descriptions of the final completion details. Each well shall be tested by pump test or slug test. The report is due within 60 days of the date of well completion. The report shall include:
 - a. Casing: depth, diameter, and type of material.
 - b. Screen: length, depth interval, diameter, material type, slot size.
 - c. Sand Pack: depth interval, material type and grain size.
 - d. Annular Seals: depth interval, material type.
 - e. Surface Casing and Cap: depth, diameter, material type, protection measures constructed.
 - f. Elevation and Location: ground surface elevation, elevation of water level measuring point, latitude and longitude in hours, minutes and seconds.
 - g. Well construction description, well completion description, results of well pump tests or slug tests.

H. COMPLIANCE SCHEDULE

Following re-activation of the facility and facility processes, all compliance schedule timelines will begin using the start date of facility activation and be completed according to the schedule listed below.

1. **Source Material Analysis Plan.** The Permittee shall submit a *Source Material Analysis Plan* within ninety (90) days of the resumption of facility operations. The *Source Material Analysis Plan* shall outline the sampling and analysis plan for identifying the source(s) of elevated nitrate and sulfate found in the Blowout and Blackhawk pit lakes. The Source Material Analysis Plan will be added to the Permit as an appendix pending upon review and approval by the Division. Upon approval of the *Source Material Analysis Plan* the Permittee shall present findings from implementation of the *Source Material Analysis Plan* within one calendar year after the resumption of facility operations.
2. **Monitoring Well Installation.** Within 1 year of the renewal date of the permit, the Permittee shall install and begin sampling a third monitoring well in the monitoring well network around the pit lakes used for tailings disposal in the process water circuit. The third well is required to enable the determination of groundwater flow direction and verification of water quality and to enhance the ability to monitor changes and impacts to the groundwater from mine operations and waste disposal. Following installation and monitoring of the additional well, the Permittee shall provide the Division with a potentiometric surface map showing groundwater flow direction in the area of Blowout and Blackhawk pit

lakes.

3. **Accelerated Background Monitoring Report.** For compliance monitoring locations that are established during the term of this permit, the Permittee shall conduct an accelerated water quality monitoring program to establish ground water protection levels in accordance with the following requirements:
 - a. At least eight samples will be collected from each new monitoring location over a one-year period.
 - b. After eight sampling events have been conducted, the Permittee will submit an *Accelerated Background Monitoring Report* with all field data sheets, laboratory analytical reports, and the following statistical calculations presented in spreadsheet format for each parameter in Table 2 for each compliance monitoring location.
 - 1) Non-detect values converted to the detection limit multiplied by 0.25
 - 2) Mean concentration
 - 3) Standard deviation
 - 4) Mean concentration plus two standard deviations
 - 5) Mean concentration of all parameters multiplied by 1.25
 - 6) Ground water quality standard multiplied by 0.25

Following Division review and approval, the Ground Water Class Protection Levels for each parameter will be adjusted if necessary to comply with Utah Admin. Code R317-6-4 for each newly established compliance monitoring location.

5. **Contingency Treatment Plan.** The Permittee shall submit to the Division for Director approval a *Contingency Treatment Plan* for the process water circuit and pit lake compliance points within one year of facility resumption. The plan will include the treatment technologies and implementation strategies to control increasing concentrations of nitrate and sulfate in the process water circuit. The increases in nitrate and sulfate allowed in the process water compliance points made in this permit are contingent on a plan being in place to limit those increases to the within the new compliance values to protect groundwater resources due to disposal of tailings and process water to unlined pit lakes. Upon approval by the Division, the permit will be modified to include the *Contingency Treatment Plan* for the process water circuit as an Appendix of this permit.
6. **Land Application Plan.** The Permittee may designate an area within the facility's property for the land application of water originating from the historic pit dewatering well or mine pit. Before initiating land application activities, the Permittee shall submit a *Land Application Plan* to the Division for review and approval, which details the proposed location(s) including a facility map showing the land application area, associated best management practices (BMPs), intended application rate, and analytical water quality results as listed in Table 2 of the water that is to be dewatered. Water applied to land under this authorization shall not be reused or used for the cultivation of agricultural crops. The *Land Application Plan* shall include the following provisions:

- a. Land application will be monitored for water quality and adjusted to prevent surface runoff. Only pit dewatering water that did not come into contact with water from other sources is permitted for land application.
 - b. The sprinkling area selected for land application shall have berms constructed around the perimeter to prevent surface runoff and have at least one piezometer installed to allow for the monitoring of perched or infiltrated water and its quality if found.
 - c. If ground water is present in the piezometer at the land application site, water quality sampling shall occur for the analytes listed in Table 2. Results will be submitted with the corresponding quarterly monitoring report.
7. **Final Closure Plan.** In the event that the Permittee decides to discontinue its operations permanently at the facility, the Permittee shall notify the Director of such a decision and submit a *Final Closure Plan*, for review and approval, within 180 days prior to permanent closure of the facility. The Permittee shall resubmit the *Final Closure Plan* within 60 days of receipt of written notice of deficiencies, therein. The *Final Closure Plan* shall address facility demolition and site reclamation activities specific to ground water protection, as well as a plan and schedule for ongoing ground water monitoring after closure. Once approved the permit will be modified to include the final closure plan as an Appendix of the permit.
8. **Appendix and Site Map Updates.** The Permittee shall submit updated site maps and appendix documents to the Director for review and approval within 90 calendar days following the construction of the additional monitoring well, as described in Compliance Schedule Item 3 above. Upon approval, a minor permit modification will be initiated to incorporate the updated site maps and appendix documents into this permit.

PART II MONITORING, RECORDING AND REPORTING REQUIREMENTS

A. REPRESENTATIVE SAMPLING

Samples taken in compliance with the monitoring requirements established under Part I shall be representative of the monitored activity.

B. ANALYTICAL PROCEDURES

Water sample analysis must be conducted according to test procedures specified under Utah Admin. Code R317-6-6.3.L, unless other test procedures have been specified in this permit.

C. PENALTIES FOR TAMPERING

The Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

D. REPORTING OF MONITORING RESULTS

Monitoring results obtained during each reporting period specified in the permit shall be submitted to the Director, Utah Division of Water Quality at the following address no later than the last day of the calendar month following the completed reporting period:

State of Utah
Division of Water Quality
P.O. Box 144870
Salt Lake City, Utah 84114-4870
Attention: Ground Water Protection Section
Electronic reporting submission portal:
<https://deq.utah.gov/water-quality/water-quality-electronic-submissions>

E. COMPLIANCE SCHEDULES

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any Compliance Schedule of this permit shall be submitted no later than 14 days following each schedule date.

F. ADDITIONAL MONITORING BY THE PERMITTEE

If the Permittee monitors any pollutant more frequently than required by this permit, using approved test procedures as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted. Such increased frequency shall also be indicated.

G. RECORDS CONTENTS

Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;
2. The individual(s) who performed the sampling or measurements;
3. The date(s) and time(s) analyses were performed;
4. The individual(s) who performed the analyses;
5. The analytical techniques or methods used; and,
6. The results of such analyses.

H. RETENTION OF RECORDS

The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended at the request of the Director at any time.

