FACT SHEET
(pursuant to NAC 445A.401)

Permittee Name: **Eureka Moly, LLC**

Project Name: **Mount Hope Project**

Permit Number: **NEV2008106 (New 2012)**

A. Location and General Description

Location: The **Mount Hope Project** is located in west-central Eureka County, approximately 24 miles northwest of the town of Eureka, Nevada, on private land and public land, administered by the U.S. Department of the Interior, Bureau of Land Management, within Sections 1 and 12, Township (T) 21 North (N), Range (R) 51 East (E); Sections 4, 5, 6, 7, 8, and 9, T21N, R52E; Sections 4, 5, and 6, T21½N, R52E; Section 1, T21½N, R51½E; Sections 1, 2, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 27, and 36, T22N, R51E; Sections 1, 12, 13, 24, 25, and 36, T22N, R51½E; Sections 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, and 32, T22N, R52E; Sections 25, 35, and 36, T23N, R51E; and Section 31, T23N, R52E, Mount Diablo Baseline and Meridian.

The Project Area is situated on the divide at the intersection of three (3) hydrologic basins: Kobeh Valley to the south and west, Diamond Valley to the east and Pine Valley to the north. The valleys are elongate along the generally north-south trend of block faulting created during the period of structural deformation, the Antler orogeny, which formed the Central Great Basin portion of the Basin and Range Physiographic Province. Elevations in the area range from about 6,400 feet above mean sea level (AMSL) in Kobeh Valley to over 8,400 feet AMSL at the top of Mount Hope. Vegetation ranges from grasses and big sagebrush in the lower elevations to small clusters of pinyon (piñon) and juniper trees in the upper elevations.

The Mount Hope deposit is associated with an igneous complex that intruded the Paleozoic sedimentary rock sequence during Eocene and Oligocene time, approximately 38 million years before present. The igneous complex consists of a quartz porphyry that intruded both the Mount Hope tuff and rhyolite vent breccia. Ore grade molybdenum mineralization, typically in the grade range of 0.04 to 0.08 percent by weight, occurs within late-stage quartz-orthoclase veins and vein selvages. Disseminated molybdenum mineralization is rare.

The Facility may be accessed by traveling approximately 3.3 miles north-northwest from Eureka on U.S. Highway 50 to the junction of State Route 278; turning onto State Route 278 and travelling approximately 19.2 miles to the

Facility turn-off located on the west side of the highway; travel west approximately 1.4 miles along an improved dirt access road to the Facility office.

General Description: The Mount Hope Project is planned for a 44-year project life, which includes 32 years of active mining plus 12 years of low-grade stockpile processing. The Facility is designed to mine, from a single open pit, molybdenum ore at up to 29 million short tons (tons) per year over the 32-year mine life. The ore will be processed in a flotation mill designed for a throughput rate of 60,500 tons per day (tpd) to 80,000 tpd. The mill will produce a nominal 125 tons per day molybdenite (MoS_2) concentrate containing an average of 55% molybdenum. The concentrate can be roasted to produce a maximum 37,000 tons per year of technical grade molybdenum oxide (TMO) with a grade of 62% molybdenum. Up to 50% of the TMO can be processed in a metallothermic plant to produce ferromolybdenum (FeMo) alloy. Both products will be packaged for shipment off site. Tailings from the mill will be pumped to a synthetic-lined tailings impoundment for storage. A second tailings impoundment may be constructed if on-going exploration results warrant, but would require a future permit modification. The Facility will also include the following ancillary components: maintenance shop, warehouse, fuel storage, truck shop, fuel stations, tire change pad, truck washbay, reagent storage, administrative buildings, and laboratory.

B. Synopsis

Brief History: The Mount Hope Project is located in an area where historic base metal (lead, zinc, manganese, and associated silver) mining occurred from the 1870's through the 1940's. The Mount Hope molybdenum deposit, which at the time of permitting contained proven and probable reserves of approximately 966 million tons of ore with approximately 1.1 billion pounds of recoverable molybdenum, was discovered through the exploration activities conducted by the Exxon Minerals Corporation during the late-1970's through early-1980's. The Permittee acquired the property in the early-2000's and initiated feasibility and permitting studies soon after.

Mining: Mining of the Mount Hope open pit will produce approximately 966 million tons of ore and approximately 1.7 billion tons of waste rock over the 32-year mine life. The open pit will excavate the core of Mount Hope, a lone peak situated between the Roberts Mountains to the immediate northwest and the Sulphur Springs Range to the northeast. Waste rock will be placed in either a waste rock storage facility designed for potentially acid generating (PAG) waste rock or a facility designed to receive Non-PAG waste rock. The waste rock facilities will be constructed on the outer slope of Mount Hope and will eventually encircle the open pit. Depending on the molybdenum grade, run-of-mine (ROM) ore will be taken to either the Coarse Ore Stockpile as current mill feed or to the Low Grade Ore Stockpile for future mill processing.

Primary Crushing and Ore Stockpiles: High grade ore will be transported from the open pit mine with a fleet of 240-ton to 400-ton capacity haul trucks to a concrete dump pocket (700 tons live capacity) that will feed the 60-inch by 89-inch diameter, gyratory primary crusher that will reduce the ore to a nominal 6-inch diameter. The crusher pocket, control room and associated surface infrastructure will be enclosed in a 135-foot by 45-foot steel building.

The Facility will utilize two (2) ore stockpiles; a Coarse Ore Stockpile for the high grade ore and current mill requirements and a Low Grade Ore Stockpile that will be used to store low grade ore for processing at the end of the active mine life. Low grade ore will be identified and trucked directly as run-of-mine ore from the pit to the Low Grade Ore Stockpile.

<u>Coarse Ore Stockpile:</u> Crushed high grade ore will be conveyed from the primary crusher lower pocket on a conveyor belt and stacked on the Coarse Ore Stockpile. The circular Coarse Ore Stockpile will measure approximately 415 feet in diameter on a 500-foot diameter graded pad. The stockpile will provide about 68,000 tons of live capacity and approximately 300,000 tons of total capacity.

The stockpile pad will be graded to drain to Coarse Ore Stockpile Pond (also known as Pond 2) (see below), finished with a 6-inch-thick layer of compacted native soil and covered with a 60-mil high-density polyethylene (HDPE) liner. A minimum 5-foot-thick layer of crushed overliner material will be maintained to protect the liner from damage by equipment.

Ore will be fed by gravity, or with bulldozers for dead storage, through one (1) or more of four (4) 4-foot wide by 20-foot long draw-hole feeder openings in the base of the stockpile pad to a conveyor located in the reinforced concrete Coarse Ore Stockpile Tunnel. The tunnel measures roughly twenty-feet square in cross-section. The conveyor provides ore feed to the semi-autogenous grinding (SAG) mill located at the head of the mill process circuit (see below).

Coarse Ore Stockpile Pond will be constructed immediately downgradient from the Coarse Ore Stockpile. The single layer 60-mil HDPE pond liner will be contiguous with the stockpile pad 60-mil HDPE liner and receive directly any precipitation reporting to the lined pad. The trapezoidal Coarse Ore Stockpile Pond will be excavated to an average depth of 12 feet and measure approximately 135 feet wide by 180 feet long. The pond will have a total capacity of 445,400 gallons, excluding a three-foot freeboard, enough to accommodate the 100-year, 24-hour storm event volume that could report to the stockpile pad. The pond will be single-lined and must be evacuated to an approved process component within twenty days whenever it contains process solution.

Low Grade Ore Stockpile: Approximately 263 million tons of low grade ore, produced over the life of the mine, will be stored in the Low Grade Ore (LGO) Stockpile to be constructed on the east side of the open pit. The LGO stormwater collection system will utilize collection ponds shared with the adjacent, but not hydraulically linked, PAG waste rock disposal facility (WRDF) located immediately to the north.

The LGO Stockpile will cover and area of approximately 18.2 million square feet ($feet^2$) (about 418 acres) with maximum dimensions of about 4,000 feet at the widest span and 6,500 feet across the longest section. Material will be placed on the stockpile to a maximum height of approximately 575 feet with an overall slope angle of 2.5H (horizontal):1V (vertical). The stockpile design includes 150-foot individual lift heights with 1.4H:1V interim slope angles and 300-foot setbacks. Stability analysis generated a minimum 1.7 static factor of safety (FOS) and a minimum 1.2 pseudostatic FOS for the LGO Stockpile design criteria.

