

FACT SHEET

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

Permittee: **Marigold Mining Company**
P.O. Box 160
Valmy, Nevada 89438

Facility Name: **Marigold Mine**

Permit Number: **NEV0088040**
Review Type/Year/Revision: **Renewal/Major Modification 2024, Fact Sheet Revision 00**

A. Location and General Description

Location: The Marigold Mine is located in southeast Humboldt County, in northern Nevada. The mine site is approximately 30 miles southeast (by air) of the town of Winnemucca and occupies approximately 39.5 square miles (25,280 acres) of public and private lands. The Mine is located in the historic Buffalo Valley Mining District.

The mine and process facilities are located in Humboldt County, within portions of:

- Township 32 North (T32N), Range 42 East (R42E), Sections 1, 2 and 12;
- T33N, R42E, Sections 1, 11, 12, 13, 23, 24, 25, 35, and 36;
- T32N, R43E, Sections 4, 5, and 6;
- T33N, R43E, Sections 4, 5, 6, 7, 8, 9, 10, 16, 17, 18, 19, 20, 21, 28, 29, 30, 31, 32, and 33;
- T34N, R42E, Section 36; and
- T34N, R43E, Sections 19, 20, 28, 30, 31, 32, and 33; Mount Diablo Baseline and Meridian.

Access: To access the Marigold Mine site, proceed approximately 37 miles east from Winnemucca or 13 miles west from Battle Mountain on Interstate-80 to Exit-216 (Valmy). The mine site is approximately 3.5 miles southwest of the interchange.

General Description: The Marigold Mine is operated by the Marigold Mining Company (Marigold, the Permittee), a wholly-owned subsidiary of Silver Standard Marigold Incorporated (SSMI).

SSMI purchased of Goldcorp's 67 percent interest and Barrick Gold Corporation's 33 percent interest in Marigold in early 2014. Barrick acquired its interest in the property in 2002 when it merged with the Homestake Mining Company (Homestake), which had previously been the junior partner in the Glamis-Homestake Joint Venture for the Marigold Mine. Goldcorp had earlier acquired its interest in Marigold through its purchase of Glamis Gold Corporation (Glamis) in 2006. Glamis acquired its interest in the property as part of its Rayrock Resources Inc. acquisition in 1999.

In August 2015, the Permittee expanded the Marigold Mine footprint further when it

acquired approximately 10.5 square miles (6,720 acres) of public and private land referred to as the “Valmy Area”, previously held by Newmont Mining Corporation--Trenton Canyon Project. Refer to the ***Mining*** sub-section for additional details.

Gold had been mined intermittently at the Marigold Mine site since the late 1920s. However it wasn’t until the late 1980’s that full-scale development and production of the Marigold Mine site was initiated.

The Marigold Mine consists of several open pits and is authorized to process up to 40 million tons of ore annually utilizing conventional cyanidation technology. Gold is recovered by carbon adsorption and electro-winning. The facility is required to be designed, constructed, operated, and closed without any release or discharge from the fluid management system except for meteorological events which exceed the design storm event.

The Permittee operates Rapid Infiltration Basins (RIBs) located in the northwestern foothills of the Battle Mountain Range at the northern end of the Project for the purpose of managing and reintroducing dewatering water from the mine into the local groundwater basin. Refer to WPCP NEV2022118 “Marigold RIBs Project” and Fact Sheet for specific design and operational details, monitoring, reporting, and record keeping requirements.

