# STATEMENT OF BASIS

# GROUND WATER DISCHARGE PERMIT UGW210011

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

**July 2025**

## Introduction

The Division of Water Quality ("Division") under the authority of the Utah Ground Water Quality Protection Rules[1] ("Ground Water Rules") issues ground water discharge permits to facilities which have a potential to discharge contaminants to ground water[2]. As defined by the Ground Water Rules, such facilities include mining operations[3]. The Ground Water Rules are based on an anti-degradation strategy for ground water protection as opposed to non-degradation; therefore, discharge of contaminants to ground water may be allowed provided that current and future beneficial uses of the ground water are not impaired and the other requirements of Utah Administrative Code ("Utah Admin. Code") R317-6-6(6.4)(A) are met[4]. Following this strategy, ground water is divided into classes based on its quality[5]; and higher-quality ground water is given greater protection[6] due to the greater potential for beneficial uses. The Division has developed permit conditions consistent with R317-6 and appropriate to the nature of the mined materials, facility operations, maintenance, best available technology[7] ("BAT") and the hydrogeologic and climatic conditions of the site, to ensure that the operation will not contaminate ground water.

## Basis for Permit Renewal

Ground Water Discharge Permit UGW210011 is being renewed in accordance with R317-6-6(6.7). However, a permit may be terminated or a renewal denied if any one of the four items listed in Utah Admin. Code R317-6-6(6.8) applies:

1) Noncompliance by the Permittee with any condition of the permit, where the Permittee has failed to take appropriate action in a timely manner to remedy the permit violation;

2) The Permittee's failure in the application or during the permit approval process to disclose fully all significant relevant facts at any time;

[1] Utah Admin. Code Rule 317-6
[2] https://deq.utah.gov/ProgramsServices/programs/water/groundwater/docs/2008/08Aug/GWQP_PermitInfo.pdf
[3] Utah Admin Code Rule 317-6-6(6.1)(A)
[4] Preamble to the Ground Water Quality Protection Regulations of the State of Utah, sec. 2.1, August, 1989
[5] Utah Admin. Code Rule 317-6-3
[6] Utah Admin. Code Rule 317-6-4
[7] Utah Admin. Code Rule 317-6-1(1.3)

3) A determination that the permitted facility endangers human health or the environment and can only be regulated to acceptable levels by plan modification or termination; or

4) The Permittee requests termination of the permit.

**Purpose**

Utah Iron, LLC ("Utah Iron"; formerly Black Iron, LLC) owns and operates the Iron Mountain Mine located in the Iron Springs District, west of Cedar City, Utah. Iron ore extracted from the open pit is processed on site via crushing and grinding methods, followed by magnetic separation and reverse flotation.

In 2020, Utah Iron installed a tailings pipeline that transports iron and gangue tailings from the milling facilities to two existing open pit lakes (Blackhawk and Blowout), approximately 2.4 miles southwest of the milling facility, located on the southern flank of Iron Mountain. After processing, the tailings consist of roughly 20-50 percent solids and 57 percent liquids. The tailings are transported as slurry and discharged into the two existing pits, where the tailings are allowed to settle and assist in backfilling the existing disturbance. A return water pipeline pumps and recovers pit water for re-use in the milling and separation process.

On April 9, 2025, Utah Iron LLC temporarily shuttered all mine activities due to global market challenges for iron ore. Currently, there are no active mine operations or discharges of process water to the pit lakes; however, operations are expected to resume during the term of this permit. The Permittee shall follow all permit requirements as listed in the permit during mine operation hiatus.

Ground Water Discharge Permit UGW210011 covers all facility and mine operations for ore processing and management of the tailings' operations. The permit established the requirements for ground water monitoring, BAT performance standards, sampling and analysis methods, and closure procedures for all activities at the site that have the potential to impact ground water as listed in Utah Admin. Code R317-6. A compliance schedule is included in Part I.H of the permit, which establishes deadlines and summarizes additional requirements for each submittal to maintain permit compliance.

**Potential Impacts to Ground Water**

The Blackhawk and Blowout pit lakes are utilized for operational process water discharge and reuse for facility operations. The water present in both pit lakes is a combination of stormwater runoff, process water discharge, precipitation, and intercepted ground water. The objective of the ground water monitoring plan is to ensure the protection of the uppermost aquifer and to detect any changes in tailings' slurry chemistry early so that they can be resolved. Ground water quality monitoring of the shallow aquifer downgradient of the pits is conducted to determine if ground water quality has been impacted by tailings' discharges into the pit lakes.

## Geologic Description

The Iron Springs District is characterized by a pluton intrusive with ore deposits situated along the flanks in sedimentary rocks. A complex series of fractures also exists in the flanks, as parallel and cross faults. The Blackhawk and Blowout pit walls consist of quartz monzonite, the Homestake Limestone member of the Carmel Formation, and Navajo Sandstone. The Iron Mountain 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.

## Hydrogeology

Regional. The direction of regional ground water movement in this part of the Basin and Range Province is toward the west. Ground water 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.