I. TWENTY-FOUR-HOUR NOTICE OF NONCOMPLIANCE REPORTING

1. The Permittee shall verbally report any noncompliance which may endanger public health or the environment as soon as possible, but no later than 24 hours from the time the Permittee first became aware of the circumstances. The report shall be made to the Utah Department of Environmental Quality 24-hour number, (801) 536-4123, or to the Division of Water Quality, Ground Water Protection Section at (801) 536-4300, during normal business hours (Monday through Friday 8:00 am - 5:00 pm Mountain Time).
2. A written submission shall also be provided to the Director within five days of the time that the Permittee becomes aware of the circumstances. The written submission shall contain:
 - a. A description of the noncompliance and its cause;
 - b. The period of noncompliance, including exact dates and times;
 - c. The estimated time noncompliance is expected to continue if it has not been corrected; and,
 - d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.
3. Reports shall be submitted to the addresses in Part II.D, Reporting of Monitoring Results.

J. OTHER NONCOMPLIANCE REPORTING

Instances of noncompliance not required to be reported within 24 hours, shall be reported at the time that monitoring reports for Part II.D are submitted.

K. INSPECTION AND ENTRY

The Permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the permit;
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and,

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

PND DRAFT

PART III COMPLIANCE RESPONSIBILITIES

A. DUTY TO COMPLY

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The Permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

B. PENALTIES FOR VIOLATIONS OF PERMIT CONDITIONS

The Act provides that any person who violates a permit condition implementing provisions of the Act is subject to a civil penalty not to exceed \$10,000 per day of such violation. Any person who willfully or negligently violates permit conditions is subject to a fine not exceeding \$25,000 per day of violation. Any person convicted under Section 19-5-115(2) of the Act a second time shall be punished by a fine not exceeding \$50,000 per day. Nothing in this permit shall be construed to relieve the Permittee of the civil or criminal penalties for noncompliance.

C. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE

It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. DUTY TO MITIGATE

The Permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. PROPER OPERATION AND MAINTENANCE

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a Permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

PART IV GENERAL REQUIREMENTS

A. PLANNED CHANGES

The Permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required when the alteration or addition could significantly change the nature of the facility or increase the quantity of pollutants discharged.

B. ANTICIPATED NONCOMPLIANCE

The Permittee shall give advance notice of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

C. PERMIT ACTIONS

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

D. DUTY TO REAPPLY

If the Permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Permittee must apply for and obtain a permit renewal or extension. The application should be submitted at least 180 days before the expiration date of this permit.

E. DUTY TO PROVIDE INFORMATION

The Permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The Permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

F. OTHER INFORMATION

When the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Director, it shall promptly submit such facts or information.

G. SIGNATORY REQUIREMENTS

All applications, reports or information submitted to the Director shall be signed and certified.

1. All permit applications shall be signed as follows:

- a. For a corporation: by a responsible corporate officer;
- b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively.
- c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.

2. All reports required by the permit and other information requested by the Director

shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

- a. The authorization is made in writing by a person described above and submitted to the Director, and,
 - b. The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)
3. Changes to Authorization. If an authorization under Part IV.G.2 is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part IV.G.2 must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.
 4. Certification. Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. PENALTIES FOR FALSIFICATION OF REPORTS

The Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

I. AVAILABILITY OF REPORTS

Except for data determined to be confidential by the Permittee, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Director. As required by the Act, permit applications, permits, effluent data, and ground water quality data shall not be considered confidential.

J. PROPERTY RIGHTS

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

K. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

L. TRANSFERS

This permit may be automatically transferred to a new Permittee if:

1. The current Permittee notifies the Director at least 30 days in advance of the proposed transfer date;
2. The notice includes a written agreement between the existing and new Permittee containing a specific date for transfer of permit responsibility, coverage, and liability between them; and,
3. The Director does not notify the existing Permittee and the proposed new Permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2 above.

M. STATE LAWS

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, penalties established pursuant to any applicable state law or regulation under authority preserved by Section 19-5-117 of the Act.

N. REOPENER PROVISION

This permit may be reopened and modified (following proper administrative procedures) to include the appropriate limitations and compliance schedule, if necessary, if one or more of the following events occur:

1. If new ground water standards are adopted by the Board, the permit may be reopened and modified to extend the terms of the permit or to include pollutants covered by new standards. The Permittee may apply for a variance under the conditions outlined in R317-6-6.4.D.
2. If alternative compliance mechanisms are required.
3. If subsequent ground water monitoring data reveals the background water quality values in Part I Table 1 are not accurate.

Appendix A

Sampling and Analysis Plan

PND DRAFT

GROUND WATER DISCHARGE SAMPLING AND ANALYSIS PLAN

Prepared By: J&R Environmental Consulting

MAY 13, 2020

BLACK IRON, LLC

6249 West Gilbert Industrial Court, Hurricane Utah 84737

Objective

The objective of water quality monitoring is to determine whether or not pollutants from plant discharges are having an adverse effect on underground water quality. In order to accomplish this, monitoring wells are drilled up and down stream of the tails facility in the same aquifer. Accelerated sampling of these monitoring wells within the first year of operation establish a baseline water quality and establish protection levels. Subsequent sampling on a quarterly basis will evaluate water quality compared to the baseline. Should any individual sample exceed any one of the protection levels, Black Iron, LLC (Black Iron) will be required to increase sampling frequency and pursue mitigation strategies.

This plan constitutes Appendix A in the Ground Water Discharge Permit.

Sampling Locations

Samples will be collected at the following locations and at the following frequencies:

1. Up gradient Well (WW-1 North Monitoring Well)
 - a. Once Per Year
2. Down Gradient Well (WW-2 South Monitoring Well)
 - a. Once Per Quarter
3. Reclamation Pipeline (At any location along the pipeline)
 - a. Quarterly
4. Tailings Pipeline (At any location along the pipeline)
 - a. Quarterly
5. Samples from the standing water in both the Black Hawk and Blowout pits
 - a. Annually

During the first year of operation, an accelerated sampling plan will be established. A total of eight independent samples (two per quarter) will be gathered from the aforementioned sample locations.

Prior to Sampling

1. Obtain Sampling Kits from AWAL: these should contain: \ a cooler, a 500ml sample bottle treated with HNO₃ for each sample point, a 500ml sample bottle for each sample point, a Chain of Custody form, and one 500ml sample bottle for the deionized water blank.
2. Print off Field Note Sheets and the Table 2 Sheet detailing testing requirements.
3. Fill one sample bottle with deionized water and label.
 - a. This constitutes a sample “blank” to be used for QA/QC.
4. Check/calibrate the pH Meter, the eC probe, and the thermometer

Purging (Wells Only)

1. In the morning, measure the depth to ground water with a water level measuring tape. Do this prior to purging the well. Record the water level in the field notes.
2. In order to ensure that the sample is of ground water and not of stagnate bore hole water, each well must be purged one full well volume prior to sampling.

Note: A “Well Volume” is the column of water that is in a well. For example, a 4-inch diameter well, drilled to 350ft deep, has a water level of 100ft from the surface. The column of water is 250ft deep. A 4in column of water 250ft tall has roughly 163 gallons. We must pump 163gal at minimum from the well to purge the well prior to sampling. A 250-gallon tote can be used to measure the volume of water purged from the well.

