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

Permittee Name: **Cortez Joint Venture dba Barrick Cortez Inc.**

Project Name: **Cortez Hills Project**

Permit Number: **NEV2007106 (Renewal 2015, Fact Sheet Revision 00)**

A. Location and General Description

Location: The **Cortez Hills Project** is located in north-central Nevada in eastern Lander County and westernmost Eureka County, approximately 37 miles southeast of the town of Battle Mountain. The facility is situated approximately one mile south of the Cortez Mine (NEV0000023), approximately nine miles southeast of the Pipeline Project (NEV0093109), and approximately seven miles east-southeast of the Pipeline Infiltration Project (NEV0095111), at the south end of Crescent Valley. The facilities are located within Sections 1, 2, 12, 13, and 24, Township 26 North, Range 47 East (T26N, R47E); Sections 6, 7, 8, 17, 18, 19, and 20, T26N, R48E; Sections 12, 13, 24, 25, 26, 35, and 36, T27N, R47E; and Sections 18, 19, 30, 31, and 32, T27N, R48E, Mount Diablo Baseline and Meridian, on both private land and public land administered by the U.S. Bureau of Land Management, Mount Lewis Field Office, Battle Mountain. The site may be accessed by traveling 40 miles west from Elko, or 30 miles east from Battle Mountain, on Interstate Highway 80, then approximately 31 miles south on Nevada State Route 306, and approximately 9 miles southeast on Lander County Road 222.

General Description: The Cortez Hills Project facilities consist of both a surface open pit and an underground gold mine with associated dewatering systems, three (3) waste rock disposal facilities, a heap leach pad, a carbon-in-column process plant for processing heap leach solution, a Pregnant Solution Sump (tank) with hydraulically linked Process Solution Pond, an Emergency/Storm Event Pond, portions of an existing cross-valley water conveyance system, ore stockpiles, a primary crusher, a cross-valley mill-grade ore conveyor to the Pipeline Mill #2, upgradient and downgradient groundwater monitoring wells, a water supply well, dewatering wells and sumps, and ancillary facilities for administrative, operational, and maintenance support. As proposed, the Project has a life of at least 13 years, which includes 10 years of active mining plus 3 years for completion of ore processing and pre-closure activities.

B. Synopsis

General: Mining in the Cortez Mining District began with the discovery of silver ores in 1862 along the western base of Mount Tenabo. Silver mining continued in this area from extensive underground workings until the 1930's. The modern era of gold production began in 1968 at the Cortez Mine, located at the base of the Cortez Mountains on the southeast edge of Crescent Valley, and continued with production of oxide gold ore from Cortez Mine open pits during the periods of 1969 to 1973 and 1983 to 1988. Mining of oxidized gold ores occurred at the Gold Acres open pit, located on the east flank of the Shoshone Range at the west side of Crescent Valley, from 1973 to 1976, and was followed by mining and treatment of refractory gold ores from 1990 to 1996. Refractory gold ores were mined from the Horse Canyon and South Silicified open pits, located on the east side of the Cortez Mountains, from 1988 to 1993. Mining of oxide gold ores from the Pipeline and South Pipeline open pits, located at the east toe of the Shoshone Range on the west edge of Crescent Valley, commenced in 1996 and continues to the present time.

The Cortez Hills Project involves mining primarily oxide gold ore from the new Cortez Hills Pit and the new Cortez Hills underground mine located on the western flank of Mount Tenabo in the Cortez Mountains. Ore analyses indicate that meteoric water that contacts the ore may mobilize arsenic and antimony in concentrations that exceed drinking water standards. However, the Permittee has demonstrated that this will not create the potential to degrade waters of the State, because arsenic and antimony concentrations will be reduced below drinking water standards after the meteoric water infiltrates through 3 to 10 feet of alluvium. Ore from the Cortez Hills underground mine locally contains mercury concentrations high enough to warrant engineered containment for ore stockpiles and other facilities associated with the underground mine, as described in detail below.

The Cortez Hills Project is owned by the Cortez Joint Venture, which was established in October 1963 and is currently comprised of Barrick Cortez Inc. (60%) and Barrick Gold Finance Inc. (40%). Barrick Cortez Inc. is the operator of the Joint Venture and does business as Cortez Gold Mines.

Mining:

Surface Mining

The majority of ore and waste rock will be excavated by surface mining from a single pit, the **Cortez Hills Pit**. The maximum pit rim elevation will be at approximately 6,000 feet above mean sea level (AMSL) and the planned pit will bottom at an elevation of 4,600 feet AMSL. With overall pit slope angles ranging from 2 to 1, horizontal to vertical (2H:1V), to 1H:1V, the average rim-to-bottom pit depth will be about 1,400 feet, with a maximum rim-to-bottom depth of approximately 2,000 feet. The final pit design results in an irregular bottom that shallows from north to south and an overall footprint of approximately 836 acres. The pit will penetrate the groundwater table and, at the end of mining and with shutdown of the dewatering system, groundwater is expected to rebound to an elevation of about 4,790 AMSL and form a pit lake. Based on modeling (see discussion below), no impacts to surrounding groundwater or adjacent surface waters are anticipated during mining operations or during and following pit infilling.

The daily average surface mining rate, ore plus waste, is anticipated to range from approximately 300,000 to 450,000 tons per day (tpd) with a maximum daily mining rate of 500,000 tpd. Mill-grade ore is transported by 300- to 400-ton capacity haul trucks to the Cortez Hills primary crusher/cross-valley conveyor system that transports the crushed ore to the Pipeline Mill #2 ore stockpile (NEV0093109). Heap leach-grade ore will be hauled by truck directly to the Grass Valley Heap Leach Pad for placement and leaching as uncrushed run-of-mine (ROM) ore.

Surface support facilities near the pit may include infrastructure for operations, engineering, geology, maintenance, warehousing, change rooms, a back-up power system, cement silo(s), laydown yard(s), fuel storage, parking lot, air compressors, an explosives magazine, a temporary ore stockpile, aggregate backfill storage, and a shotcrete plant. Some existing and upgraded light vehicle maintenance and fueling facilities and reagent storage areas would be utilized at the adjacent Cortez Mine (NEV0000023) site.

Underground Mining

Twin-declines are used to access underground mining areas located between elevations below approximately 4,600 feet AMSL and above a maximum depth of approximately 3,800 feet AMSL. The lateral extent of the underground mine workings area will be approximately 3,000 feet wide by 4,500 feet long and will remove approximately 13 million tons of ore. The twin-decline, **F-Canyon Portal** is collared in the existing F-Canyon Pit and was constructed as part of the approved pre-mining, underground exploration activities.

The declines measure approximately 18 feet high by 16.5 feet wide to accommodate mining equipment, piping, ventilation ductwork, and a possible underground conveyor system. Underground support facilities may include pump stations, sumps, explosives magazines, fuel storage areas, and laydown areas. Ground support consists of rock bolts, wire mesh, shotcrete, cemented rock fill, and other appropriate underground methods, which may change as mining progresses. Two (2) additional portals may be added if future production rates warrant.

The **F-Canyon Ore Storage Pad** was reconstructed in accordance with an engineering design change (EDC) modification submitted in response to a Finding of Alleged Violation and Order issued 20 March 2012. The pad was originally constructed without authorization in late 2010. The EDC, approved in late May

2012, incorporates synthetic liners for the Segregated Ore Stockpile Pad and Stormwater Collection Sump, a low-permeability geosynthetic clay layer (GCL) for the Upper and Lower Non-Segregated Ore Stockpile Pads, and secondary containment for pipelines that will convey stormwater that comes into contact with Segregated and Non-Segregated ore.

As defined by the Permittee, Segregated Ore is underground ore, either 'oxide' or 'refractory', that contains elemental mercury; Non-Segregated Ore is all other ore from the underground operation. Segregated Ore is transported directly from underground to the Segregated Ore Stockpile Pad where it is plug-dumped to a maximum height of twelve (12) feet and metal is removed with a track hoe equipped with a grappling hook. Non-Segregated Ore is transported from underground and processed through the Metal Removal Plant (MRP) located on the Upper Non-Segregated Ore Stockpile Pad and stacked on the Lower Non-Segregated Ore Stockpile Pad to a maximum height of thirty (30) feet using a radial stacker. All stockpile pads are located within the overall footprint of the F-Canyon Ore Storage Pad.

The Segregated Ore Stockpile Pad was constructed in two phases, the east ('existing,' constructed in 2010) and west ('expansion,' constructed in 2012) phases, measuring approximately 16,500 square feet (ft^2) and 15,600 ft^2 respectively. When loaded to the design 12-foot height with 6-foot setbacks, the east phase will accommodate approximately 6,500 tons of ore and the west phase will accommodate approximately 3,900 tons. However, a design modification approved in September 2012 removed an internal north-south berm that would have separated the east and west phases from each other. Consequently, the two phases are consolidated into a single stockpile pad. The entire pad area is constructed with a 5-foot high perimeter berm.

The Segregated Ore Stockpile Pad base and berms are covered with a single layer of 80-mil high-density polyethylene (HDPE) placed on a minimum 12-inch thick subgrade compacted to 90% maximum dry density (ASTM Method D1557) in the east phase and 95% maximum dry density (ASTM Method D1557) in the west phase. Common fill, compacted to 90% maximum dry density (ASTM Method D1557) in the east phase and 95% maximum dry density (ASTM Method D1557) in the west phase, was placed on the subgrade in maximum 8-inch compacted lifts as needed to attain the design grade. A 6-inch thick lift of liner bedding material, compacted to 95% maximum dry density (ASTM Method D1557), underlies the HDPE in areas where the subgrade or common fill contains excess amounts of gravel. The HDPE liner is covered with a minimum 36-inch-thick layer of protective overliner material. The protective overliner material consists of waste rock or borrow gravel material, 100% passing the 2-inch sieve; the texture and color also serve as a visual warning to minimize the potential for HDPE liner damage during ore off-loading activities.

Stormwater reporting to the Segregated Ore Stockpile Pad will pass through the overliner layer and flow by gravity along the HDPE pad liner surface to a single outlet pipeline located at the northeast corner of the west phase, near the center of the north (downgradient) end of the pad. The outlet pipeline is constructed with a prefabricated combination 10-inch diameter HDPE secondary pipeline and 6-inch diameter carrier pipeline attached to the HDPE pad liner with a factory-welded and clamped pipe boot. The upgradient annular opening between the primary and secondary pipelines is sealed. The 6-inch diameter carrier pipeline is reduced to a 4-inch diameter HDPE primary pipeline immediately downgradient of the pad liner boot. The pipe-in-pipe system will convey solution downgradient approximately 300 feet west to the Stormwater Collection Sump located at the southwest corner of the Lower Non-Segregated Ore Stockpile Pad. The secondary containment pipeline daylights at the sump and is identified as 'LD-SEG.' Minimum weekly monitoring of this leak detection port is required in the Permit.

