FACT SHEET

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

Permittee Name: **Klondex Midas Operations Inc.**

Project Name: **Midas Project (Ken Snyder Mine)**

Permit Number: **NEV0096107**
Review Type/Year/Revision: **Renewal 2025, Fact Sheet Revision 00**

A. Location and General Description

Location: The **Midas Project (Ken Snyder Mine)** is located on private land within portions of Sections 21, 22, 27, 28, 33, and 34, Township 39 North, Range 46 East, Mount Diablo Baseline and Meridian, in western Elko County, approximately 1.5 miles southeast of the town of Midas, Nevada. The Project may be accessed by traveling 16 miles east from Winnemucca on Interstate Highway 80 to the Golconda exit #194, then approximately 45 miles east on the paved and graveled State Route (SR) 789 toward the towns of Midas and Tuscarora. Access to the mine site is via 2.5 miles of gravel road that forks to the left (northeast) off of SR 789 approximately one-half mile east of the junction of SR 789 and County Road 724, which leads to the town of Midas.

General Description: The Project consists of an underground mine accessed by a decline portal and ramp system, a waste rock storage area (WRSA), a crushing plant, a 1,000 ton-per-day conventional mill incorporating gravity separation and cyanide leaching with Merrill-Crowe recovery, a refinery, a cyanide destruction circuit, two tailings impoundments, each with its own underdrain reclaim system and collection pond, two settling ponds, and various process and administrative support facilities. The Project will disturb an estimated 153.7 surface acres over a remaining Project life in excess of 5 years. Dewatering of the mine workings currently averages less than 300 gallons per minute (gpm) and is primarily attributed to fresh water introduced for dust control. All dewatering water is conveyed to the tailings impoundment where it is utilized in the processing circuit. The Project is designed and constructed to operate and close without any discharge or release from the fluid management system except for meteorological events which exceed the design storm event.

B. Synopsis

General: Franco-Nevada Mining Corporation, Inc. (Franco-Nevada) Chief Geologist, Dr. Ken Snyder, is credited with discovery of the Midas ore body in 1994. Following exploration and feasibility work, a decision to develop the underground mine and build the associated process facilities, at a cost of $84 million, was made in January 1997. Water Pollution Control (WPC) Permit NEV0096107 was first effective 7 February 1998. Commercial production commenced in January 1999, at a rate of 600 tons per day and has gradually ramped up to approximately 1,000 tons per day. In May 2001, the Permit was officially transferred from Franco-Nevada to Normandy Midas Operations, Inc.

(Normandy), a wholly owned subsidiary of the Australian mining company Normandy Mining Limited (NML). In February 2002, Newmont USA Limited, doing business as (dba) Newmont Mining Corporation (Newmont) completed their acquisition of both NML and Franco-Nevada as wholly owned entities, including the Ken Snyder Mine and its associated Permit. In April 2014, the Permit was transferred to Klondex Midas Operations Inc. (the Permittee), and the Project name was changed from the Ken Snyder Mine Project to the Midas Project (Ken Snyder Mine).

Mining: The Project includes an underground mine consisting of a decline and ramp system to access the steeply dipping, gold-silver bearing vein deposit. The decline portal is located to the south of the main mining zone and approximately 200 feet west of the footwall of the vein at an elevation of 5,800 feet above mean sea level (AMSL). Mining levels are developed at 50-foot vertical intervals to access stopes located on the mineralized vein. Mineralization has been identified between an elevation of 5,700 feet AMSL and at least 4,300 feet AMSL.

During decline excavation, approximately 250,000 tons of waste rock were removed and stored in the WRSA. Approximately 17,500 tons of this material was crushed and used as roadbed material in the decline. The majority of the remaining material has been used in construction and expansion of the Phase VI tailings impoundment embankment. The waste rock in the rock storage area is managed to minimize the potential for acid generation and release of solutes.

Small quantities of waste rock are trucked to the surface for placement in the WRSA. However, the majority of waste rock generated during regular mining operations remains underground and is mixed with neutralizing cement to backfill stopes within three months of their completion. Waste rock characterization, including acid-base accounting (ABA) and kinetic tests (humidity cell tests), has been performed on this material. Geochemical analysis of the waste rock indicate that approximately 27% of waste rock is slightly net acid generating although kinetic tests showed that the leachate remained circum-neutral (pH 6.5 to 8.5) after 30 weeks of oxidation. These results suggest that acid generation will not be a problem for short-term surface storage of the waste rock; however, as a conservative measure to minimize the potential for acid generation, lime is an added component of the cement in the backfill.

Meteoric Water Mobility Procedure (MWMP) tests were also performed on a suite of 32 waste rock samples to evaluate the potential for meteoric water to mobilize constituents of concern. Some leachates from these tests exceeded Division Profile I reference values for several constituents including antimony (twenty samples), arsenic (three samples), lead (two samples), selenium (one sample), thallium (one sample), TDS (one sample), aluminum (two samples), sulfate (one sample), fluoride (one sample), and magnesium (one sample). Therefore, runoff from exposed waste rock in the WRSA could potentially degrade surface water or groundwater if not properly handled. In response, several mitigation measures have been incorporated. An upgradient diversion ditch, designed to convey the peak flow from a 100-year, 24-hour event, directs stormwater surface flow around the WRSA. Any meteoric fluid emanating from the WRSA is collected in a downgradient sump and is analyzed for Profile I constituents in accordance with the Permit. Each truckload of waste rock removed from underground has lime added at a rate of 5% Calcium Carbonate ($CaCO_3$). As an extra measure, even though very little waste rock is added to the WRSA, approximately 40 tons of lime or dolomite is spread over the dump on an annual basis. Finally, a downgradient monitoring well (MW-9) is sampled and analyzed quarterly for Profile I constituents and the waste rock is analyzed quarterly by Nevada Modified Sobek Procedure and MWMP – Profile I methods.

A re-evaluation of the waste rock management plan determined that approximately 2,860,000 tons of waste rock will be stored at the WRSA during operations; however, the waste rock will be partially or entirely consumed to construct the Section 22 Tailings Impoundment and to supply cover material for impoundment areas and other reclamation projects, such as backfill of the underground openings at closure. Approximately 433,600 tons of waste rock will be consumed for reclamation alone.

An EDC was approved by the Division in April 2018 for an expansion of the WRSA. It will be expanded to the immediately north of its existing footprint over an area of approximately 2 acres. Waste rock will be transported from the underground mine, placed in the expanded area, and stacked to a height of approximately 75 feet above grade, which will accommodate approximately 184,000 cubic yards. At 75 feet above grade, the top of the expanded WRSA will be at the same elevation as the existing WRSA. Once the expansion is level with the existing WRSA, low grade ore will be stockpiled on the waste rock for temporary storage. Stockpiling of low grade ore will be intermittent as it is not always available from the mine. Approximately 4,025 cubic yards (5,000 tons) of low grade ore will be typically stockpiled on top of the waste rock. Low grade ore will be hauled from the stockpile and processed in the Midas mill as needed. An MWMP – Profile I analysis indicated that the low grade ore exceeds the reference values for nitrate + nitrite at 93 mg/L and antimony at 0.0062 mg/L. The low grade ore has an acid neutralizing potential to acid generating potential ratio of 2.52 which is acceptable based on the Division criteria of 1.2.