3. After the well or port has been purged, measure the water level. Record the water level in the field notes.
4. Record the time of purging in the field notes.

5. Test the sample for pH, eC, and temperature. Record in the field notes.
6. Allow the well to recharge for several hours prior to sampling. It is best to purge the well in the morning and then sample the well in the afternoon.

Sampling (Wells, Pipeline, and Tailings Ponds)

1. Record the time of sampling.
2. Make note of the weather conditions at the time of sampling in the field notes per each location. (Precipitation, windy, wet or dry ground).
3. Purge Lines prior to Sampling:
 - a. If sampling from a monitoring well, ensure the well has been purged and has been allowed to recharge prior to sampling.
 - b. If sampling from a tap on a tails or recirculation line, purge the sample port for 10-15 seconds prior to sampling.
4. Record the sample and the sample location on the sample bottles:
 - a. Samples collected in a treated bottle will be recorded by a location tag followed by a "T" Ex. WW1-T.
 - b. Samples collected in a non-treated bottle will be recorded by a location tag followed by a "N" Ex. WW1-N.
 - c. Deionized Water Sample Blanks will be labeled with the sample location followed by a "D" Ex. WW1-D.
5. Collect one 500ml treated sample and one 500ml non-treated sample:
 - a. In the untreated bottle, test the water for pH, eC, and temperature and record these in the field notes.
 - b. Dry the bottles with a towel and apply seals.

After Sampling

1. Verify Sample Quantity:
 - a. Each location should have three samples, a treated sample, a non-treated sample, and a deionized water blank.
2. Complete the chain of custody form.
3. Place samples in the AWAL-provided cooler with ice.
 - a. "Ice" may be bags of ice that are double bagged to prevent leaking, or frozen sealed water bottles.
4. Include the chain of custody paperwork and the Table 2 Testing Parameters with the samples.

QA/QC of Lab Results

1. Lab results are considered valid if the deionized water blank that accompanied the samples contains no detectable metals or trace elements.
2. If the seals are broken, the chain of custody cannot be validated, or the deionized water blank has measurable results, then the sample results are considered invalid and must be resampled.

Data Evaluation and Validation

1. On receipt of the lab results the data will be entered into an excel table which lists the protection limits (when established):
 - a. Should any individual data point exceed the protection limit, the affected well will immediately be resampled, and the sample results and notification will be sent to the Division of Water Quality (DWQ) within 30 Days.
 - b. Should two consecutive samples exceed the protection limit, monthly sampling of the affected well will begin and the results will be submitted to the DWQ as soon as they are received.
2. An electronic copy of the Excel Table, Official Lab Results, and scanned copies of the Field Notes will be submitted to the DWQ on a quarterly basis. These will be accompanied by a general report on operations and conditions onsite.

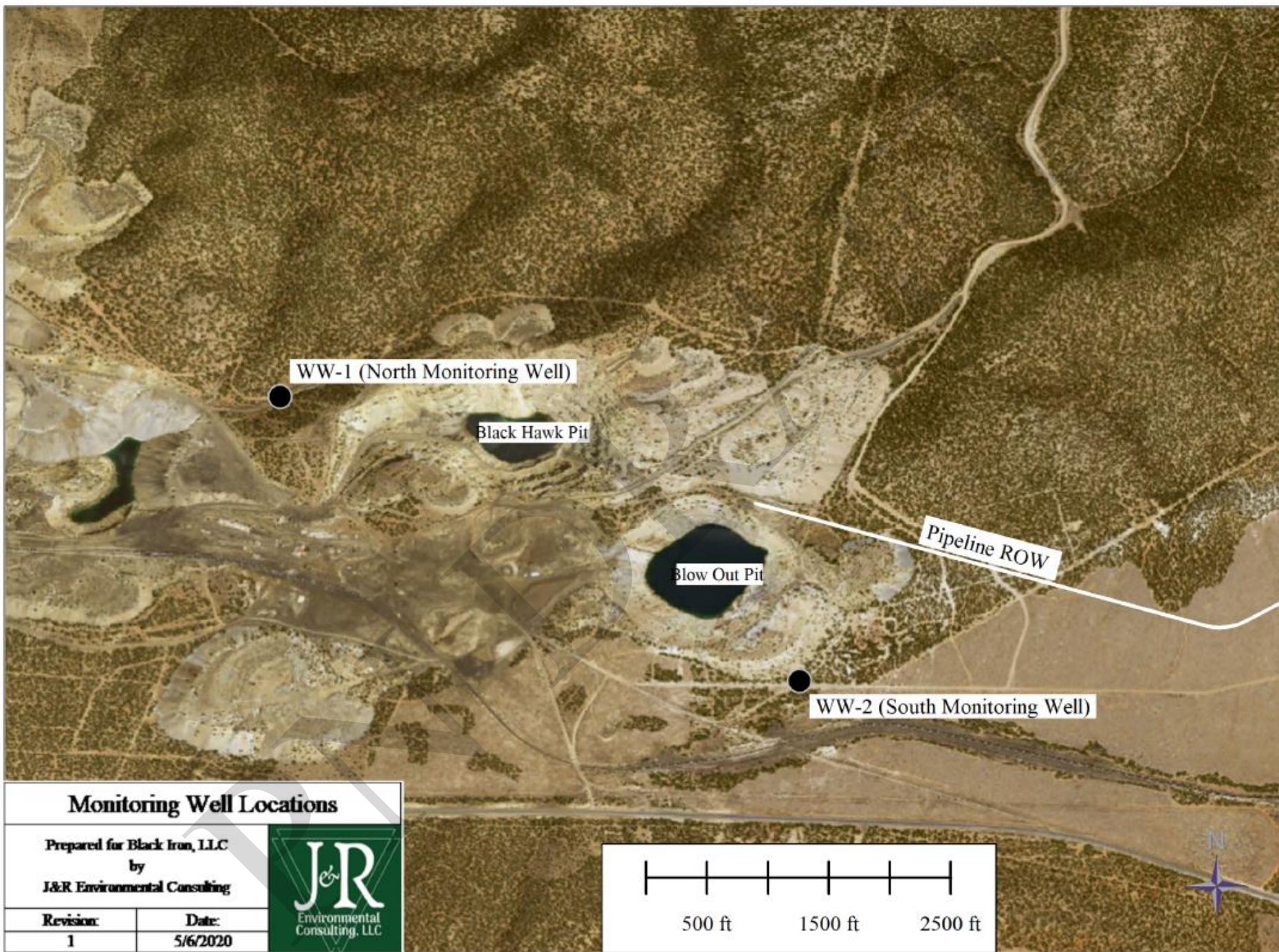
Table 2. Interim Ground Water Protection Levels

Parameter	Protection Level (mg/L)
pH	6.5-8.5
Total Dissolved Solids	981
Nitrate + Nitrite as N	2.5
Sulfate	200
Dissolved Metals	
Antimony	0.0015
Arsenic	0.125
Barium	0.5
Beryllium	0.001
Cadmium	0.00125
Chromium	0.025
Copper	0.325
Lead	0.00375
Mercury	0.0005
Selenium	0.0125
Silver	0.025
Thallium	0.0005
Zinc	1.25