An EDC approved in May 2013 (after construction) documented the decommissioning, partial removal, and abandonment of a second pipe-in-pipe outlet pipeline that was originally constructed at the northwest corner of the east phase of the Segregated Ore Stockpile Pad. The record of construction report indicates that the single remaining outlet pipeline will adequately drain the entire Segregated Ore Stockpile Pad.

The Non-Segregated Ore Stockpile Pad is divided into an 'Upper', east side, and a 'Lower', west side, ore storage area separated by an approximately 15-foot embankment drop from the Upper to the Lower pad. The embankment is covered with a layer of double-twisted wire mesh to enhance stabilization. The Upper Non-Segregated Ore Stockpile Pad storage area, which contains the MRP, a stockpile area, and a radial stacker, measures approximately 141,000 ft^2 and will accommodate about 56,000 tons of ore when loaded to the maximum 12-foot height with a 6-foot setback. The Lower Non-Segregated Ore Stockpile Pad storage area, designed to contain ore that has been processed through the MRP and placed with the radial stacker, measures approximately 146,000 ft^2 and will accommodate about 170,000 tons of ore when stacked to the maximum 30-foot height with 15-foot setbacks. The entire pad area is constructed with a 7-foot high perimeter berm.

The Upper and Lower Non-Segregated Ore Stockpile Pad base is covered with GCL placed on a minimum 12-inch thick subgrade compacted to 95% maximum dry density (ASTM Method D1557). The GCL is considered a low-permeability layer rather than a liner, because it has not been demonstrated to meet the specifications for a liner at NAC 445A.438. An EDC approved in May 2013 (after construction) allowed an exclusion zone with no GCL in the vicinity of the MRP and radial stacker, provided that any ore spillage in this area is removed at the end of each 12-hour shift. The GCL is covered with a minimum 36-inch-thick layer of protective overliner material comprised of 100% waste rock or borrow gravel passing the 2-inch sieve. The cover material texture and color also serve as visual warning to minimize the potential for GCL damage during ore off-loading activities.

The base of the Upper and Lower Non-Segregated Ore Stockpile Pad was graded to a central low point along the north-south centerline of each portion. The Upper and Lower portions were also graded to a similar east-west swale located between the Segregated Ore Stockpile Pad and the adjacent extension of the Upper Non-Segregated Ore Stockpile Pad on the south and the Non-Segregated Ore Stockpile Pad on the north. A single, perforated, 8-inch diameter, smooth interior, corrugated polyethylene pipeline (CPEP) was placed at the base of the overliner material, above the GCL, within each north-south swale to facilitate collection and conveyance of stormwater. The north-south CPEP for the Upper pad is tied into a series of three (3) CPEPs similarly located above the GCL within the east-west swale. The latter three (3) CPEPs and the CPEP from the Lower pad (four (4) CPEPs total) convey stormwater to the downgradient Stormwater Collection Sump.

A stormwater diversion constructed along the east side, upgradient edge of the F-Canyon Ore Storage Pad is designed to divert and convey the 100-year, 24-hour storm event flow around the pad and into natural drainages. The F-Canyon Stormwater Collection Sump will collect and convey stormwater and other solution discharge from within the footprint of the F-Canyon Ore Storage Pad. The sump, measuring approximately 80 feet by 100 feet from crest to crest, is lined with a single layer of 80-mil HDPE and can accommodate 122% of the 100-year, 24-hour storm event volume (130,000 gallons) with a 2-foot freeboard remaining.

To eliminate the time limit for storage of solution, the Stormwater Collection Sump, which is constructed as a single-lined pond, is equipped with a 120-mil HDPE-lined, subgrade, concrete vault located at the low end. The vault drains by gravity into a prefabricated pipeline, consisting of a 10-inch diameter HDPE secondary pipeline and 6-inch diameter carrier pipeline, welded to the HDPE vault liner and traced with copper wire for leak detection. Outside the vault, the 6-inch diameter pipeline stub is connected with a reducer to a 4-inch diameter HDPE primary pipeline within the 10-inch diameter HDPE secondary pipeline. The pipe-in-pipe system conveys solution from the Stormwater Collection Sump to a wye tie-in with the existing above ground, single-wall, 4-inch diameter HDPE Contact Water Pipeline that conveys water to the Water Storage Reservoir. The 10-inch diameter secondary containment pipeline daylights into a small, 80-mil HDPE-lined leakage collection sump (leak detection port LD-SEG3), located just upgradient of the wye connection that allows for monitoring, quantification, and removal of any primary pipeline leakage. A check-valve prevents backflow from the Contact Water Pipeline.

Ore from the underground operations is processed either at the Pipeline Mill #2 or at an authorized off-site facility. The F-Canyon Pit will remain a dry pit and will be backfilled with approximately 2 million tons of development waste rock from the underground workings. Approximately 11 million tons of predominately Cortez Hills limestone waste rock from the underground workings and the Cortez Hills Pit will be used as aggregate to produce cemented backfill for the mined underground workings.

Processing:

Mill Ore

Mill-grade ore will be processed at the Pipeline Mill #2, permitted as part of the separate Pipeline Project Water Pollution Control Permit NEV0093109, or at an authorized off-site facility. The facility is permitted to process up to 11,500 tons of ore per day and uses both carbon-in-leach (CIL) and carbon-in-column (CIC) circuits to recover gold (see Permit NEV0093109 and fact sheet for details).

Mill ore is transported from the Project to the Pipeline Mill #2 either via haul truck (uncrushed) or via the Cortez Hills primary gyratory crusher (and associated stockpile) and an overland conveyor system. The **Cross-Valley Ore Conveyor System** design calls for a 42-inch wide belt, moving at approximately 550 feet per minute to transport approximately 1,500 tons per hour over the approximately 12-mile route to the Pipeline Mill #2. The conveyor is constructed on supports, at an average height of four (4) feet above ground, and designed with wildlife and cattle crossings where bridges cross over public and private roads. Fencing along the entire conveyor alignment prevents access by livestock. The conveyor design includes a partial cover on the south side – the predominant wind direction - to minimize wind-blown dust generation. Since the conveyed ore does not have the potential to generate acid or liberate contaminants, dedicated spillage containment is not required but spillage would be picked up with a loader and placed in the Pipeline Mill #2 ore stockpile as soon as practical after detection.

An EDC was approved in December 2014 for a new oxide ore stockpile on the North Waste Rock Facility (North WRF). From the stockpile, the ore may be transported to the leach pad or to the Pipeline Mill #2 (NEV0093109). If transported to the mill, it could go either via truck or be first crushed in the Cortez Hills gyratory crusher and then transported via the Cross-Valley Ore Conveyor System. Characterization data demonstrates that the oxide ore does not have the potential to degrade waters of the State; consequently, the stockpile pad includes no engineered containment. The ore shall be set back at least 200 feet from the crest of the North Waste Rock Facility for stability purposes.

Leach Ore

Leach-grade ore from the Cortez Hills Pit will be processed at the **Grass Valley Heap Leach Facility** located approximately ½ mile south of the Cortez Hills Pit. (The facility design is similar to that used for the Area 30 South Area Heap Leach Facility located at the Pipeline Project (NEV0093109)). Ore is hauled from the pit by haul truck and placed directly as uncrushed ROM material, with lime added, on the Grass Valley Heap Leach Pad, a synthetically–lined facility. Gold is recovered from the leach solution in the Grass Valley CIC Process Plant, located on the south edge of the heap leach pad and adjacent to the Process Solution Pond.

The **Grass Valley (Area 34) Heap Leach Pad** is planned for development in three, approximately equal-area phases to accommodate a total of approximately 79.3 million tons of ore, if placed to the anticipated average height of 150 feet. A significantly greater tonnage of ore can be accommodated if it is placed to the maximum authorized design height of 300 feet for Phases I and II, and to the maximum authorized design height of 200 feet for Phase III. The ultimate pad footprint, including all three phases, covers approximately 12.3 million ft^2 (about 282 acres). The 2007 original Permit application included a detailed design for only the Phase I construction, which was completed in late 2010. Construction of the other phases required later submittal of detailed engineering designs and modification of the Permit. A minor modification for the Phase II expansion was approved in October 2012, and another minor modification for the Phase III expansion was approved in October 2014.

The Phase I pad is constructed with a footprint of approximately 3.66 million ft^2 (about 84 acres) and will accommodate approximately 18.04 million tons of leach ore, if loaded in the design 20-foot lifts to the anticipated height of 150 feet. The Phase II pad adjoins the eastern side of the Phase I pad toward which it is graded. The Phase II pad footprint measures approximately 2.91 million ft^2 (about 67 acres) and increases the combined Phase I/Phase II leach ore capacity to approximately 38.43 million tons if both are loaded to a height of 150 feet. The Phase III pad adjoins both the Phase I and Phase II pads on their north sides, and is graded to drain to a pipeline collection channel along its western margin, which is a northward extension of the Phase I Main Header Pipeline Channel. The Phase III pad footprint measures approximately 3 million ft^2 (about 70 acres). Approximately 2.75 million ft^2 of available space remain on the north side of Phase III for additional future expansion of the leach pad.

The Phase II and Phase III designs are similar to the Phase I design with minor differences noted below. By design, ore can be loaded on both Phase I and Phase II in 20- to 30-foot lifts (30-foot lifts in Phase III) to a maximum height of 300 feet (200 feet in Phase III) above the synthetic liner, which would result in a total Phase I/II ore capacity of approximately 79.30 million tons. Regardless of the ultimate heap height, the pad construction will allow a 2.5H:1V final reclamation slope to be achieved at closure without pushing any leach material off containment. During operation this mandates a minimum 30-foot setback of ore from the inner toe of the leach pad perimeter berm, and an approximate 36-foot setback on each successive lift from the outer crest of the previous lift. The heap leach pad design was evaluated for static and seismic (pseudostatic) stability for anticipated scenarios. The minimum factors of safety results of all models meet or exceed Nevada Division of Environmental Protection (Division) minimum requirements.

The entire Grass Valley Heap Leach Facility is protected from upgradient stormwater run-off by the East and West stormwater diversion channels, which are designed to withstand the peak flow from the 100-year/24-hour storm event (2.99 inches). The riprap-armored trapezoidal channels are designed with a 10-12-foot wide base, minimum 3-4-foot depth, and a gradient between 0.5% and 2.7% to limit flow velocity.