To limit runoff into a nearby channel, a berm will be constructed on the east of the expansion which will direct any runoff to the existing stormwater collection basin south of the facility.

Ore is developed and extracted using both long-hole and shrinkage stope mining methods. Hand-held stoper and jack-leg drills are used in shrinkage stopes, and single-boom production jumbos are used in the long-hole stopes. Ore is mucked from the stopes using load-haul-dump (LHD) equipment and loaded into underground haul trucks for haulage and placement in a surface transfer stockpile located outside the decline portal. The stockpile is constructed with a layer of geosynthetic clay layer (GCL) material. This type of GCL is constructed of bentonite clay sandwiched within two geotextile layers. Laboratory testing by the product vendor indicates the GCL has a permeability $\leq 5 \times 10^{-11}$

centimeters per second (cm/sec). The ore stockpile area is also graded to control any surface flow.

Portal Ore Stockpile Pad: An engineering design change (EDC) was approved by the Division in January 2010, to construct a new, larger portal ore stockpile pad to the east of the mine portal in an existing laydown area located north of the waste rock storage facility. As part of the new construction, the original ore stockpile pad described above was reclaimed by removing all stockpiled ore, constructing perimeter berms, regrading the pad surface, and capping the stormwater collection and conveyance system prior to converting the pad for use as a parking and laydown area.

The new pad covers an area of approximately 39,200 square feet (0.92 acres). The pad construction includes a prepared subgrade placed in maximum 12-inch thick lifts in fill areas and scarified to a depth of 8 inches in cut areas and compacted to 90% of maximum dry density as determined by the modified Proctor method (ASTM D 1557). A layer of GCL, with a specified maximum permeability of $\leq 5 \times 10^{-11}$ cm/sec, covers the subgrade, which must not contain any particles > ¾-inch diameter. The GCL is covered with a 3-foot thick layer of 6-inch minus gravel as overliner material to provide a protective cushion between it and the overlying ore and equipment loads. The lower 2-foot-thick layer of overliner is capped with a layer of geonet that is covered with the remaining 1-foot-thick layer of overliner. The geonet layer serves as an “indicator” to warn a loader operator of the GCL proximity 2 feet below. The GCL is carried over the 5-foot high pad perimeter berm and secured in an anchor trench.

The base of the pad is constructed with a 2% gradient toward a stormwater solution collection sump located in the southwest corner of the pad. The inverted trapezoidal-shaped sump has a base 10 feet below the base of the pad and is constructed with a continuation of the GCL pad layer. The sump is backfilled with clean drain rock (100% ≤ 3-inch diameter, maximum 15% ≤ #200-mesh) and fitted with a 48-inch diameter perforated and geotextile-wrapped, high-density polyethylene (HDPE) evacuation riser equipped with an automated stainless steel submersible pump. The pump is activated when the collected solution reaches a depth above 6 to 12 inches and is designed to pump at least 45 gallons per minute (gpm) to evacuate the flow reporting to the pad area from the modeled 25-year, 24-hour storm event.

Collected solution is conveyed from the collection sump through a 4-inch diameter HDPE primary pipeline located within a 6-inch diameter secondary containment pipeline to a precast concrete valve box where it joins the existing 4-inch diameter HDPE mine water discharge pipeline. The conveyance pipeline is buried 3.5 feet below ground surface between the collection sump and the valve box. The conveyance pipeline is equipped with a gate valve and check valve at the valve box to prevent backflow of mine water into the collection sump. The mine water discharge pipeline conveys all solution to the tailings impoundment.

Access ramps, constructed at the north and south ends of the pad, are designed with a minimum 4 feet of fill material to protect the pad liner and berm. By design, ore placement is limited to a maximum height of 12 feet above the pad base.

Dewatering: Dewatering rates from the mine workings were predicted by previous modeling to be approximately 60 gpm. The mine workings have not intercepted large quantities of water. Occasional pockets of perched water have been encountered as mining advances but are of small volume and quickly drained. Water generated over time by mine seeps, i.e., the exposed rock penetrated by the mine workings, occurs in quantities too small to collect or sample. The actual discharge rate experienced to date has averaged less than 300 gpm, comprised primarily of fresh water introduced for dust control. That water is collected in engineered sumps and utilized in the processing circuit. A rapid infiltration basin (RIB) permitted as part of the original Permit application design was closed and reclaimed as of September 2008, due to the continued low discharge rates and volumes from the mine, which can be managed within the existing process circuit. A Final Closure Report was submitted in November 2008.

The mine dewatering system consists of underground collection sumps and portable sump pumps and piping, two sedimentation basins, and a liquid hydrocarbon separator located downstream of the sedimentation ponds on the surface used in case of an emergency. Mine water is pumped to the surface from the underground sumps via a 6-inch diameter HDPE pipeline that discharges to the tailings impoundment.

A non-fee modification approved by the Division in September 2013 authorized construction of an underground shop and washbay. The entire shop and washbay floor is constructed of concrete. Oils are stored in 350-gallon totes on steel trays with appropriate secondary containment. The concrete floor provides tertiary containment for the oil totes. The concrete floor is graded to drain to a 12-foot by 26.5-foot concrete washbay sump. Hydrocarbons are removed from the sump with floating booms or socks. Excess sump water is pumped via a 2-inch diameter HDPE pipe to one of the underground sumps used in the mine dewatering system, where it comingles with mine dewatering water and is pumped to the tailings impoundment as described above. Washbay solids are assayed for precious metals and managed as mill ore feed if warranted. If the solids do not qualify as ore, they are analyzed for Total Petroleum Hydrocarbons (TPH) and Toxic Characteristic Leaching Procedure (TCLP) metals and may be shipped to an authorized off-site facility for proper disposal if exceedances exist.

Surface Discharge: Significant amounts of dewatering water being discharged to the tailings impoundment has resulted in the need for an additional means of managing excess dewatering water. The issuance of a temporary discharge Permit in August 2017 allowed Klondex to temporarily discharge treated dewatering water meeting all Profile I reference values to Squaw Creek, a non-jurisdictional waterway. The treated water met Profile I reference values, and a permanent discharge application was under review by the Division.

The permanent surface discharge Permit was effective in April 2018; however, shortly after, the water treatment plant was taken off site. Discharge has not taken place since.

Milling: Ore is trucked from the transfer stockpile located at the mine decline portal to the main ore stockpile area located adjacent to the mill. One or more stockpiles are maintained, dependent upon ore grade, to allow for blending of ore for a weighted average feed grade material.

The mill process building and perimeter areas contain crushing, grinding, gravity separation, cyanide leaching, Merrill-Crowe gold recovery, retorting, and precious metal refining facilities. The floors of the mill building and perimeter facilities are built of reinforced concrete and are designed with concrete curbs and stem walls for containment and sumps equipped with evacuation pumps to return solution to process components or to the tailings impoundment. All building doorjambs are constructed at least 6 inches higher than the high point of the floor slab. All mill process component containment meets or exceeds the minimum requirements of NAC 445A.436.