Laboratory Parameters

Alkalinity	Calcium
Bicarbonate	Magnesium
Chloride	Potassium
Sodium	

Black Iron Field Sample Sheet					
Well Purge - Must be done prior to Well Sampling!					
Date:	/ /	Well Name:		pH	
Time:		Depth Of Well:	ft	eC	
Technician:		Depth to Water:	ft	Temp	Celsius
Total Volume of Water to be Purged: _____ Gallons					
Instructions:					
<p>Measure the depth from the surface of the well to the water level. Take the half the diameter of the well (the radius) multiply by itself, then by 12, then by 3.141, then by the depth of the well in feet. Divide the product by 252 to convert to gallons. This is the amount of water that needs to be purged from the well.</p> <p style="padding-left: 40px;">Example, a 4in well with a depth of 350 feet, and a depth to water 100ft.</p> <p style="padding-left: 80px;">$2*2*12*3.141*150 = 37,692$</p> <p style="padding-left: 80px;">$37,692/252 = 149.5$</p> <p>Pump 150 gallons from the well, this can be running a 10gpm pump for 15 minutes or filling a 250gallon tote 2/3 full. Take a sample of the purged well water and measure temperature, eC and pH.</p>					
Sample Collection					
Date:	/ /	Sample Location:		pH	
Time:		Depth Of Well:	ft	eC	
Technician:		Depth to Water:	ft	Temp	Celsius
Weather Conditions (Sunny, Raining, Windy, Cold Ect) _____					
Instructions:					
<ol style="list-style-type: none"> 1. If collecting a sample from a tails or recirculation line, purge sample port for 10-15 seconds prior to collecting sample. 2. Sample Location is Name of Well, Tails Pond, Recirculation Line, Tails Line, or Tails Pond Name 3. A total of two samples are collected from each location, one is placed in a treated bottle and labeled with location "-N", "-T" depending on if the sample is in a treated bottle or not. 4. Dry bottles and apply seal. 					

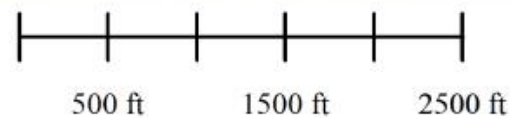


Monitoring Well Locations

Prepared for Black Iron, LLC
by
J&R Environmental Consulting

Revision:
1

Date:
5/6/2020



Appendix B

Pipeline Monitoring and Spill Prevention Plan

PND DRAFT

PIPELINE MONITORING AND SPILL PREVENTION PLAN

Prepared By: J&R Environmental Consulting

MAY 13, 2020

BLACK IRON, LLC

6249 West Gilbert Industrial Court, Hurricane Utah 84737

Contents

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Objective

Black Iron, LLC (Black Iron) operates an approximately three-mile long pipeline for the purposes of tailings disposal and water reclamation. Both the plant tailings and the reclaimed water have been tested and found to carry no harmful chemicals and do not pose a threat to plants or animals native to the area. The potential harm of a spill comes in the form of tailings disposition on public or private land, and/or erosion and property damage to public and/or private land. The purpose of this document is to set forth standardized operating procedures for the operation of the pipeline as it relates to leak detection, reporting and shut down criteria in the event of a leak, and the reclamation standards of areas affected by a spill.

Section 1: Technical Specs

The pipeline consists of two HDPE pipes placed above ground for the purpose of conveying tailings to the Blowout and Blackhawk pits, and conveying reclaimed water from the pit(s) back to the mill. Both pipes are pressure rated to 200psi. The total length of this pipeline is approximately 16,200ft.

The tailings pipeline diameter will be 12 inches, and the return line will be 10 inches in diameter. The tailings line and the return line will be placed up to 5 feet, but not more than 10 feet, apart.

There are estimated to be four pumping stations, and each station will be comprised of the following:

1. A concrete pad, not exceeding a footprint of 12 feet x 12 feet.
2. A 200-horsepower motor.
3. Pressure gauges linked to the mill.
4. Emergency Failsafe Valving to shut down the pipeline.

At points where the pipeline crosses access roads, the pipeline will be placed in culverts that run under the road. The design and construction of the culverts are sufficient to withstand external loading of vehicle traffic.

Tailings are pumped uphill to the pits for disposal in the pits, and reclaimed water flows downhill to the mill for reuse in milling operations.

Section 2: Leak Detection

There will be two main methods of leak detection:

1. A visual inspection will occur each day.
2. Continuous monitoring of flow meters and/or pressure gauges will be installed at the pumphouses.
 - a. Monitoring will be done through a combination of computer algorithm and operator checks.

- b. If a leak is detected, a follow-up visual inspection will occur to confirm the leak prior to the pipeline shutdown.

If a leak is found, the operation will follow the plan outlined in Section 6 of this document.

Section 3: Emergency Shut Off

Emergency shut off valves are located at each pumphouse:

1. These valves are failsafe, and will close if electrical power is lost in the pipeline.
 - a. In the event of a power loss, an emergency backup generator will provide power in order to open the valves and allow the pipeline to drain.
2. The Valves can be actuated manually by emergency shut down buttons located at each pumphouse.
3. The Valves will be tested once per quarter and will be kept in working order for the duration of pipeline operation.
4. The emergency shutoff valves will be clearly marked and will be kept accessible at all times during pipeline operation.

Section 4: Commissioning

The commissioning or return to service of the pipeline will consist of the following:

1. Prior to commissioning, the line will be hydrostatically tested in the following manner:
 - a. Hydrostatic test water will be obtained in accordance with operators' Water Rights.
 - b. Only clean water will be used, with no chemical additives.
 - c. The total water requirement for a full line test is ~110,000 gallons for the 12-inch line, and ~72,000 gallons for the 10-inch line.
 - d. The line will be filled with water and then pressurized to the maximum allowable operating pressure.
 - e. The line will visually be inspected for leaks, during which the line pressure will be monitored for drops in pressure.
2. In the instance of line repairs, the affected segment will be blinded off and tested.
3. Test water will be drained into either the Blowout or Black Hawk pits.
 - a. In the instances where line segments are tested after repair, the lines will be drained in a manner that prevents erosion. This may include the use of energy dissipating devices such as hay bales or sediment bags.

Section 5: Inspections

Visual Inspections of the pipeline will occur once a day, during daylight hours:

1. Inspections will be performed by someone who has been task-trained to perform the inspection.
2. The date, time, and findings of the inspection will be logged each day.
3. Inspections will include the pumphouses in order to ensure the pumphouses are in good repair, accessible, and provide direct access to the emergency shutoff switch.

When the pipeline is in operation, an aerial survey via drone will occur at least quarterly, and these will provide the following:

1. Aerial photograph of the pipeline in its entirety including both points of termination.
2. A surface model at a sufficient resolution to measure deflection of the pipeline and ensure that any settling, expansion, or contraction is within engineering tolerances.