The Phase I, Phase II, and Phase III pads are constructed with a composite liner system comprised of a single layer of 80-mil double-textured HDPE geomembrane placed on a 12-inch thick Low Hydraulic Conductivity Soil Layer (LHCSL) compacted to at least 95% of maximum dry density (ASTM Method D1557) with a measured permeability no greater than 1 x 10^{-6} centimeters per second (cm/sec; ASTM Method D5084). The subgrade preparation under the LHCSL includes stripping and grubbing to a minimum depth of 12 inches, followed by scarification and moisture conditioning of an 8-inch depth of native soils compacted to at least 90% of maximum dry density (ASTM Method D1557). As needed to achieve the design grade, fill materials are placed on the subgrade in 8- or 12-inch loose lifts and compacted to at least 95% of maximum dry density (ASTM Method D1557).

The leach pad design incorporates a solution collection pipeline system capable of conveying a maximum 15,000 gallons per minute (gpm) flow, which is substantially in excess of the 12,600 gpm flow resulting from the design 0.003 – 0.005 gpm/ft^2 solution application rate. The Phase I and Phase II pads are divided internally into six bermed cells each to provide a further level of flow control within each pad. The Phase III pad is divided into two bermed cells. In all phases, the cell divider berms run approximately east west. The Phase II cells are eastern continuations of the Phase I cells. Cell 1 is located along the northern edge of Phases I and II, and Cell 6 is located along the southern edge of Phase Phases I and II. In Phase III, Cell 7 is located along the south side of Phase III (adjacent to Phase I/II Cell 1), and Cell 8 is located along the north side of Phase III.

The solution collection pipeline system is comprised of a primary network of perforated CPEP solution collection pipes (alternating 6-inch and 8-inch diameter on Phase I and the lower half of Phase III; only 6-inch diameter on Phase II and the upper half of Phase III), placed on 30-foot centers over the HDPE pad liner. The primary collection network reports to 24-inch diameter, perforated CPEP, intermediate solution collection pipes – two (2) or three (3) per cell in Phases I and II; only one per cell in Phase III. In Phases II and III, the intermediate solution collection CPEPs are placed diagonally transverse to the approximately westerly flow direction of the primary collectors. The intermediate solution collection pipes are covered by a minimum 16-inch-thick layer of drain rock and are located within 22.5-foot wide zones where the HDPE liner is covered with a 24-inch-thick layer of drain rock (instead of normal overliner material, described below) to enhance solution collection and conveyance. In Phases I and II, the intermediate solution collection pipes report to solid CPEP Collection Header pipes, which run westerly, along the upgradient toe of each cell divider berm. In Phase III, the one intermediate solution collection pipe in each cell runs westerly down the middle of the cell all the way to the solution collection channel along the western edge of the pad.

The Phase III intermediate solution collection pipes report to dual 24-inch diameter perforated CPEP solution collection header pipes that run southerly within the trapezoidal Phase III solution collection channel until they transition into the single 32-inch diameter, non-perforated, carbon steel, Phase I Main Collection Header Pipe at the Cell 7/Cell 1 solution channel transition. The Phase III solution collection header pipes are buried under overliner material within the solution collection channel, unlike the Phase I Main Collection Header Pipe, which is exposed within the vee-shaped Phase I Main Header Pipeline Channel. Just upstream (north) of the Cell 1/Cell 7 transition, an HDPE manifold joins the two Phase III 24-inch diameter CPEP headers into one 32-inch diameter, standard dimension ratio (SDR) 21, non-perforated HDPE Cell Outlet Pipe. The Cell Outlet Pipe is booted through an 80-mil HDPE-lined Phase III channel dam and connects to the Phase I Main Collection Header Pipe. The lined Phase III channel dam is constructed entirely on top of the 80-mil, double-textured, HDPE channel liner. At the south end of the Phase III solution collection channel, just on the upstream side of the channel dam, a gravel-filled, geotextile encased, leakage collection and return system (LCRS) sump (GV-PIIIC) is constructed beneath the channel liner and LHCSL layer. The LCRS also includes a 4-inch diameter CPEP pipe, encased in gravel and geotextile, which runs the entire length of the Phase III solution collection channel under the liner and LHCSL, and reports to the channel LCRS sump. The LCRS sump, but not the rest of the LCRS, is underlain by an 80-mil, double-textured, HDPE liner.

On the Phase I, II, and III pads, the entire HDPE liner and the primary underdrain solution collection pipeline system are covered with a minimum 24-inch thick layer of coarse (1½-inch minus for Phases I and II; 2-inch minus for Phase III) overliner material within the pad area to protect the system and to promote drainage to the pipes. However, to provide an improved flow to the downgradient solution collection system on the Phase I and II pads, drain rock is used instead over and adjacent to the intermediate solution collection pipelines (see above), and a 40-inch thick layer of drain rock is placed along a 150-foot wide transition zone upgradient of the toe of the Phase I pad. Drain rock (2-inch minus) is graded to contain a lower percentage of fine size fractions than the normal overliner material, although both materials have size-gradation specifications designed to promote rapid lateral drainage. Similarly, on the Phase III pad, the overliner layer is increased to 40-inches thick in a 150-foot wide zone along the western margin of the pad, but normal overliner material is used in this location and elsewhere, instead of drain rock.

During initial mining of the Phase I pad ore, the ore was noted to exhibit lower permeability and lower strength than expected, due to alluvial ore and bedrock hydrothermal alteration. This raised concerns regarding drainage and stability on the pad. A new stability analysis was performed in 2009, using new data applicable to the altered ore, and changes to the mining and ore loading protocols were implemented; these include, but are not limited to, blending of ore types to increase stability, and constructing a perimeter rockfill buttress using only competent ore material within the Phase I pad footprint on its west, southwest, and south sides. To monitor pad stability, pairs of vibrating wire piezometers were installed at multiple locations within the first ore lift on Cells 1, 3, 4, and 5 of the Phase I pad; the lower piezometer in each pair is located near the base of the lift approximately four feet above the pad liner, and the upper piezometer in each pair is located within the middle to upper part of the first lift. No piezometers were installed in Cells 2 or 6. Each piezometer cable is routed along the top of the appropriate lift and down the side slope of the pad to a readout station at liner level on the inner side of the pad perimeter berm. After initial difficulties with damaged instruments (subsequently replaced in 2013) and incorrect temperature sensor readings giving erroneous pore pressure results, the piezometric data through 2014 indicate that Phase I is drained with no excess pore pressure. Therefore, as a result of the Permittee's actions, the initial stability concerns in Phase I appear to have been addressed and no additional stability issues have been noted.

As a precaution, stability piezometers are also included in the Phase II pad design, and were installed in 2013 mid-height within the first lift (minimum 10 feet above the HDPE liner) and near the top of the second lift in multiple locations in each of the six cells. Phase II piezometer data through 2014 indicate drained conditions, except for transient pore pressures up to 2 feet in a few Lift 2 piezometers for a 2-3 month period while under leach. The blending and loading protocols continue to be implemented, and a rockfill buttress is constructed using competent ore within the Phase II pad footprint on its south and east sides. Piezometer monitoring and reporting requirements for Phases I and II were added to the Permit with the Phase II approval in October 2012, as were Permit limits regarding the size, location, and construction of the rockfill buttresses, a minimum

10-foot distance above the pad liner for piezometers installed using heavy equipment (to protect liner integrity), and piezometer hydrostatic head action levels of 50 and 80 feet above the pad liner (later revised; see below), which would trigger reporting, investigation, and operational changes, as appropriate. The action levels are based entirely on the stability analysis. Based on piezometer data collected to date, the hydrostatic heads within the ore are expected to remain well below 50 feet, and the actual hydrostatic head exerted on the pad liner is expected to be minimal due to the well-drained character of the overliner/drain rock layer.

A revised stability assessment submitted with the Phase III pad design indicates that the Phase I, Phase II, and Phase III pads will be stable under pseudostatic conditions with up to 50 feet of hydrostatic head when they are loaded to their maximum permitted limits and when utilizing 80-foot wide rockfill buttresses on all outer pad slopes. Therefore, the piezometer hydrostatic head action levels in the Permit were revised downward to 30 and 50 feet (from 50 and 80 feet); however, those amounts of hydrostatic head are not expected to occur in any portion of the Grass Valley Heap Leach Facility. Actual heads are expected to be in the 0- to 2-foot range based on the piezometer data obtained thus far. Based on the revised stability assessment, the minimum horizontal width of rockfill buttresses required in the Permit for Phases I and II was also revised downward from previously approved 100- to 210-foot widths to the 80-foot width approved for Phase III.

Phase III includes 11 piezometers, all installed just above a locally thickened, 5- to 7-foot thick overliner layer, and covered with a minimum 3-foot thick layer of protective fill. Buried piezometer cables are routed to two separate readout stations, one near the northwest corner, and one near the northeast corner, of the Phase III pad.

Leach Solution Collection and Conveyance

The Phase I heap leach pad solid CPEP Collection Header pipes connect to a solid 32-inch diameter, SDR 21, HDPE Cell Outlet Pipe that conveys solution to the solid 32-inch diameter, SDR 32.5, HDPE Phase I Main Collection Header Pipe. The Phase I Main Collection Header Pipe is located in the vee-shaped, 6-foot deep Main Header Pipeline Channel lined with a single layer of 80-mil HDPE placed over prepared subgrade. Where needed, a minimum 6-inch thick layer of liner bedding material, compacted to 95% maximum dry density (ASTM Method D1557), is also placed beneath the channel synthetic liner for additional liner protection. The Main Header Pipeline drains to the 32-inch diameter, SDR 32.5, Transfer Pipeline located in the Transfer Pipeline Channel. The Transfer Pipeline Channel is a trapezoidal-shaped channel with an 8-foot wide base and minimum 3.5-foot depth, constructed to the same liner specification as the Main Header Pipeline Channel, which leads to the launder and flume that discharges to the

Pregnant Solution Sump. A tee and valve combination, located just upgradient of the launder and flume assembly, ties the Transfer Pipeline into the 32-inch diameter, SDR 32.5, By-Pass Pipeline, which is located in the 80-mil HDPE-lined By-Pass Pipeline Channel. The By-Pass Pipeline and associated channel provide flexibility to discharge pad draindown solution directly to the Process Solution Pond in the event the Pregnant Solution Sump or related systems require maintenance.

The Pregnant Solution Sump consists of a 36-foot diameter, 14.5-foot tall steel tank equipped with three (3) vertical turbine pumps. Pregnant leach solution discharged to the sump is pumped directly from the sump to the process plant through a 24-inch diameter steel pipeline.