The mill was originally designed to operate at a nominal 500 tons per day (175,000 tons per year) with a maximum production rate of approximately 225,000 tons of ore per year. An EDC approved by the Division on 27 January 2000 provided for upgrades to the mill to increase annual throughput to 365,000 tons per year. The physical modifications included addition of a Verti-mill, replacement of two 15-inch diameter cyclones with four 10-inch diameter cyclones to provide operational flexibility and more precise size segregation of ground ore, replacement of pneumatic underflow pumps with electric versions, a change in the impeller housings, replacement of the Merrill-Crowe de-aeration tower with a larger unit rated at 600 gpm flow capacity, placement of a filter in the process water circuit to remove fine particles that cause plugging in the Knelson Concentrator unit, and the addition of a second retort in the refinery.

An EDC, approved by the Division 1 November 2007, replaced the existing concentrator table with an Acacia Reactor Unit, downstream of the Knelson Concentrator, for improved gold recovery in the gravity portion of the mill circuit. The skid-mounted Acacia Unit produces a pregnant solution, which is pumped to the existing pregnant solution tank via the Leach Tails Sump and Counter Current Decant (CCD) #1, and a solid tails product that is returned to the grinding circuit, processed to leach any remaining gold, and ultimately deposited in the tailings impoundment. The modification did not increase the solution containment requirements, alter the processing rate, or change the character of the tailings waste stream.

A further increase in mill throughput, to 450,000 tons per year, was authorized by the Division as part of a minor modification to the Permit, approved 20 November 2003, for expansion of the tailings impoundment (see below). No physical modifications to the mill were required; however, a coincident modification to the Class II Air Quality Operating Permit AP1041-0766 allowed an increase in the rate at which ore can be fed into and processed through the existing facility.

The mill processing sequence is made up of the following steps: A front-end loader places stockpiled ore into a two-stage crushing plant consisting of a jaw crusher and a cone crusher. As part of an EDC approved by the Division 6 March 2000, additional containment was added to the crusher building to contain fresh water used to wash down dust and the conveyor belt within the building and to slurry process water and dust from the bag house to a steel and concrete sump located outside the building. The material collected in the sump is pumped by a dedicated pump through a double-walled pipeline into the mill building and added to the pre-leach thickener screen sump.

The crushing system is a closed circuit designed to crush blended run-of-mine ore to a nominal 3/8-inch size at a nominal throughput rate of 108 tons per hour. The crushed ore is stored in two 500-ton fine ore storage bins and then fed as needed by conveyor to a single-stage ball mill. Following grinding, the ore is routed to one of the four cyclones. Approximately 20 percent of the cyclone underflow is fed to the gravity concentrator and another 25 percent provides feed for the Verti-mill. The remaining cyclone overflow from the grinding circuit is gravity fed to a 30-foot diameter pre-leaching thickener tank.

Thickener underflow is pumped to the first, in a train of eight, 28-foot diameter agitated cyanidation leach tanks. To accommodate increased mill throughput and maintain solution residence times, the number of tanks in the train was increased from six to eight with an EDC approved 18 August 2000. A leak collection and detection system was also added to the design of the two later tanks. The six original tanks do not have leak detection, which will require evaluation at closure. Residence time in each tank is about 12 hours for a total leach time of approximately 96 hours. Slurry from the last tank in the train flows by gravity to the first of five 30-foot diameter conventional CCD thickeners where slurry solids are washed of the gold bearing solution. The rinse water from the CCD thickener circuit becomes the gold and silver-bearing pregnant solution. The washed solids report to a cyanide detoxification circuit designed to reduce cyanide concentration to 20 parts per million. The detoxified tailings slurry is pumped from the mill to the lined tailings impoundment. A common, hydraulically-linked, concrete slab with stem wall provides secondary containment in excess of the minimum required 110% for all tanks.

In 2016, the leach circuit was retrofitted to allow for operation as a Carbon-in-Leach (CIL) circuit. Four of the eight leach tanks were modified; carbon retention screen, carbon advance pumps, and a service crane were added to each of the four tanks. A Sweco screen was added to the first and fourth tank to allow for removal of carbon from the two tanks. When operating as a CIL circuit, the underflow from the pre-leach thickener is pumped to the first of four CIL tanks. The slurry flows by gravity through the tanks and is pumped to the cyanide detoxification tank to reduce the cyanide levels before being pumped to the tailing storage facility. Each of the four tanks contain activated coconut shell carbon to allow for precious metal adsorption. Stripped carbon is added to the fourth slurry tank and is progressively pumped upstream counter-current to the slurry flow until it is in the first tank. Periodically, carbon from the first tank is pumped over the Sweco screen and removed from the system to recover the metal from the carbon. Carbon is removed from the fourth tank when changing the system from a CIL circuit to the originally designed leach circuit.

An EDC, approved by the Division 29 March 2005, authorized construction of a new mill-to-impoundment detoxified tailings slurry delivery system. The design replaced the original 4-inch diameter thermoplastic conveyance pipelines with 6-inch diameter Standard Dimension Ratio (SDR) 11 HDPE pipelines placed within 10-inch diameter SDR 11 HDPE pipe for secondary containment wherever the pipelines are buried or are not on existing containment or liner. The design incorporates a new concrete valve box, located adjacent to the mill building, with a pair of 'Y'-connectors that allow tailings slurry to be pumped directly to the Phase III (and Phase V vertical expansion) impoundment, the Phase IV impoundment, or both for distribution. In addition, separate 6-inch diameter HDPE pipelines in 10-inch diameter HDPE secondary containment are available to convey emergency overflow by gravity to the impoundments.

Gold and silver are recovered from the pregnant solution in a conventional Merrill-Crowe zinc precipitation plant that produces a precious metals-bearing precipitate filter cake. Both the Merrill-Crowe precipitate and the gravity concentrate are treated in a propane-fired pressure retort to volatilize the mercury and selenium associated with the ore for removal and recovery. Mercury is recovered by condensing the mercury vapor, collecting it as a liquid, and capturing it in a carbon column. After mercury removal, the retort gases are passed through the refinery wet-scrubber to remove the selenium, which occurs at this stage in the process as water-soluble selenium dioxide. The retort product is fed to the refinery where it is loaded into a propane-fired melting furnace to produce a molten gold/silver doré, which is poured from the refinery furnace into molds. Slag from this stage of the process is fed back to the ball mill for residual precious metal recovery in the gravity circuit. The doré bullion is shipped off-site for smelting.

An EDC was approved by the Division in September 2014 for a new temporary laboratory housed in two mobile trailers located on the northwest side of the mill. Freshwater for the lab is supplied via a buried single-walled pipe connected to the warehouse. Any fluid from the emergency shower/eyewash and the lab floor drain is conveyed to a partly buried single-walled 750-gallon HDPE grey-water tank under the wet lab trailer. The grey-water tank is pumped as needed into a tote and the tote is emptied into the beneficiation circuit or the tailings storage facility (TSF). Acidic solution from the lab wet scrubber is neutralized periodically and pumped via an overhead double-walled pipe to a 55-gallon drum that sits on a secondary containment pallet outside the wet lab. A separate 55-gallon drum for dilute cyanide solution used in the laboratory also sits on a secondary containment pallet outside the lab. Separate dry sinks for disposal of acid and cyanide solution in the lab drain into separate carboys that are emptied as needed into the outside 55-gallon drums. The acid carboy is neutralized prior to disposal in the acid drum. Both drums are emptied into the process circuit as needed. Lead-contaminated waste cupels and crucibles generated in the lab are managed and disposed off-site in accordance with hazardous waste regulations.

