FACT SHEET
(Pursuant to Nevada Administrative Code [NAC] 445A.401)

Permittee Name: **Borealis Mining Company, LLC**

Project Name: **Borealis Mine Project**

Permit Number: **NEV2005101**
Review type/Year/Revision: **Renewal 2021, Fact Sheet Revision 00**

A. Location and General Description

Location: The **Borealis Mining Project** is located on the western flank of the Wassuk Range and the east side of Fletcher Valley, approximately 12 miles southwest (by air) of the town of Hawthorne, in Mineral County, Nevada. The project is located within the Walker Lane Gold Belt and the historic Borealis Mining District (also referred to as the Ramona, Hawthorne and Lucky Boy Districts).

The project is located within portions of Sections 8, 9, 10, 16, and 17, Township 6 North, Range 29 East, Mount Diablo Baseline and Meridian. The entire project area is located on public land within the Humboldt-Toiyabe National Forest, administered by the United States Forest Service (USFS)-Bridgeport Ranger District.

Site Access: To access the Borealis Project site, proceed approximately 3 miles south from Hawthorne on State Route 359 to Lucky Boy Pass Road. Proceed west on Lucky Boy Pass Road approximately 9 miles to Forest Road (F.R.) -199. Proceed south approximately two miles to F.R.-026. Proceed east on F.R.-026 approximately one mile to the Borealis Project.

General Description: Borealis Mining Company, LLC (Borealis), is a wholly owned subsidiary of Waterton Global Mining Company LLC (Waterton) and the Permittee-of-Record for the Borealis Project. Annual ore processing is limited to 7.446 million tons, with a project life expectancy estimated at 4.5 years, however this could change depending on the outcome of current and future exploration activities.

The Borealis Project is designed to be constructed, operated and closed without any discharge or release in excess of those standards established in regulation except for meteorological events which exceed the design storm event.

Geology: The Borealis Mine is a disseminated gold deposit hosted in Miocene andesites. The volcanic stratigraphy consists of flows, breccias and tuffs. Epithermal gold-system alteration types identified during mining operations include argillic, advanced argillic, propyllitic, silicic and an "acid-leached zone". This acid leached zone contains quartz, rutile, clinochlore, barite, and jarosite/alunite. The argillic alteration zones are characterized by the occurrence of kaolinite and montmorillonite clays.

History: Historical records indicate that gold and silver mining has occurred at the Borealis site since the 1930's, however, it wasn't until 1978, that Houston International Minerals Company (HIMCO) discovered a commercially viable gold deposit. HIMCO's successor company Tenneco Resources placed the Borealis Mine into production in 1981, as an oxide-ore, low-cost, cyanide heap-leach mining operation with a Merrill-Crowe circuit for precious metals recovery. Tenneco Resources later sold its interests to Echo Bay in 1986 and at the cessation of mining in 1991, a total of 10.7 million tons of ore had been processed and approximately 635,000 ounces of gold had been recovered. Although significant sulfide-bearing gold deposits were encountered during Borealis Mine development, the sulfides were never mined.

During the life of the mine, five open pits and their associated waste rock dumps were developed (Borealis, East Ridge/Goldview, Deep Ore Flats, Freedom Flats and Northeast Ridge) and five heap leach pads (HLP #1 through #5) were constructed. Two of the pits, the Borealis and Deep Ore Flats pits were completely backfilled with waste rock and the six waste rock dumps and five heap leach pads were subsequently regraded and re-vegetated. A small pit lake has formed in the East Ridge/Goldview Pit.

Following mine closure in 1991, Santa Fe Pacific Gold Corporation (Santa Fe) and Cambior Exploration USA, Inc. (Cambior) each independently conducted exploration on the Borealis property throughout the 1990's.

Gryphon Gold Corporation (Gryphon) purchased Borealis from Echo Bay in 2004 with the intention of expanding several existing pits, re-working the heap leach pads and waste rocks dumps, and constructing a new cyanide heap leach pad for gold recovery, all within the footprint of the previous Borealis Mine disturbance. A new Water Pollution Control Permit application was submitted by Borealis Mining Company (a wholly owned subsidiary of Gryphon) in February 2005 and became effective on 28 January 2006. Most of the initial site activity was confined to exploration with a minimal amount of construction activity. All activity at the Borealis site was suspended on 27 November 2006 and on 9 January 2007 the facility entered "Temporary Closure" status.

In early 2011, high gold prices and the availability of additional financing led to a resumption in construction activity at the Borealis site and on 29 November 2012, the site was able to return to active cyanide leaching operations. In February 2013, Borealis Mining Company changed its name to Borealis Mining Company, LLC to reflect their Joint Venture with Waterton Global Value LP.

B. Synopsis

Mining: Long-term plans indicate that the Permittee will return to active surface mining with the expansion of five previously mined pits: Freedom Flats, Borealis, East Ridge/Goldview, Northeast Ridge, and Polaris (formerly referred to as Deep Ore Flats).