The Pregnant Solution Sump is located on a bench, the Pregnant Sump Shelf, constructed on the upper interior slope of the Process Solution Pond. The Pregnant Sump Shelf is lined with an 80-mil double-textured HDPE primary liner and a 60-mil smooth HDPE secondary liner with a geonet layer between the liners that serves as an LCRS. The shelf LCRS is hydraulically isolated from the Process Solution Pond LCRS and reports to a 4-foot by 4-foot by 2-foot deep solution collection sump filled with gravel encapsulated in geotextile. The LCRS sump can be evacuated through a 12-inch diameter HDPE riser pipe that exits the primary liner at the pond crest.

The Pregnant Solution Sump foundation consists of a 2-foot thick, lean concrete platform, poured in place over an 80-mil textured HDPE wear sheet and an underlying geotextile layer that rests directly on the Pregnant Sump Shelf primary liner. Solution flows in excess of the sump capacity or during upset conditions will overflow the sump via a 10-inch diameter discharge port and be retained in the Process Solution Pond.

The Process Solution Pond is designed to provide storage volume during upset conditions. The pond measures approximately 500 feet by 380 feet at the crest and is approximately 22.5 feet deep. The pond has a design capacity of 18.56 million gallons, which consists of the calculated 24-hour power loss draindown volume from the heap leach pad at the design return flow rate of 12,600 gpm and the calculated volume reporting to the pond from the design 100-year/24-hour storm event. A 2-foot freeboard brings the pond maximum storage volume at the crest to 21.32 million gallons.

The Process Solution Pond is constructed with a composite liner system and an LCRS system. The composite liner system consists of a 60-mil smooth HDPE secondary liner and an 80-mil smooth HDPE primary liner with a layer of geonet placed between the liners to serve as an LCRS. The secondary liner is placed on a 0.5-foot thick layer of bedding material to protect the geomembrane from damage by gravel in the underlying native soils. The liner system is anchored in a key trench along the pond crest. The LCRS reports to a 15-foot square by 2-foot deep solution collection sump filled with gravel encapsulated in geotextile. Collected solution can be evacuated through a 12-inch diameter HDPE riser pipe that exits the primary liner at the pond crest.

The Process Solution Pond has a 10-foot wide overflow spillway connecting it to the adjacent Emergency/Storm Event Pond. The spillway is lined with a single layer of 80-mil smooth HDPE placed on a 0.5-foot thick layer of liner bedding. The Emergency/Storm Event Pond measures approximately 500 feet by 380 feet at the crest and is approximately 22.3 feet deep. The pond has a design capacity of 18.42 million gallons, which is the calculated run-off volume from the 100-year/24-hour storm event falling on 8.4 million ft^2 pad surface (twice the Phase I design footprint area) plus the run-off from exposed liner, the pond surface, and all solution channels, with 2 feet of pond freeboard remaining. The Emergency/Storm Event Pond is double-lined, leak detected, and constructed to the same specification as the Process Solution Pond.

Leach Solution Processing

Pregnant solution is conveyed to the Grass Valley CIC Process Plant from the Pregnant Solution Sump via a 24-inch diameter steel conveyance pipeline or from the Process Solution Pond reclaim sump, if solution is present, via a 10-inch diameter steel conveyance pipeline. All pipeline runs are located within the 80-mil HDPE-lined pipeline channel for secondary containment.

The majority of the process facility equipment is contained within a pre-engineered steel process building that measures 92 feet wide by 154 feet long by 55 feet high. The building is constructed on a steel-reinforced concrete floor slab with a minimum 8-inch tall reinforced concrete containment stemwall. All floor and stemwall construction joints are constructed with embedded membrane waterstops and the concrete floor surfaces are coated with an epoxy-type sealant.

The plant floor slab is sloped to a grated 18-inch wide floor channel located centrally along the length of the building. The floor channel reports to a 24-foot by 6-foot by 5-foot deep solution sump, screened to prevent carbon loss, and evacuated to the Process Solution Pond by an automatic sump pump. The floor channel and sump have a combined capacity of approximately 120,000 gallons, sufficient to contain one entire column of carbon plus 110% of the volume contained in one 5-column train.

The process building is also equipped with an 80-mil HDPE-lined spillway that can convey up to the maximum 12,600 gpm solution flow by gravity from the process building floor (in the event of an upset) to the lined pipeline channel and into the Process Solution Pond. The spillway, which measures approximately eight feet wide at the base with 12-inch high side slopes, can convey the

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maximum process flow at a flow depth of 4 inches. The spillway liner is tied to the building containment slab and welded to the channel HDPE liner.

The process circuit is designed for a maximum process flow rate of 12,600 gpm, which is the design maximum solution return flow rate from the heap leach pad, through three (3) trains of carbon adsorption columns. Each train can operate independently of the other two (2) trains and is comprised of five (5) up-flow, fluidized, carbon adsorption columns, each measuring 14 feet in diameter by 15 feet tall. A 6-foot by 12-foot inclined vibratory safety screen recovers overflow carbon at the end of each train. Each individual 5-column train has a design flow rate of 4,200 gpm.

Barren solution reports to the Barren Solution Pump Box, a steel tank that measures 14 feet in diameter by 15 feet high. The tank is equipped with two (2) vertical turbine pumps that pump barren solution back to the heap leach pad through a 30-inch diameter steel pipeline located in the 80-mil HDPE-lined pipeline channel.

After loading with gold, the carbon is transported by a special 8-ton capacity tanker truck, at a rate of up to 12 tons per day, to the Pipeline Mill #2 where the gold is recovered and the carbon is regenerated for further use. The tanker truck is loaded within the process building containment with access on a pull-through pad constructed with roll-up doors and containment ramps on each end of the building.

Reagent load-out and storage is located on the north side of the process building. The load out and storage areas are constructed with more than the required 110% solution containment and are hydraulically segregated from the process building containment. The load-out pad is constructed of steel-reinforced concrete and measures approximately 103.5 feet long by 20 feet wide. The pad is of a pull-through design and is equipped with a containment curb, containment ramps at each end, and pad gradient to direct any fugitive solution to scupper drains that hydraulically link the pad to the respective reagent tank containment area. Reagent storage is comprised of one (1) anti-scalant tank measuring 12.5 feet in diameter by 14 feet 10 inches high; one (1) mercury suppressant tank measuring 10 feet in diameter by 11.5 feet high; and two (2) sodium cyanide solution tanks each measuring 13 feet in diameter by 20 feet high. Each reagent tank has individual compartmental containment equipped with a dedicated evacuation sump with a pump that reports to the Barren Solution Pump Box inside the process building.

Waste Rock Management

Waste rock can be placed in one of three (3) engineered waste rock disposal facilities (WRFs). The WRFs are identified as the **Canyon Waste Rock Facility**

(Canyon WRF), the **North Waste Rock Facility** (North WRF), and the **South Waste Rock Facility** (South WRF). The respective facility design capacities and footprints are: 800 million tons on 1,504 acres; 185 million tons on 400 acres; and 65 million tons on 169 acres.

The waste rock facilities are constructed by end-dumping from haul trucks to form individual bench lifts up to 200 feet thick with angle-of-repose slopes. All facilities are designed in a terraced configuration to facilitate regrading of individual benches to an overall 2.5H:1V final reclaimed slope. A 15-foot relief bench will remain at the crest of each lift elevation following reclamation to minimize the potential for stormwater ponding and surface erosion. All facilities and stormwater structures are designed to contain the 100-year, 24-hour storm event flows. Stability analysis of the post-reclamation configurations of the waste rock facilities indicated static factors of safety in excess of 1.9 and pseudostatic (seismic event) factors of safety in excess of 1.48. These calculated factors of safety are well above the Division-accepted minimum factors of 1.3 for static and 1.05 for pseudostatic.

The Canyon WRF is the main facility for the Cortez Hills Pit and is located within Cortez Canyon and a portion of Pixie Canyon. The canyon location provides for a stable facility since the waste rock is constrained on three sides by native topography. The open toe of the facility is located on the floor of Crescent Valley and the slope angle is reduced by design to ensure stability. The canyon location reduces the footprint required for waste rock disposal, reduces the growth media required for reclamation, and reduces visual impact. The design avoids seeps and springs to prevent entry of water into the base of the facility. A diversion channel, constructed along the southwest side of the Canyon WRF and lined with 80-mil HDPE where it traverses waste rock fill, will intercept and direct upgradient stormwater run-on flows into Copper Canyon.

The North WRF is located to the north of the Cortez Hills Pit. An EDC was approved in December 2014 to expand the previously approved North WRF and to place an oxide ore stockpile on its top surface. An engineered East Diversion Channel constructed along the east side of the North WRF intercepts and diverts upgradient stormwater run-on into an unnamed drainage north of the WRF. An engineered West Diversion Channel and culvert system constructed along the south side of the WRF diverts upgradient stormwater run-on to an unnamed drainage on the southwest and west sides of the WRF. The 24-inch diameter culvert directs the stormwater under the North WRF access ramp and the F-Canyon haul road. Riprapped stormwater stilling basins are constructed along the diversion ditches at grade breaks and at ditch and culvert terminations. Characterization data and a revised slope stability assessment submitted with the EDC indicate that the waste rock and oxide ore do not have the potential to degrade waters of the State or to compromise the stability of the final reclaimed North WRF.

The South WRF is located to the south and east of the Cortez Hills Pit. Unlike the canyon construction of the Canyon and North WRFs, the South WRF is constructed on a pediment surface. A diversion berm, constructed along the east side of the facility intercepts and directs upgradient stormwater run-on to existing drainages in Grass Valley.

The potential for Cortez Hills waste rock to generate acid and leach metals was evaluated by static testing on 10,250 drill samples. Rock types in the Cortez Hills deposit are comprised of marble, skarn, refractory rock, alluvium, siltstone conglomerate, limestone, and limestone conglomerate. The latter two (2) rock types make up 89% of the Cortez Hills waste rock mass. Except for some refractory rock (less than 0.3% of the total waste rock volume) encountered at depths greater than 1,200 feet below surface in the Cortez Hills deposit, the deposit is entirely oxidized. Of 779 samples analyzed by acid-base accounting (ABA static) methods, only 13 generated an acid neutralizing potential (ANP) to Acid Generating Potential (AGP) ratio of less than 3. Most samples generated ratios of 200 to greater than 900. Subsequent humidity cell (kinetic) tests performed on these and other test samples resulted in generation of net alkaline leachate solutions. Based on these static and kinetic characterization tests, none of the rock types, including the refractory material, are considered to have the potential to generate acid because of abundant carbonate minerals relative to sulfide minerals.