Carbon Tank Reclaim Solution Processing System: A non-fee letter authorization was given by the Division in October 2010, for a 30-day pilot test to recover low-grade gold values from reclaim solution using a carbon truck located within existing CCD thickener/tank farm containment area of the mill. Based on the positive pilot test results, an EDC modification was approved by the Division in early December 2010, to continue the activity indefinitely. Further positive results prompted the Permittee to submit an EDC, approved by the Division in October 2011, for installation of a new, permanent column within the same area of the CCD containment and removal of the truck-based system.

The steel carbon-column reclaim tank measures 5 feet wide by 15 feet tall with an inverted cone base. The column is constructed with a 4-foot tall I-beam support structure that suspends it above the containment area floor to allow inspection for any leakage from the tank. The tank support structure is constructed on a new 8-foot by 8-foot by 12-inch thick reinforced concrete slab dowelled into the underlying existing containment concrete slab.

Reclaim solution is pumped directly into the column to recover residual gold with activated carbon and the remaining solution flows by pipeline at 300 to 500 gpm to a pump box within the containment area for conveyance with a submersible pump to the cyanide destruction (detox) tank. Loaded carbon is trucked off-site. The CCD containment has a volume of approximately 86,000 gallons, in excess of the required 110% capacity required, and is equipped with an emergency overflow that reports directly to the tailings impoundment.

A second identical carbon column was constructed and operating in April 2016 prior to approval in June 2016.

Processing Off-Site Mined Material: An EDC was approved by the Division in July 2008, authorizing processing of ore from the Hollister Development Block Project (NEV2003107) at the Midas Project (Ken Snyder Mine) mill. The ore is stored on a containment pad, located adjacent to the mill, prior to processing in batches. The Hollister ore is not blended with the Ken Snyder ore for processing. Individual Hollister batch tonnages and composite ore and tailings liquid fraction characterization data are provided in the quarterly report.

A second EDC was approved by the Division in November 2008, which provides for processing of off-site mined material, including that from sites owned and/or operated by the Permittee. Off-site mined material may be processed in batches, as is the case for Hollister ore, or blended with the Ken Snyder ore for processing. Prior to delivery on site, the Permittee must submit to the Division for review and approval, material characterization data, source information, and quantity data for the off-site mined material proposed for processing. Quarterly characterization data for off-site mined material composite samples and the tailings liquid fraction must be reported in accordance with the Permit. In November and December 2008, non-fee requests were approved by the Division to process Granite Construction ore (location to be specified upon receipt), and French Gulch concentrate from the Washington Mine located 15 miles northwest of Redding, California, respectively. The source of off-site ore processed at the facility must be specified in the monitoring report for the quarter in which it is processed. In July 2013, a non-fee request to process ore from the Fire Creek Exploration Project (NEV2007104) was approved by the Division. On 8 December 2014, a non-fee request was approved by the Division with restrictions for the processing of up to 5,000 wet tons of acid-generating ore from the Golden Wonder Mine, located near Lake City, Colorado.

Tailings Disposal: The Phase VI tailings impoundment is located south and downgradient of the mill process building and is constructed using downstream embankment construction methods. The impoundment was constructed as Phase I through III, Phase IV, and Phase V-A, and V-B, now referred to as the Phase VI impoundment. (Note: The embankment raise phase designation has oscillated between Arabic and Roman numerals over time; Roman numerals have been used as an attempt at consistency).

Both the surface of the impoundment basin and the upstream face of the embankment of Phase I through III are lined with textured 60-mil HDPE. Originally constructed to store 1.25 million tons of tailings at a dry density of 70 pounds per cubic foot, the original impoundment storage capacity was increased to 1.8 million tons in accordance with the Phase III design criteria and a minor modification of the Permit approved by the Division 15 February 2000. At that time, the permitted maximum tailings impoundment embankment crest height was 5,643 feet AMSL.

A minor modification to the Permit, designated as Phase V and approved by the Division in November 2003, authorized a downstream lift construction to raise the Phase I through III impoundment crest to a maximum elevation of 5,675 feet AMSL. The same minor modification authorized construction of the new, adjacent but hydraulically separated, Phase IV tailings impoundment basin, which was completed in November 2004. Design and construction of the Phase IV tailings impoundment is identical to that used for the Phase I through III/V impoundment, except for the following changes, which were designed to improve the performance of the newer impoundment:

The Phase IV uses a thicker 80-mil, double-textured HDPE liner material. The underdrain solution collection system is constructed entirely of 6-inch diameter perforated corrugated polyethylene tube (CPT) pipe, rather than a mix of 4-inch and 6-inch diameter CPT pipe. A layer of 16-ounce per square yard (oz/yd^2), rather than 6-oz/yd^2, geotextile was placed on the surface of the textured HDPE liner for protection prior to placement of underdrain material. The underdrain blanket thickness was increased from the original Phase I through III design minimum of 12 inches to a minimum 16 inches, except over the collection pipes, where it remains a minimum 12 inches thick. Maximum particle size in the drainage blanket material was increased from ¾-inch to 2-inch diameter rock. The drainage blanket is overlain with a layer of 16-oz/yd^2 geotextile, unlike the previous construction method, which wrapped 6-oz/yd^2 geotextile directly around the collection pipes. This latter, earlier design has resulted in slower than anticipated draindown due to a suspected buildup of fines on the geotextile surface, which limits transference of fluid into the collection pipes. Four vibrating wire piezometers located at the base of the underdrain blanket measure hydraulic head on the HDPE liner.

Although not hydraulically linked, the Phase IV impoundment shares a common, equal height embankment with the Phase I through III/V impoundment. Phase V-A was completed in November 2004, and Phase V-B was completed in November 2008. As constructed and at an average dry density of 80 pounds per cubic foot, Phase V adds 2.02 million tons of tailings storage capacity and Phase IV will accommodate 1.85 million tons of tailings. Although the two facilities are not hydraulically linked, the Phase I through III/V impoundment on the west, and the Phase IV impoundment on the east, share a common, central north-south embankment buttress, on which an access road is located. The total permitted tailings impoundment storage capacity, through Phase V construction, was approximately 5.67 million tons. The completed expansions created approximately 92.2 acres of new surface disturbance.

The tailings impoundment embankment for Phase I through III/V is constructed with random fill material from nearby borrow sources and with waste rock from the basin excavation for Phase IV. The embankment random fill for Phase I through III and Phase V is comprised of 100 percent passing the 6-inch screen size and 100 percent passing the 16-inch screen for Phase IV. The waste rock used in the outer embankment is minus 10-inch, for Phase I through III/V and minus 24-inch for Phase IV. All embankment fill is hard, angular rock.

An EDC was approved by the Division in September 2007, to incorporate minor changes to the final Phase V impoundment construction approved in November 2003. To accommodate construction of the final Phase V embankment, within the limited remaining space and to avoid relocating the underdrain pond, the upstream embankment is constructed with a slightly steeper slope of 2 horizontal to 1 vertical (2H:1V) and lined with 80-mil textured HDPE geomembrane placed over 8-oz/yd^2 non-woven geotextile. The ultimate crest width was also decreased from 30 feet to 20 feet. As part of the same EDC design, the tailings distribution systems for both the Phase IV and Phase V impoundments were reconfigured to move the supernatant pools from the south end to the north end of each respective impoundment and the reclaim barge system for each was moved to the new supernatant pool area. Seismic modeling indicates the modified design is stable for the anticipated and modeled maximum seismic event.