The LGO Stockpile will be constructed with a minimum 1-foot-thick prepared subgrade having a coefficient of permeability less than or equal to (≤) 1×10^{-6} centimeters per second (cm/s). Acceptable in-situ or imported borrow material will be scarified, moisture conditioned, and recompacted to meet the permeability specification.

Foundation drains consisting of 6-inch diameter, perforated corrugated polyethylene pipe (CPeP) will be installed along natural drainages at the base of the LGO Stockpile to collect and convey precipitation to a collection channel located along the east side of the stockpile. The drain pipelines will be placed on a 10-foot-wide strip of 60-mil HDPE liner and covered with a minimum 1-foot-thick layer of drainage gravel. The LGO Stockpile will be constructed with five (5) foundation drains (LGO-1 through LGO-5) identified in Water Pollution Control Permit NEV2008106 (Permit).

Collection Channels and Diversion Channels: Diversion Channel No. 1 and Diversion Channel No. 2 will convey stormwater away from the upgradient watershed areas located to the west of the LGO Stockpile and the adjacent PAG WRDF into natural drainages. Solution collected in the LGO Stockpile and PAG WRDF foundation drains or any runoff from these facilities will be conveyed to Collection Channel Nos.1 and 2. Collection Channel No. 1 will be constructed along the eastern toe of the LGO Stockpile and the adjacent and upgradient PAG WRDF; Collection Channel No. 2 will be constructed only along the southern toe of the LGO Stockpile. Collection Channel No. 1 will be constructed during Phase 1 and Phase 2. The Phase 1 Collection Channel No. 1 will discharge into the Phase 1 Stormwater Collection Pond. The Phase 2 Collection Channel No. 1 will be constructed as the LGO Stockpile and PAG WRDF are expanded and, along with Collection Channel No. 2, will convey collected solution to the Phase 2 Stormwater Collection Pond.

The collection channels and [stormwater] diversion channels were sized to accommodate the 100-year, 24-hour storm event flows reporting to the preproduction watershed area located between the respective upgradient stormwater diversion channel and downgradient collection channel. The collection channels will be trapezoidal in cross section with 2H:1V side slopes, a 12-foot wide base, and a depth that will range from three (3) to seven (7) feet plus a 1-foot freeboard, depending upon transect location. The diversion channels will be trapezoidal in cross section with 2H:1V side slopes, but will have a 5-foot wide base and depth will range from 3 to 3½ feet plus a 1-foot freeboard, except those lined with HDPE where the design incorporates no freeboard.

All channels will be constructed with a foundation prepared by clearing and grubbing, placing fill in maximum 12-inch-thick compacted lifts or scarifying in-situ material to a minimum 8-inch depth, and moisture conditioning followed by compaction to 95% of maximum dry density as determined by ASTM D698. The collection channel foundation layer will be covered with a single layer of 60-mil textured HDPE liner. The foundation layer for stormwater diversion channels, dependent upon location, will use either the HDPE liner system or a riprap protective layer over 10-oz/yd^2 (ounce per square yard) geotextile.

For channels receiving HDPE liner, the channel design incorporates a non-continuous geomembrane installation concept that limits the transverse welds in the liner to the spacing between transverse anchor trenches at the end of each geomembrane roll, i.e., approximately 300 to 400 feet. The upgradient liner will overlap the transverse anchor trench for the downgradient liner by a minimum of five (5) feet (in the flow direction) and will be extrusion welded to the top surface of the downgradient liner. A 1-foot-wide gap at the midpoint of the weld will provide an escape point for water trapped beneath the geomembrane liner. The overlap length and the gradient of the channel will prohibit migration of solution beneath the liner through the gap.

All channels will have an adjoining 16-foot wide light vehicle access road. Portions of the stormwater diversion channels will be removed, reconfigured, or expanded as necessary to accommodate the modified water shed areas after about production year 5 as the LGO Stockpile and PAG WRDF expand laterally and upgradient along the side slope of Mount Hope and the adjacent open pit.

Phase 1 and Phase 2 Stormwater Collection Ponds: The Phase 1 Stormwater Collection Pond, to be constructed on the east side of the LGO Stockpile, will receive the majority of captured runoff from the LGO Stockpile and the PAG WRDF. The Phase 2 Stormwater Collection Pond, to be constructed on the southeast corner of the LGO Stockpile, will receive increased captured runoff following expansion of the LGO Stockpile and PAG WRDF.

The ponds were designed to store the 100-year, 24-hour storm event runoff as calculated using the Year 15 production watershed areas, which will be the largest watershed area and is therefore the controlling factor for pond sizing (1,053 acres versus 563 acres for the preproduction watershed). The Phase 1 Stormwater Collection Pond is designed as a square measuring 380 feet by 380 feet, 30 feet deep, with 2.5H:1V side slopes. The design pond capacity will be 19.0 million gallons excluding a 3-foot freeboard, which exceeds the required stormwater volume of 16.4 million gallons. The Phase 2 Stormwater Collection Pond is designed as a square measuring 250 feet by 250 feet, 15 feet deep, with 2.5H:1V side slopes. The design pond capacity will be 3.6 million gallons excluding a 3-foot freeboard, which exceeds the required stormwater volume of 3.0 million gallons.

Both ponds will be constructed with an 80-mil HDPE liner placed on a 12-inch-thick engineered subgrade. The engineered subgrade will be compacted to 92% of maximum dry density as determined by ASTM D1557 and have a measured coefficient of permeability $\leq 1 \times 10^{-5}$ cm/s. A piece of 80-mil HDPE liner will cover the pond liner as a protective wear sheet at the collection channel inlet location. The base of each pond will be graded to a low-point sump area that can be evacuated with a dedicated pump. Stormwater from the single-lined ponds, which must be evacuated within twenty (20) days, will be pumped to the mill for use in the process at rates up to 1,000 gallons per minute (gpm).

Waste Rock Disposal Facilities: Two (2) disposal facilities will be constructed to manage waste rock; the PAG WRDF and the Non-PAG WRDF. The PAG WRDF will have a footprint of approximately 24.5 million feet^2 (about 562 acres) and is designed to contain approximately 447 million tons of PAG waste rock when loaded to a maximum height of 700 feet during the life of the mine. The Non-PAG WRDF will have a footprint covering approximately 73.3 million feet^2 (about 1,683 acres) and is designed to contain approximately 1.3 billion tons of Non-PAG waste rock when loaded to a variable maximum height ranging from 400 to 450 feet. The designs for both facilities result in an overall slope angle of 2.7H:1V with 100-foot individual lift heights, 2.5H:1V interim slope angles, and 20-foot setbacks. Stability analysis generated a minimum 2.0 static factor of safety (FOS) and a minimum 1.3 pseudostatic FOS for the design criteria.

<u>PAG WRDF:</u> The PAG WRDF will be constructed on the north side of the open pit adjacent to the north limit of the LGO Stockpile. The PAG WRDF will have a minimum 1-foot-thick engineered subgrade demonstrating a coefficient of permeability $\leq 1 \times 10^{-5}$ cm/s. Acceptable in-situ or imported borrow material will be scarified, moisture conditioned, and recompacted to meet the permeability specification. Although adjacent, the PAG WRDF and LGO Stockpile will be hydraulically separated by a 3-foot wide, 3.5-foot high berm over which the respective subgrades will overlap. The material loaded in the facilities will also

not physically abut to allow future removal of low grade ore for processing without compromising the stability of the PAG WRDF.

Foundation drains consisting of 6-inch diameter perforated CPeP will be installed along natural drainages at the base of the PAG WRDF on the low permeability layer. The drain pipelines will be placed on a 10-foot-wide strip of 60-mil HDPE liner and covered with a minimum 1-foot-thick layer of drainage gravel. The low permeability base of the facility and foundation drains will also be covered with a minimum 5-foot-thick base layer of Non-acid generating waste rock. The base layer and seven (7) foundation drains (PAG-1 through PAG-7) will collect and convey precipitation to Collection Channel Nos.1 and 2 at the toe of the facility for discharge into the Phase 1 and Phase 2 stormwater collection ponds (see above).

