STATEMENT OF BASIS

GROUND WATER QUALITY DISCHARGE PERMIT RENEWAL UGW370005

Lisbon Valley Mining Company, LLC
May, 2015

Site Location/Background and Description

Lisbon Valley Mining is a copper mining facility and is located southwest of La Sal Junction, Utah. The primary extraction of copper is via heap leaching. The facility is located south and west of La Sal Junction, Utah. This is a permit renewal. The previous Permit was issued November 2007.

Site Hydrogeology

Lisbon Valley - The hydrogeology of the local flow system within Lisbon Valley is dominated by vertical heads between the shallow (Burro Canyon) aquifer and the deeper (Navajo/Entrada) aquifer. Geologic structure prevents the horizontal flow of ground water over significant distances within the Burro Canyon aquifer which consists of largely unconnected zones of water ponded on top of the Morrison Formation. These pockets of water are generally 100-300 feet below ground surface with average saturated thicknesses of around 40 feet. This water infiltrates along localized faults or high angle fractures and reaches the Navajo aquifer at considerable depth (800-1000 feet). The Navajo aquifer is considered the regional aquifer and transmits water to the southeast, with the Dolores River being the point of regional discharge. Within Lisbon Valley, ground water quality concerns will be focused on the Navajo aquifer because of its regional significance. The processing facilities, water supply wells, mine pits and waste rock dumps will all be located within Lisbon Valley, with the mine pits extending out from the actual fault to the east. The Cretaceous Burro Canyon Formation consists of upper beds of shale, sandstone, mudstone, limestone and chert and a lower bed of clean sandstone and conglomerate. The lower bed is the primary host for ore. The Jurassic-aged Navajo/Entrada Formation consists of various sandstones and is disconnected from the larger Navajo aquifer outside of Lisbon Valley due to the collapsed structure of Lisbon Valley. The quality of water in the Burro Canyon aquifer and the Navajo\Entrada aquifer will be monitored to study potential water quality impacts related to development of the mine pits.

Little Valley - Little Valley is a small valley to the west of the main Lisbon Valley. It is an eroded up thrown block that lies to the west of the Lisbon Valley Fault. The heap leach pad and process water ponds will be located within Little Valley. The geology within Little Valley is totally distinct from that of Lisbon Valley in that all of the water bearing formations (Dakota, Burro Canyon, Morrison and Navajo) within Lisbon Valley has been eroded away. The stratigraphy in Little Valley consists of 10-35 feet of Quaternary eolian sands and silts, underlain by the Permian Cutler Formation, a shallow water deposition of arkose, conglomerate and silty mudstone, which outcrops to north of the valley and is generally around 500 feet in depth. Underlying the Cutler formation is the Pennsylvanian Honaker Trail Formation, an interbedded limestone/siltstone/shale. Borehole 94MW4 was initially dry for about 1 year. Thereafter water appeared in the well and is now present at an elevation of 410 feet below ground surface. It is this potential Honaker Formation aquifer on the south side of the heap leach that would be impacted if there was significant discharge from the Heap Leach or Ponds.

Ground Water Quality

Background - Background will be determined for all monitoring wells. The data collected prior to startup (1994-2004) indicates elevated alpha and beta particle levels are present in wells completed in the Burro Canyon Aquifer and N-aquifer.

Class - In accordance with UAC R317-6-3 ground water at the existing monitoring wells in the Burro Canyon aquifer is classified as Class III, based upon levels of alpha and beta activity above the ground water standards as defined in UAC R317-6-2. Groundwater in the N-aquifer has also been classified as Class III.

Protection Limits - Protection limits have been established for wells: 94MW4, MW97-7A, MW96-7B and MW06-15.

Facility Description (Best Available Technology Standards)

Little Valley Heap Leach - The pad liner will be a composite clay/HDPE with a leakage detection system. The standard design for a heap leach pad consists of a composite clay/HDPE liner below a leakage detection system (geonet or gravel) and another HDPE liner. The alternative design was approved for this facility since a combination of site factors and design allow for a less conservative approach to still be protective of ground water. These factors include:

1. a pad design that will not allow a hydraulic head in excess of 24 inches on the pad surface;

2. depth to ground water at the site that is estimated to be at least 500 feet;

3. intervening stratigraphy between the pad bottom and ground water that has a strong buffering capacity which would neutralize any acidic leakage;

4. the quality of the ground water beneath the site limits its beneficial use due to the natural radioactivity present in the area, and;

5. the quantity of ground water (if any) is believed to be very limited. The liner shall be constructed of the following layers in order from bottom to top:
   a) 12 inches of compacted silt with a maximum permeability of 1×10^{-6} cm/sec;
   b) A leakage detection system consisting of gravel under drains surrounded by a geotextile with a 2 inch perforated pipe in the bottom. The pipes shall be placed on 200 foot centers;
   c) The compacted silt and the leakage detection system will be covered by a minimum 6 inch layer of compacted clayey soil with a maximum permeability of 1×10^{-7} cm/sec;
   d) The primary liner will be a 80-mil HDPE liner with a minimum two foot protective cover of minus 3/4 inch sedimentary ore.