- *Freedom Flats Pit*—The existing Freedom Flats Pit was first mined in 1986 and ore production from the pit continued for about 2½ years. The Permittee intends to mine approximately 1.5 million tons of ore from the pit over the life of the project.
- *Borealis Pit*—The existing Borealis Pit was first mined in 1981 and backfilled in 1986. The Permittee intends to mine approximately 841,000 tons of ore from the pit over the life of the project.
- *Polaris Pit (Deep Ore Flats Pit)*—The Deep Ore Flats Pit was mined and backfilled during the mid 1980's. The Permittee renamed this pit the Polaris Pit in 2005 and intends to mine approximately 559,000 tons of ore over the life of the project.
- *East Ridge/Goldview Pit*—The Permittee intends to expand the existing East Ridge/Goldview Pit and mine up to 1.5 million tons of ore over the life of the project. The current plan is for the pit to be deepened by about 75 feet (ft) to a final floor elevation of 7,330 ft above mean sea level (amsl). Groundwater in the area of the pit is 7,100 ft amsl. Currently there is a small pit lake (referred to as the East Ridge/Gold View Pit Lake) that has formed as a result of the accumulation of meteoric and shallow groundwater. The pit lake occupies a footprint of approximately 0.33 acre with a surface elevation of 7,395 ft amsl and had an average pH of approximately 2.87 standard units (SU) during 2012. For additional details regarding pit lake management, refer to the section *"Receiving Water Characteristics—Pit Lake"*.
- *Northeast Ridge Pit*—The Permittee intends to mine approximately 744,000 tons of ore from the existing Northeast Ridge Pit over the life of the project. The current plan is for the pit to be deepened by about 25 feet to a final floor elevation of 7,950 feet amsl. Groundwater in the area of the pit is known to have a maximum elevation of about 7,960 feet amsl. This could result in the development of a pit lake, but current data is limited. For additional details regarding pit lake management, refer to the section *"Receiving Water Characteristics—Pit Lake"*.

Mining activity since permit issuance has been minimal and only consisted of the mining and reprocessing of ore materials from existing Heap Leach Pad (HLP) #3. However, the resumption of mining and processing at the site began in May of 2021. For additional details regarding the reprocessing or ore materials, refer to the sections *"Processing"* and "*Heap Leach Pad, Process Solution Conveyance, and Process Solution Ponds"*.

Waste Rock Facilities (WRFs): The Permittee intends to expand the Freedom Flats, Borealis, East Ridge/Goldview, and Northeast Ridge Waste Rock Facilities (WRFs). Characterization results (including MWMP-Profile I and Acid-Base Accounting results) indicate that most of the waste rock from the Borealis site has the propensity to be acid generating. However, none of the historic WRFs have shown any evidence of acid rock drainage (ARD). The Permittee will continue to characterize waste rock as mining progresses.

- *Borealis WRF*—The Borealis WRF is comprised of two WRFs: The South Borealis and North Borealis WRFs. The South Borealis WRF will be located south of the Borealis Pit will have the capacity to store 5.92 million tons of waste rock from the Freedom Flats and Borealis Pits. The North Borealis will be located northeast of the Borealis Pit and will have the capacity to store 1.72 million tons of waste rock from the Borealis Pit.
- *Polaris WRF*—The Polaris WRF will be located south of the Polaris Pit. Current plans indicate the storage capacity will be approximately 2.41 million tons of waste rock.
- *East Ridge/Goldview WRF*—In 1987, the East Ridge/Goldview WRF was recontoured as part of the reclamation activities at the Borealis Mine site. Current plans indicate that the WRF will be expanded both vertically and laterally to store an additional 1.56 million tons of waste rock.
- *Northeast Ridge WRF*—The Northeast Ridge WRF was closed in 1990. Current plans indicate that this WRF will be expanded to store an additional 1.78 million tons of waste rock.
- *Freedom Flats, Goldview and Deep Ore Flats WRF*--The Freedom Flats, Goldview and Deep Ore Flats WRF were reclaimed and the bond released. These WRFs will not be disturbed.

With the 2021 renewal of the Permit, the Division incorporated a schedule of compliance item that requires the submittal of a characterization plan that proposes a strategy to characterize mined materials in accordance with the most recent update of the Divisions guidance document "*Waste Rock, Overburden, and Ore Characterization and Evaluation*". This plan is required to include an anticipated timeframe for testing and for the submittal of a final characterization report. The characterization conclusions drawn from the final characterization report will be utilized to update site closure strategies, as necessary.

Processing: Run-of-mine (ROM) ore or previously leached ore removed from the existing heap leach pads (HLPs) is crushed and screened in closed circuit to a nominal size between ½ and ¾-inch diameter. Depending on metallurgical testing results of the ROM ore, a gravity circuit may be operated to recover any of the coarse gold. A small stockpile is maintained in order to provide a continuous supply of crushed ore to the heap leach facility, in the event the crushing and screening plant is down for maintenance.