Non-PAG WRDF: The Non-PAG WRDF will be constructed along the west and south open pit perimeters. Construction will begin as four (4) separate areas that will merge into a single facility by production year 10. Construction of the Non-PAG WRDF base involves grubbing to clear vegetation, excavation and storage of growth media (topsoil), and grading of the topographic surface toward the future facility toe. Rock berms and temporary sediment control structures will be placed as necessary to control sediment runoff prior to placement of waste rock directly on the grubbed and cleared surface.

Spring SP-7 Foundation Drain: An existing spring, identified as Spring SP-7, is located within the central portion of the south Non-PAG WRDF footprint at an elevation of 6,819 feet AMSL. Preconstruction investigation identified the 2-foot by 2-foot depression in soil that contains one to two feet of standing water. No flow measurement is possible, however, the spring appears to be permanent and the water level does fluctuate seasonally.

Historic water quality analyses indicate the water is circum-neutral, bicarbonate dominated. There is an historic exceedance of the Profile I reference value of 0.1 milligrams per liter (mg/L) for manganese (2006 and 2007 sampling event results 0.11, 0.14, 0.12 mg/L), and elevated concentrations of sulfate (2006 and 2007 sampling event results 290, 450, 280 mg/L) and total dissolved solids (2006 and 2007 sampling events 900, 1200, and 960 mg/L).

A drain will be constructed beneath the WRDF footprint to reroute flows to an external, accessible monitoring and sampling point. Construction will involve excavating an area centered over the spring, approximately 20-feet square and 18 inches deep, to create a collection gallery. The gallery will be lined with a layer of 10-oz/yd^2 geotextile and a 6-inch diameter perforated CPeP main collector pipe will be placed diagonally, from corner to corner, on the base of the gallery. Two (2) 6-inch diameter perforated CPeP branches, spaced at zero (0) and ten (10) feet along the diagonal from the excavation outlet, will be connected to each side of the diagonal to form a tree. The excavation will be backfilled to the stripped WRDF base surface with clean drainage aggregate, encased in the geotextile, and covered with a layer of 60-mil textured HDPE that will extend at least four (4) feet beyond the edge of the gallery. A minimum 2-foot-thick cover layer of random fill will protect the HDPE liner.

The main collector pipe will exit the gallery along the base of a trench approximately 2-feet wide by 18-inches deep. The trench will be backfilled to the stripped WRDF base surface with clean drainage aggregate encased in a layer of 10-oz/yd^2 geotextile. The geotextile will be covered with a layer of 60-mil textured HDPE that will extend at least four (4) feet beyond each side of the trench. The HDPE liner will be covered with a minimum 2-foot-thick layer of random fill for protection. At the outside edge of the WRDF, a distance of approximately 2,300 feet from the spring, the perforated CPeP will transition to a solid 6-inch diameter HDPE pipeline. The solid pipeline will exit the trench and the HDPE liner and the protective random fill cover layer will terminate approximately four (4) feet beyond the exit point. The solid HDPE pipeline will continue in a backfilled trench to an outlet point at the nearest natural drainage. During year 10 of the Non-PAG WRDF expansion, the outlet pipeline will be incorporated into the constructed stormwater diversion channel.

Non-PAG WRDF Stormwater Controls: During the preoperational construction period through operational year 1, a group of five (5) temporary stormwater control channels and four (4) sediment/runoff collection basins (Control Structure 'A' through 'D') will be constructed to channelize runoff and minimize sediment transport as the Non-PAG WRDF expands. Temporary stormwater control channels will be lined with 60-mil HDPE geomembrane due to the relatively steep topography and potential for erosion. The temporary channel HDPE liner will be constructed to the same specification used for collection channels (see above), incorporating the same non-continuous geomembrane installation concept that limits the number of transverse welds. The temporary channels will eventually be covered and replaced with permanent stormwater diversions constructed along the entire ultimate toe of the Non-PAG WRDF. The permanent stormwater diversions are designed for the 100-year, 24-hour storm event flows and will be constructed with a layer of protective riprap over 10-oz/yd^2 non-woven geotextile placed on an engineered subgrade.

All channels that discharge to natural drainages will be constructed with a stilling basin and weir at the discharge point. The stilling basins will be approximately 40 feet long with a 20-foot-wide base and 2.5H:1V side slopes. The stilling basin will terminate at a 2-foot high transverse weir. The footprint of the stilling basin, weir, and a 30-foot-long downstream portion of the drainage channel will be covered with a layer of 10-oz/yd^2 geotextile protected with a layer of riprap.

Control Structure 'A' through 'D' will be trapezoidal in plan view and will be constructed as a rock berm across the drainage. The narrow dimension of the structure will be the channel inlet side and the widest dimension will be the channel outlet weir. The design provides stilling to reduce sediment load carried into the natural drainage. The basins have been sized to contain the 25-year, 24-hour storm event volume and withstand the 100-year, 24-hour storm event flows reporting from the respective watershed area and have design capacities of approximately 7.01, 2.16, 1.97, and 1.36 million gallons for basins 'A', 'B', 'C', and 'D', respectively.

Waste Rock Characterization and Management: Samples of various rock types and alteration types to be mined at the Mount Hope Project were characterized to determine the potential for generation of acid and mobilization of constituents from waste rock, ore, and tailing material. Tests on historic (1970 through 1980) and recent (2006) drill core samples included, but were not limited to, contact testing for pH and conductivity, multi-element analysis (48-element, 4-acid digestion inductively-coupled plasma), optical mineralogy and x-ray diffraction mineralogical analysis, Net Acid Generation (NAG) using a 2-stage hydrogen peroxide digest, acid-base accounting (ABA) using both the Modified Sobek method with LECO-furnace sulfur speciation and the total sulfur and total carbon analysis method with LECO-furnace, Nevada Meteoric Water Mobility Procedure (MWMP) using the American Standard Testing Method (ASTM) E-2242-02 method with Profile II leachate analysis, and humidity cell testing (HCT) using the ASTM D-5744-96 method on nine (9) samples for 69 weeks and an additional twenty (20) samples for 66 weeks.

Several conclusions were drawn from the geochemical characterization program. The Mount Hope rock assemblage is relatively low in carbonate content, hence the neutralization potential is generally low. It is predicted that approximately 26% of the total waste rock tonnage to be generated at Mount Hope will be PAG, and the balance (74%) will not have a potential to generate acid. The PAG waste rock will include all rock types and almost all alteration types described at Mount Hope, but the rhyolite with argillic alteration will account for nearly half of the PAG waste rock. The sulfide content was found to be the best indicator of acid generation potential, and will therefore be used as the basis for segregation and management of waste rock on either the PAG WRDF or the Non-PAG WRDF. During MWMP static testing, waste rock that exhibited low pH and the potential to form acid variably released constituents such as aluminum, arsenic, cadmium, copper, fluoride, iron, lead, manganese, nickel, sulfate, and zinc in elevated concentrations to the MWMP leachate; samples with neutral pH and a reduced potential to generate acid did not release constituents to the leachate.

The HCT results confirm the static test result that total sulfur is the most sensitive indicator of potential for acid generation and metal leaching. Therefore, waste rock is divided into two (2) distinct management categories based on LECO furnace results for total sulfur and carbon content in blast hole cuttings samples. Every tenth blast hole in a pattern will be analyzed and material with a sulfide (total sulfur) content greater than or equal to (≥) 0.3 weight percent will be classified and managed as PAG and material with a sulfide content ≤ 0.3 weight percent will be classified and managed as Non-PAG. Classified waste rock will be transported with 240-ton to 400-ton capacity haul trucks from the open pit and placed directly in the appropriate WRDF as described above.

Ore will also be routinely characterized and placed accordingly on the engineered Coarse Ore or LGO stockpile facilities described above for temporary storage prior to processing.

Tailing material generated by the milling process (see below) will be pumped to a synthetic-lined tailing storage facility (see below). Based on characterization, the tailing material exhibits a limited potential for generation of acid or release of metals. A significant proportion of the sulfide present in the tailing will be encapsulated within silica or silicate minerals. In addition, the process solution has high neutralization potential, which will further reduce the potential for acid generation in the tailing storage facility. Constituents released to reclaim water will be recycled to process or attenuated within the tailing mass.