Section 6: In the Event of a Spill

In the event that a leak is observed, the affected pipeline will immediately be shut down. The following will then occur:

1. Notification by phone to the Division of Water Quality within 24 hours of the discovered spill with the following information:
 - a. The approximate location of the spill.
 - b. The approximate size of the spill.
 - c. The approximate time between the spill being discovered and the pipeline being shut down.
 - d. The estimated time for repairs.
2. The affected line will be drained back to the mill. If there is a danger of freezing the unaffected line will also be drained.
3. If the spill is estimated to be less than 25,000 gallons:
 - a. The spilled tailings will be moved and disposed of in an approved manner.
 - b. The water will be allowed to soak into the ground or evaporate off.
 - c. Erosion to the road or surrounding area will be repaired.
 - d. The affected area will be reseeded with a Division of Oil, Gas and Mining (DOGM) and/or Bureau of Land Management (BLM) approved seed mix.
4. If the spill is estimated to be greater than 25,000 gallons:
 - a. The accessible tailings will be disposed of with equipment, and disposed of in an approved manner.
 - b. The DOGM and the BLM will be consulted and the operator will adhere to the resulting agency requirements.
5. Regardless of the spill size, the Division of Water Quality (DWQ) will be notified prior to the pipeline restart.
6. A formal written notice will be sent to the DWQ within 7 days of the discovered leak and will include the following:
 - a. The exact location of the spill.
 - b. The best estimated size of the spill.

- c. Photos, including available aerial photos of the affected areas.
- d. The duration and extent of the repairs required.
- e. The determination of the root cause, and future mitigation.
- f. What correction and mitigation work was done, and what work remains outstanding.
- g. The quarterly report to the Division of Water Quality will document the status of any outstanding items left open by the 7-day written submission until these items are completed.

Section 7: Pipeline Repairs and/or Modifications

Should the pipeline require repair or maintenance, Black Iron will observe the following:

1. Pipeline repairs will only be conducted using industry best practices by task-trained individuals.
2. The entirety of the pipeline will be drained if repairs are expected to take longer than four hours and there is a possibility of freezing.
3. Repairs on the pipeline will meet or exceed its original factor of safety.
4. Prior to restarting the pipeline after a repair, the pipeline will be tested as outlined under Section 4.
5. Any spill resulting from the repair will follow the clean-up and reporting requirements outlined in Section 6.

Modifications of the pipeline will be engineered to meet or exceed the original factor of safety. The DOGM, BLM, and DWQ will be notified prior to any modification of the pipeline that alters its path, carrying capacity or operation.

Section 8: Pipeline Security

The security for the pipeline will be provided by Black Iron, LLC and will consist of the following:

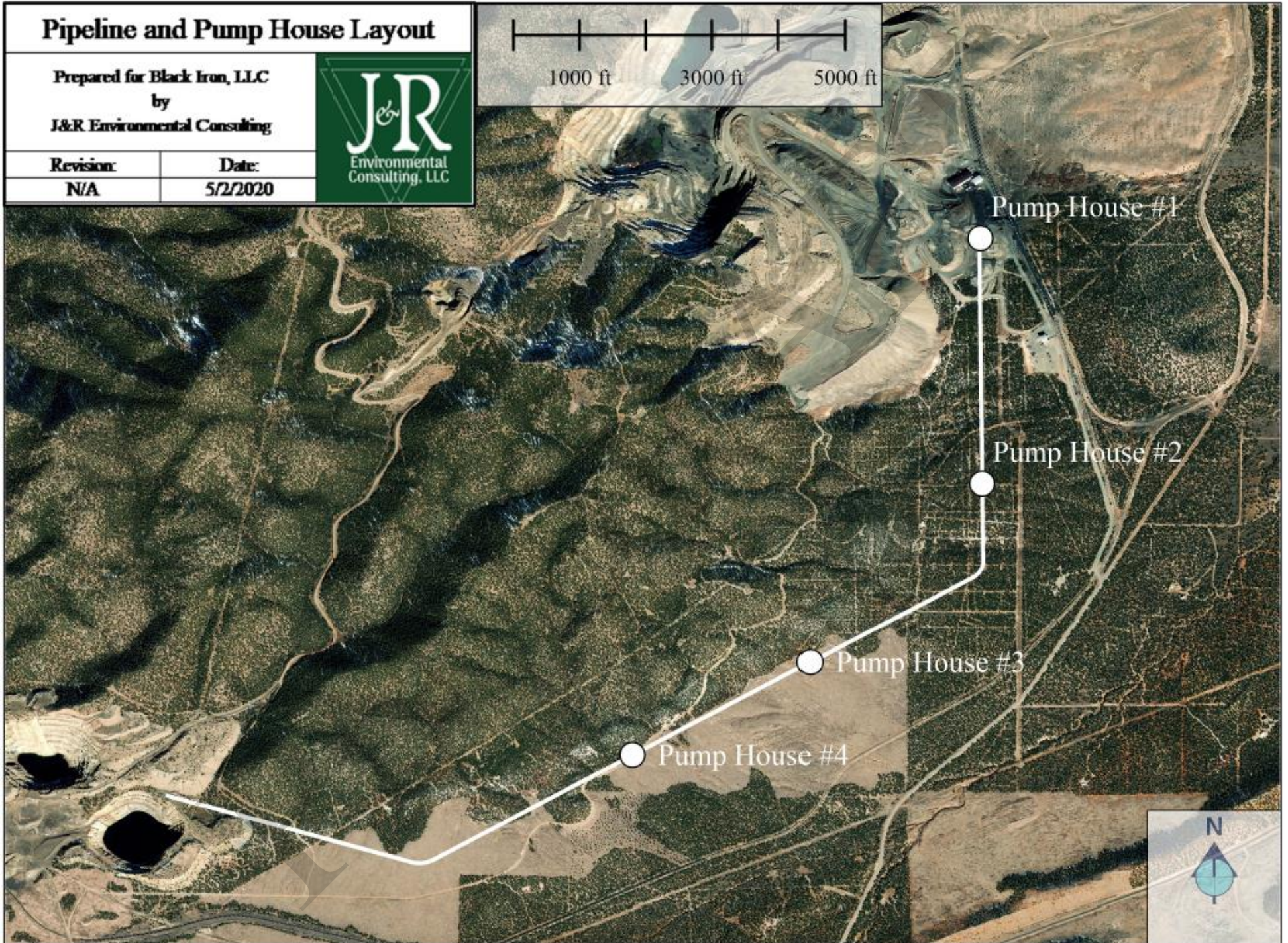
1. Signs will be placed along the path of the pipeline to warn of active mining activities, and will remind the public of penalties for trespassing or tampering with the pipeline.
2. Cameras will monitor the pipeline.
3. Black Iron employs 24-hour mill-site security, which will include the pipeline and tailings facilities.

Pipeline and Pump House Layout

Prepared for Black Iron, LLC
by
J&R Environmental Consulting

Revision:
N/A

Date:
5/2/2020



Appendix C

Ground Water Monitoring Plan

P/N DRAFT



REPORT

Groundwater Monitoring Plan

Iron Mountain Mine

Iron County, Utah

Submitted to:

Black Iron, LLC

6249 W. Gilbert Industrial Court
Hurricane, UT 84737

Submitted by:

Golder Associates Inc.