Crushed ore is conveyed to the HLP where it is agglomerated with lime, cement, and dilute cyanide solution prior to placement on the HLP. The agglomeration drum is located on a lined portion of the HLP for containment.

Heap Leach Pad, Process Solution Conveyance, and Process Solution Ponds: The five existing HLPs numbered 1 through 5 were constructed during the early 1990's and were all reclaimed by 1995. Designs for a new pad (HLP#6), a pregnant pond and a barren/stormwater pond, were included in the new facility Permit approved by the

Division in January 2006, and the designs were later revised as a Minor Modification in October 2009. At the time of the 2006 approval, leached ore from the existing HLP#1 and HLP#3 would be placed on a new pad (HLP#6) and re-leached. New ore generated from the expansion of the Freedom Flats, Borealis, Polaris (Deep Ore Flats), East Ridge/Goldview, and Northeast Ridge surface mines will be placed on the new pad at a later date.

HLP#6--HLP #6 is designed for construction in three phases: Phase 1A, approximately 406,200 square feet (sq ft); Phase 1B, approximately 399,500 sq ft; and Phase 2, approximately 1,269,800 sq ft. The Permittee estimates that 10 million tons of gold bearing ore will be loaded onto the heap leach pad during the life of the project. Maximum stack height above the liner surface is limited to 260 ft with a maximum cyanide solution application rate of 0.005 gallons per minute per square foot (gpm/sq ft).

Phases 1A, 1B and 2 were initially projected to occupy a footprint with combined area of 2,075,500 sq ft and would be located north of the existing HLP#2, within the reclaimed area of the old process plant site.

In response to changes in their short term and long term mine development strategies, the Permittee proposed a Minor Modification to the approved HLP#6 design. The Minor Modification was submitted on 12 August 2009; revised and re-submitted on 15 September 2009; and approved by the Division on 13 October 2009.

In the approved design, the HLP#6 footprint was decreased to 1,518,300 sq ft (including the perimeter berm) and the amount of ore placed on the pad reduced to 7.9 million tons. HLP#6 was to be constructed in two phases (Phases 1A and 1B); while construction of Phase 2 was postponed indefinitely. Phases 1A and 1B each occupy a footprint of 759,150 sq ft with a capacity of 3.95 million tons of ore. Maximum HLP height was reduced from 260 ft to a new limit of 200 ft above the liner surface with a lift height of approximately 25 ft. Maximum cyanide solution application rate is 0.005 gpm/sq ft.

HLP#6 consists of a lined leach pad, pond, solution channel and pipelines, surrounded by a 2-foot high (minimum) perimeter berm which also serves as an access roadway. The HLP is underlain by a 12-inch thick prepared subbase of native and amended soil and compacted to a minimum of 95-percent maximum dry density (American Society for Testing and Materials [ASTM] D698) and a maximum in-place permeability of $1x10^{-6}$ centimeter per second (m/sec). A 60-mil high-density polyethylene (HDPE) liner (textured side face down) overlies the subbase and a 12-inch thick protective layer of minus ½-inch diameter crushed and screened ore overlies the 60-mil HDPE.

A network of perforated 4-inch diameter Advanced Drainage Systems (ADS) pipe is placed on the protective layer to promote leach solution and stormwater flow off the leach pad. The piping has been sized to collect and convey 100 percent of the solution flow and any increases in the flow due to storm events. The pipes are spaced on 20-ft centers with a maximum run of about 200 ft and encapsulated in a 24-inch thick layer of aggregate over the entire leach pad. Aggregate is placed around the pipes to promote

solution drainage into the collector pipes as well as to provide protection to the pipe network during construction and heap leach pad loading.

Lateral collectors convey the pregnant leach solution to 8-inch diameter dual-wall, "plain end" N-12 ADS header pipes, sized to collect and convey 100 percent of the solution flow and any increases in the flow due to storm events. In addition, the pipe sizing also accounts for expected reductions in pipe cross-sectional areas (e.g. deflection) due to leach pad loading. On the south side of the leach pad, the perforated headers transition to solid HDPE headers. Phase 1A and Phase 1B each have their own dedicated header pipes.

The 8-inch diameter N-12 ADS pipes connect to 8-inch diameter solid wall HDPE pipes at the HDPE-lined exit notches located on the west perimeter berm of the Phase 1A and 1B pads. Each exit notch invert will be below the lowest level of any leach pad floor liner, limiting the transient head on the liner system to 1 foot or less. Beyond the exit notches, the HDPE pipes are placed in an 80-mil HDPE lined ditch (see Pipe Containment Channel, below).