Milling Operation: The Mount Hope Mill will utilize conventional flotation methods and, depending on feed grade and mineralogy, will recover 83 to 89 percent of the molybdenite (MoS_2) from the ore. The mill is designed for a throughput capacity ranging from 60,500 to 80,000 tons per day (2,700 to 3,600 tons per hour assuming 92% availability). Approximately 125 tons of molybdenite will be produced each day in a concentrate with a molybdenum (Mo) content of approximately 55 weight percent. All mill and associated component buildings are constructed with reinforced concrete floors and stemwalls with embedded flexible water stops at construction joints. Floor sumps will be cast-in-place or prefabricated reinforced concrete with HDPE liners. Building and sump capacities, as applicable, are designed to contain at least 110% of the maximum potential spill volume either independently or with hydraulic connections that allow flow to cascade into larger capacity components. The ultimate mill secondary containment is the Tailing Thickener Emergency Overflow Pond (see below).

<u>Grinding:</u> Ore will be conveyed from the Coarse Ore Stockpile and fed into the grinding circuit located in a 305- by 120-foot steel building. The grinding circuit will be comprised of a 36-foot diameter by 17-foot long SAG mill with pebble crusher and two (2) 22-foot diameter by 36.5-foot long ball mills operating in parallel. The ball mills will operate in closed circuit with hydro-cyclone classifiers that will gravity feed properly sized material (80% ≤ 150-micron diameter) as cyclone overflow at 29,700 to 38,000 gpm into the flotation circuit.

Oversized underflow slurry from the cyclones will flow by gravity back to the ball mills.

Flotation: The flotation and regrind portion of the circuit will be housed in a steel building measuring 325 by125 feet with a steel building extension on the north side measuring 150 feet by 50 feet. Slurry consisting of ground ore and water will flow by gravity from the cyclones to two (2) rows (one row for each ball mill) of eight (8) rougher flotation cells. Rougher concentrate slurry will be pumped to the first cleaner flotation cells and on to an elevated, 105-foot diameter regrind thickener. Dewatered concentrate from the regrind thickener will be pumped through a regrind cyclone cluster. Underflow from the regrind cyclones will flow by gravity to a regrind mill, after which it will be pumped back through the regrind cyclones. Overflow from the regrind cyclones will be pumped through as many as seven (7) cleaner flotation cycles before being pumped to the 50-foot diameter final concentrate thickener. Tailing from the rougher and first cleaner flotation cells will flow by gravity to a pair of tailing thickeners for dewatering (see below).

Concentrate Filtration/Drying/Leaching: The filtration building, a steel building measuring 220 feet by 125 feet, contains filters, dryers, and associated equipment for additional processing of molybdenite concentrate. Final concentrate slurry will be pumped at a nominal 35 gpm to one of four agitated tanks for sampling to determine if the concentrate will require leaching to meet specification.

Molybdenite concentrate not meeting specification will be pumped to a series of agitated tanks and leached with ferric chloride solution to remove impurities such as copper, lead, and zinc and to bring the concentrate into specification. Following the leaching process, the ferric chloride solution will be neutralized with lime and mixed with tailing thickener feed for disposal in the tailing impoundment. The ferric chloride will not be necessary under normal circumstances.

Concentrate meeting specification, either naturally or following leaching, will be thickened then filtered in two (2) rotary drum-type filters prior to introduction into the dryer where moisture content is reduced to approximately 3% Dried concentrate will advance to the roaster.

Roaster and TMO: Two (2) 21.5-foot diameter, 12-hearth roasters and associated equipment will be housed in a steel building measuring approximately 100 feet by 150 feet in maximum dimension. A screw conveyor will feed dried concentrate to the roasters at a maximum 7 tons per hour. The roasting process oxidizes the sulfur in the molybdenite (MoS_2) to produce TMO (molybdenum trioxide (MoO_3), which is marketed as technical grade molybdenum oxide). Roasted TMO will be conveyed to the packaging facility located on the east side of the filtration building for storage in supersacks or other containers as a powder for shipment. The TMO powder can also be combined with ammonium hydroxide, pressed into briquettes in a briquetting machine, and stored in drums for shipment.

Roaster Off-Gas Scrubber: Off-gas from the roasters will be cleaned using a series of coolers, cyclones, scrubbers, and dry and wet electrostatic precipitators to remove particulate and SO_2/SO_3 prior to venting to the atmosphere. Dry collected particulate will report back to the roasters. Solution from the scrubber and wet electrostatic precipitators will be contained within the equipment and be processed through a series of tanks resulting in neutralized gypsum slurry to be pumped to the tailing thickeners for final disposal.

Ferro Molybdenum Plant: The ferro molybdenum plant is contained in a building located to the west of the roaster building and laid out as a tee in plan view. The top of the tee will measure 160 feet by 60 feet and the base will measure 320 feet by 40 feet. The plant will use a metallothermic process to reduce TMO and iron oxide by aluminum and silicon to produce an alternative ferro molybdenum product. Up to 50% of the TMO produced will be converted to ferro molybdenum. A typical batch for processing is comprised of TMO, aluminum metal powder, hematite or magnetite (iron oxide), and ferrosilicon alloy (FeSi). The constituents are thoroughly blended, loaded into a refractory vessel, and ignited. The ferro molybdenum metal will solidify after 24 hours and be removed from the vessel. Slag and sintered sand are removed from the alloy button, which is quenched with water and allowed to cool for two to four hours. The button is broken down and fed to jaw and pebble crushers for final size reduction and packaging.

Tailing Thickening: The rougher tailing from the various mill process circuit underflows will flow by gravity through a 6-foot-by-6-foot, square section, concrete launder to a drop box that will feed an above ground 48-inch diameter, rubber-lined carbon steel pipeline that will terminate at a concrete distribution box. The launder and distribution box will each be constructed within a trench lined with a layer of 60-mil HDPE. Leak detection will be provided by a series of perforated, 4-inch diameter HDPE pipelines placed on the HDPE liner at approximately 3-foot separation prior to backfilling the space between the lined trench wall and the concrete launder or distribution box with clean gravel.

The distribution box will convey rougher tailing slurry through separate 36-inch diameter carbon steel pipelines to a pair of 180-foot diameter tailing thickeners operated in parallel. The thickeners will dewater the tailing and increase pulp density from approximately 30 percent solids to 50 to 55 percent solids. Decant water will be pumped back into process and solids will be removed through the bottom of the thickeners through underflow pipelines.

The thickeners will have steel sidewalls on reinforced concrete ring-foundations and will each have a live capacity of approximately 4.2 million gallons excluding a 1-foot (190,345 gallons) freeboard. The floor of the thickener will be constructed, from bottom to top, with a minimum 18-inch thick subgrade compacted to 95% of maximum dry density as determined by ASTM D698, a layer of 60-mil linear low density polyethylene (LLDPE) studded drainage liner (such as LLDPE Super Gripnet™ manufactured by Agru America), a layer of 60-mil LLDPE smooth liner, and a 10-inch thick layer of sand. The LLDPE liners will be welded to embedment strips emplaced in the foundation-ring concrete.

The space created by the studs between the LLDPE liners will act as a leakage collection and recovery system (LCRS) and the sand will protect the upper liner from damage by ultraviolet light, the thickener rakes, and occasional foreign objects. The LCRS will convey solution to leak detection drain pipes – six (6) per thickener – located in the center well foundation and observable from below in the respective Tailing Thickener Tunnel.

An approximately 7.5 feet high by 13 feet wide reinforced concrete Tailing Thickener Tunnel will be constructed beneath each thickener. Each tunnel will provide access to a thickener center well for repairs and will house a pair of 22-inch diameter carbon steel underflow pipelines. Any leakage collected in the tunnels will report to the sloped concrete Tailing Emergency Containment Trench, which discharges to the Tailing Thickener Emergency Overflow Channel (see below).

In the event of an upset condition in either thickener, solution will flow by gravity through a 36-inch diameter, steel overflow pipeline to the adjacent Thickener Overflow Tank. The tank will convey any overflow from the thickeners by a single 48-inch diameter surface pipeline to the approximately 15-foot wide, 80-mil HDPE-lined, trapezoidal Tailing Thickener Emergency Overflow Channel, which reports to the Tailing Thickener Emergency Overflow Pond located approximately 400 feet to the east.