Leaching tests conducted on waste rock samples resulted in leachate effluent with circum-neutral pH and no exceedances of Profile I reference values except for antimony and arsenic, which the Permittee has demonstrated will be attenuated to below the applicable reference values after meteoric water that may contain the elevated concentrations infiltrates through 3 to 10 feet of vadose zone alluvium or basin fill. Therefore, no impacts to groundwater are expected from waste rock, because the shallowest groundwater near the Cortez Hills WRFs (i.e., Canyon WRF, North WRF, and South WRF) is approximately 30 feet below ground surface (bgs) at monitoring well MW-96, located in the Crescent Valley basin north of the toe of the Canyon WRF. Elsewhere, groundwater depths near the Cortez Hills WRFs range from approximately 60 feet bgs to greater than 1,400 feet bgs.

Dewatering and Water Management

Development of the Cortez Hills Pit includes dewatering operations to relieve hydraulic pressure in the pit walls and produce stable pit wall conditions over the life of mining operations. Hydrologic and geotechnical studies indicate that: groundwater is localized in the structural bedrock and that no substantial water-bearing zones occur in the alluvium; groundwater elevations in the open pit area range from 500 to 1,600 feet bgs; groundwater flow is structurally controlled by numerous north-south and east-west trending faults and fractures; and local bedrock exhibits low hydraulic conductivity, which generally limits sustainable pumping rates to approximately 20 to 50 gpm, except for three (3) identified zones of approximately 200 to 500 gpm.

Numerical groundwater flow modeling estimates indicate that the dewatering rate would not exceed an annualized average of 8,200 gpm with the higher rate occurring at the end of mining. The Cortez Hills Pit is dewatered using a combination of perimeter wells, horizontal and vertical gravity drains, and in-pit wells and sumps. In addition to the effects of the perimeter well and in-pit dewatering, the underground workings are dewatered with supplemental collection sumps and gravity drainholes.

Dewatering water is consumed primarily in process make-up at the Grass Valley Heap Leach Facility (approximately 1,500 gpm) and dust suppression activities (approximately 1,000 gpm) in accordance with valid water rights. Dewatering water in excess of consumptive requirements, that meets Permit criteria, can be conveyed to existing permitted Pipeline rapid infiltration basins (NEV0095111), used for irrigation at the Dean Ranch as permitted by the State Engineer, or stored in the Cortez Hills Fresh Water Reservoir as a supply of dust control or process make-up water. Water that does not meet Permit criteria can only be used in process facilities and is conveyed by a separate cross-valley pipeline for use in the Pipeline Mill #2 (NEV0093109). As part of the 2015 Permit renewal, the requirement that dust suppression water meet Profile I Permit criteria was relaxed somewhat to be consistent with Division Water Pollution Control permit boilerplate requirements. The new requirement states that if a dust suppressant exceeds both a water quality standard and the corresponding natural background water concentration in the area where dust suppression will occur, the Permittee shall first demonstrate no potential to degrade waters of the State.

The **Cortez Hills Fresh Water Reservoir** is located immediately south of the Cortez Hills Pit and has a working volume of approximately 16 million gallons. The reservoir measures approximately 500 feet by 500 feet and is 10 feet deep. The reservoir is designed to store fresh, Non-Contact Water (see definition below) and collected surface water and will be operated with a 2-foot freeboard and available capacity for the direct precipitation from a 100-year, 24-hour storm event. The reservoir is lined with a single layer of 60-mil HDPE placed over a smooth drum-rolled subbase cleared of protrusions larger than 1-inch in diameter. The reservoir is not leak detected but the liner is marked with approximate volume and maximum volume markings.

The **Cortez Hills F-Canyon Underground Event Pipeline** was approved 30 May 2006, as an EDC modification to the Cortez Mine Permit NEV0000023 during the early Cortez Hills underground exploration stage. The event pipeline was transferred into the Cortez Hills Project Permit as part of the new Permit application review. The Event Pipeline conveys Contact Water (see definition below) from the underground workings to the Water Storage Reservoir (WSR).

The pipeline is a 6-inch diameter HDPE pipe placed on the surface, primarily along the main Project access road. Road crossings are accomplished by placing the pipeline within a large-diameter pipe for secondary containment and routing it beneath the road. A maximum flow of approximately 200 gpm is anticipated from perched zones that may be encountered during drilling or advancement of the underground workings.

Analysis indicates the perched groundwater may have Profile I reference value exceedances for iron and manganese. Therefore, the Event Pipeline reports directly to the double-lined and leak detected Water Storage Reservoir (WSR) and the water is evaporated or retained in containment for use in the beneficiation process.

In July 2005, construction was initiated of the twin-decline within the F-Canyon Pit, one of the three (3) original pits from which material was historically mined for processing at the Cortez Gold Mine Mill #1 (NEV0000023), to provide access for underground exploration of the Cortez Hills gold deposit as part of the Cortez Underground Exploration Project. Part of an EDC modification (see discussion above), authorized construction of the Event Pipeline to support decline construction activities. It was anticipated that once the decline penetrated groundwater, which is located approximately 350 feet below the elevation of the decline portal (approximately 4,950 feet AMSL), dewatering requirements would increase to as much as 5,000 gpm for peak flows when water-bearing fractures are first intercepted. However, dewatering flow from all sources, which include underground sumps, drillholes, and surface dewatering wells located along the trace of the decline, is anticipated to average about 2,500 gpm or less for the life of the Project.

To handle the anticipated flow volumes and to plan for potential future deposit development, the **Cortez Hills F-Canyon Underground Water Handling System** proposal was submitted as a group of three (3) engineering design change modifications, approved October 2006. The modifications, each of which is tied to the appropriate project where the dewatering water is discharged or consumed, affected the Cortez Mine Project (NEV0000023), the Pipeline Project (NEV0093109), and the Pipeline Infiltration Project (NEV0095111). All three (3) projects are located within the same Crescent Valley hydrogeologic region (State of Nevada Hydrographic Basin #54) as the dewatering water source.

For the purposes of dewatering water handling and management, the water removed is identified as either "Contact Water" or "Infiltration Water" (Infiltration Water may also be referred to as "Non-Contact Water"), and each is directed to a separate and dedicated portion of the approved system. Contact

Water is that water collected from either underground mining sources or dewatering wells that, due to either "contact" with mining products or mined materials or naturally occurring contained constituents, exceeds one or more of the Division Profile I water quality reference values. Contact Water may only be consumptively used in process components unless the quality is modified to meet the criteria required for infiltration. Dewatering water that meets all the Division Profile I water quality reference values, or water quality criteria that may be specific to a particular water pollution control permit, is termed Infiltration Water and may be either discharged to infiltration basins or used for other approved consumptive uses outside containment, such as dust control. As stated above, the water quality requirements for dust suppression water were relaxed slightly during the 2015 Permit renewal. The new requirement is that if the proposed dust suppression water exceeds both a Profile I reference value and the corresponding natural background concentration for the same parameter, the Permittee must first demonstrate no potential to degrade waters of the State.

The most common reference value exceedances, especially for water extracted through dewatering wells, are for iron and manganese, which are usually the result of the groundwater being oxygen depleted. Studies demonstrate that aeration alone will often bring this water quality within the Profile I reference values and make the water suitable as Infiltration Water. Therefore, this natural chemical process, combined with physical methods of segregating better quality water in the underground workings to prevent contamination, results in a much smaller proportion of the total volume of dewatering water being classified as Contact Water.

The Cortez Gold Mine (NEV0000023) portion of the Cortez Hills F-Canyon Underground Water Handling System was transferred into the Cortez Hills Project Permit as part of the new Permit application review and was originally comprised of: a new 6-inch diameter, surface run, HDPE **Contact Water Pipeline** that incorporates the existing Event Pipeline (see discussion above); four (4) subsequently permanently closed CIL (settling) tanks; two (2) existing 8-inch diameter HDPE pipelines in a lined pipeline corridor; the existing synthetic-lined and leak detected **Water Storage Reservoir** (WSR) (see description below); and the existing synthetic-lined and leak detected **Tailings Impoundment 7 (TA-7)**. The latter components were also transferred into the Cortez Hills Project Permit as part of the new Permit application review.

A **Solid-Liquid Separation (SLS) Plant** was approved as an EDC in August 2011, for construction near the F-Canyon underground portal. After the completion of construction, the as-built report was submitted in June 2012. Contact water is diverted from the existing 6-inch diameter Contact Water Pipeline to the SLS Plant for removal of suspended solids prior to conveyance of the clarified Contact Water to the WSR. With the permanent closure of the Cortez Mine CIL tanks in 2013-2014, the SLS Plant is the sole component responsible for clarifying Cortez Hills Contact Water. The SLS Plant is comprised of two (2) adjoining reinforced concrete pads, designated as Area 1 and Area 2, and each pad measures approximately 37 feet by 60 feet in plan. Area 1 is constructed with an 8-foot high containment stemwall on 4 sides and Area 2 is constructed with a 4-foot high containment stemwall on 3 sides with an open side adjacent the filter press location for equipment access.

Area 1 houses a carbon steel 8-foot diameter by 7-foot high (2,632 gallon) agitated flocculent mix tank and a carbon steel 35-foot diameter by 15-foot high (108,000 gallon) elevated clarifier tank. Area 2 houses a small laboratory and control center room, a polyethylene 5-foot diameter by 7-foot high (1,000 gallon) polymer (flocculent) feed tank, a carbon steel 10-foot diameter by 15-foot high (8,808) sludge holding tank, a 55 ton per day plate-and-frame filter press, and an approximately 19-foot square solids storage area located below the elevated filter press. The containment areas each provide containment in excess of the regulatory minimum 110% of the largest vessel volume. Each containment area is constructed with a sloping floor and collection sumps for returning spillage back into containment vessels. All man doors and roll-up doors are curbed to prevent escape of spills and the solids storage area floor is sloped toward the interior of the pad and a collection sump trough.

For treatment, Contact Water is conveyed to the agitated flocculent mix tank where approved flocculent is added at an approved dosage. The flocculated mixture is conveyed to the clarifier tank where a concentrated sludge containing approximately 24% solids forms. Clarified water exits the top of the clarifier tank through a launder and is conveyed through the Contact Water Pipeline to the WSR. The sludge is pumped from the bottom of the clarifier tank and split into two (2) streams; one stream is recirculated to the mix tank to aid in the flocculation process and the other stream is pumped to the sludge holding tank that is designed to store the sludge for a 4-hour period. Following the holding period, the sludge is pumped to the filter press to form a dewatered 49% dry cake that is discharged to the solids storage area. The solids are removed from the storage area with a front-end loader and trucked to the Pipeline Mill #2 (NEV0093109) for gold recovery. The dry cake is periodically characterized in accordance with Permit requirements.