The ditch liner is fusion welded to the 60-mil HDPE HLP#6 liner. The lined ditch serves as secondary containment for the 8-inch diameter HDPE pipes. All solutions, including stormwater run-off, exit the west side of the pad perimeter berm and will be directed to the Pregnant Solution Pond (Preg Pond) or to the Barren Solution (Barren Pond) for recycling back to HLP#6. Stormwater runoff from HLP#6 is also transported in the solution collection header pipes along with the leachate.

Approximately 1.3 million tons of spent leach ore from existing HLP#1 and HLP#3 will be crushed, agglomerated and loaded onto the Phase 1A HLP. Following the removal of approximately 600,000 tons of spent leach ore from HLP#1, construction of Phase 1B will begin.

Each phase of construction will require the removal and stockpiling of all vegetation and topsoil prior to any grading. Soil material unsuitable for construction will be removed from the perimeter embankment foundation and replaced with random fill as required by the grading plan. Materials unsuitable for engineered fill will be stored in the growth media stockpile.

The topography at the HLP#6 slopes to the west at approximately 5 percent; therefore significant excavation is not required. Berm construction in this area will be less than 20 ft in height. Maximum cut is approximately 22 ft and the maximum fill for the perimeter is about 19.5 ft.

HLP#6--Phase 2: A Minor Modification approved by the Division 9 August 2013, authorized the design, construction, operation, and closure of HLP#6--Phase 2. As stated previously, plans for Phase 2 were included in the February 2005 Permit Application Submittal and approved by the Division in January 2006, but indefinitely postponed in October 2009.

HLP#6--Phase 2 will be constructed adjacent to HLP#6 Phase 1A, on the south embankment. HLP#6 (Phases 1A and 1B) total approximately 41.3 acres with a combined HLP ore capacity of approximately 6 million tons. Phase 2 will add an additional 13.5 acres for a total capacity of approximately 10 million tons and will encompass 54.8 acres.

The Phase 2 design is identical to Phases 1A and 1B. Phase 2 will be underlain by a 12-inch thick prepared subbase of native and amended soil and compacted to a minimum of 95-percent maximum dry density (ASTM D698) and a maximum in-place permeability of $1x10^{-6}$ centimeters per second (cm/sec). A 60-mil HDPE liner (textured side face down) will overly the subbase and a 12-inch thick protective layer of minus ½-inch diameter crushed and screened ore overlies the 60-mil HDPE. The protective layer will be comprised of fines from the crushed and screened spent ore from the existing East Ridge Pit, East Borealis WRF, and HLP#3.

A network of perforated pipes will be placed on top of the Phase 2 liner system to promote leachate and storm water collection from the leach pad to the Adsorption/Desorption/Regeneration (ADR) Plant. These pipes will be encapsulated in a 24-inch thick layer of clean gravel placed over the entire leach pad. The clean gravel will be placed around the pipes to promote solution drainage into the collector pipes as well as to provide protection to the pipework during initial loading of the ore.

The pipe network, gravel and ore placement are intended to limit hydraulic head on the liner to less than 1 foot on average under normal HLP operating conditions. To provide less than 1-foot head on the liner system, the solution collection pipework consists of 4-inch diameter perforated ADS N-12 pipes. The collection pipes are designed to flow less than 50-percent full at an application rate of 0.005gpm/sq ft over an area of 5,855 sq ft. The 4-inch diameter collector pipes will be spaced on 20-foot centers and have a maximum length of approximately 300 ft. Where the collector pipes are longer than 300 ft, the spacing has been reduced to 10-foot centers to collect and convey 100 percent of the solution flow from the contributing area and minimize the head on the HLP liner system. The 4-inch diameter collector pipes convey leachate to the 10-inch diameter collector pipes.

HLP#6--Phase 2 will have an approximate 5-percent slope towards the west. Small intermediate clay berms covered with HDPE liner have been constructed at intervals to slow down the leachate within the HLP. A 10-inch diameter perforated ADS N-12 collector pipe is installed on the upstream toe of each intermediate berm to collect flows from the collector pipes. The 12-inch diameter solid wall ADS N-12 header pipes collect flows from the 10-inch diameter collector pipes and convey flows mainly along the exterior berm to the pad connection with Phase 1A. Within the pad connection, the 12-inch diameter header pipe transitions to a 14-inch diameter HDPE pipe with an inside diameter of approximately 12 inches. The pipes were designed to convey the 2000 gpm maximum design flow rate for the HLP#6 Phase 2.

The Minor Modification also included the construction of a new stormwater storage pond (Phase 2 Stormwater Pond) and three new bedrock monitoring wells (PMW-2A, PMW-4 and PMW-5). Refer to the subsections *"Solution Ponds"* and *"Receiving Water Characteristics"* for additional details.

Pipe Containment Channel: The Pipe Containment Channel conveys solution to the Pregnant Solution Pond and Barren/Stormwater Solution Pond, both located approximately 640 ft southwest of HLP #6. Pond solutions can be returned to either HLP #6 or conveyed to the ADR plant.