<u>Tailing Thickener Emergency Overflow Pond (TTEOP):</u> The TTEOP is designed to contain 110% of the largest vessel capacity (4.2 million gallon Tailing Thickener Tank) plus the 100-year, 24-hour storm event while maintaining a 3-foot freeboard. The TTEOP will measure approximately 244 feet by 314 feet, crest to crest, and 24 feet deep, comprised of a three-foot minimum freeboard and 21-foot maximum operating depth. The TTEOP will have a total capacity of 6,902,385 gallons and an operating capacity of approximately 5,443,870 gallons. The pond will be constructed with a single 80-mil HDPE liner placed on an 18-inch thick subgrade compacted to 95% of maximum dry density as determined by ASTM D698. The TTEOP has a 20-day limit for evacuation whenever it contains process solution (including meteoric water if process slurry or sediment is present in the pond).

Plant Area Stormwater Pond: The Plant Area Stormwater Pond (also known as Pond 1) will be constructed downgradient of the TTEOP and Process Facility. The trapezoidal pond will be excavated to an average depth of 19 feet below the pond crest and measure approximately 300-feet wide by 500-feet long. The pond will have a total active capacity of 8.9 million gallons, excluding a three-foot freeboard, which is enough to accommodate the 100-year, 24-hour storm event volume that could report to the pond from the Process Facility watershed.

Underflow Pump House: The underflow pump house will be a steel building measuring approximately 80 feet by 160 feet and will contain multiple pumps to convey thickened tailing slurry to the tailing impoundment at a nominal rate of 16,400 gpm. The concrete floor of the building will slope to a 6-foot by 6-foot by 8-foot deep, clean-out sump lined with 80-mil HDPE Studliner. Overflow from the sump and the building floor will report to the lined Tailing Thickener Emergency Overflow Channel and then to the TTEOP.

Tailing Conveyance Pipeline, Collection Trench, and Emergency Pond System: The tailing slurry will be pumped from the Underflow Pump House into a pair of 24-inch diameter, HDPE-lined, carbon steel, tailing slurry pipelines and conveyed to the Cyclone Station located on a hill above the South Tailing Storage Facility (South TSF). The total tailing slurry pipeline alignment is approximately 5.5 miles long.

Collection Trench: The slurry pipelines and the reclaim water pipeline (see below) will be placed on the surface, between a light vehicle access road and an unlined, collection trench that will be constructed along an alignment that is always downgradient of the pipelines. The collection trench, which is designed to contain and convey peak pipeline flow, will measure a minimum six (6) feet wide at the base and a minimum two (2) feet deep with 4H:1V side slopes. The collection trench will capture any solution escaping a primary containment pipeline and, depending on the leak location, convey the solution to either a downgradient emergency containment pond or the South TSF. A parallel, upgradient stormwater diversion ditch will prevent stormwater flows from entering the collection trench.

Emergency Containment Ponds: Three (3) Emergency Containment Ponds (ECP-1, ECP-2, and ECP-3; ECP-1 will be the furthest north and ECP-3 will be the furthest south) will be constructed at low points in the topography along the first mile of the conveyance pipeline alignment. The ponds will be unlined, earthen excavations with an 18-inch thick subgrade compacted to 95% of maximum dry density as determined by ASTM D698. Each pond is designed to contain 110% of the respective pipeline volume, 10 minutes of continued full flow of tailing slurry, and the 100-year, 24-hour storm event volume reporting to the affected portion of the Collection Trench. Because these ponds are unlined, any process solution and solids that report to them represent a release, which must be reported and remediated in accordance with the Permit.

All pipelines, two (2) slurry and one (1) reclaim water return, will be placed within individual HDPE secondary containment pipelines at the crossing beneath the Pony Express Trail. The secondary containment pipelines will daylight into ECP-3. If a primary pipeline breaks within the limits of the crossing containment area, the system is designed to drain solution either directly to ECP-3 or along the Collection Trench into ECP-2.

Monitoring of the pipeline system will be enhanced by the installation of a level sensor in each pond that will trigger an alarm in the mill control room when solution in the pond reaches the one-foot level. Each pond will also be equipped with a video camera that can be monitored in the mill control room. The slurry pipelines will be visually inspected during each shift and will also be monitored for leakage at five (5) locations (SPLDM-1 through SPLDM-5) using monitors that may include noise detectors, negative pressure wave detectors, or other systems suitable for slurry pipelines.

Tailing Storage – South Tailing Storage Facility: Based on a tailing production rate ranging from 19 to 29 million tons per year, the required tailing storage capacity for the life-of-mine is approximately 966.1 million tons and will be stored in two (2) separate tailing storage facilities; the South Tailing Storage Facility (South TSF) and North TSF. The South TSF design has a capacity of approximately 789.8 million tons and is planned to operate for slightly less than 36 years. In concept, the North TSF will accommodate approximately 176.3 million tons of tailing and would be commissioned when the South TSF is nearly full. However, final designs for the North TSF were not submitted as the component will not be built for at least 30 years and regulatory and operational changes could arise during that time. Therefore, construction of the North TSF will require prior approval by the Division supported by submittal of an engineering design report, the appropriate fee, and an application for the type of modification to the Permit as determined by the Division.

The South TSF embankment is designed with an ultimate downstream embankment slope of 3H:1V. The embankment will be raised using a centerline construction method with cycloned sands and will have a crest width of 30 feet and a maximum ultimate tailing depth of 370 feet. The cycloned portion of the embankment will be constructed with an underlying drainage blanket (see below).

Since tailing storage capacity is required prior to sand being available from the cyclone system, a random fill starter embankment will be constructed to contain eight (8) months of slimes. During this initial period of tailing deposition, the cycloned sand portion will be used to raise the embankment above the starter.

After approximately six (6) months of operation, an adequate volume of sand can be produced to raise the embankment to one (1) year of storage capacity.

Embankment Foundation and the Starter Embankment: The South TSF embankment foundation and starter embankment footprint area will be cleared and grubbed. The surface will be moisture conditioned and smoothed using cut and fill methods. Random fill, excavated from the impoundment basin area to reduce haulage distances, will be placed in maximum 12-inch lifts, moisture conditioned, and compacted to 90% of maximum dry density as determined by ASTM D1557.

Embankment foundation surface areas located between the downstream toe of the starter embankment and the ultimate toe of the main embankment will be smooth drum rolled and cleared of exposed coarse material in preparation for placement of a layer of double textured 60-mil LLDPE liner. The synthetic liner will be covered with an 18-inch thick select drainage blanket and a solution collection piping system within the embankment collection area. The select drainage blanket material will have a maximum particle size of 3 inches, < 10% non-plastic fines to prevent piping of overlying sands and achieve permeability 25-times greater than that of the overlying sands. The embankment collection piping system will be comprised of 4-inch diameter, perforated, smooth interior wall CPeP installed in a herringbone pattern on 50-foot centers that connect to 8-inch diameter, perforated, smooth interior wall (type-SP) CPeP headers located in the toe trench

The South TSF starter embankment, which is designed to provide approximately 8 months of tailing storage, will be constructed of random fill excavated from the impoundment basin, placed in 12-inch lifts, moisture conditioned, and compacted to 90% of maximum dry density as determined by ASTM D1557. The starter embankment will measure approximately 10,200 feet long along the centerline, will measure up to 70 feet vertically depending upon base topography, and will have a maximum crest elevation of 6,418 feet AMSL and width of 30 feet. The slopes of the starter embankment will be graded, shaped and compacted to a smooth non-yielding surface to be covered with a layer of liner bedding material followed by a layer of double textured 60-mil LLDPE liner that will be continuous with the foundation area LLDPE liner described above.

Cycloned Sand Main Embankment Raises and Basin Fill: Subsequent South TSF main embankment raises will incorporate centerline construction methods using sands produced as the coarse cyclone underflow fraction once tailing cycloning commences. The fine cyclone overflow (slimes portion of the tailing) containing 69.5% of the tailing solids will be deposited into the TSF basin along with approximately 28% of the underflow coarse sands that will not be needed for embankment construction.

The Cyclone Station will be located adjacent to the Collection Trench, on a hill above the South TSF, approximately midway between the Underflow Pump House and the TSF. The Cyclone Station will be comprised of a steel building measuring 125 feet by 90 feet that will house multiple tailing pumps and an adjacent steel building extension measuring 60 feet by 50 feet that will house the primary cyclones. Cyclone underflow, the coarse sand fraction of the tailing slurry, will be mixed with reclaim water and pumped through two (2) 16-inch diameter HDPE pipelines to the embankment for use in embankment construction. Cyclone overflow, the fine (slimes) fraction of the tailing slurry, will be pumped through a 42-inch diameter HDPE tailing launder for discharge into the TSF basin.

