

## STATEMENT OF BASIS

### RIO TINTO KENNECOTT GROUND WATER DISCHARGE PERMIT RENEWAL LARGE AND SMALL BINGHAM RESERVOIRS PERMIT NO. UGW350006

This Statement of Basis (SOB) is for the renewal of Rio Tinto Kennecott's (RTKC) Ground Water Discharge Permit (UGW350009) for the Large and Small Bingham Reservoirs; which are located 18 miles southwest of Salt Lake City adjacent to RTKC's Bingham Canyon Mine operations. The reservoirs are approximately 1/4-mile southeast of Copperton Utah, in the northeast quarter of section 17 in Township 3 South, Range 2 West (SLBM).

#### **Large Reservoir System**

The Large Reservoir system, beginning at the upstream end, consists of:

- a) Desilting Basin (108 acre-feet capacity)
- b) Zone 1 (612 acre-feet capacity)
- c) Zone 2 (1,100 acre-feet capacity)

#### Desilting Basin

The Desilting Basin is located immediately upstream from Zone 1 and consists of three chambers which are used primarily to remove silt and debris from storm water flow out of Bingham Canyon, thus protecting the liner systems in other parts of the Large Reservoir from debris damage. The Desilting Basin is also used to de-water sludge removed from either the Small Reservoir or the zones in the Large Reservoir. Future ground water remediation projects may require more frequent use of this basin for sludge de-watering and drying depending on selected remediation technologies. The Desilting Basin's three chambers have the following lining systems.

Chamber 1 has the following seven-part liner system from bottom to top:

- 1. Compacted fill soil sub-base;
- 2. Four-inch thick road base;
- 3. 16 oz. geotextile felt layer,
- 4. 80-mil HDPE synthetic liner;
- 5. 16 oz. geotextile felt layer;
- 6. 12 inch thick road base; and
- 7. 8-inch thick concrete.

The sloping sides of the chamber are lined accordingly from bottom to top;

1. Compacted soil sub-base;
2. 12-inch thick compacted low permeability ( $1 \times 10^{-6}$  cm/s) clay layer;
3. 8 oz. geotextile felt; and
4. 80-mil HDPE synthetic liner.

Chambers 2 and 3 are constructed in a manner similar to chamber No. 1 except that there is not an HDPE liner underlying the 8-inch thick concrete bottom.

Zones 1 and 2 are utilized for containment of the following waters: 1) storm water runoff from the mine; 2) acidic flows from the waste rock dumps; 3) water pumped from alluvium in Bingham Canyon, located up-gradient from the Large Reservoir; 4) flows associated with ground water remediation activities; 5) other managed mine flows; and may be used interchangeably with the Small Reservoir. Water in Zone 1 and Zone 2 is generally characterized by low pH (3.0-4.0) and elevated total dissolved solids (TDS > 20,000 mg/l). Zones 1 and 2 have identical leak detection and design specifications.

The liner system for Zones 1 and 2 consists of the following from bottom to top:

1. Twelve inches of low permeability ( $1 \times 10^{-6}$  cm/s) clay liner;
2. A layer of geotextile;
3. A 60-mil HDPE liner;
4. A layer of drainage net material with a transmissivity of no less than 10 gallons per minute per foot;
5. An 80-mil HDPE liner.

#### SMALL RESERVOIR

The Small Reservoir is located to the north of the Large Reservoir and is used to store and manage either low pH water similar to the Large Reservoir or fresh water. The water is primarily used as a surplus and/or makeup water for the Concentrator when there is a need for additional process water. The Small Reservoir may be used to store and manage acidic flows from the dumps or fresh water from the Lark Shaft and Bingham Tunnel plant. The fresh water has a circum-neutral pH and a TDS concentration less than 4,000 mg/L.

The Small Reservoir has a multiple liner configuration from bottom to top as follows:

1. Six-inch clay layer;
2. Six inches of sand with HDPE pipe leak detection layer (Lower Leak Detection LLD)
3. 12 inch clay liner;
4. Six inches of sand with HDPE pipe leak collection and removal layer (Pressure Relief System, PRS);
5. 60-Mil HDPE liner.

Both the PRS and LLD layers flow to separate sumps that are equipped with water level sensing devices which report flow out of these two layers. The flow sensing devices are incorporated into RTKC's computerized process control network that is monitored 24 hours a day.

#### BASIS FOR PERMIT ISSUANCE

The basis for the issuance of the discharge permit as required under UAC R317-6-6.4, is to assure adequate ground water quality protection. The facility has been designed to employ a discharge control technology and a performance monitoring technology to prevent any significant measurable discharge from the facility. This approach is being used in lieu of monitoring wells, which are not feasible due to prior contamination of the ground water. If an effective ground water monitoring well network can be developed in the future and approved by the Director, this permit may be re-opened to incorporate appropriate ground water compliance monitoring and technology measurement provisions. Until such time as the basis for a water quality based permit is developed to set numeric criteria for ground water compliance limits, the basis for this permit shall be through the performance of Best Available Technology.

#### MONITORING REQUIREMENTS:

The Large Reservoir will be monitored as required in the following approved plans:

1. Water Quality Sampling Plan;
2. Leak Detection and Repair Program; and
3. Desilting Basin Monitoring Plan.

The Small Reservoir water quality will be monitored on a semi-annual basis when it contains either neutral or acidic water. In addition, fresh water sources (Lark Shaft and Bingham Tunnel) are measured at least twice per year and the analytical data may be included with the semi-annual ground water reports. The PRS and LLD layers are alarmed with sensing devices that indicate when water accumulates in the sump. Continual monitoring of sump levels and sump pump operation from both the PRS and LLD must be reported.