905 Railroad Street, Suite 101 Elko, Nevada, USA 89801

+1 775 753-6923

20142374.001.R.REV1

August 28, 2020

1.0 OBJECTIVE

As required by the State of Utah Department of Environmental Quality's Division of Water Quality (UDWQ), this Ground Water Monitoring Plan provides detailed information for proposed monitoring wells, as required by the Ground Water Discharge Permit No. UGW210011 for Iron Mountain Mine, a property of Black Iron, LLC. In general, purpose of the plan is to obtain an overall understanding of the hydrogeologic conditions at the site and how ground water will be monitored to determine impacts, if any, resulting from the mining activities. This plan details the following elements, including, but not limited to:

- proposed locations of the monitoring wells,
- estimated depths and flow direction of ground water,
- anticipated presence of alluvial and/or bedrock aquifers,
- up-gradient and down-gradient ground water conditions,
- drilling methods,
- well construction specifications,
- well development and sampling procedures and methods, and
- routine ground water sampling of monitoring wells.

This plan is to be used in combination with the Sampling and Analysis Plan which further details the sampling plan and methods, as specified in R317-6-6.3.I.

2.0 MONITORING WELL DETAILS

2.1 Site Hydrogeology

The primary source of information regarding the hydrogeology of the Iron Mountain Mine is documentation provided by Black Iron, LLC, for their Notice of Intent Revision for Division Review (permit #MO/021/008), dated August 12, 2020. Their summary of the hydrogeology was compiled from previously submitted permits from past mining activities by mine owners prior to Black Iron, LLC.

The Iron Mountain mining area is underlain by unconsolidated Quaternary alluvial sediments (sands, silts, and clays) in the valley floors and semi-consolidated to consolidated Jurassic/Cretaceous rock sediments in the mountains and hills. The principal groundwater aquifer is comprised of Quaternary and Cretaceous sediments and ground water occurs in valley fills under both confined and unconfined conditions. The sediments with the highest yield potential are beds of well-sorted sand and gravel. Ground water also exists in the deeper Jurassic rock and along the iron ore contacts, primarily in fracture planes (joints/faults) and along bedding planes. Flow is controlled by the fracture pattern systems, fault trends and attitude (strike and dip) of the bedrock. Permeability of the bedrock combined with fracture pattern flows controls the transmissivity (flow rate) of the deeper bedrock aquifers. Further complicating the flow systems are the intrusive bodies with associated faulting and fracturing.

The potentiometric surface of the ground water in the area generally parallels the topographic surface of the valley and mountain slopes except where mine excavations or major faulting occurs. Figure 1 shows the ground water contour map across the Iron Mountain and Comstock Mining areas. Information from water level measurements taken from the 1950's exploration drill holes was used to compile the ground water contour map, according to

previous permit application documents located by Black Iron, LLC. This figure also includes a water well that has not been located in the field and for which insufficient records have been found; therefore, is not included as a part of this plan and should be disregarded. Additionally, ground water contours understood to have been produced as part of a limited hydrogeological survey conducted by Geneva Steel in 1996, show similar results. Neither data set has been located to date – only the contour mapping has been found. Water levels of standing water in the open pit ponds taken from 2009 aerial photographs were also used to evaluate current ground water level conditions. Black Iron, LLC acknowledges that while the data is historical, it is still a valuable tool for purposes of estimating the site's hydrogeologic conditions.

Since all of the historic test holes have been mined-out, it is not possible to obtain ground water measurements for current potentiometric surface updates. However, a comparison of current standing water levels in the open pits, believed to be controlled primarily by ground water plus surface runoff entry, indicates that ground water levels have generally lowered across the site. This trend is believed to have resulted from seasonal differences during times of measurement, impacts on surface recharge from past 100-year peak flows to the pits, and more recent drought conditions. No artesian wells are known to exist within the Blackhawk and Blowout Pits area.

Faulting and fracturing, which occur in the pit zones, can affect the impact of the pits on ground water levels. Intrusive contacts and associated faulting are also factoring in ground water flow conditions of the Blackhawk Pit where discontinuities exist seemingly concordant with fault patterns and clusters. A cross-fault detected beneath a portion of the site could also be responsible for the irregular ground water flow patterns shown on Figure 1.

Recharge to the ground water aquifer system in the area is primarily from snowmelt and rainfall on Iron Mountain and other adjacent mountains to the south and west. Discharge of ground water occurs primarily from springs and evaporation from open pit ponds. The remaining ground water is discharged from the area by subsurface flow into valley fills to the north and southwest. Some ground water is also stored in interstitial pore spaces and/or fractures of area sediments.

It must be noted that all information in this section was compiled by Black Iron, LLC from various sources and has not undergone any re-evaluation by field methods.

2.2 Monitoring Well Locations

Monitoring wells will be installed upgradient and downgradient of the Blackhawk and Blowout Pits, where future tailings will be deposited, and water decanted for reuse in the mining process. The timeline for this process is two-part: deposition will first occur in Blowout Pit and will transition to Blackhawk Pit in 3 to 5 years' time. In order to expedite the approval and execution of the ground water monitoring program, the upgradient monitoring well (WW-1) will be drilled immediately, along with the monitoring well downgradient of Blowout Pit (WW-2) (see Figure 2). Prior to transition of tailings deposition to Blackhawk Pit, a third well will be located downgradient of this pit to ensure capture of ground water potentially effected by this deposition. At that time, this Ground Water Monitoring Plan will be amended to include all required details of the new well prior to tailings deposition in Blackhawk Pit.

The locations of the upgradient well and the well downgradient of Blowout Pit have been selected based on available hydrogeological data, as previously discussed. After examining the ground water contours (see Figure 1), WW-1 North Monitoring Well was placed in a position upgradient of both the Blackhawk and Blowout Pits, as well as any mining activity, to provide a baseline for water quality. WW-2 South Monitoring Well will be located downgradient of the Blowout Pit and will provide samples to determine any changes in water quality. The approximate locations are shown in the table below.

Name	PLSS	Lat	Long
WW-1 North Monitoring Well	Section 35, Township 36S, Range 14W, SL B&M	37.62047	-113.39091
WW-2 South Monitoring Well	Section 01, Township 37S, Range 14W, SL B&M	37.61500	-113.38250

The estimated depth to ground water for both wells is between 150-250 feet (ft), based on topography and the available ground water contour elevations. It is expected that the monitoring well will be sited in the uppermost ground water aquifer. There is no available information on a vertical gradient between the pit and monitoring well location, but the proximity of the two suggests a limited possibility of such a loss.

The well locations were also selected to minimize drilling depth to ground water, promote ease of access, and to maintain property ownership considerations by being sited on Black Iron, LLC, property (see Figure 2).

2.3 Well Drilling

The wells will be drilled by a licensed well driller in the State of Utah by air-rotary method, as required, and the well construction will meet Utah Administrative Code (UAC) R655-4-15, Monitoring Well Construction Standards (see Figure 3), as well as those referenced in UAC R317-6-6.3.I, including the Handbook of Suggested Practices for Design and Installation of Ground-Water Monitoring Wells (EPA/600/4-89/034, March 1991). In general, the wells will be constructed as follows:

- 1) Each well will be permitted as a Non-Production Well, prior to drilling.
- 2) The wells will be no greater than 17.5 inches in diameter at the surface (cased to 6-inch diameter), drilled to a depth of 40-50 ft into the aquifer.
- 3) The wells will be equipped with a schedule-80, polyvinylchloride (PVC), 6-inch diameter casing with a 0.032-inch machine slotted, schedule-80 flush-joint, threaded PVC well screen for monitoring and pumping purposes. A 6-inch casing will allow for the placement of a dedicated submersible pump at each well. The well will be screened over a 20-foot interval, beginning at least 5 ft below the water table to provide enough coverage for nominal fluctuations in water level.
- 4) Each well will be equipped with a dedicated submersible stainless-steel pump, capable of producing 5 gallons per minute for purging and sampling. The pumps will be chemically inert and suitable for the anticipated water quality at the site.
- 5) Upon completion of the wells an official Well Driller's Report (Well Log) will be filed by the driller with the Utah State Engineer, as required by R655-4-4. Similarly, a Pump Log will also be completed, as required, when pumps are installed. A Monitoring Well As-Built Report will be submitted to DWQ, as required.
- 6) The abandonment of the well will be conducted as outlined in Utah Administrative Code R655-4-14.