The underflow sand will be distributed in thin lifts with bulldozers within the ultimate limits of the double-textured 60-mil LLDPE-lined embankment footprint. Testing indicates the embankment sands will achieve a density of 90% standard Proctor (ASTM D698) maximum dry density through drying and consolidation prior to subsequent material placement. The sands are anticipated to have an average permeability of 2.5 x 10^{-4} cm/sec at the maximum overburden load to minimize the phreatic surface within the embankment, which will be monitored with vibrating wire piezometers.

Embankment construction will be continuous during 9 months of the year when cycloning will occur. Cycloning will cease during the 3 winter months. The embankment will be raised in completed lifts varying from approximately 20- to 40-feet high, depending on the mining and processing schedule, and the final embankment lift elevation of construction will be completed by the end of year 26, approximately 10 years before the ultimate South TSF capacity is reached.

South TSF Basin: The South TSF basin, like the embankment, will be constructed in phases. The starter embankment and starter basin will have a combined footprint of approximately 480 acres; the ultimate combined South TSF basin and embankment footprint will cover approximately 2,700 acres.

The basin area will be cleared and grubbed and the surface shaped through cut-to-fill operation to provide a smooth contour followed by smooth drum rolling and clearing of exposed coarse material. The prepared basin surface will be covered with a layer of smooth 60-mil LLDPE liner. (The starter embankment and South TSF embankment footprint will have a double-textured 60-mil LLDPE liner connected to the basin smooth liner – see above.)

The entire South TSF basin footprint will be covered with an 18-inch thick drainage layer that will consist of two (2) design elements: 1) a basin drainage blanket constructed within the basin foundation footprint; and 2) a select drainage blanket constructed within the embankment foundation footprint. Both blankets will utilize native gravelly sand material with a maximum particle size of 3 inches. However, the basin drainage blanket material is limited to a maximum non-plastic fines content of 15 percent and the select blanket material is limited to a maximum non-plastic fines content of 10 percent. For the respective blankets, the specification will prevent piping of overlying basin tails or embankment cycloned sand and achieve permeability approximately 25 times greater than that of the overlying material. The double-textured LLDPE liner on the downstream slope of the starter embankment will be covered with an 18-inch thick select drainage blanket. The crest and upstream slope of the starter embankment will be covered with an 18-inch thick basin drainage blanket.

The South TSF will be constructed with three (3) independent solution collection systems: 1) a tailing basin collection system; 2) a reclaim trench collection system; and 3) an embankment collection system.

Tailing Basin Collection System: The tailing basin solution collection system will be located upstream of the starter embankment. The system will be constructed with perforated 4-inch diameter, perforated type-SP CPeP placed in a herringbone pattern on 50-foot center-to-center spacing directly on the geosynthetic liner, which will convey underdrain solution to 6-inch to 18-inch diameter, perforated type-SP CPeP solution collection headers. The solution collection headers will be surrounded with clean aggregate and segregated from the basin drainage blanket material with a layer of 10-oz/yd^2 non-woven geotextile. The tailing basin headers will terminate at the low point of the basin and connect to two (2) concrete-encased 24-inch diameter HDPE pipe main solution headers. The system is designed to carry approximately 6,000 gpm.

Reclaim Trench Collection System: The reclaim trench and associated reclaim trench collection system will be constructed along the centerline of the most prominent natural drainage within the basin to limit the extent of the supernatant pool during TSF operation. A 3,800-foot-long section of the trench, as measured from the upstream toe of the starter embankment, will be excavated initially and will ultimately extend approximately 8,650 feet into the basin. The trench will have a 150-foot bottom width and be excavated to a depth of 30 feet. The 4-inch diameter, perforated type-SP CPeP basin collector pipelines (see above) will continue into the reclaim trench and tie into an 8-inch diameter, perforated type-SP CPeP collector placed along the centerline of the trench. A retarding layer, consisting of 40-mil HDPE liner, will be placed over the basin drainage blanket layer to avoid direct contact of the supernatant pool with the drainage layer. The HDPE retarding layer will extend a minimum 1,000 feet from the reclaim trench centerline in both directions.

Embankment Collection System: The embankment collection system will be located immediately downstream of the starter embankment toe. The system will be constructed with perforated 4-inch diameter, perforated type-SP CPeP placed in a herringbone pattern on 50-foot center-to-center spacing directly on the geosynthetic liner. Solution will be conveyed to 8-inch diameter, perforated type-SP CPeP placed in the toe drainage trench leading to the reclaim pipe trench where they transition to two (2) 12-inch diameter (see below), perforated type-SP CPeP main solution headers. The toe drainage trench will parallel the downstream toe of the starter embankment (perpendicular to basin flow), will have a 10-foot bottom width, and will be lined with a continuation of the double-textured 60-mil LLDPE liner downstream of the starter embankment.

Concrete-Encased Reclaim Pipelines and Reclaim Pipe Trench: At the transition from the low point of the tailing basin to the upstream toe of the starter embankment, the perforated pipelines from the tailing basin (two (2) 24-inch diameter) and reclaim trench (one (1) 8-inch diameter) systems will tie into two (2) 24-inch diameter, solid HDPE and one (1) 8-inch diameter solid HDPE pipelines, respectively. The underdrain solution pipelines, plus four (4) 4-inch diameter HDPE piezometer cable conduits, will be encapsulated in a concrete encasement under the embankment. The pipes and conduits will be booted through the double-textured, 60-mil LLDPE liner embankment flap on the upstream starter embankment face, but will not penetrate the South TSF liner. The encased pipes will extend within a trench lined with a layer of double-textured, 60-mil LLDPE (the South TSF liner).

The reclaim pipe trench will have a 20-foot-wide bottom, and a depth of six (6) feet with 2.5H:1V side slopes. The double-textured, 60-mil LLDPE liner will be protected with a layer of conveyor belt prior to placement of reinforced concrete to encase the underdrain pipelines and piezometer conduits. The reinforced concrete encasement will be constructed to the ultimate embankment toe location. The reclaim pipe trench will be backfilled with drainage blanket material in advance of each phase of downstream embankment expansion. As the channel is advanced, two (2) 12-inch diameter, perforated type-SP CPeP, one (1) on each side of the channel will also be extended to convey any solution reporting to the backfill. The 8-inch diameter, perforated type-SP CPeP starter embankment toe drainage trench pipelines (see above) also tie into these 12-inch diameter pipelines. The reclaim pipe trench will terminate at the Underdrain Collection Pond 1 (see below) and the trench liner will be welded to the pond liner system.

Piezometer Installations: The South TSF will be equipped with several sets of vibrating wire piezometers to monitor hydrostatic head on the liners. Seven (7) pairs of ‘B-series’ piezometers (B-1A/B-1B through B-7A/B-7B) will be installed in the basin drainage blanket approximately 70 feet upstream of the upstream starter embankment toe and within five (5) feet of a basin solution collection system 4-inch diameter, perforated type-SP CPeP collector. Eight (8) pairs of ‘C-series’ piezometers (C-1A/C-1B through C-8A/C-8B) will be installed in the select drainage blanket on the downstream crest of the starter embankment. Twenty-six (26) pairs of ‘E-series’ piezometers (E-1A/E-1B through E-26A/E-26B) will be installed in the select drainage blanket of the ultimate embankment footprint within five (5) feet of a basin solution collection system 4-inch diameter, perforated type-SP CPeP collector.

South TSF Embankment Stability Analysis: Slope stability analyses were conducted for the South TSF embankment at the ultimate crest elevation of 6,710 feet and at the mid-life crest elevation of 6,525 feet under both static and seismic loading conditions. A seismic survey was also completed to provide additional site-specific data for the modeling. The factors of safety obtained under static conditions for both circular and block type failures, using both smooth and textured HDPE liner in the modeling, vary from 1.4 to 2.0. Based on the dynamic modeling, loss of containment or a breach in the South TSF embankment is not likely.

South TSF Underdrain Collection Ponds and Solution Reclaim System: Two (2) underdrain solution collection ponds and a Reclaim Pump Sump will be constructed to collect and convey reclaim solution from the South TSF underdrain systems. Underdrain Collection Pond 1 (UCP-1) and adjacent Reclaim Pump Sump will be constructed prior to Facility startup and Underdrain Collection Pond 2 (UCP-2) will be constructed during operation year 4. Barge-mounted pumps will be used to recover reclaim solution from the supernatant pool.