The SLS Plant operates continuously for twenty (20) hours per day and sits idle for four (4) hours per day, although Contact Water runs continuously through the clarifier tank and the sludge is recirculated during the plant idle time. In addition, the plant is only manned for eight (8) hours per day. During the period the SLS Plant is unmanned, alarms are in place at the underground batch plant, which is located 350 feet to the southeast and is manned at all times, to alert personnel of any abnormal conditions. As designed, the SLS Plant treats approximately 1.1 million gallons of Contact Water and produces approximately 55 tons of dewatered dry cake daily.

The 6-inch diameter Contact Water Pipeline is comprised of the Event Pipeline that exits the F-Canyon Portal and a subsequently added branch pipeline located approximately 500 feet upgradient of the former Mill #1 CIL tank containment. The branch pipeline was tied into the existing Event Pipeline with a valve. Until the Mill #1 CIL tanks were permanently closed in 2014, the branch pipeline was used as the primary means (Contact Water Pipeline) to convey Contact Water by gravity from the decline, at a rate of up to 500 gpm, to the CIL tanks for settling of suspended solids. The portion of the original Event Pipeline downgradient of the branch pipeline valve remained as a bypass pipeline to allow conveyance of Contact Water directly to the WSR South Cell, and with the permanent closure of the CIL tanks, the original Event Pipeline portion of the Contact Water Pipeline is once again the only pipeline for conveying Contact Water to the WSR. All pipeline runs are on the surface. The branch pipeline from the Event Pipeline to the Mill #1 CIL tanks must be permanently closed in accordance with an approved final plan for permanent closure (FPPC).

Prior to the permanent closure of the Mill #1 CIL tanks, clarified Contact Water was conveyed from the CIL tanks through an 8-inch diameter HDPE pipeline, located in a synthetic-lined pipeline corridor, to the southeast corner of the WSR and directly into the 18-inch diameter HDPE **Cross-Valley Contact Water Pipeline** (permitted under NEV0093109) for use in the Pipeline Mill #2 or associated heap leach circuits. The now disconnected pipeline from the CIL tanks to the WSR and Cross-Valley Contact Water Pipeline must be permanently closed in accordance with an approved FPPC.

The Contact Water bypass pipeline discharge at the WSR South Cell is equipped with an outlet diffuser constructed of a section of 8-inch diameter HDPE pipe with a glued end-cap and 2-inch diameter holes drilled on the top and both sides to reduce the potential for damage to the HDPE pond liner system.

Infiltration Water can be added, if needed for approved consumptive use, to the Contact Water Pipeline near the F-Canyon Portal. A section of 6-inch diameter HDPE pipeline, equipped with a gate valve and directional check valve, is designed to convey Infiltration Water from the 24-inch diameter Infiltration Water Pipeline at a location downgradient from the F-Canyon Portal Surge Tank into the Contact Water Pipeline in the event additional flow volume is required. The gate valve and check valve are designed to prevent back-flow of Contact Water into the Infiltration Water Pipeline. The F-Canyon Portal Surge Tank and the Infiltration Pipeline are permitted under Water Pollution Control Permit NEV0095111.

Contact Water flow rate data are collected at the F-Canyon Portal, and Contact Water samples are collected for water quality analyses at the F-Canyon Portal and at the discharge to the WSR South Cell.

The **Cortez Hills F-Canyon Underground Fresh Water Supply System** was approved in September 2007, as an EDC modification to the Cortez Mine Permit (NEV0000023), during the underground exploration phase of the Cortez Hills Project development. The system was transferred into the Cortez Hills Project Permit as part of the new Permit application review.

The approved design was for the installation of two (2) permanent fresh water storage tanks and associated conveyance pipelines for delivery of water to the F-Canyon Portals to support underground operations. Installation of the permanent storage and conveyance system was prompted by lower than anticipated volumes of fresh water being produced from surface dewatering wells and sources encountered in the underground workings. Additional fresh water for the system was pumped from Pediment Pumping wells PPW-05 and PPW-06 to supplement the originally identified sources of water needed for underground operation. The water quality in these wells exceeds Division Profile I reference values. PPW-06 was subsequently abandoned and mined through.

Fresh water is conveyed from the supply wells to the storage tanks via a single-wall 4-inch diameter HDPE pipeline buried a minimum of 4 feet bgs. The good water quality does not warrant the use of secondary pipeline containment. The conveyance pipeline is tied into the surface-located main 12-inch diameter HDPE fresh water dewatering pipeline with a T-fitting and valve at a point approximately 200 feet southeast of the tanks, adjacent to the main Project access road.

Fresh water storage consists of two (2) cylindrical steel tanks, the Primary and Secondary Fresh Water tanks, measuring approximately 9.5 feet in diameter by 21 feet high. The tanks are bolted to a 40-inch-thick slab of concrete formed, in plan view, in the shape of an elongated hexagon with maximum footprint dimensions measuring 12.5 feet wide and 27 feet long. The Primary Fresh Water Tank is filled from the base via a section of 4-inch diameter steel inlet pipe equipped with a butterfly valve. Both tanks are connected to a 4-inch diameter gravity flow distribution pipeline through a short outlet pipe to a common 'Y' fitting located at the base of the tanks. Each outlet pipe has a valve to control flow from an individual tank. The two tanks are also connected, near the base, with a section of 15-inch diameter steel pipe equipped with a double-seated knife-gate valve that allows rapid transfer of water between the tanks as needed.

The maximum capacity of each tank is limited to approximately 10,000 gallons by placement of an emergency gravity overflow outlet at a height of approximately 20 feet on the Primary Fresh Water Tank and an operating gravity overflow pipeline at a height of about 18 feet on the Secondary Fresh Water Tank. The operating overflow pipeline is connected back into the main 12-inch diameter HDPE fresh water dewatering pipeline at an elevation conducive to gravity flow away from the tanks only. The 4-inch diameter distribution pipeline is connected to a distribution manifold located at the F-Canyon Portal, located approximately 550 feet northwest of the fresh water storage tanks. The Permit requires monitoring of flow rate and water quality of the fresh water at the storage tank outlet to the distribution pipeline.

Other Existing Components Transferred to the Cortez Hills Project

Several existing process components, primarily associated with the nearby Cortez Mine (NEV0000023), were transferred into the Cortez Hills Project Permit as part of the new Permit application review. The identified components may be used immediately, at some future time, or not at all. Some components may require certification or further approval prior to use, and ultimately, all sources must be permanently closed in accordance with an approved FPPC per regulation. The process components transferred to the Cortez Hills Permit include Tailings Impoundment 7, Cortez Mine Underdrain Pond, Cortez Mine Stormwater Pond, Water Storage Reservoir, monitoring wells and dewatering ports, and associated pipelines, channels, sumps, pumps, and tanks for the conveyance and control of fluids. As described above in this Fact Sheet, components that were previously constructed at the F-Canyon Portal as part of the pre-mining underground exploration phase of Cortez Hills Project development (e.g., F-Canyon Underground Event Pipeline and F-Canyon Underground Water Handling System) were also transferred to the new Cortez Hills Permit.

Demolition of the Cortez Mill #1 and Roaster (NEV0000023) was completed in 2014 in accordance with an approved FPPC; however, the associated Tailings Impoundment 7 (TA-7), and its associated Underdrain Pond and Stormwater Pond, are not currently being closed. A Schedule of Compliance item in the Cortez Hills Permit requires submittal of an updated engineering design for review and approval prior to either the commencement of construction of the previously approved, but never built, Stages 3 through 5 of TA-7, or the recommencement of operation of any associated historic Cortez Mine beneficiation process component that has been in temporary or permanent closure. This is to ensure that all components will meet current regulatory requirements and Division approval prior to any plan to resume beneficiation at the historic Cortez Mine site.

Cortez Mill #1 dates from 1969, and was constructed within concrete slab-and-stem wall secondary containment with adequate capacity to contain 110% of the largest vessel volume. Components within the Mill #1 secondary containment included a 9.5-foot by 14-foot rod mill, an 11-foot by 14-foot ball mill, vibrating screens, cyclones, five (5) 80-foot diameter by 16-foot tall conventional rake thickeners, five (5) 7-foot diameter by 8-foot tall carbon columns, eight (8) 30-foot diameter agitator tanks, static launder screens, five (5) individual carbon strip circuits, an electrolytic cell, a discharge bin, a stainless steel indirect-fired kiln, and a small refractory-lined furnace. Each carbon strip circuit had two (2) strip vessels, a 15-foot pipe-and-tube heat exchanger for steam heat transfer, and three (3) 20-foot pipe-and-tube heat exchangers to recycle heat from the strip vessel discharge to the strip vessel feed. An 8-inch diameter HDPE pipeline previously carried excess solution from the thickeners to Solution Pond 1; however, with permanent closure of the thickeners and Solution Pond 1, this Thickener Overflow (TO) pipeline is no longer active. Approximately 750 feet of the pipeline is buried and 3,770 feet is on the surface. Buried portions of the pipeline are leak detected with a perforated 4-inch diameter corrugated pipeline placed in a 1-foot-deep, gravel-filled trench; however, as a result of the pipeline being disconnected, the leak detection monitoring was removed from the Cortez Hills Permit as part of the 2015 renewal. The TO pipeline must be permanently closed pursuant to an approved FPPC.

Tailings from Mill #1 were conveyed to TA-7 (see below) over a distance of approximately 5,500 feet through an 8-inch diameter HDPE pipeline. The tailings pipeline is buried for a distance of approximately 1,200 feet without secondary containment or leak detection. Secondary containment for this pipeline would need to be addressed prior to any plan to resume operation.

A Circulating Fluid Bed Roaster (NEV0000023), associated with Mill #1, was constructed by Lurgi Gesellschaft mit beschränkter Haftung (GmbH) in 1989 to oxidize carbonaceous and sulfidic ore. Like Mill #1 itself, the Roaster was not included in the transfer to the Cortez Hills Permit, and was dismantled in 2014. Non-acid generating material remaining on a roaster ore stockpile near the Roaster was removed and processed for gold recovery, and the stockpile was permanently closed with the Roaster in 2014.