The leakage detection system for the heap leach pad is designed such that only significant failure of the composite liner will be detected. Small leaks may go undetected. This is justified by local hydrogeologic considerations as described above. The allowable leakage rate due to the leakage detection system design is thus zero gallons per acre per day.

Process and Storm Water Ponds - The standard design was applied to the Raffinate, Pre-Raffinate, Pregnant Liquor Solution (PLS), Intermediate Leachate Solution [ILS] and Storm Water Ponds. This consists of a double HDPE liner with leakage collection systems. The allowable leakage rate for this pond is 200 gallons per acre per day. An alternative design was approved for the emergency overflow pond that will have a single composite clay/HDPE liner. The Emergency Over Flow pond is designed for use only under the most extreme combination of meteorological events and any solutions entering this pond will be neutralized to a pH of between 6.5 and 8.5. In addition to neutralizing to the ground water quality standard for pH, the use of this pond will be limited to relatively short periods of time. There is no allowable detectable leakage from this pond.
Waste Rock Piles - The draft-EIS estimated that only about 10% of the waste rock generated could be potentially acid producing. The other 90% of the waste rock is predicted to be acid neutralizing. The potentially acid producing rock will come from the Burro Canyon and Dakota formations and can be identified by color. Acid generating waste rock from beds 6 through 10 of these formations will be encapsulated in acid neutralizing material within the waste dumps.

Wetlands Treatment Cell – The standard design was applied to the Wetlands Treatment Cell. This design consists of a single HDPE liner above 12 inches of clay. The allowable leakage rate for this facility is 200 gallons per acre per day.

Solvent Extraction/Electrowinning Plant - All processing tanks and chemical storage tanks are designed with secondary containment. Any spills within the process areas will be cleaned up and/or conveyed to a lined (Concrete, PVC or HDPE) sump which is then pumped to the Raffinate or Pre-Raffinate pond.

Mine Pits - During the permitting process and as part of the Environmental Impact Statement process the potential for the development of pit lakes was studied. The two hydrogeologic models that were used to predict site conditions following mining that offer drastically different outcomes for the mine pits. The first model is based on classical hydrologic flow in the horizontal direction. The second model predicts flow at the site to be largely vertical as opposed to horizontal. The permittee currently believes the vertical flow model more accurately describes the ground water hydrology. The vertical flow model predicts that the pits would be either dry or intermittently dry. By contrast the horizontal flow model predicted final pit lake water elevations in excess of 100 feet above the pit floor for three of the mine pits. The potential pit lake scenario could potentially be of concern from a water quality standpoint since ambient water quality could degrade over time due to evapoconcentration. Since the pits will expose many layers of geologic strata ground water leaking into the pit from one formation could infiltrate out of the pit into another. Additional data will be collected over the life of the mine to further refine the understanding of the locally complex hydrogeology of the mine site. This data will be provided in the form of a yearly hydrogeologic report to be prepared by the permittee. In the event that further hydrogeologic investigation indicates a potential adverse impact to ground water during the post mining period, mitigation measures will be considered when the permit is renewed. These measures will reduce any potential impacts to the extent practicable and feasible. Five additional pit wells have been drilled and developed to further delineate pit hydrology.

Activities Since the Last Modification/Renewal – MW05-14 and MW97-8 were plugged and abandoned due to insufficient well production. The wells are not included in the current monitoring plan.

Basis for Permit Issuance

Accelerated Monitoring requirements outlined in the original permit have been met and background conditions have been characterized. The conditions have been met by the permittee in terms of the permit application and their commitment to abide by the terms of this permit.

Potential Impacts to Ground Water Quality

Potential impacts to ground water have been minimized by the design of process facilities that under normal operating conditions will not discharge. There is also an economic incentive to prevent ground water discharge since it is the process fluids that provide revenue for the permittee. Poor construction practices and/or inadequate operation and inspection procedures would result not only in potential discharge to ground water but would also reduce the return on the permittee's investment. The Division of Water Quality will provide periodic onsite inspections during construction and operation of the above facilities. The BAT monitoring plan required to be submitted, to the Director, by the permittee will ensure that the facility is operated in accordance with design specifications and will also ensure that any early indications of facility problems will be addressed.

Basis for other Specific Permit Conditions

Best Available Technology Monitoring Plan - The permittee has submitted a BAT monitoring plan to the Executive Secretary for approval prior to the start of construction of the facilities described in the permit. The plan includes procedures and methods sufficient to ensure compliance with the BAT performance standards of the permit. An appropriate mechanism for demonstrating compliance with the waste rock standard for encapsulation of potentially acid generating waste rock is also included in the BAT monitoring plan. The approved document will become an enforceable part of this permit. The BAT Monitoring Plan is on file with the Division of Water Quality. Due to the size of this document it is not incorporated in this permit other than by reference.

Closure Plan - The information provided by the permittee to date is sufficient and has been determined that their closure plan would be protective of ground water. The Closure Plan is on file with the Division of Water Quality. Due to the size of this document it is not incorporated in this permit other than by reference.