Both ponds will be constructed with smooth 80-mil HDPE primary and secondary liners. The LCRS design is comprised of a layer of geonet between the liners and a 4-inch diameter, perforated type-SP CPeP placed between the liners at the engineered low-point toe of the pond bottom that will drain to a subgrade LCRS collection sump backfilled with gravel encased in 10-oz/yd^2 geotextile. Both ponds incorporate side slopes of 2.5H:1V. The LCRS sump can be evacuated with a submersible pump through a 10-inch diameter HDPE riser pipe placed on the pond slope between the primary and secondary liners and slotted over a 10-foot interval within the LCRS collection sump. Fluids collected in UCP-1 will be conveyed through a horizontal pipe which will be connected to a vertical sump located within the Reclaim Pump Sump. Pumps installed in the sump will convey solution through a reclaim pipeline to the Booster Station. The liner system under the Reclaim Pump Sump will be continuous with the UCP-1 liner system and will have a dedicated LCRS. The Reclaim Pump Sump LCRS will be similar to the UCP-1 LCRS construction except for the elimination of the 4-inch diameter, perforated type-SP CPeP toe drain and the addition of a concrete pad over the LCRS sump as a reclaim pump foundation.

<u>Underdrain Collection Pond 1:</u> Underdrain Collection Pond 1 (UCP-1) is sized to store approximately 4 million gallons of operating volume, 2.1 million gallons generated by 24 hours of draindown from the South TSF, and 6.1 million gallons generated by the 100-year, 24-hour storm event within the first four (4) years of operation. The design total pond volume is 12.9 million gallons, which provides 3-foot freeboard. The pond will measure approximately 30 feet deep and 385 feet

long by 140 feet wide at the crest. Collected solution will be conveyed by gravity from the UCP-1 to the adjacent reclaim solution sump (see below).

Underdrain Collection Pond 2: Underdrain Collection Pond 2 (UCP-2) is connected to UCP-1 by a lined spillway at the 3-foot freeboard elevation and will provide overflow capacity. During overflow situations the freeboard in UCP-1 and the spillway will be 2.88 feet. Therefore, the Permit allows a two-foot minimum freeboard for UCP-1 and UCP-2. UCP-2 will measure approximately 30 feet deep and 615 feet long by 385 feet wide at the crest. UCP-2 has a capacity of 33.3 million gallons and a combined capacity of 46.2 million gallons with UCP-1. This capacity is sufficient based upon 4 million gallons operating volume, the combined ponds will provide approximately 6.9 million gallons storage capacity for 24 hours of draindown from the ultimate South TSF and 34.8 million gallons storage capacity for the volume generated by the 24-hour, 100-year storm event.

The design requires the construction of UCP-2 in approximately year four of operation. When constructed, a permanent or portable pumping system capable of draining the pond in 30 days (equal to or greater than 775 gallons per minute) will be installed. This pumping system will allow pumping from UCP-2 back to UCP-1.

Reclaim Solution Sump: The Reclaim Solution Sump (RSS) will be constructed as a subgrade extension of the UCP-1 with an identical liner system and an independent LCRS. The RSS will be constructed beneath and adjacent to the west side slope of the UCP-1. The pond and sump liner systems will be separated by a single layer of smooth 80-mil HDPE liner that will form a retarding layer on the west slope of UCP-1. The surface expression of the sump will measure approximately 250 feet by 175 feet in plan and be about 40 feet deep. The sump will be backfilled with random fill. A conveyance pipeline will be booted through the retarding layer of the pond and connected to a vertical turbine pump casing located approximately in the center of the sump. The turbine pump will pump solution through a 30-inch diameter HDPE pipeline to the Booster Station (see below).

Supernatant Pool Reclaim Barge: Reclaim solution will be recovered from the supernatant pool using barge-mounted pumps. The barge may be operated up to 1,500 feet from the South TSF embankment crest. The barge will be equipped with four (4) vertical turbine pumps and will be located within the limits of the Reclaim Trench and requires a minimum 10-foot operating depth. The pumps will feed a single manifold connected to a 30-inch diameter HDPE pipeline that will convey solution to the Booster Station.

Booster Station: The Booster Station will be located adjacent to the Collection Trench about 1-mile north of the west end of the TSF embankment. The Booster

Station will be comprised of an 80,000-gallon steel retention tank and up to eight (8) booster pumps placed within a reinforced concrete containment structure measuring approximately 35 feet wide by 125 feet long. The design containment volume will exceed the required 110% tank volume. Reclaim solution, which is anticipated to reach a peak flow rate of 7,200 gpm (5,200 gpm from the supernatant pool and 2,000 gpm from the underdrain system) will be pumped from the Booster Station to the Process Water Tank through a single 36-inch diameter reclaim water return line that will be placed in the Collection Trench adjacent to the slurry pipelines.

Process Water Tank: The Process Water Tank will be located on a slope on the northwest, upgradient side of the mill building and will store a mixture of reclaim solution and fresh water supplied by the Kobeh Valley well field for use in the process circuit. The steel tank, approximately 70 feet in diameter and about 38 feet tall, will have a capacity of about 1 million gallons and will be placed on a 90-foot by 205-foot, reinforced concrete slab with a minimum 1-foot high stemwall. The floor of the tank containment area is sloped to a subgrade, HDPE-lined concrete sump. Since the containment does not meet the required 110% maximum vessel size capacity, the sump will have a 48-inch diameter HDPE overflow pipeline at the low point that will convey solution by gravity to the TTEOP, which has a design capacity of 5.4 million gallons, excluding freeboard.

Reagent Storage and Mixing: Process circuit reagents will be stored and mixed within dedicated containment located on the southeast side of the mill building. Bulk quantities of reagents and other process chemicals, such as fuel oil, will be stored in a steel building on a reinforced concrete slab that will measure approximately 250 feet long by 60 feet wide. The slab will be constructed with containment stemwalls and the floor will be sloped to a central drain that will report to a floor sump. The containment areas are designed with capacity in excess of the required 110% of the largest vessel volume.

C. Receiving Water Characteristics

The Mount Hope Project area straddles the divide between Diamond, Kobeh, and Pine valleys. Much of the Project Area surface water drains into the Diamond Valley, from which surface water and groundwater has been used extensively for agricultural irrigation. Diamond Valley is a closed basin and because drainage outside the valley does not occur, numerous alkali and salt flats exist in the north half of the valley.

Kobeh, the largest of the three basins, is an alluvial basin in which most of the Facility is located. Surface water drainage from Kobeh into Diamond Valley may occur in response to large storm events. Pine Valley is located to the north of the Project Area and receives flow through Henderson Creek from a small ephemeral stream that drains the northwest flank of Mount Hope. Virtually all surface water flows are ephemeral and contain water only during storms or periods of intense snowmelt.

Regional groundwater recharge originates in the upland areas of each basin, flowing downgrade toward the basin axis. Groundwater elevations in this greater project area were evaluated using data collected between 1900 and 2007 for nearly 400 wells located in Antelope, Diamond, Kobeh, Pine, South Monitor, and North Monitor valleys. Groundwater not discharged in Monitor Valley and Antelope Valley flows north to comingle with groundwater of Kobeh Valley. Groundwater not discharged in Kobeh Valley could possibly flow eastward into Diamond Valley, through Devil’s Gate, although an interbasin hydraulic link has not been proven.

Drawdown in Diamond Valley, caused by irrigation pumping, may affect groundwater flow direction in the southern end of the valley and the groundwater flow pattern in Kobeh Valley may also be affected by irrigation pumping. Steady-state flow conditions, interpreted mainly from pre-1960 elevation data, groundwater elevations range from greater than 6,700 feet AMSL in Garden Valley and north of Mount Hope to less than 5,800 feet AMSL near the playa area of Diamond Valley. The compiled data indicate groundwater flows from North Monitor and Antelope valleys, through Kobeh Valley, to the terminus of the flow system in Diamond Valley. The groundwater gradient averages about 5.3 feet per mile along the axis of North Monitor Valley and increases to 8.8 to 9.4 feet per mile near the boundary of Kobeh Valley.