Tailings Impoundment 7 (TA-7), the only remaining operational Cortez Mine tailings impoundment, was approved for construction in 1994 as a fully lined and leak detected facility. The facility has a footprint of approximately 46 acres and is permitted for five (5) phases of construction with an ultimate crest elevation of 4,859 feet AMSL and a cumulative maximum design storage capacity of 6.0 million tons. The TA-7 facility is divided into east and west halves designated as Cell-1 and Cell-2, respectively. Phase 1, the Cell 1 Starter Dam, was constructed in 1994/1995, and Phase 2, the Cell 2 Starter Dam, was constructed in 1996/1997. The three (3) phases remaining to be constructed are identified as the Stage 1 Raise, Stage 2 Raise, and Stage 3 Raise. A Schedule of Compliance item in the Cortez Hills Permit requires advance re-submittal and approval of updated designs prior to construction of the remaining phased stages.

For the existing construction, tailings slurry was rotationally spigotted in thin, subaerially deposited lifts sloped toward vertical decant towers located in each cell. Construction of the Stage 2 Raise will eliminate the separation of the cells and only the Cell 2 decant tower will be used. The decant towers drain supernatant solution via a 10-inch diameter HDPE pipeline to a pumphouse located adjacent to the Underdrain Pond. From the pumphouse, solution is pumped to the Water Storage Reservoir (WSR) (see below) for use as makeup water.

The TA-7 liner system is comprised of a 12-inch thick LHCSL base constructed of reworked near-surface clayey native soils and silty clay tailings from the now permanently closed Tailings Impoundment 5 (TI-5), placed in two 6-inch lifts and compacted to a maximum permeability of 1 x 10^{-6} cm/sec and overlain with a layer of 60-mil HDPE geomembrane liner material. Textured liner was used in areas beneath the impoundment embankment, to improve embankment stability, and smooth liner was used within the impoundment basin. A minimum 18-inch thick underdrain blanket was placed on the liner with an integral solution collection piping network comprised of perforated 4-inch diameter CPEP placed in a diagonal cross-gradient pattern (southeast to northwest) to promote drainage of the tailings material. The 4-inch CPEP is placed on 100-foot centers over the entire impoundment basin except for a 200-foot wide zone along the downgradient (north) edge of each cell where the spacing is reduced to 50-foot centers to accommodate potentially higher hydraulic head. The solution collection piping network for each cell reports to a perforated 6-inch diameter CPEP Main Collection Header located along the west interior edge of each cell. Each Main Collection Header reports to a perforated 12-inch diameter CPEP Solution Channel Pipe located beneath protective gravel cover in the 80-mil HDPE-lined Solution Collection Channel on the downgradient (north) edge of the impoundment. The impoundment 60-mil HDPE liner transitions to the 80-mil HDPE channel liner upgradient of the collection channel.

Leak detection for the TA-7 facility includes systems for the impoundment, the solution collection channel, and the Underdrain Pond. "Tiered" systems were constructed at the downgradient toe of TA-7, at the toe of the Cell-1/Cell-2 divider berm, and immediately upgradient from the Solution Collection Channel. The Tiered systems are comprised of a "Leak Collection Riser" constructed over a "Leak Detection Sump". The Leak Collection Riser design is a subgrade leak detection system comprised of a 1-foot deep v-trench that was constructed on the LHCSL base beneath the synthetic liner, lined with 40-mil polyvinyl chloride (PVC), and equipped with a perforated 4-inch diameter HDPE solution collection pipe placed within gravel fill encased in 10-ounce per square yard (oz/yd^2) geotextile to collect and convey fugitive solution to solid 8-inch diameter HDPE vertical riser pipe sumps. The Leak Detection Sump design is of identical construction but located beneath the LHCSL base and on top of another 40-mil PVC liner placed on the prepared subgrade. Both types of leak detection sumps daylight to the Solution Collection Channel or Underdrain Pond via 4-inch diameter HDPE emergency overflow pipes. The Solution Collection Channel has only the primary LCRS constructed between the synthetic liner and the LHCSL base.

Cell 2 of TA-7 was also equipped with basin and embankment piezometers, but all had failed by December 2008. Consequently, the piezometer monitoring was removed from the Permit as part of the 2015 Cortez Hills renewal.

The Solution Collection Pipe and Solution Collection Channel convey reclaim solution to the **Cortez Mine Underdrain Pond** (UDP). The UDP was reconstructed, along with the Cortez Mine Stormwater Pond (see below), as part of an EDC approved in December 2008, to address issues related to liner displacement in the original ponds caused by the rising groundwater elevation.

Reconstruction of the UDP, as part of the EDC approved December 2008, included expanding the pond crest dimensions to 450 feet long by 150 feet wide. Pond sediment and the original liners were removed and disposed in TA-7. The HDPE liners were shredded prior to burial to eliminate the potential to create a barrier or preferential pathway(s) that could cause solution to pond or channel. The pond base was over-excavated and the subgrade was moisture conditioned and compacted to a minimum 95% maximum dry density (ASTM Method D1557) to a depth of 12 inches. A layer of 12 oz/yd^2 non-woven geotextile was placed over the prepared subgrade and 3V:1H side slopes. The excavation was then backfilled with rock fill (100% <8-inch diameter) to an elevation 24 inches below the pond bottom of 4,773 feet AMSL; over which 18 inches of drain rock (100% <2-inch diameter) was placed; followed by a 6-inch thick layer of cushion layer material (100% <1-inch diameter). The rock fill, drain rock, and cushion layers were enveloped in 12-oz/yd^2 non-woven geotextile to provide filtration and a cushion for the new synthetic liner system.

The UDP synthetic liner system is comprised of a 60-mil HDPE secondary liner and an 80-mil HDPE primary liner with a geonet LCRS that reports to two (2) subgrade collection sumps (UDP-LD1 and UDP-LD2). The LCRS sumps are filled with clean gravel encapsulated within a layer of 12-oz/yd^2 non-woven geotextile. Each sump is constructed with a 12-inch diameter HDPE evacuation riser pipe that is perforated within the sump drain rock. Evacuation risers for the LCRS sumps daylight at points along the east and west halves of the south crest of the pond.

Groundwater entering the rock fill sump beneath the UDP liner system can be evacuated through two (2) 12-inch diameter HDPE riser pipes that serve as Groundwater Monitoring Ports (UDP-GWP). The ports are centrally located along the east and west half of the pond and the port risers daylight on the north crest of the pond where they penetrate the pond liner system through fabricated boots to an elevation 1.5 feet above the pond crest. The port riser casings are slotted within the rock fill sump and can be equipped with portable, level-controlled submersible pumps that will maintain the groundwater elevation below the pond base elevation of 4,773 feet AMSL, as necessary.

Lowering of the groundwater elevation is not anticipated to be required during the first four (4) years of pond operation. However, as a schedule of compliance requirement, an additional EDC was approved in August 2009, that provides for construction of a permanent Groundwater Dewatering System in the event the groundwater elevation beneath the pond liner exceeds 4,770 feet AMSL. Based on modeled potential groundwater inflows, a 100 gpm stainless steel submersible well pump will be permanently installed in the west side GWP riser (UDP-GWP). Equipped with a pressure transducer to evaluate water level, solution will be pumped through a 3-inch diameter steel pipeline into a 10-inch diameter HDPE pipeline for conveyance to the North Water Storage Reservoir. Pumping will be initiated at a groundwater elevation of 4,772 feet AMSL and will stop once a groundwater elevation of 4,771 feet AMSL is achieved. A dedicated back-up diesel-electric generator provides power in the event of a loss of line power at the facility.

Underdrain solution from the TA-7 and solution from the Cortez Groundwater Pumpback system may report to the reconstructed UDP at a maximum design rate of 300 gpm. The reconstructed UDP has a design capacity of approximately 649,000 gallons at the base of the spillway (elevation 4,776 feet AMSL) that hydraulically links the UDP to the Cortez Stormwater Pond located immediately to the west. The distance between the spillway elevation and pond crest elevation of 4,778 feet AMSL effectively creates the 2-foot freeboard in the pond.

The reconstructed UDP is designed with two (2) pond evacuation risers constructed of 24-inch diameter, SDR 17, HDPE pipe located on the south side of the pond parallel to the trace of the evacuation risers for the LCRS sumps. The pond evacuation risers are equipped with two (2) submersible pumps, each rated for a nominal 350 gpm pumping rate, with a dedicated back-up diesel power generator. The pumps are level-controlled and are automatically activated if the water level in the pond reaches 4,775.5 feet AMSL. Solution removed from the pond is conveyed from each pump through a new 8-inch diameter Schedule 40 steel pipeline to the existing pumphouse and on to either TA-7 or the WSR via an 8-inch diameter HDPE pipeline. The pond and pump design will maintain the minimum 2-foot freeboard while accommodating the pond operating inventory volume from all inflows plus the volume generated by the 25-year, 24-hour storm event. The 100-year, 24-hour storm event volume is accommodated by diverting approximately 135,000 gallons of solution to the Cortez Stormwater Pond via a shared, single-lined HDPE spillway.

The **Cortez Mine Stormwater Pond** (SWP) is located west and adjacent to the UDP and is a single-lined pond without leak detection. The SWP was also reconstructed as part of an EDC approved December 2008, to address issues related to liner displacement in the original ponds caused by the rising groundwater elevation.

The reconstruction consisted of removing all solution and sediment from the existing SWP, perforating the existing, in-place 60-mil HDPE liner on the sideslopes to provide a minimum 25% open area, and leaving the bottom portion of the existing 60-mil HDPE pond liner in place and intact. Similar to the reconstructed UDP (see above), a layer of 12-oz/yd^2 non-woven geotextile was placed over the existing synthetic pond liner, which is also underlain by a layer of 10-oz/yd^2 non-woven geotextile. The original lined pond excavation was then backfilled with rock fill (100% <8-inch diameter) to an elevation 24 inches below the pond bottom of 4,773 feet AMSL; over which 18 inches of drain rock (100% <2-inch diameter) was placed; followed by a 6-inch thick layer of cushion layer material (100% <1-inch diameter). The rock fill, drain rock, and cushion layers were enveloped in 12-oz/yd^2 non-woven geotextile to provide filtration and a cushion for the new, single layer, 80-mil HDPE pond liner. The new HDPE liner is carried across and beyond the original liner at the pond crest and tied into a new key trench located approximately five (5) feet beyond the original liner key trench. The reconstructed SWP measures approximately 222 feet square at the crest.

Groundwater entering the rock fill sump beneath the SWP liner can be evacuated through any of four (4) 12-inch diameter HDPE Groundwater Monitoring Port (GWP) riser pipes. Each GWP is located at a corner of the square pond footprint and where it penetrates the liner through a boot and extends about 1.5 feet above the pond crest. The port riser casings are slotted within the rock fill sump and can be equipped with a portable level-controlled submersible pump to maintain the groundwater elevation below the pond base elevation of 4,773 feet AMSL, as necessary.