A 60-mil HDPE liner was used on the upstream face of the Phase I through III embankment. An 80-mil HDPE liner was used on the upstream face of the Phase IV and will be used for the Phase V construction. The downstream face of the Phase IV and Phase V embankment construction incorporates a maximum 2H:1V slope, except for a narrow portion of the Phase V embankment adjacent to the underdrainage solution collection pond. In this area, the downstream face is constructed with a 1.9H:1V slope. Seismic modeling indicates the steeper slopes are stable, based on the anticipated seismic event.

A minor modification was approved by the Division in May 2012, for a short, final raise on the Phase IV and Phase V embankments using downstream construction, where practical, and gabion structures (welded wire retaining walls) with downstream fill, primarily along the south and west embankment crests, where pure downstream construction is impractical. The upstream face of the raised embankment is covered by an extension of the existing liner using 80-mil, double-textured HDPE placed over 8-oz/yd^2 geotextile. The raise is constructed with 2H:1V maximum upstream and downstream slopes and raise the Phase I through III/V, and Phase IV, embankments to a maximum 5,680 feet AMSL, with a minimum crest width of 20 feet, and add approximately 400,000 tons combined additional capacity.

The reinforced gabion retaining walls are constructed in individual 2-foot vertical lifts, with select granular fill (100% passing 4-inch sieve) placed within the gabion reinforcement wire mesh envelope, and a layer of 8-oz/yd^2 geotextile between each lift. The constructed gabion retaining walls are constructed on a platform up to 12-feet deep cut into the existing embankment face random fill and will range from 8- to 12-feet high and 9- to 12-feet wide. Stability analysis performed on the range of wall widths and heights resulted in minimum calculated factor of safety values ≥ 1.4 and > 1.1 for static and pseudostatic analyses, respectively. A minimum 3-foot freeboard depth was used in the calculation.

The entire Phase I through III/V tailings impoundment basin is constructed over native soils that were grubbed, scarified to a minimum depth of 8 inches, and optimum moisture conditioned and compacted with a drum roller to a minimum 90% Modified Proctor American Society for Testing and Materials (ASTM) D-1557 dry density. This prepared sub-base was covered with a minimum 6-inch-thick soil-bedding layer that was compacted with a smooth drum roller to a minimum 90% Modified Proctor dry density as verified by field density testing. A layer of 60-mil HDPE textured liner was placed over the compacted bedding material. A 6-oz/yd^2 non-woven geotextile layer was placed on the geosynthetic liner for protection and then covered with a minimum 12-inch thickness of minus 1.5-inch diameter drain rock.

Tailings material is distributed from a single-point discharge pipeline that can be moved to promote drying and consolidation of the tailings fines. In order to minimize hydraulic head on the impoundment liner, an underdrain solution collection system was constructed. The Phase I through III/V system consists of a network of 4- and 6-inch diameter slotted corrugated polyethylene (CPE) collector pipes placed on the HDPE liner at 20-foot spacings, wrapped with 6-oz/yd^2 geotextile, and covered with a minimum 12-inch-thick layer of drain rock. Four piezometers, placed in the Phase I through III/V impoundment basin at the base of the underdrain blanket, measure hydraulic head pressure on the HDPE liner.

The underdrain solution collection system for the Phase I through III/V impoundment conveys drainage from the tailings material to a low spot at the upstream base of the embankment and into a solid-walled, lean concrete-encased, 6-inch diameter HDPE pipeline to the leak-detected and double-lined underdrainage solution collection pond located downgradient of the tailings impoundment. At a design solution draindown flow rate of 150 gpm, the pond capacity of 432,000 gallons is sufficient to contain 48 hours of uncontrolled draindown from the tailings impoundment and maintain a 2-foot freeboard.

The independent Phase IV impoundment underdrain solution collection system reports to a 4-inch diameter HDPE pipeline placed within an 8-inch diameter HDPE containment pipeline, an upgrade of the previous design. Where the pipe-in-pipe conveyance runs beneath the impoundment embankment, it is to be placed in a sub-grade trench and encased in lean concrete. The pipe-in-pipe exits the embankment and is placed on the surface to its discharge point into the underdrain solution collection pond.

The underdrainage collection pond was completed during Phase I tailings impoundment construction and is constructed with 60-mil HDPE primary and secondary liners with a layer of geonet between the liners. The liner sub-base was scarified and compacted to a minimum 90% Modified Proctor dry density. Any solution that may escape the primary liner is collected by the geonet layer and conveyed to a 2,180 gallon leak detection sump filled with drain rock. The leak detection sump may be monitored and evacuated via a 10-inch diameter HDPE inclined riser pipe. A dedicated submersible pump located in the riser pipe recycles any fluids collected in the sump back to the tailings impoundment. The pond is also equipped with an emergency generator to operate the pump-back system in the event of a power failure.

Underdrain solution collected in the underdrainage collection pond is pumped with a submersible pump through a 4-inch diameter SDR 15.5 HDPE pipeline placed within a 6-inch diameter SDR 26 HDPE pipeline for secondary containment. The pipeline is located on the surface of the Phase I through III/V downstream embankment face and discharges into the Phase I through III/V impoundment from where it is reclaimed for use in the mill.

Tailings solution is recycled from the impoundment supernatant pools to the mill via barge-mounted submersible pumps and a 3-inch diameter HDPE pipeline. The tailings impoundment is designed to store the incident precipitation from the 100-year, 24-hour storm event, plus operational solution volumes, with 3 feet of freeboard remaining. A runoff diversion ditch on the upgradient perimeter of the tailings impoundment is designed to divert surface runoff from a 100-year, 24-hour storm event to an adjacent catchment basin.

The tailings material generated is very fine grained with approximately 80 percent passing the 200-mesh and a final dry density of 70 pounds per cubic foot. Characterization studies of the tailings material indicate that it is not acid generating.

An EDC was approved by the Division in April 2012, to construct a liner system, contiguous with the adjacent impoundment liners, across the former access road on the crest of the north-south intermediate embankment shared by the Phase I through III/V impoundment on the west and the Phase IV impoundment on the east. The construction allows placement and operation of evaporators along the crest of the intermediate embankment during warmer months. A non-fee modification approved by the Division in December 2012 (before the embankment liner was constructed) eliminated construction of the roadway on top of the liner on the intermediate embankment crest.

The evaporator liner construction consisted of: grading the access road; dressing and compacting the existing random fill as needed; and covering the prepared surface with a layer of 10-oz/yd^2 non-woven geotextile and a layer of 80-mil, double-textured HDPE. The 80-mil HDPE overlaps the adjacent impoundment liner key trenches on both sides of the embankment crest and is attached to the existing impoundment HDPE liners with continuous extrusion welds. At the north and south limits of the construction, the liner is placed in a new key trench.

Tailings material is treated in an International Nickel Company (INCO) sulfur-dioxide/air cyanide destruction circuit located at the mill. Based on cyanide concentration management, the use of bird balls and propane-fired cannon, for additional wildlife protection in the supernatant pools, was discontinued by the year 2010. However, the underdrain solution collection pond still utilizes a layer of bird balls for wildlife protection. A fence encompasses both the tailings impoundment and the underdrain solution collection pond.