The solution channel starts on the northwest corner of the Phase 1A HLP and terminates on the northeastern corner of the pregnant pond. The channel is approximately 800 ft long with slopes ranging between 1.5 and 22 percent. There is a roadway crossing about halfway down the channel consisting of four, 36-inch diameter HDPE culverts.

The solution channel and roadway crossing were designed with Phase 1A and 1B HLP to accommodate 100 cubic feet per second (cfs). The design flow at that time was based on Phase 1A covered with drain rock and Phase 1B with liner only. Since then Phase 1A is now heaped in excess of 25 ft and Phase 1B is covered with drain gravel and a portion is heaped. The maximum peak flow for the solution channel from Phases 1A, 1B and 2 combined is 94 cfs with an estimated time of concentration of 30 minutes.

Since all of the process solution will be contained within the solid HDPE pipes and only storm water runoff will be conveyed in the channel, the channel is single-lined. The channel liner system consists of a 60 mil HDPE overlain by an 80 mil HDPE rub sheet. The solution collection piping for Phase 1A and Phase 2 HLPs is conveyed underneath the weir in a geomembrane "burrito" until the pipes daylight into the channel. Near the end of the solution channel the pipes from Phases 1A, 1B and 2 join into one 14-inch diameter HDPE pipe connected to the pregnant tank at the ADR Plant. The pregnant tank is equipped with and overflow that is piped to the Pregnant Solution Pond

Solution Ponds—Three solution ponds (Pregnant, Barren, and the proposed Phase 2 Stormwater Pond) are located downgradient of the HLP#6--Phase 1A and the existing HLP #2. The double-lined and leak detected Pregnant and Barren ponds were initially designed for use as process solution ponds. With the expansion of the ADR Plant, process fluid application rate and the 24-hour required drain down capacity has increased significantly. To accommodate the combined volumes of the process ponds, the 100-year, 24-hour storm event, and the 24-hour HLP draindown, a total pond capacity of 11.86 million gallons is required.

With the Permittee opting to use existing steel tanks at the ADR facility for process solution management, the existing Pregnant and Barren ponds and the proposed Phase 2 Stormwater Pond will be used exclusively for the management of stormwater and solution drain down. The existing Pregnant, Barren, and the new Phase 2 Stormwater Pond have a combined volume of 13.36 million gallons at 2-ft of freeboard and have sufficient capacity to contain the average operational pond volume, the 100-year, 24-hour

storm event, and a 24-hour HLP draindown. It is currently anticipated that all of the ponds will be converted to evapotranspiration (ET) cells at the time of closure.

The double-lined Pregnant Pond is constructed on the west side of HLP #6. The pond occupies a footprint of approximately 200 ft by 307 ft with a depth of 20 ft. Volume at 2 ft of freeboard is approximately 4.48 million gallons. The subbase consists of 6-inch thick prepared subgrade, overlain by a 60-mil HDPE liner to serve as a secondary liner, and is graded to allow drainage to a Leak Collection and Recovery Sump (LCRS), located midway on the west side of the pond floor.

The secondary liner is overlain by a layer of 80-mil HDPE "Drain Liner", to serve as the primary liner and to provide a leakage solution pathway into a 2,400-gallon HDPE-lined LCRS, filled with pea gravel. Assuming 30 percent porosity, the available sump capacity is approximately 750 gallons. An 8-inch diameter HDPE pipe is placed on the interior face of the pond and extends into the gravel filled sump between the liners for use in removing any collected solution. The collected solution can be pumped to the pond or to the ADR Plant.

The double-lined Barren Pond is constructed on the south side of HLP#6 and adjacent to the Pregnant Pond. The pond occupies a footprint of approximately 258 ft by 378 ft with a depth of 10 ft. Volume at 2 ft of freeboard is approximately 4.48 million gallons. The base will consist of a 6-inch thick prepared subgrade, overlain by a 60-mil HDPE liner to serve as a secondary liner, and graded to allow drainage to a LCRS, located midway on the west side of the pond floor.

The secondary liner is overlain by 80-mil HDPE "Drain Liner", to serve as the primary liner and provide a seepage solution pathway into a 2,400-gallon HDPE-lined LCRS, filled with ¾-in diameter pea gravel. Assuming 30 percent porosity, the available sump capacity is approximately 750 gallons. An 8-inch diameter HDPE or polyvinyl chloride (PVC) pipe will be placed on the interior face of the pond extending into the gravel-filled sump between the liners for use in removing any collected fluids. A submersible pump is placed in the pipe to evacuate any collected fluids. Collected solution is either returned to the pond or to the ADR Plant.

The proposed stormwater pond will be constructed with an LCRS system consisting of an 80 mil Drainliner^{TM} HDPE and a secondary 60 mil HDPE. The space between the liners will drain to a sump filled with gravel. From the sump any collected solution can be removed via an 8-inch diameter HDPE or PVC pipe will be placed on the interior face of the pond extending into the gravel-filled sump between the liners for use in removing any collected fluids. A submersible pump is placed in the pipe to evacuate any collected fluids. Collected solution is either returned to the pond or to the ADR Plant.