The overall water table level in the Iron Mountain area has dropped between 12 and 100 feet between 1996 and 2009. This small but general decrease in ground water elevation is mirrored by a similar, if not stronger, decrease in ground water levels throughout the Escalante Desert basin, of which Iron Mountain is a part. Data extending back to 1945 show a clear decline in water table elevations of agricultural lands located in this basin to the north and west of Iron Mountain due to water-well pumping for irrigation in the Enterprise-Beryl-Lund area. Records indicate that discharge exceeds recharge in this area, resulting in a declining water table; in some places, ground water levels have decreased by 70 feet or more (Thomas and Lowe 2007). Because agriculture is ongoing in the Escalante Desert, it can be assumed that water table elevations will decline further, rather than increase, over time.

Local. The Quaternary and Cretaceous sediments comprise the principal ground water aquifer. Ground water exists in the shallow Cretaceous Iron Springs Formation, which consists of continental sandstone with subordinate shale and other rock types. According to pump testing in the area, the aquifer in the Iron Springs Formation is shallow and has very low recharge, indicating the aquifer occurs in very tight rock with limited transmissivity and is fed primarily by rainfall and other means of infiltration.

Another ground water aquifer occurs in the deeper Jurassic rock and along the iron ore contacts, primarily in fracture planes (joints/faults) and along bedding planes. The permeability of the bedrock, combined with fracture flow, controls the transmissivity (flow rate) of the aquifers. Like the overlying formations in the area, the deeper aquifer has limited transmissivity, and fractures do not appear to be extensively interconnected. This has been substantiated by previous drilling programs conducted to establish a production well that would supply the facility. None of these test-well drilling programs installed a well with sufficient production. Only one test well was considered a possibility (NE, NE, Sec 30, T36S, R13W); yet, after two weeks of pumping the water level dropped below the pump level. These data indicate that the formation has limited transmissivity, with most storage occurring within fractures. The fractures are not widely interconnected, and the storage within them is limited. As a result of the inability to install a

production well, a pipeline from Cedar City was installed to provide water for the operations.

**Ground Water Quality**

Ground Water Classification. The uppermost shallow ground water aquifer at the site is contained within both Quaternary and Cretaceous sediments. In accordance with Utah Admin. Code R317-6-6(3.1) and ground water quality data provided in the permit application; ground water is classified as Class II Drinking Water Quality Ground Water.

Class II Protection Levels. In accordance with Utah Admin. Code R317-6-6(4.5), Class II ground water will be protected for use as drinking water or for other similar beneficial uses with conventional treatment prior to use. Class II protection levels are established in accordance with the criteria in Utah Admin. Code R317-6-6(4.5)(B).

The processing of the magnetite ore involves the use of a thickening process of concentrate and tailings. The flocculant used in the thickeners does not contain hazardous or substances, as indicated by the Material Safety Data Sheets (MSDS); therefore, no adverse impacts on water quality are expected.

Based on information submitted in the original discharge permit application, the post-processing thickener tank tailings discharge water meets Class II quality comparable to ground water. A long-term analysis of the water quality of the tailings was conducted using a Toxicity Characteristic Leaching Procedure (TCLP). The long-term prediction of water quality of the tailings conforms to primary drinking water standards and Class II ground water quality standards.

**Compliance Monitoring Program**

A quarterly ground water compliance monitoring program has been established since tailings discharge operations began in 2020. The ground water monitoring plan includes analyses of water chemistry for surface water (pit lakes), process water (tailings and reclaimed water pipelines), and ground water (upgradient and downgradient monitoring wells, relative to the pit lakes).

The following key parameters were selected for compliance monitoring based on their concentrations in the process water compared to concentrations in shallow ground water:

- TDS
- Alkalinity, bicarbonate, chloride
- Nitrate + Nitrite
- Sulfate
- Dissolved Metals

**Compliance Schedule**

Following the reactivation of the facility and its associated processes, all compliance schedule item timelines will commence using the start date of facility activation and be completed according to the schedule listed below.

1. **Source Material Analysis Plan.** For the ensuing permit term following the date of renewal, 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 review and approval by the Division. Upon approval of the *Source Material Analysis Plan*, the Permittee shall present findings from implementation of the Plan within one calendar year after 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 determine the ground water flow direction, verify water quality, and enhance the ability to monitor changes and impacts to ground water 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 ground water flow direction in the area of the 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 may be adjusted if necessary to comply with Utah Admin. Code R317-6-4 for each newly established compliance monitoring location.

4. **Contingency Treatment Plan.** Within one year of the permit renewal date, the Permittee shall submit to the Division for Director approval a *Contingency Treatment Plan* for the process water circuit and pit lake compliance points. 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 specified in this permit are contingent upon a plan being

in place to limit those increases to within the new compliance values, to protect ground water 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 C*ontingency Treatment Plan* for the process water circuit as an Appendix of this permit.

5. **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 the 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 of the water being dewatered, as listed in Table 2. 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 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 shall be submitted with the corresponding quarterly monitoring report.

6. **Final Closure Plan.** In the event that the Permittee decides to discontinue its operation 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.

7. **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 the permit.

## References

Thomas, Kevin, and Mike Lowe. 2007. *Recharge and Discharge Areas for the Principal Basin-Fill Aquifer, Beryl-Enterprise Area, Iron, Washington, and Beaver Counties, Utah*. Utah Geological Survey, Map 225. Utah Department of Natural Resources. ISBN 1-55791-770-1.