To aid in water management at the facility, a minor modification was approved by the Division in September 2016 to add a tailings thickener facility located between mill and the TSF. Following cyanide destruction from the mill, tailings material is pumped to the thickener feed box in 6-inch HDPE Dimension Ratio (DR) 9 in 10-inch HDPE DR26 piping. A non-hazardous Polyacrylamide flocculant (OPTIMER® 83949) is added within thickener containment, and the slurry flows into the thickener feed well. Thickener overflow gravity flows to the TSF Supernatant Pond where it is further pumped for reuse in the mill and thickener underflow is pumped to the TSF. Both the overflow and underflow is transported in 6-inch HDPE DR9 in 10-inch HDPE DR26 piping. Leakage from the carrier pipelines will be visually inspected periodically at each open end.

An EDC was approved by the Division in November 2019 allowing the disposal of brine solution from the Fire Creek Project under WPCP NEV2007104. Brine received from Fire Creek may be disposed of in a tailings impoundment at Midas if there is enough storage available. The volume of brine solution received at the facility is required to be reported to the Division on a quarterly frequency.

Tailings Impoundment Toe Soil Stain and Monitor Well Nitrate Investigations: Investigations into the source of soil staining at the toe of the Phase I through III embankment and increased nitrate concentrations in samples from monitor wells (MW-1, MW-2, MW-3, MW-4, and MW-19) were submitted in mid-July 2007. No sources were conclusively identified. However, based on discussion of potential sources, a commitment to complete certain further investigation and component upgrades was made by the Permittee and incorporated as a Permit Schedule of Compliance (SOC) item and a condition of the September 2007 Division approval of the EDC to construct the Phase V expansion of the tailings impoundment. Items to be constructed and/or identified in the Phase V as-built drawings and QA/QC report include, but are not limited to: 1) a detailed survey and identification of all buried pipelines and utilities within the immediate area of the Phase V construction; 2) replacement of all existing tailings impoundment pipelines between the toe of the impoundment and the underdrainage reclaim pond with pipelines of double-wall construction and construction of a small drainage gallery to collect any potential seepage that may follow the pipelines upstream of the double-wall construction; and, 3) constructing all buried solution conveyance pipelines with secondary containment. Other agreed steps include continued monitoring and analysis to determine a potential source influencing nitrate concentrations specifically in monitor well MW-19 and initiation of monthly sampling of underground mine water at the discharge to the underdrainage reclaim pond. The Permittee closed the existing permitted rapid infiltration basin (RIB) in accordance with the 2007 Permit renewal. There was no evidence it was a source.

After years of sampling MW-19 for Profile I on a monthly basis and the analysis indicating compliance with Profile I reference values, the Division approved a reduction to quarterly monitoring frequency with the 2016 Permit Renewal.

Section 22 Impoundment: With a significant amount of water to manage at the Midas Mine in addition to the current Phase VI Tailings Storage Facility (TSF) reaching capacity, it was determined a new TSF was crucial to the operation of the facility and a major modification was submitted for the design, construction, and operation of the Section 22 Impoundment.

The Section 22 TSF was designed to exist solely on private land within Section 22 and is situated approximately 0.3 miles north of the existing impoundment. The proposed design utilizes the existing valley to buttress the north-east and south-west sides of the facility and extends north-west until reaching the private land boundary. The facility is designed to contain a maximum of 7.46 million tons (Mtons) of thickened tailings, in addition to an operating supernatant pond and the stormwater associated with a Local Probable Maximum Precipitation (PMP) event while maintaining a minimum freeboard of 3 feet. The allowance for stormwater storage included direct precipitation within the TSF footprint and run-on from within localized watersheds below the proposed diversion channel and valley ridgelines. The storage capacity is based on an in-place density of 80 pounds per cubic foot (pcf) for the Phase I facility and 90 pcf for the following phases with an average tailings beach slope of 1 percent.

The starter facility (Phase I) is designed to contain 1.04 Mtons and requires the construction of two embankments (saddle and main) and a perimeter road to provide containment. The upstream and downstream slopes of the embankments will be constructed at 2.5H:1V and future expansions of the facility will employ conventional downstream construction. Phases II through IV increase the capacity of the impoundment to 2.65 Mtons, 5.46 Mtons, and 7.46 Mtons respectively. A stability analysis performed on each phase of the embankments resulted in minimum calculated factors of safety of ≥ 1.6 and ≥ 1.1 for static and pseudostatic respectively. A minimum 3-foot freeboard depth was used in the calculations.

The impoundment sits on top of soil overlying competent bedrock, is designed with a liner system that includes a 60-mil HDPE liner overtop 12 inches of compacted liner bedding

(ASTM D1557) and competent bedrock, and includes construction of two embankments. Permeability testing of the soil beneath the impoundment revealed that undisturbed samples had a permeability ranging from 1.2 x 10^{-5} cm/sec to 2.1 x 10^{-6} cm/sec, and bulk samples remolded to approximately 95 percent of the maximum dry unit weight as determined by modified Proctor (ASTM D1557) had a permeability ranging from 1.3 x 10^{-6} cm/sec to 6.1 x 10^{-8} cm/sec. Excavated soil from beneath the impoundment will be used as fill where needed.

Underdrain Collection System: An underdrainage collection system is designed over the HDPE liner to assist with drainage and dewatering of the tailings. As the tailings consolidate, some of the retained water will be liberated from the tailings slurry and drain through the underdrainage collection system to the Underdrain Pond and be returned via pumping to the Section 22 supernatant pond. The system includes a gravel blanket drain with a series of underdrain pipes located throughout the basin in topographic lows. The basin underdrains consist of 4-inch diameter perforated CPE pipe wrapped in 10 oz/yd^2 non-woven geotextile spaced throughout the blanket drain layer. The spacing of these pipes is 160 feet at the lower reaches of the basin and 190 feet in the upper portion. The 4- and 6-inch perforated CPE underdrain pipes convey the collected solutions to an 8-inch perforated HDPE pipe encapsulated in select gravel in the upper portions of the impoundment, and 4- and 8-inch perforated CPE pipes convey collected solutions to a 12-inch perforated HDPE pipe encapsulated in select gravel in the lower portion of the impoundment. The gravel is wrapped in 10 oz/yd^2 non-woven geotextile and covered with an 18-inch thick blanket drain to promote drainage, provide separation of tailings fines from the select gravel, and reduce clogging. The perforated underdrain pipes drain to a single outlet point at the upstream toe of the main TSF embankment and travel through a reinforced concrete encasement. The reinforced concrete encasement surrounds the solid pipe to reduce the potential for damage and deformation. At the downstream side of the embankment, the underdrain pipe transitions from the concrete encasement to the pipes being carried in an 80-mil HDPE-lined channel and discharging to the underdrain collection pond.

Groundwater Drainage: A series of boreholes and test pits determined that there are multiple perched aquifers throughout the footprint of the facility. This is addressed through the design of a groundwater drainage system to control any near surface groundwater which may exist beneath the impoundment. The groundwater will be collected through 6-inch perforated CPE pipes surrounded by drainage gravel and wrapped in 10 oz/yd^2 non-woven geotextile. The perforated pipes will be installed where flow is anticipated and groundwater has been encountered during construction and will be routed to the center of the impoundment where they tie in to a solid 8-inch HDPE DR11 pipe, also surrounded by drainage gravel and wrapped in 10 oz/yd^2 non-woven geotextile, to drain downstream towards the main embankment of the facility. At the downstream side of the embankment, the groundwater drain is routed around the underdrain pond to a discharge point in the natural drainage. This outlet is subject to quarterly Profile I analysis in accordance with the Permit.