Adsorption/Desorption/Recovery (ADR) Circuit—The ADR processing plant is housed on a concrete-lined area with a stem wall and a containment capacity of 110-percent of the volume of the largest tank/vessel in the plant. The concrete floor is graded to drain any overflow into the double-lined Barren/Stormwater Pond. The ADR circuit and its

associated pipelines and pumps have been designed to manage solution from normal precipitation events.

Pregnant leach solution is conveyed via the pregnant solution pipeline to the ADR plant. The pregnant solution is pumped to a feed box in the carbon-in-column (CIC) circuit where it is contacted with activated carbon for extraction of the gold via carbon adsorption. The CIC circuit will consist of one train of five columns and operate in counter current mode. Solution from the last column overflows to the barren tank where liquid sodium cyanide, fresh water and anti-scalent will be added on an as-needed basis prior to the solution returning to the heap leach pad for additional leaching of the ore.

Loaded carbon from the first column will be conveyed to the carbon stripping circuit, where it will be washed with dilute hydrochloric acid for removal of scale and then stripped in a pressure stripping circuit. Pregnant solution from the carbon strip circuit will be pumped through electrowinning cells where the gold will be plated onto steel wool. The steel wool will be washed to remove the gold-laden sludge, combined with the sludge pumped from the bottom of the electrowinning cells and dewatered in the filter press. The sludge will be manually removed from the filter press and then heated in a mercury retort for mercury removal. The retort residue will then be combined with fluxes and heated in an induction furnace to produce gold doré, which will be shipped off site for refining.

Stormwater Management: The stormwater diversion channels have been designed and will be constructed at various locations to safely transport the peak flow from a 100-year, 24-hour storm event. The diversion channels are located south of HLP#6 and to the east of the existing HLP#3. All diversion channels will be either v-ditches or trapezoidal-shaped channels having 2 horizontal to 1 vertical side slopes and rip-rap lining.

An Engineering Design Change (EDC) approved by the Division 7 October 2011, authorized the rerouting and resizing of the previously approved diversion channel in an effort to redirect an existing drainage around the HLP to natural drainages. In addition, a berm was proposed for construction to direct storm flow away from the pregnant and barren ponds. The top surface of the berm was designed and sized to accommodate small motor vehicle access.

To better analyze flow patterns for the Borealis site, the drainage area was divided into two separate drainage basins identified as Drainage Basin-1 (DB-1) and Drainage Basin-2 (DB-2). For the flow analysis, DB-1contains the upland flow which will be diverted around the proposed leach pad via a diversion ditch and then reconnected to the existing drainage path north of the HLP. DB-2 contains the on-site flow directed away from the Pregnant and Barren Solution Ponds and then reconnected to an existing drainage path to the south.

Site specific point precipitation frequency estimates, compiled from National Oceanic and Atmospheric Administration (NOAA) Atlas 14, were used to develop the required engineering design calculations. Because of the large surface area of Drainage Basin-1,

the TR-55 Method was used to determine the resultant storm event flows from the 10, 25 and 100 year-24 hour storm event. In addition, DB-1 was further subdivided into sub-basins, identified as SB-1A through SB-1G. For DB-2, the Rational Method was used to determine the resultant storm event flows from the 10, 25 and 100 year-24 hour storm event.

Hydrology Calculations included in the EDC submittal indicated that for DB-1, storm event flows ranged from a low of 197 cfs for the 10-year event to 416 cfs for the 100-year event. For DB-2, storm event flows ranged from a low of 48 cfs for the 10-year event to 89 cfs for the 100-year event.

For design purposes, Diversion Channel-1(DC-1) was sized to accommodate a design flow of 416 cfs from DB-1. To accommodate the various slopes and cross sections throughout the length of the channel, DC-1 was further divided into six sub-sections, referred to as DC-1.1 through DC-1.6.

Rip-rap was selected for channel protection due to readily available sources on-site. The riprap D_{50} design size was based on the hydraulics of DC-1.4 (lowest velocity) and DC-1.6 (highest velocity). Within DC-1.4, an 18-inch layer of rip-rap with a D_{50} of 9 inches is required. Within all other sections of the channel, a 3-foot layer of rip-rap with a D_{50} of 18 inches is required. The riprap will be placed on a geotextile fabric to minimize erosion of the existing soils beneath the riprap.

A sediment basin is proposed on the upstream end of DC-1 and has been sized to accommodate 240 cubic yards (cu yd) of annual sediment volume generated from the undisturbed natural slopes. Sediment generated from existing roads and mining disturbance will be captured in sediment traps or other storm water controls near the sediment source as part of the Storm Water Pollution Prevention Best Management Practices plan for the site.