Lowering of the groundwater elevation is not anticipated to be required during the first four (4) years of pond operation. However, as a schedule of compliance requirement, an additional EDC was approved in August 2009, that provides for construction of a permanent Groundwater Dewatering System in the event the groundwater elevation beneath the pond liner exceeds 4,770 feet AMSL. Based on modeled potential groundwater inflows, a 1200 gpm stainless steel submersible well pump will be permanently installed in the northeast corner GWP riser (SWP-GWP). Equipped with a pressure transducer to evaluate water level, solution will be pumped through a 10-inch diameter steel pipeline into a 10-inch diameter HDPE pipeline for conveyance to the North Water Storage Reservoir. Pumping will be initiated at a groundwater elevation of 4,772 feet AMSL and will stop once a groundwater elevation of 4,771 feet AMSL is achieved. A dedicated back-up diesel-electric generator provides power in the event of a loss of line power at the facility.

The reconstructed SWP is designed with a pond evacuation riser constructed of 16-inch diameter, SDR 17, HDPE pipe located on the east side of the pond near the southeast corner. The pond evacuation riser is equipped with a manually controlled submersible pump rated for a nominal 50 gpm pumping rate. Solution removed from the pond is conveyed from the SWP pump through a new 3-inch diameter Schedule 40 steel pipeline directly to the UDP. The reconstructed SWP has a calculated solution capacity of 609,000 gallons with two (2) feet of freeboard remaining. The pump design allows for transfer of all SWP solution inventory located below the maximum spillway and 2-foot freeboard elevation (4,776 feet AMSL) in less than 10 days. The SWP evacuation pump is connected to line-current only and emergency power must be supplied by a portable generator. Also, due to the single liner construction, the Permit requires the SWP be evacuated within twenty (20) days of any event that introduces process solution or whenever an overflow from the UDP to the SWP occurs.

The 50-million gallon, double synthetic-lined and leak detected **Water Storage Reservoir** (WSR) was constructed in 1990 within the southeast corner of Tailings Impoundment 4 (TI-4), which was active from 1973 to 1976 and permanently closed and reclaimed in 2004. The WSR was originally designed to store decant water from the tailings impoundment, water from the groundwater pumpback and remediation system (NEV0000023), and overflow from the Mill #1 thickeners and is now also used for management of Contact Water as described above.

The WSR consists of two (2) 17-foot deep ponds separated by a 10-foot high central divider berm to create a north cell and a south cell. A single HDPE pipeline discharges onto the lined divider berm and solution reports to both cells. If necessary, the design permits separate storage of approximately 17.2 million gallons of fluid in each cell. The original pond liner system consisted of a 60-mil Very-Low-Density Polyethylene (VLDPE) primary liner, a 40-mil VLDPE secondary liner, and a layer of polyethylene geonet between the liners to serve as an LCRS. The LCRS for each cell drains to an individual vertical riser pipe leak detection sump located at the east end of each cell. To address maintenance issues, the primary VLDPE liners for the north cell and south cell were replaced with 60-mil HDPE in 1995 and 1997, respectively.

Pit Lake Assessment

The initial water quantity and quality modeling for the predicted Cortez Hills Pit Lake was completed by Geomega, Inc. (Geomega) and compiled in two 2007 reports entitled, "*Ground Water Flow Modeling Report for the Cortez Hills Expansion Project,*" and "*Cortez Hills Expansion Project: Pit Lake Water Quality Prediction*," which were supplemented by a Geomega 2008 report entitled, "*Groundwater Quantity and Quality Assessment of the Revised Cortez Hills Pit Design, May 14, 2008.*" The 2015 Permit renewal includes a schedule of compliance item requiring submittal of an updated pit lake study and ecological risk assessment that includes, among other things, the results of the most recent three-basin regional groundwater model.

Pit lake water model simulations were run for a period of 100 years beyond the end of dewatering activities. The Cortez Hills Pit Lake begins to form approximately 3 years after the end of dewatering and recovers to 80% of full recovery 16 years after dewatering ceases. At 100 years, the resulting terminal pit lake will have a surface area of approximately 18 acres and the water will be slightly alkaline, with a pH of approximately 8.9.

The predicted pit water chemistry meets applicable water quality standards for most parameters, with the exception of arsenic and thallium, which exhibit natural elevated background concentrations in the regional groundwater and are further enhanced by evapoconcentration effects associated with the terminal pit lake. However, neither constituent is considered to be of concern. The arsenic should be sequestered by formation of predicted mineral assemblages, such as calcium arsenate. Additionally, the predicted concentrations of thallium are considered artificially high and result from evapoconcentration of non-detect values, i.e., the thallium exceedance is an artifact stemming from the proximity of the conventional detection limit (0.001 to 0.002 milligrams per liter (mg/L)) to the water quality standard (0.002 mg/L). Low detection limit studies of metals in the former Cortez Pit Lake revealed thallium at 0.0002 mg/L, an order of magnitude lower than the conventional detection limit and water quality standard.

The modeled Cortez Hills Pit Lake predictions were further verified by comparing them to the water quality of the former Cortez Pit Lake, which was located approximately six miles from the proposed Cortez Hills Pit in a pit with similar lithology. Actual Cortez Pit Lake chemistry after 20 years was in good agreement with that predicted for the modeled Cortez Hills Pit Lake after 20 years. Data from an analog pit lake test with representative waste rock backfill, used to quantify the influence of in-pit waste rock translocation on water chemistry, was also in agreement.

The further conclusion of the pit lake modeling is, based on the results of the groundwater flow model and on numerical and bench-scale analyses, there will be no impact on groundwater surrounding the pit after infilling. The pit lake chemogenetic pathways will result in consistently good water quality, comparable to existing surface waters in Crescent Valley.

Ecological Risk Assessment

The Geomega pit lake modeling also included ecological risk assessments (ERAs) to characterize potential chemical risk to wildlife and fish resulting from surface water metal constituents in the Cortez Hills Pit Lake. Constituents of potential concern (COPCs) were identified by comparing predicted pit lake concentrations at year 100 to ecological screening benchmarks. COPCs identified for quantitative risk analysis included mercury and selenium. Literature on pH effects on fish was also reviewed for screening level assessment purposes.

The conclusions of the risk assessments are that chemical risk is unlikely for wildlife following exposure to metal constituents in the Cortez Hills Pit Lake; that estimated fish tissue concentrations should be at or below U.S. Federal Drug Administration action levels and within background concentrations for Nevada; and that pH and other physical chemistry aspects of the pit lake should be well within acceptable ranges for fish populations.

Petroleum-Contaminated Soil Management

An EDC for a Petroleum-Contaminated Soil (PCS) Management Plan was approved in April 2010. No PCS storage or disposal is approved for the facility. The Permittee is required to remove all PCS from the facility for provisional storage and disposal at the approved Pipeline Project waste rock dump (NEV0093109) in accordance with the approved PCS Management Plan and the Division's Guidance for Mine-Site PCS Management Plans.

C. Receiving Water Characteristics

In the Project area, groundwater is localized in structural bedrock aquifers with no substantial water-bearing zones in the alluvium. Groundwater flow is controlled by numerous north-south and east-west trending faults and fractures. Local bedrock has generally low hydraulic conductivity. In general, groundwater is shallower under the northwest and south portions of the Cortez Hills facility, which are located on the west side of the Crescent Fault (e.g., Canyon WRF and Grass Valley Heap Leach Pad), and deeper under the north and east parts of the Cortez Hills facility on the east side of the Crescent Fault (e.g., Cortez Hills Pit, F-Canyon Portal, North WRF, and South WRF). The shallowest groundwater on the Project site is in Crescent Valley on the north side of the old Cortez Mine facility.

Groundwater depths near the Cortez Hills Pit range from approximately 500 to 1,600 feet bgs. Groundwater depths on the north, south, and west sides of the Grass Valley Heap Leach Pad range from approximately 100 to 250 feet bgs, while groundwater depths on the east side of the pad are greater than approximately 900 feet bgs. Groundwater in the vicinity of the Canyon WRF is locally as shallow as approximately 30 to 60 feet bgs. Groundwater in the area of transferred Cortez Mine components, located on the edge of the Crescent Valley Playa, lies at a depth of 11 to 59 feet bgs.

Surface water flow is intermittent and occurs in response to storm events or during periods of snowmelt. Some stream segments exhibit continuous flow over short reaches that are fed by springs or seeps.

Receiving waters are located in Crescent Valley (State of Nevada Hydrographic Basin #54) and the northern portion of Grass Valley (State of Nevada Hydrographic Basin #138). Grass Valley is closed topographically. The Toiyabe Range separates Grass Valley from the southernmost part of Crescent Valley; the southern Cortez Mountains and northernmost section of the Simpson Park Range separate the northern part of Grass Valley from Pine Valley to the east (State of Nevada Hydrographic Basin #53). Crescent Valley is semi-closed topographically, bordered by the Shoshone Range on the west, the Cortez Mountains on the east, the Toiyabe Range on the south, and the Tuscarora Mountains on the northeast. A low topographic divide on the northwest end of Crescent Valley separates that valley topographically from the Humboldt River, but the Permittee has determined through regional hydrologic studies that, despite the topographic high, some groundwater flows from Crescent Valley toward the Humboldt River.

Previous data indicated that groundwater in Crescent Valley was hydrologically isolated from groundwater in Grass Valley and Pine Valley; however, in 2014 the Permittee determined from hydrologic studies that groundwater in the western portion of the Pine Valley Hydrographic Basin is being drawn down by the Permittee's dewatering activities in Crescent Valley. At this point, the interbasin groundwater transfer appears to be more of a water supply issue than a water quality concern. However, this will be evaluated further in future pit lake studies.

Baseline groundwater chemistry for both Crescent Valley and Grass Valley is circum-neutral (pH) and of the Na-Ca-HCO_3 type. Baseline characteristics of several analytes periodically exceed Division Profile I reference values (drinking water standards) in one or more locations for aluminum, antimony, arsenic, cadmium, fluoride, iron, lead, magnesium, manganese, mercury, nitrate + nitrite, pH, selenium, silver, sulfate, total dissolved solids, and thallium. Maximum baseline concentrations of arsenic exceed the Division Profile I reference value of 0.01 mg/L in both areas.

D. **Procedures for Public Comment**

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

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

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

E. Proposed Determination

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

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

See Section I of the Permit.

G. Rationale for Permit Requirements

The facility is located in an area where annual evaporation is greater than annual precipitation. Therefore, it must operate under a standard of performance which authorizes no discharge 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 upgradient and downgradient monitoring wells and two (2) local springs. 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 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: Thomas E. Gray
Date: 16 January 2015

Revision 00: Renewed Permit, effective Day Month 2015.

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