Appendix C

DESILTING BASIN MONITORING PLAN
(Reviewed June 2020)

RIO TINTO KENNECOTT
DESILTING BASIN MONITORING PLAN
UTAH GROUNDWATER DISCHARGE PERMIT UGW350006

DESCRIPTION

The Desilting Basin (DSB) forms the upgradient part of the Large Bingham Reservoir, which is approximately one-quarter mile southeast of Copperton, Utah, in the northeast quarter of section 17, T3S, R2W (SLB&M).

The DSB consists of three chambers which are used to remove silt and debris from storm-water flow in Bingham Canyon; it is designed to protect the liner systems of other parts of the Large Reservoir System from debris damage. The DSB can also be used to de-water sludge removed from the Bingham Reservoir; the inlet works settling basins, the eastside reservoir, or Zone I and 2 of the Large Bingham Reservoir. Once sludge's, silts, and debris are removed, they must be de-watered, dried, and stabilized before they can be transported to the waste rock dumps. Removing sludge and debris from the DSB chambers requires a robust concrete bottom to carry the load of heavy equipment; the presence of this concrete base makes leak detection and repair in the chambers difficult and impractical.

Sludge de-watering of the reservoirs is expected to occur infrequently, depending on usage of the reservoirs. De-watering of sludge effluent from the copper concentrating plant and treatments of contaminated ground water from the Bingham ground-water plume may also be handled by the DSB.

Chamber 1 of the DSB contains an 80-mil HDPE synthetic liner beneath an 8-inch thick concrete slab. The two drying chambers (Chambers 2 and 3) do not have an HDPE bottom liner. Potential leakage is limited due to the infrequent usage and low water levels (less than three feet) anticipated for sludge-drying events. Sludge's must be removed to facilitate any repair to these liner systems. The three chambers of the DSB have an aggregate capacity of about 100 acre feet.

BASIS

Ground water protection levels for the DSB have been established (Table 1). The monitoring program for the DSB also includes other strategies for minimizing leakage and assuring compliance while maintaining operational flexibility during this interim period of ground-water clean up. The DSB protection plan is based on *five* main components:

- Robust liner design (concrete plus HDPE) which provides protection from equipment damage as well as relatively impermeable characteristics.
- Infrequent use of the DSB for sludge de-watering and handling of contaminated waters.
- Frequent visual inspection.
- Annual liner continuity survey in Chamber 1.
- Ground water compliance monitoring (Table 1).

AUTHORIZED USE

The DSB will be operated mainly for flood control and removal of related sediments and trash. De-watering of sludge from the Large Reservoir systems will take place infrequently.

MONITORING METHODS

The following methods are used to monitor compliance for the DSB:

Inspection
The DSB will be visually inspected on a weekly basis, with special attention given to the integrity of the exposed concrete, curbing, and attachment of the liner to the curbs. Liners on the slopes of the DSB chambers will be inspected for penetrations and integrity. Results of the inspection will be recorded on the Desilting Basin Weekly Inspection Form.

Water quality in DSB
Water quality will be measured in Chamber 1 of the DSB if non-meteoric standing water exceeds the curb depth by six inches at any point. If sludge de-watering operations are conducted in the DSB, a sample of standing water will be collected for each discrete de-watering event.

Ground-Water Monitoring
Monitoring wells P248A, B, C (upgradient) and LRG910 and LRG911 (downgradient) will be monitored for water level and quality on a semi-annual basis. Baseline water quality in these wells has been established using the last 20 to 30 years of monitoring data.

Water samples will be collected, handled and analyzed in conformance with Appendix A (Water Quality Sampling Plan) in the GWDP and the currently approved version of the Rio Tinto Kennecott (RTKC) Ground Water Characterization and Monitoring Plan (GCMP).

Chamber I Leak Detection
An electrical liner continuity test will be conducted in Chamber 1 under the following conditions:

- If visual inspection suggests leakage through the concrete base.
- When acidic water is held in the DSB for more than 120 continuous days per year.
- When sludge de-watering is conducted more than 360 days in a consecutive three-year period, based on a three-year rolling average. A three-year rolling average will be interpreted as follows: In the first three years of operation, a block of 360 days can be drawn from for sludge de-watering processes. In the fourth year, the days used in the first year would be dropped and the second, third, and fourth years would be used to calculate 360 days, and so forth.
- If ground water monitoring suggests leakage from the DSB; Leakage may be occurring when increases in analyte concentrations over baseline of TDS, sulfate, or metals in LRG910 or LRG911 for two or more consecutive samples.

FREQUENCY

Visual inspections of the DSB will be conducted on a weekly basis.

Water quality sampling for ground water will be conducted on a frequency identified in Table 1. Standing water in Chamber 1 of the DSB will be sampled at least once semi-annually if the water level exceeds the curb depth by six inches at any point; otherwise meteoric water will not be sampled. During sludge de-watering, a water sample from the DSB will be collected for each discrete de-watering event.

An electrical liner continuity survey in Chamber 1 will be conducted per criteria listed under Chamber 1 Leak Detection, as discussed above.

DETERMINATION OF COMPLIANCE

Any of the following criteria will indicate out of compliance status for the DSB unless RTKC makes the affirmative defense described in Part 1, Section F of permit UGW350006.

- Sludge de-watering events exceed '360 days within a consecutive three-year period-based on a three-year rolling average.
- Visual inspection reveals damage or penetration of the HDPE liner or concrete base.
- Ground-water monitoring suggests leakage from the DSB, as indicated by increases in analyte concentrations of TDS, sulfate values, or metals in LRG910 or LRG911 for two or more consecutive sampling events.
- An electrical continuity test indicates that the DSB is leaking.