A stilling basin was considered for the outlet of DC-1. However, the velocity within the natural drainage course (13 feet per second [ft/sec]) was greater than the velocity at the outlet of DC-1 (12 ft/sec). Therefore, a stilling basin was not considered necessary at the outlet of DC-1.

DB-2 has many naturally occurring drainage paths that are capable of accommodating storm events occurring on a regular basis. Many of these natural drainage paths flow toward the Pregnant and Barren Ponds. A large drivable berm was constructed to divert the 100-year storm flows to the south away from the pregnant and barren ponds.

C. Receiving Water Characteristics:

Surface Water: The watershed associated with the Borealis Mine site is approximately 2,400 acres of which approximately 441 acres are located upgradient of the project boundary. There are no perennial streams in the project area, however several unnamed ephemeral streams trend to the southwest through the project area into Mud Spring

Canyon. No springs have been identified during previous mining operations or during the most recent site investigations in 2004. Two above-ground, man-made catchment facilities were constructed in fenced areas northeast of HLP#4 and south-southwest of the Borealis site for use by wildlife.

Groundwater: Mine groundwater gradient follows topography northeast to southwest. Recharge to the groundwater system in the Borealis Mine-Powell Valley area is primarily from snowmelt and rainfall in the Wassuk Range to the east. Groundwater flows laterally through the range front through sediments and fractured rock into Fletcher Valley west of Mud Spring. Winter and late spring appear to be the most active recharge periods. Depth to groundwater beneath the HLP#6 site and the process solution ponds occurs in bedrock, approximately 143 feet below ground surface (ft bgs) and 189 ft bgs, respectively.

The most recent environmental assessment by the USFS (2004) found no evidence of groundwater in the older and younger gravels that cover the bedrock at the Borealis site. The only exception is the seasonal occurrence found in the localized area surrounding the East Ridge/Goldview pit (see below).

Hydro-Search, Inc (Hydro-Search) conducted a comprehensive bedrock groundwater evaluation in 1981. Some confirmatory measurements were collected during the 2004 site assessment with an additional assessment to be performed during 2005. The results from the Hydro-Search evaluation showed that groundwater was present in the bedrock, however, it appears to be highly compartmentalized due to the numerous fault structures with movement between compartments extremely limited, and is of insufficient quantity for use as make-up water.

Because of the highly compartmentalized nature of the bedrock groundwater, groundwater depths vary throughout the Borealis Mine site and range between 44 ft bgs (7258 ft amsl) at well WX-7 near the existing Leach Pad 5 on the eastern boundary of the Borealis Mine site to 436 ft bgs (6699 ft amsl) at well WX-5 outside of the northern boundary of the Borealis Mine site. It should be noted that four wells (WX-1, WX-2, WX-9 and WX-13) located in the Freedom Flats Pit area on the southwestern boundary of the Borealis Mine site, have been drilled to depths greater than 500 ft bgs (less than 6,500 ft amsl) and are dry. Background water quality is characterized by TDS, arsenic, sulfate and manganese concentrations that exceed the Profile I reference values. The bedrock groundwater is not suitable as a potable water source.

Water for the Borealis project is obtained from two production wells (PW-1 and PW-2) located approximately 5 miles southeast of the Borealis Mine site. Water quality from these wells met the Profile I standards during Echo Bay's operation and there is no reason to believe that the water quality has degraded. Average water usage for processing, heap leaching, dust suppression and other activities is estimated at 825 gallons per minute. Water will be stored in a 25,000-gallon raw water tank adjacent to the ADR plant.

Monitoring Wells: Four alluvial monitoring wells (MW-175S, MW-176S, MW-177S, and MW-178S) and eleven bedrock groundwater monitoring wells (PMW-2, PMW-2A,

PMW-3, PMW-4, PMW-5, MW-170, MW-174, MW-175D, MW-176D, MW-177D, and MW-178D) are permitted at the Borealis site. Alluvial wells MW-175S and MW-176S and bedrock wells MW-170 and MW-174 are dry.

Background water quality is characterized by TDS, arsenic, sulfate and manganese concentrations that exceed the Profile I reference values. In addition, water quality at MW-177S and MW-177D has shown exceedences of selenium, sulfate, nitrate, TDS and on occasion, detectable WAD cyanide. The bedrock groundwater is not suitable as a potable water source. Monitoring wells, their locations, groundwater and completion depths, and status are listed below:

Table 1—Alluvial (Shallow) Monitoring Well Data

Monitoring Well	***Location***	***Groundwater Depth/Completion Depth (ft bgs/ft bgs)***	***Status***
MW-175S	Upgradient of HLP#6 and downgradient of existing HLP#3	--/109	Dry
MW-176S	Upgradient of HLP#6 and downgradient of existing HLP#4	--/20	Dry
MW-177S	Upgradient of HLP#6 and downgradient of existing HLP#5	62/69	Operational
MW-178S	Downgradient of the Barren/Stormwater Pond	189/200	Operational