3.0 WELL DEVELOPMENT AND SAMPLING

Once the surface seal has properly cured and not less than 48 hours after installing the surface seal, the monitoring well will be developed using a combination of bailing, swabbing and pumping (by airlift and submersible pump, if sufficient ground water is present) to remove drilling mud and fine-grained material from the well screen and filter pack. Field parameters including pH, temperature, and specific conductance (EC) will be

monitored. The well will not be considered fully developed until the field parameters from three consecutive measurements stabilize as follows: temperature is within ± 1 degree Celsius ($^{\circ}\text{C}$), pH is within $\pm 5\%$, EC is within $\pm 5\%$ of the previously measured value. Wells will be developed until turbidity reaches 5 nephelometric turbidity units (ntu) and a minimum of 10 casing volumes have been purged. The purge water will be allowed to run off to the surface, away from the well, as it is designated as Class II Drinking Water Quality Ground Water. An airlift aquifer test will also be conducted by the driller. The results of the aquifer test will be included in the monitoring well as-built report for each well.

Records of all the parameters measured prior to sampling will be documented in the field notebook or appropriate sampling form. Once stabilization is achieved, water samples can be obtained using the proper techniques and methods for the specific analyses required. Each of the sampling points will require new tubing for sampling.

Further testing and sampling procedures are provided in the Sampling and Analysis Plan for the same Ground Water Discharge Permit No. UGW210011.

Signature Page

Golder Associates Inc.



