

STATEMENT OF BASIS

GROUND WATER DISCHARGE PERMIT UGW350015

Kennecott Utah Copper LLC
Magna Process Water Reservoir
Magna, Utah

August, 2020

Introduction

The Division of Water Quality (DWQ) under the authority of the Utah Ground Water Quality Protection Rules¹ (Ground Water Rules) issues ground water discharge permits to facilities which have a potential to discharge contaminants to ground water². As defined by the Ground Water Rules, such facilities include mining operations³. 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 Rule 317-6-6.4.A are met⁴. Following this strategy, ground water is divided into classes based on its quality⁵; and higher-quality ground water is given greater protection⁶ due to the greater potential for beneficial uses.

The Director has developed permit conditions consistent with R317-6 and appropriate to the nature of the mined materials, facility operations, maintenance, best available technology⁷ (BAT) and the hydrogeologic and climatic conditions of the site, to ensure that the operation would not contaminate ground water.

Basis for Permit Renewal

This Permit is being renewed in accordance with R317-6-6.7. However, a permit may be terminated or a renewal denied if any one of the four items in R317-6-6.8 applies:

- A. 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;

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 317-6-6.1A

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)

- B. The permittee's failure in the application or during the Permit approval process to disclose fully all significant relevant facts at any time;
- C. 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
- D. The permittee requests termination of the Permit.

Permit Changes and Modifications

No new facilities will be regulated under this Permit. Any reference to the Utah Copper Power Plant (UPP) has been removed from this permit application as the facility is the process of being demolished.

Purpose

Past permitting of this area included the North Concentrator facilities consisting of the Bonneville Crushing Mill as well as the Magna Flotation Mill and Filter Plant and the Utah Copper Power Plant (UPP). These mills and filter plant facilities ceased operations in 2001 with reclamation completed in 2007 while the UPP ceased operations in 2017 and is in various stages of demolition. Currently in place is the Magna Process Water Reservoir, which includes containment and pumping facilities that route process water for Kennecott Utah Copper LLC (Kennecott) operations.

The Magna Reservoir facility, located north of the former UPP facility, consists of two reservoirs located adjacent to each other. The reservoirs were constructed in 2011 to primarily be operated in series with flow typically first entering Reservoir No. 1, flowing to Reservoir No. 2, and then to Pump Stations 3, 3A, and 3B. However, each reservoir has an inlet, outlet, and overflow that can be isolated so that the reservoirs can be operated independently during periods of maintenance, modification, or repair. The reservoirs include an identical, double containment liner system as the seepage barrier:

- A primary liner consisting of an 80-mil HDPE geomembrane with microspikes for surface traction is located on top.
- A secondary liner consisting of a 60-mil HDPE geomembrane with drainage nubs is located beneath the primary liner.

The volume of any leakage is monitored by electrical controls in leak detection manholes that are linked to a programmable logic controller (PLC) located and monitored remotely at the Tailings Control Room.

Hydrogeology

The Magna Process Water Reservoir facilities are located on the north flank of the Oquirrh Mountains. Immediately to the east and north of the site lie basin-fill sediments. Three aquifer systems exist in the vicinity of the Magna Process Water Reservoir: the Bedrock Aquifer system

associated with the Oquirrh Mountains, the confined Principal Aquifer, and the unconfined Shallow Aquifer.

The Bedrock Aquifer beneath the facility is comprised of Paleozoic shale, quartzite, limestone, and dolomite. Recharge to the Bedrock Aquifer system is principally from precipitation on the mountains to the south. Ground water in the bedrock system flow path discharges to the north of the Magna Process Water Reservoir facilities either directly to Adamson Spring or passes into the Principal Aquifer and into Adamson Spring or the Clarification Canal at or near Pump Station #1.

The Principal Aquifer is a confined system which includes a gravel zone and lacustrine deposits. The gravel zone was most likely derived from erosion of the mountains during an extensive low lake cycle. Many high yield water supply wells near the Oquirrh Mountains are completed in the gravel zone of the Principal Aquifer. The lacustrine zone consists of clay, silt and interbedded fine sand. Principal ground water flow direction for this aquifer is northerly.

The Shallow Aquifer system consists of interbedded lacustrine Bonneville clay, silt, and fine sand. The exact depth of this system varies but is approximately the upper 35 to 50 feet of saturated sediments. The potentiometric surface for the Shallow Aquifer system depicts lateral flow in a north and northeasterly direction with vertical ground water flow gradients predominantly in an upward direction for the majority of wells completed in the shallow system.

The Little Valley area encompasses the surface drainage from the decommissioned Bonneville Mill. Recharge from rain and snow events that come in contact with the former ore storage area or other decommissioned operations associated with Bonneville facilities would enter the bedrock system beneath the Little Valley area.

Ground Water Quality

The water quality in the Bedrock, Principal, and Shallow Aquifers beneath and immediately adjacent to the Magna Reservoir facilities is generally a Class II water with TDS values that range from 1,000 mg/L in the southern area to near 2,000 mg/L in the northern area. Ground water concentrations of sulfate typically range from less than 100 mg/L up to 500 mg/l. In addition, the seepage from the fresh water Utah - Salt Lake Canal (Jordan River source) has an average sulfate concentration of approximately 400 mg/L. This appears to influence the ground water quality in the area along the canal that is east of the permit boundary.

Concentrations of dissolved trace metals are relatively low. Cadmium, chromium, lead, mercury, and silver are near or below the minimum detection limit. Arsenic concentrations are generally in the 0.005 to 0.016 mg/L range but well below the ground water quality standard of 0.05 mg/L. Dissolved copper concentrations range from non-detect to 0.02 mg/L. Selenium concentrations range from non-detect to 0.025 mg/L.

Compliance Monitoring Program

A semiannual compliance monitoring program is required by the permit. Compliance Limits have been established following the specific rule of R317-6-6.4. The following parameters were selected for compliance monitoring based on their high concentrations in the process water compared to concentrations in shallow ground water:

- TDS
- Chloride
- Sulfate
- Alkalinity
- Calcium
- Magnesium
- Potassium
- Sodium
- Dissolved Metals (arsenic, boron, lead, barium, cadmium, chromium, copper, selenium, and zinc)

Best Available Technology (BAT) and Facility Modifications

Kennecott is in the process of demolishing the UPP Make-up Process Water storage cells (10 total). BAT is applicable to management of the Magna Reservoirs and its conveyance system.

Compliance Schedule Items

- 1) Within 180 days of permit issuance Kennecott shall submit to the Director for review and approval a map or maps of the facility area including the location of specific facilities, monitoring wells and locations described in the permit and contained in Tables 1, 2, 3, and 4 as well as in Appendices A, B, and C.
- 2) Within 180 days of permit issuance Kennecott shall submit to the Director for review and approval a series of contour maps of the site-wide facility area that display selenium, arsenic, and chloride concentrations and groundwater elevations. The contour maps provided will include 2010, 2015, 2020, which coincide with previous permit renewal years so that changes over time can be depicted and as a basis for future groundwater permit renewal packages.

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