Saddle Dam Drainage: To prevent long-term ponding of storm water runoff against the saddle dam, an 18-inch diameter solid HDPE pipe extends from the upstream side of the embankment, through the embankment in a reinforced concrete encasement, and into the TSF basin below the basin liner system. This pipe extends through the TSF basin, to the main TSF embankment where it is placed in the same concrete encasement as the underdrain and groundwater drainage pipes. At the downstream side of the embankment, the saddle dam drain pipe is routed around the underdrain pond to a discharge point in the natural drainage. A sample port is positioned near the discharge point to allow water quality monitoring to occur. In the event the water contains a constituent of concern, valves on the saddle dam drain pipe allow the water to be directed to the underdrain pond.

Within the saddle dam are four 6-inch diameter perforated CPE embankment drains to collect stormwater that may seep into the embankment during a precipitation event. The drains are positioned on the prepared embankment foundation surface, encapsulated in select gravel and wrapped with non-woven geotextile to prevent fines from entering the perforated CPE pipe.

An EDC was submitted in July 2018 to substitute linear low density polyethylene (LLDPE) liner for high density polyethylene liner (HDPE) in a portion of the impoundment which is anticipated to experience higher consolidation levels than originally anticipated due to higher moisture content than the geotechnical study initially revealed.

Underdrain Collection Pond: The underdrain collection pond is located externally and immediately downstream of the main embankment. The pond has a capacity of approximately 547,600 gallons with an additional 3 feet of freeboard. The pond is rectangular in shape and measures 110.5 feet by 145 feet with a depth of 11.5 feet. The pond was sized to contain the calculated underdrain flow for an 8-hour period in the event of a pump/power outage in addition to an operational volume equal to 8 hours of draindown.

The underdrain pond has a bottom that slopes to a 3-foot deep sump located at the west side of the pond for decanting of solution. The pond will be lined with, from bottom to top; 12 inches of liner bedding; a secondary 80-mil textured HDPE geomembrane; a leak collection recovery system (LCRS) consisting of a layer of geonet; and a primary 60-mil textured HDPE geomembrane. A geomembrane wear sheet will protect the pond slope at the inlet of the solution channel to the pond.

The LCRS sump has been included to collect any flows that may pass through the primary liner. The LCRS collection sump collects drainage from the geonet and from 6-inch-diameter perforated HDPE pipes that run along the toe of the ponds and discharge into the LCRS sump. The LCRS sump consists of a depression filled with select gravel. The gravel sump has a capacity of approximately 580 gallons assuming 30 percent porosity of the gravel. The select gravel will be encapsulated in 10 oz/yd^2 non-woven geotextile. A 12-inch-diameter HDPE riser pipe will be installed along the pond slope to the bottom of the sump. The lower 10 feet of the pipe will be perforated for collection of solution and a submersible pump will be used for evacuating the sump.

A pump tube and submersible pump system will be located in the sump at the western edge of the pond for the removal of fluid from the underdrain pond. The system will utilize a submersible pump housed at the bottom of a pump tube. The pump tube will consist of a 24-inch diameter carbon steel (CS) support pipe which will rest on two 6-inch CS pipes. Internal to this pump tube, a submersible pump will be installed.

At the pond crest, the HDPE underdrain pumpback pipe will be routed to a geomembrane lined pipe channel, which will provide double containment for the pipe. At this location, the pumpback pipe will transition to a pipe-in-pipe configuration to provide secondary containment. The pipe-in-pipe alignment will follow the underdrain pond access road northwest until it enters the geomembrane lined limits of the impoundment. It will then follow the perimeter road to the upstream side of the main embankment. Near the supernatant pond, the underdrain pumpback pipe discharges into the supernatant pond.

Water within the facility will consist primarily of supernatant generated from the milling operation, underdrain solutions pumped into the facility from the underdrain collection pond, and meteoric water falling on the footprint of the impoundment. Solution that accumulates in the water pool within the facility will be removed and cycled back to the plant for use in the process. The solution will be recovered from the supernatant pool via a pump system located on the main embankment. The reclaimed solution will be pumped to the mill area and connected to the thickener underflow pipeline which will return the solutions to the process. The supernatant pond depth will vary seasonally throughout the operational life of the facility. The operating pond will be maintained at a level that reserves sufficient storage for direct precipitation onto the impoundment from the PMP storm event in addition to maintaining 3 feet of freeboard.

Stormwater Management: In an effort to prevent damage to the impoundment and to minimize stormwater run-on into the facility, stormwater runoff is diverted around the facility through an engineered channel. The diversion channel is designed to convey surface water from the west side of the impoundment around its northern flank to the eastern limit. The diversion channel was designed to pass peak flows from the local PMP storm event (11.6 inches) with a minimum of 1 foot of freeboard and to consider erosion protection to protect against peak flows from the 100-year, 24-hour storm event (2.5 inches).

The 95th percentile depth of the supernatant pond peaks near 17 feet annually, while the median value is approximately 13 feet. Due to the tailings surface rate of rise and the planned phased expansions to the TSF, the result is a minimum of 10 feet of freeboard in the supernatant pond at all times throughout the simulation for storage of the PMP storm event. Runoff from the PMP event is estimated to produce approximately 44,000,000 gallons of water. This results in at least 6.4 feet of freeboard maintained at all times throughout the simulation, satisfying the requirement for a minimum freeboard of 3 feet be maintained at all times. Even when considering the upper bound pond volume resulting from the PMP event, more than 5 feet of freeboard is maintained for all scenarios of the simulation.

Based on the water balance results, the TSF supernatant pond was found to be capable of storing all inflows under normal operating conditions, while maintaining the minimum freeboard. In most years, the reclaimed solutions from the supernatant pond can meet the demands of the mill during the wetter parts of the year; however, freshwater input will be required during the drier, late summer months each year.

Construction Water Pond: For the construction of the new impoundment, Klondex developed a water needs balance and determined that construction activities would require 22 to 24 million gallons of water over the construction life of the first phase of the impoundment. A nearby well located south of the Project was able to provide 150,000 gallons per day of water that meets NDEP Profile I reference values; however, Klondex had anticipated a net construction water shortfall.

The Division approved the Construction Water Pond on May 2, 2018. This pond was designed to store non-potable water from the underground spirals for use in constructing the Section 22 impoundment. However, initial testing revealed that the underground water did not meet Profile I reference values for aluminum, iron, manganese, fluoride, and pH levels. Consequently, the pond must be monitored quarterly and cannot store water for more than 20 days due to its single-liner construction.
The pond features a single liner consisting of a double-sided, textured 80-mil HDPE liner, which is placed over 12 inches of moisture-conditioned and compacted soil, in accordance with ASTM D1557 standards. The pond slopes at a ratio of 2.5 horizontal to 1 vertical and measures 180 feet in length, 200 feet in width, and 10 feet in depth, providing an approximate capacity of 1.9 million gallons.