Elise Brachtel, P.E.
Senior Water Resources Specialist



Edward Minnes
Associate/ Project Director

EB/AG/kg/vk

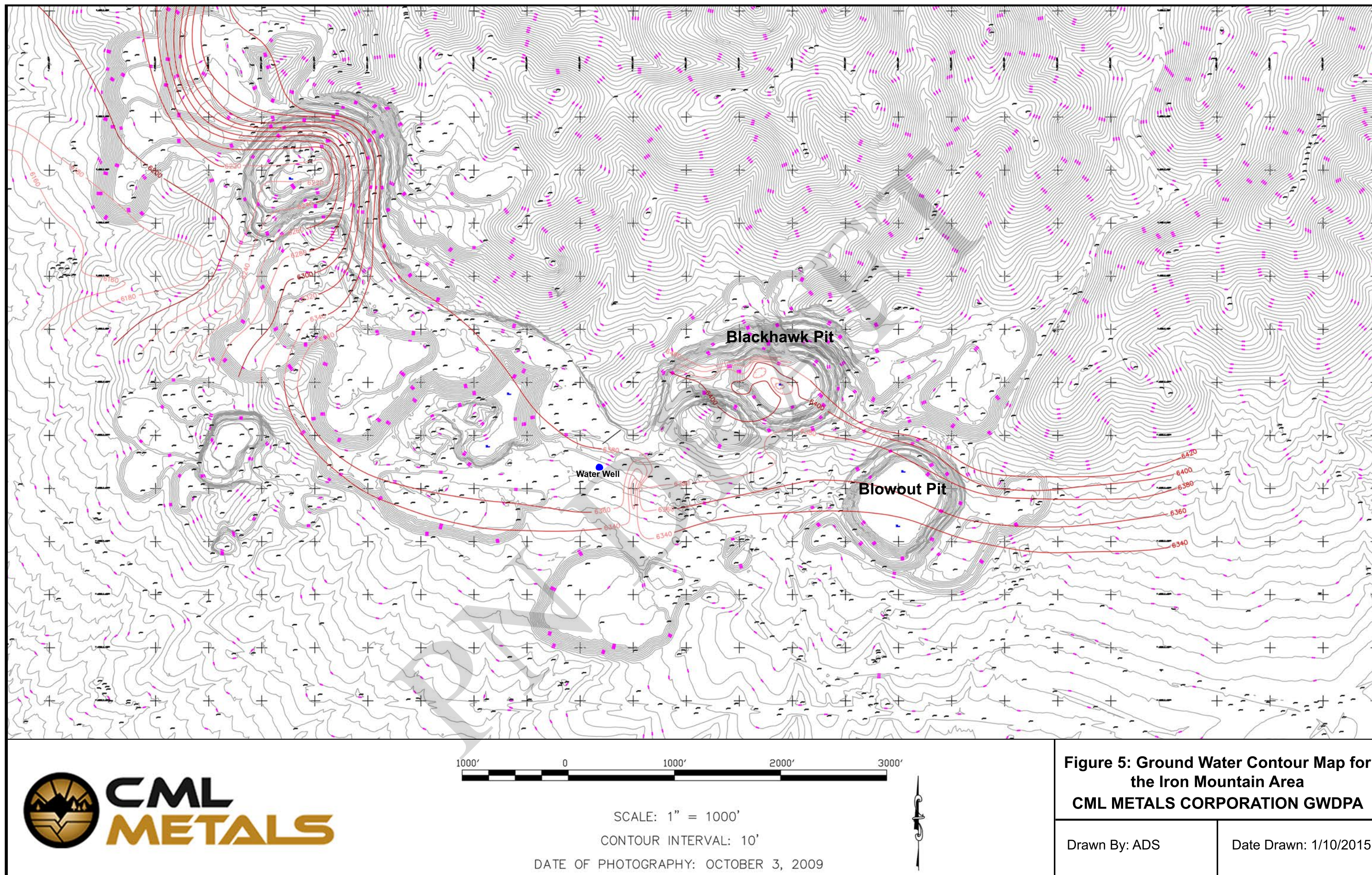
ATTACHMENT - FIGURES

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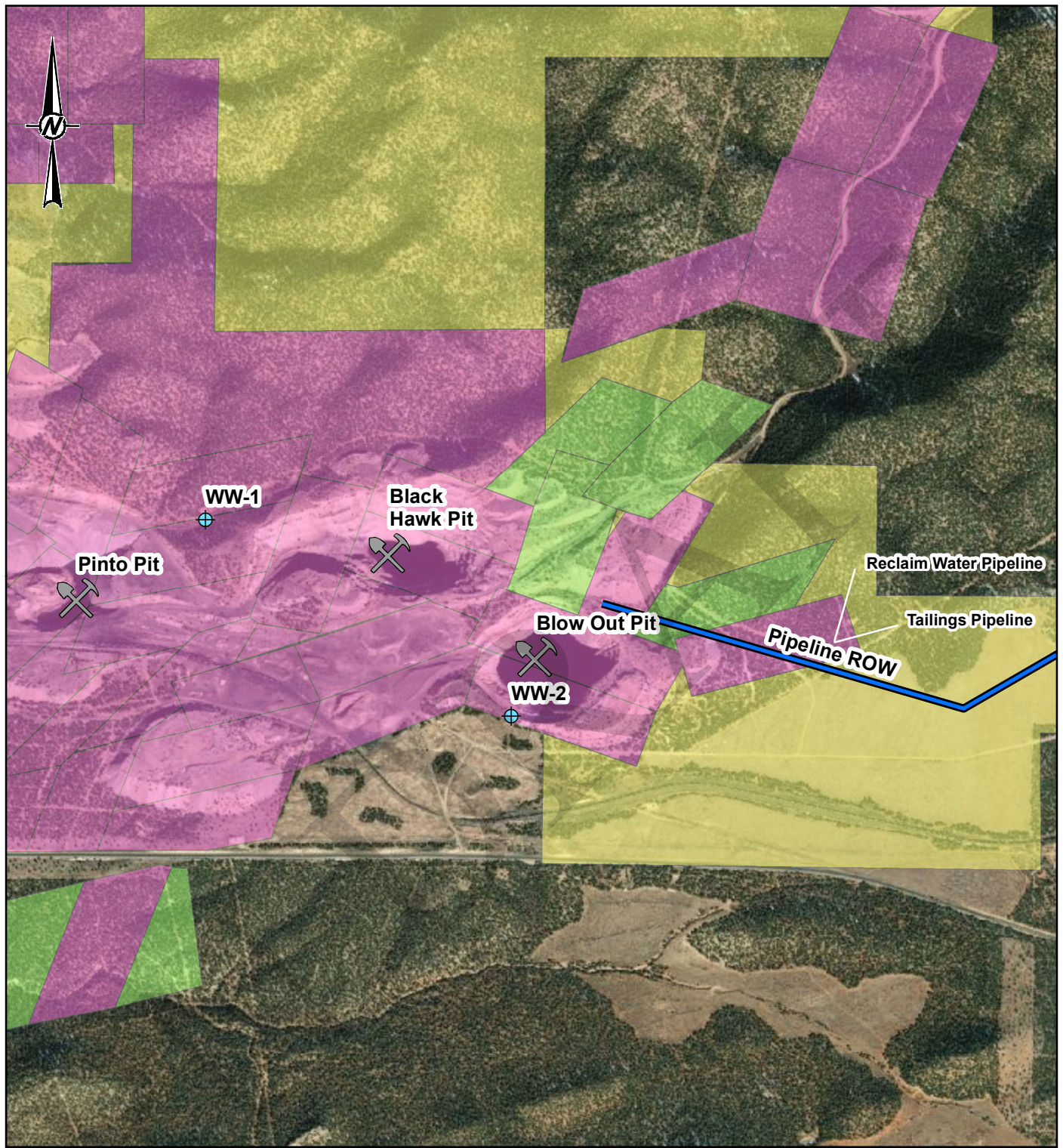
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FIGURES








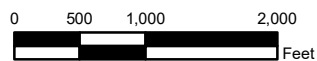
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Figure 1 - Source: Black Iron, LLC, 2020. NOTE: Water Well on figure not part of Ground Water Monitoring Plan, as verification not available.



Legend

-  GROUNDWATER MONITORING WELLS
-  PIPELINE ROW
-  BLM
-  Gilbert Owned
-  Partial Interest



REFERENCE(S)

1. SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRIID, IGN, AND THE GIS USER COMMUNITY
2. GLOBAL MAPPER PACKAGE PROVIDED BY BLACK IRON, LLC ON JULY 23, 2020 IN ELECTRONIC FILE TITLED 'LAND OWNER WITH MONITORING WELLS 7-23-2020.GMP'.
3. PIPELINE ROW LOCATION PROVIDED BY BLACK IRON, LLC IN FILE TITLED 'SAMPLING AND ANALYSIS PLAN - FINAL.DOCX'.

CLIENT
IRON MOUNTAIN MINE
BLACK IRON, LLC
IRON COUNTY, UTAH

PROJECT
GROUND WATER MONITORING PLAN

TITLE
SAMPLING LOCATIONS

CONSULTANT



YYYY-MM-DD	2020-08-27
DESIGNED	MEB
PREPARED	MEB
REVIEWED	EVB
APPROVED	EVB

PROJECT NO.
20142374

REV.
1

FIGURE
2

PERMANENT STEEL PROTECTIVE SURFACE CASING MUST BE INSTALLED TO A MINIMUM DEPTH OF 2 FT WHEN PVC CASING IS USED. SURFACE CASING SHALL BE CEMENTED INTO THE SURFACE SEAL ANNULAR SPACE

2 FT X 2 FT X 4 FT CONCRETE PAD (SLOPED AWAY FROM WELL)

WATER TIGHT, LOCKING COVER

STEEL PROTECTIVE WELL CASING AND WELL CASING MUST EXTEND AT LEAST 18 INCHES ABOVE GROUND SURFACE

STEEL PROTECTIVE POSTS

GROUND SURFACE

SEAL MATERIAL SHALL BE CONSIST OF NEAT CEMENT GROUT, SAND CEMENT GROUT, BENTONITE GROUT, OR UNHYDRATED BENTONITE.

CASING MUST BE CENTERED IN WELL BORE TO ALLOW THE SEAL MATERIAL AND GRAVEL/FILTER PACK TO EVENLY SURROUND THE WELL.

ANNULAR SPACE BETWEEN PROTECTIVE SURFACE CASING AND WELL CASING MUST BE SEALED WITH CEMENT/CONCRETE ABOVE LEVEL OF PAD TO PREVENT PONDING. CONCRETE PAD AND APRON MUST BE CONTINUOUSLY POURED AND EXTEND BELOW FROST LINE.

WELL CASING (6" SCHEDULE 80 PVC)

UNDIFFERENTIATED DEPOSITS

TRANSITION SEAL (E.G. 2 FT TO 5 FT OF BENTONITE CHIPS/PELLETS OR FINE (MORTAR) SAND TO PREVENT GROUT PENETRATION INTO GRAVEL/FILTER PACK.

0.032" MACHINE SLOTTED SCHEDULE 80 FLUSH JOINT THREADED PVC

GRAVEL PACK/FILTER MATERIAL

ESTIMATED 20 FT (FIELD ADJUSTED)

WATER BEARING UNITS TARGETED FOR MONITORING

UNDIFFERENTIATED DEPOSITS

NOTE(S)

1. UTAH DIVISION OF WATER RIGHTS OFFICE OF THE UTAH STATE ENGINEER. STATE OF UTAH WATER WELL HANDBOOK, BASED ON THE ADMINISTRATIVE RULES FOR WATER WELLS (R655-4 UAC), ADOPTED MAY 2018.
2. DIAGRAM NOT DRAWN TO SCALE.

NOT FOR CONSTRUCTION

CLIENT
IRON MOUNTAIN MINE
BLACK IRON, LLC
IRON COUNTY, UTAH

CONSULTANT

YYYY-MM-DD 2020-08-27

DESIGNED MEB

PREPARED MEB

REVIEWED EVB

APPROVED AG

PROJECT
GROUND WATER MONITORING PLAN

TITLE
TYPICAL MONITORING WELL DETAIL

PROJECT NO.
20142374

REV.
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FIGURE
3



PVNDRAFT



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