Several wells were samples to determine alluvial and bedrock groundwater quality background in Kobeh and Diamond valleys. The analyses indicate that Kobeh Valley alluvial water is a sodium-bicarbonate water that exceeds the Profile I reference values for arsenic and manganese and the Diamond Valley alluvial water exceeds for manganese, sulfate and total dissolved solids (TDS). Kobeh Valley bedrock water exceeds for manganese and Diamond Valley water exceeds for fluoride, pH, aluminum, arsenic, iron and manganese.

Baseline water quality within the Facility area was determined with samples from locations along Henderson Creek, 24 springs, 13 monitoring wells, and one (1) collapsed adit associated with the historic Mount Hope Mine. Henderson Creek surface water and off-site springs exhibit calcium-bicarbonate chemistry with low TDS and metals concentrations. On-site springs exhibit elevated TDS and mixed calcium and magnesium cation and bicarbonate to sulfate anion dominated water. Drainage associated with the Mount Hope Mine is a calcium sulfate type water with elevated arsenic, manganese, iron, sulfate and TDS. Onsite groundwater wells indicate exceedances of arsenic, iron, manganese, aluminum, fluoride, sulfate and TDS, reflecting the geochemical influence of the geology associated with the ore deposit rather than an impact from past mining.

Data for six (6) monitoring wells located approximately 1,500 to 2,500 feet outside the east and south limit of the proposed South TSF footprint suggest groundwater is relatively deep. Although one (1) well (TM-C/236P), located to the east along an alluvial drainage, encountered static water at 60 feet below ground surface (bgs), the static water level in the remaining five (5) wells, which are more proximal to the footprint, encountered water at depths ranging from 208 to 380 feet bgs.

Pit Lake Study: At the proposed end of mining (year 32) when pit dewatering is expected to cease, the pit bottom will be at an elevation of approximately 4,700 feet AMSL and the south pit rim will be at approximately 6,800 feet. A pit lake will form in the Mount Hope Pit following the conclusion of mining. Therefore, a pit lake predictive model was developed incorporating data from a hydrologic and geochemical conceptual model; geological modeling of the final pit walls; geochemical characterization to determine potential pit wall leachate composition; baseline water quality analysis of site-specific groundwater; a hydrogeological assessment of the immediate pit vicinity including estimates of fill rate, groundwater inflow, pit wall runoff, precipitation volumes, and evaporation rates; and sensitivity analysis of multiple hydrologic and geochemical parameters on the model.

Hydrogeologic data indicate a low-permeability system with low expected groundwater flux rates into the pit. The base case was modeled in a series of time steps at 5, 10, 20, 50, 100, 150, and 200 years for chemistry and run to an end point of 1,580 years post-mining for the water balance. The base case model predicts an initial groundwater inflow rate of 285 gpm, when pit dewatering ceases, decreasing to 133 gpm at 200 years post-mining. At 200 years the pit lake will be at 82% of its maximum depth and will reach the maximum hydraulic equilibrium elevation of 5,912 feet AMSL at approximately 1,000 years post-mining. This hydraulic equilibrium elevation is estimated to be below the surrounding groundwater potentiometric surface and the lowest pit rim elevation of 6,800 feet AMSL. Based on this information and modeled evaporation and precipitation rates, which exceed inflow rates and pit wall runoff rates, the final pit lake will act as a terminal lake or hydraulic sink with no outflow to groundwater or the surface.

A relatively low groundwater inflow rate will result in a long pit filling time and exposure of the pit walls to weathering and potential oxidation for a considerable period of time. As a proportion of inflows during the early pit filling years, groundwater will make up approximately 60% and pit wall runoff another 38%. The groundwater expected to enter the pit lake will be well buffered and of overall good quality with the exception of elevated fluoride and antimony. The material in the proposed final pit walls will be generally non-acid generating but can contain elevated cadmium, manganese, and zinc. Therefore, groundwater will be the primary influence on ultimate pit lake quality and pit wall material will have a secondary influence.

For the base case model, the pH of the pit lake is predicted to be neutral to slightly alkaline, with a pH of approximately 7.7 standard units throughout pit filling to 200 years post-mining. Total alkalinity is predicted to be present in moderate concentrations of approximately 55 milligrams per liter (mg/L) $CaCO_3$, increasing over time. Sulfate concentrations are predicted to be low, ranging between 134 and 214 mg/L over the modeled time period. Iron and aluminum are predicted to precipitate with secondary hydroxide mineral phases. Most trace metals and metalloids will be in low or non-detectible concentrations; however, concentrations of antimony, cadmium, and manganese are predicted to be above the Profile I reference values. The concentrations are considered conservative because some mechanisms of co-precipitation and adsorption, which will attenuate trace constituent concentrations, were not included in the modeling. Overall, water in the proposed pit lake is expected to be of generally good quality with moderate, long-term alkalinity, low metals concentrations, and neutral to slightly alkaline pH.

Screening-Level Ecological Risk Assessment: A Screening-Level Ecological Risk Assessment (SLERA) was prepared using results of the pit lake study for water quality. The general approach used was developed by Oak Ridge National Laboratory and incorporated recent toxicity reference values for certain inorganic chemical constituents derived by the Environmental Protection Agency to develop species-specific toxicity criteria. Criteria were developed for species considered reasonable surrogate species for the populations inhabiting the area in and around the Mount Hope Project site. The SLERA results indicate the overall ecological risk to livestock and wildlife that might inhabit the site or could use the pit lake as a drinking water source is considered to be low. Given the low risks identified, mitigation of the Mount Hope Project pit lake does not appear to be necessary at this time.

D. Procedures for Public Comment

The Notice of the Division's intent to issue a Permit authorizing the facility to construct, operate and close, subject to the conditions within the Permit, is being sent to the **Eureka Sentinel** newspaper for publication. The Notice is being mailed to interested persons on the Bureau of Mining Regulation and Reclamation mailing list. Anyone wishing to comment on the proposed Permit can do so in writing within a period of 30 days following the date of public notice. The comment period can be extended at the discretion of the Administrator. All written comments received during the comment period will be retained and considered in the final determination.

A public hearing on the proposed determination can be requested by the applicant, any affected State, any affected intrastate agency, or any interested agency, person or group of persons. The request must be filed within the comment period and must indicate the interest of the person filing the request and the reasons why a hearing is warranted.

Any public hearing determined by the Administrator to be held must be conducted in the geographical area of the proposed discharge or any other area the Administrator determines to be appropriate. All public hearings must be conducted in accordance with NAC 445A.403 through NAC 445A.406.

E. <u>Proposed Determination</u>

The Division has made the tentative determination to issue the Permit.

F. <u>Proposed Effluent Limitations, Schedule of Compliance, Special Conditions</u>

See Section I of the Permit.

G. <u>Rationale for Permit Requirements</u>

The facility is located in an area where annual evaporation is greater than annual precipitation. Therefore, it must operate under a standard of performance which authorizes no discharge(s) except for those accumulations resulting from a storm event beyond that required by design for containment.

The primary method for identification of escaping process solution will be placed on required routine monitoring of leak detection systems as well as routinely sampling downgradient monitoring well(s). Specific monitoring requirements can be found in the Water Pollution Control Permit.

H. <u>Federal Migratory Bird Treaty Act</u>

Under the Federal Migratory Bird Treaty Act, 16 U.S.C. 701-718, it is unlawful to kill migratory birds without license or permit, and no permits are issued to take migratory birds using toxic ponds. The Federal list of migratory birds (50 CFR 10, April 15, 1985) includes nearly every bird species found in the State of Nevada. The U.S. Fish and Wildlife Service is authorized to enforce the prevention of migratory bird mortalities at ponds and tailing impoundments. Compliance with State permits may not be adequate to ensure protection of migratory birds for compliance with provisions of Federal statutes to protect wildlife.

Open waters attract migratory waterfowl and other avian species. High mortality rates of birds have resulted from contact with toxic ponds at operations utilizing toxic substances. The Service is aware of two approaches that are available to prevent migratory bird mortality: 1) physical isolation of toxic water bodies through barriers (covering with netting), and 2) chemical detoxification. These approaches may be facilitated by minimizing the extent of the toxic water. Methods which attempt to make uncovered ponds unattractive to wildlife are not always effective. Contact the U.S. Fish and Wildlife Service at 1340 Financial Boulevard, Suite 234, Reno, Nevada 89502-7147, (775) 861-6300, for additional information.

Prepared by: Thomas E. Gray
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