Table 1—Bedrock (Deep) Monitoring Well Data

Monitoring Well	***Location***	***Groundwater Depth/Completion Depth (ft bgs/ft bgs)***	***Status***
PMW-2A	Replaces PMW-2 (in footprint of HLP#6-Phase 2 expansion), downgradient of HLP#6 and west of HLP#6-Phase 1B	--/240	Dry
PMW-3	Downgradient of HLP#6	154/240	Operational
PMW-4	Downgradient and west of HLP#6-Phase 2	130/240	Operational
PMW-5	Replaces MW-174 (now plugged and abandoned), downgradient of historic HLPs#1 and #2 (now in closure) and west of the new Stormwater Pond	169/240	Operational
MW-170	Downgradient of HLP#6 and historic HLPs#1 and #2 (now in closure)	--/100	Dry
MW-175D	Upgradient of HLP#6 and downgradient of historic HLP#3 (now in closure)	150/280	Operational
MW-176D	Upgradient of HLP#6 and downgradient of historic HLPs#4 and #5 (now in closure)	40/111	Operational
MW-177D	Upgradient of HLP#6 and downgradient of historic HLPs#4 and #5 (now in closure)	60/112	Operational
MW-178D	Downgradient of future heap leach pad in the “Coal Valley Formation”	200/240	Operational

<u>*Pit Lakes:*</u> As discussed in the above section *“Mining”* there is a small acidic pit lake that periodically forms in the East Ridge/Gold Ridge Pit. The pit lake generally exhibits pH values in the range of 2.75 with concentrations of aluminum, copper, and fluoride exceeding Division Profile III reference values. While the pit lake was backfilled with non-PAG material to mitigate the expression of the acidic pit lake in December of 2017,

the current mine plan includes the expansion and subsequent deepening of the pit to an elevation of approximately 7,350 feet amsl, or about 50 feet below the currently interpreted groundwater elevation. In addition, the current mine plan includes the expansion of Northeast Ridge Pit and subsequent deepening to an elevation of about 7,950 feet amsl, or about 10 feet below the currently interpreted groundwater elevation.

To mitigate the expression of these pit lakes, the mine plan calls for the partial backfilling of the pits with what is termed "Type I and II" waste materials which is the classification given to materials that have excess neutralization capacity or a lower propensity for acid generation and metals leaching. These materials would be placed above the pit lake equilibrium elevation and will be graded to render the areas free draining. However, because groundwater beneath both the East Ridge/Gold View and Northeast Ridge pits is characterized by low pH, elevated sulfate, and elevated metals, the Division required that characterization be performed that will eventually be utilized to evaluate if the proposed management/closure strategy is protective of waters of the State. This was added to the 2021 Permit renewal as a Schedule of Compliance Item.

PMW-5 Groundwater Investigation: Monitoring well PM-5 is downgradient of the historic HLPs #1 and #2 and west of the new Stormwater Pond. Beginning in 2016, monitoring well PMW-5 displayed a concentration of nitrate + nitrite (as N) in exceedance of the Divisions Profile I reference value. This was discovered with the review of the 2019 Annual Monitoring Report and resulted in the submittal of a groundwater investigation work plan that was approved by the Division in August of 2020. The groundwater investigation was split into 3 Phases: 1) a detailed data review, 2) additional sampling and testing, and 3) further investigation.

Based on the well's location, current understanding of groundwater flow at the site, and construction of the Stormwater Pond (double-lined and leak detected), the reclaimed HLP #2 was determined to be the most likely source and the focus of the investigation. As of the 2021 renewal, Phase 1 has been completed and is indicating that the miss-managing of the water supply tank that was previously atop the reclaimed heap could have caused the degradation. This initial conclusion will be further evaluated/refined during Phase 2 and 3.

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 published on the Division website: https://ndep.nv.gov/posts/category/land. 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 the public notice is posted to the Division website. 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 or 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. Proposed Determination:

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

F. Proposed Limitations, Schedule of Compliance, Monitoring, Special Conditions:

See Section I of the Permit.

G. Rational for Permit Requirements:

The facility is located in an area where annual evaporation is greater then 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 wells. Specific monitoring requirements can be found in the Water Pollution Control Permit.

H. Federal Migratory Bird Treaty Act:

Under the Federal Migratory Bird Treaty Act, 16 U.S. Code 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 Code of Federal Regulations 10, 15 Apri1 1985) includes nearly every bird species found in the State of Nevada. The U.S. Fish and Wildlife Service (the Service) is authorized to enforce the prevention of migratory bird mortalities at ponds and tailings 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: Matthew Schulenberg
Date: 13 July 2021

Revision 00: 2021 Renewal – Permit effective **31 July 2021**. Updated text to describe the addition of SOC Item 1 for additional characterization of mined materials to update closure plans and PMW-5 nitrate+nitrite (as N) exceedance and work plan.