Ancillary Facilities: Power for the Midas Project (Ken Snyder Mine) is supplied by a 24.9-kilovolt overhead electrical power line. The Project has emergency generators to operate fluid management components in the event of a power failure. Fresh water for the mining and milling operations is supplied by a well located in the valley approximately 1.5 miles south of the mill. Other ancillary facilities include a maintenance shop and warehouse complex, an administration building for office and security purposes, a separate mine dry building, and surface diesel fuel, gasoline, and propane distribution installations.

Monitor Well MW-19 Pumpback System: On January 26, 2010, the Division issued a revised Finding of Alleged Violation (FOAV) and Order, mandating that the Permittee address elevated nitrogen contamination detected in groundwater monitoring well MW-19. In response, the Permittee submitted a Corrective Action Plan on March 4, 2010, which included a proposed pumpback system. This design was approved by the Division as an Engineering Design Change (EDC) in early May 2010 for construction.

The approved system introduced a new pumpback well, MW-20, strategically located approximately 100 feet southeast of MW-19 along the projected downgradient groundwater flow path. To enhance monitoring capabilities, two additional wells were installed: MW-21, positioned approximately 400 feet east-northeast of MW-19 as a cross-gradient monitoring point, and MW-22, located approximately 875 feet south-southeast of MW-19 (and 875 feet east-northeast of existing downgradient monitor well MW-3), serving as both a cross-gradient and downgradient monitoring well.

Each well was constructed with a 4-inch diameter casing, screened from just above the water table at the time of installation to the bottom of the borehole. This extended screening facilitates comprehensive monitoring of potential water table fluctuations caused by the operation of pumpback well MW-20. MW-20 itself was outfitted with a dedicated submersible pump capable of delivering up to 60 gallons per minute (gpm). The pump is controlled by a groundwater level switch to prevent cavitation, ensuring operational reliability.

Initially, the pumpback solution was conveyed via a 3-inch HDPE pipeline enclosed within a 6-inch secondary containment pipeline. The pipeline, buried in a trench at least 3 feet below the surface and supported by compacted backfill and a bedding sand layer, discharged into the existing underdrain conveyance system through a sealed valve box. This valve box housed totalizer flowmeters, check valves, and other components, ensuring containment and operational integrity.

While nitrogen concentrations initially declined to levels below the Profile I reference value, they began to rise again in 2017, exceeding the threshold during the first quarter of the year. By November 2019, nitrogen concentrations at MW-19 had reached approximately 40 mg/L.

To identify the source of the contamination, the Permittee conducted isotopic analyses, reviewed in 2018. The findings revealed that nitrogen contamination in MW-19 and MW-20 primarily originated from highwall blasting residues and overspray from the supernatant pond evaporator system. The use of ammonium nitrate (ANFO) during the Phase IV tailings impoundment construction contributed significantly to the observed nitrate+nitrite levels in groundwater.

The escalation in nitrogen concentrations necessitated the active operation of MW-20 to capture the contamination. However, issues with the initial pumpback system configuration prompted the Permittee to submit an EDC to separate the pumpback pipeline from the Phase IV underdrain pipeline. This modification, approved on November 1, 2019, mitigated the risk of backflow and improved the system's functionality. A new 2-inch HDPE pumpback pipeline, encased in a 6-inch secondary containment pipeline, was installed, rerouted to discharge directly into the Phase VI underdrain pond.

Additionally, the embankment drain—originally blind flanged—was reconnected to the Phase IV underdrain pipeline, enabling flow measurement and sampling. The embankment

drain's water quality closely aligned with the solution from MW-20, confirming effective capture of contaminated groundwater.
Monitoring results from MW-21 and MW-22 demonstrated nitrogen concentrations of approximately 3 mg/L, confirming that MW-20 effectively contains the contamination. However, approximately 60 feet of highwall remained exposed above the impoundment rim, with blasted rock incorporated into the embankment and foundation materials further contributing to contamination. Highwall samples from Phase IV construction revealed nitrate+nitrite concentrations averaging 33.2 mg/L (range: 5.43–94.1 mg/L), significantly exceeding the 10 mg/L NDEP Profile I reference value.

Overspray from the evaporator system was also identified as a contributing source. In early 2018, a combination of evaporator aerosols and meteoric water caused ponding near the tailings impoundment crest, leading to seepage along the embankment face. This incident mirrored similar observations from 2006 and 2009.

To mitigate this pathway, the Permittee implemented several corrective measures, including lining the embankment area where ponding occurred, relocating the evaporators to limit overspray, and ceasing evaporator operations during storms or high winds. These actions successfully eliminated ponding, and the evaporator system has since been decommissioned due to the reduced size of the supernatant pond. These mitigative efforts, coupled with the enhanced pumpback system, have effectively contained nitrogen contamination and minimized the risk of further groundwater impact.

C. Receiving Water Characteristics

The Midas Project (Ken Snyder Mine) is located in the Willow Creek Hydrographic Basin that is part of the Humboldt River drainage system. The average annual precipitation in the Project area is approximately 8 to 12 inches. Runoff in the area averages at least 1 inch per year, principally from snowmelt. The estimated annual evaporation rate is approximately 44 inches. The surface water features within a one-mile radius of the Project area are ephemeral or intermittent drainages and include Midas Creek to the west of the Project, Squaw Creek to the north and east, and unnamed ephemeral tributaries draining southward from the central part of the Project area. Three springs are within a one-mile radius of the Project. None of the springs are located downgradient of the Project facilities.

Rock types in the Midas area are dominated by volcanic flows, tuffs, and tuffaceous sediments. Regional northwest-trending extensional faults are the dominant geologic structures and are locally offset by northeast-trending normal faults. The volcanic rocks generally exhibit low permeability but transmit water locally through faults and fractures.

Static water levels measured in selected exploration drill holes indicate that the upper groundwater surface generally reflects the topography in the area. The groundwater flow direction in the Project area is south-southeasterly in the vicinity of the mill, tailings impoundment, and the waste rock storage area. In the vicinity of the closed and reclaimed infiltration basin, the groundwater flow direction appears to be west to southwest. The pre-mining depth to groundwater is variable throughout the Project area and ranges from approximately 8 to 149 feet below ground surface (bgs). The pre-mining depth to groundwater is estimated to be approximately 30 feet beneath the mill area, 48 to 85 feet beneath the tailings impoundment and embankment, 40 to 75 feet beneath the waste rock storage area, and 28 feet beneath the location of the closed and reclaimed infiltration basin.

There are naturally-occurring exceedances of the Division Profile I water quality standards for the groundwater within the vicinity of the process components and the water quality data collected indicates the presence of variable groundwater types in the Project area. The primary and secondary exceedances in the various process monitoring wells include antimony, arsenic, iron, manganese, and total dissolved solids. These have been addressed in the Permit monitoring requirements. There are no drinking water wells within five miles downgradient of the Project.

D. <u>Procedures for Public Comment</u>

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. <u>Proposed Determination</u>

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

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

See Section I of the Permit.

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

The Project 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 routine sampling of downgradient monitoring well(s) and inspection of other monitoring devices as required by the Permit and operating plans. 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 April 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 (e.g., by 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 2800 Cottage Way, Room W-2606, Sacramento, California 95825, (916) 414-6464, for additional information.

Prepared by: TJ Mohammed
Date: 19 February 2025
Revision 00: Renewal 2025, Boiler Plate