On 8 July 2019, the Division received the Mackay Expansion Major Modification/Renewal application to expand the current mining operation. The modification proposes three open pits, additional waste rock facilities, and one additional heap leach pad. Please see the following sections below for more information: ***Mining, Dewatering, Future Pit Lake, and Heap Leaching Cell 23A.***

On 6 December 2023, the Division received the Valmy Project Major Modification/Renewal application to expand the current mining operation into T32N, R42E, Section 12 and T33N, R43E, Section 5. The modification also requests to remove T34N, R43E, Section 29 Mount Diablo Baseline and Meridian. This Section of land was acquired by ARJ Properties LLC in 2021, and with the acquisition MMC no longer holds rights to the land. With these changes, the total amount of land controlled by MMC decreases from 26,447 acres to 25,889 acres (including 12,606 acres of public land administered by the Bureau of Land Management and 13,283 acres of private land). In addition, the Modification proposes mining above the water table in three open pits acquired in the Valmy Project acquisition. Please see the following sections below for more information: ***Mining, Future Pit Lake, and Waste Rock Characterization and Management.***

B. Synopsis

Geology: There are three major sequences or bedrock units present within the Marigold Mine Project Area. The rock units include the Ordovician Valmy Formation, the Pennsylvanian to Permian Antler or Overlap Sequence, and the Mississippian to Permian Havallah Formation. The three rock units are oxide in character and drilling has indicated that little to no sulfidic materials will be encountered during mining. The rock types are

described below:

- **Alluvium:** Locally, alluvium is up to several hundred feet thick and consists of poorly sorted fan gravels interspersed with abundant fines and interbedded with thin layers of fine silt, sand, and clay. The upper 200 to 250 feet is derived mainly from chert. An older Tertiary Alluvium has been identified in the mine area. In addition to weakly consolidated gravels, silts, and sands, Tertiary volcanic rocks, including basalt, volcanic tuff, and intrusive have been identified.
- **Antler Sequence:** Pennsylvanian to Permian in age, this unit has also been called the Overlap assemblage. The Antler Sequence consists of interbedded siltstone, sandstone, mudstone, conglomerate, and limestone. This unit varies from 200 to 700 feet thick within the Project Area and rests unconformably in the Ordovician Valmy Formation. Locally, this sequence consists of the Battle Formation, the Antler Peak Limestone, and the Edna Mountain Formation.

The Battle Formation typically contains conglomerate beds resting on eroded Valmy Formation along with some local beds of sandstone and shale. The basal part of this formation is typically composed of coarse chert and meta-quartzarenite cobble conglomerate. A distinctive shale unit is found just above the conglomerate in some places. Coarse siliceous sandstone with interbedded conglomerate may also be part of this formation. The Antler Peak Limestone, a late Pennsylvanian-to-early Permian unit, overlies the Battle Formation. The Antler Peak Limestone is a massive- to well-bedded, gray, micritic limestone. The Edna Mountain Formation overlies the Antler Peak Limestone. The lower member of the Edna Mountain Formation consists mostly of coarse-sized, very poorly sorted debris flows containing chert and meta-quartzarenite fragments. The upper member of the Edna Mountain Formation consists of a thick, brown or gray siltstone.

- **Havallah Sequence:** This Pennsylvanian- to-Permian aged unit consists of bedded chert, siltstone, sandstone, and mudstone. Mafic to intermediate volcanic flows occur randomly throughout this unit. The chert-siltstone-sandstone sequence can have a calcareous matrix, which is not present throughout the unit. Some minor limestone is also present. This unit has been thrust into the region along the Golconda thrust fault and emplaced above the Antler Sequence or the Valmy Formation. Thickness of this unit varies from zero to several thousand feet.
- **Valmy Formation:** Ordovician in age, this formation consists of bedded to massive chert, siltstone, quartzite, and argillite. The chert and siltstone is gray to black, and the quartzites are light to dark gray and interbedded with argillite. In areas to be mined, the Valmy marker units of interest are 1) a lower package of meta-quartzite with a few argillite beds; 2) an intermediate package composed of meta-basalt, chert, and argillite; and 3) an upper package of meta-quartzite and argillite very similar to the lower package.

Mining: Currently there are several open pits at the Marigold site in various stages of development. Combined annual mine production is approximately 150 million tons of

ore and waste rock annually. Their current authorized pits are as follows:

- 5 North Pit;
- Mackay North Pit (includes the previously known 8-Pit and Terry Zone Pit);
- Mackay Pit (includes the previously known East Hill, Target 1, Target 2, and Target 3 pits);
- New Millennium Pit (includes the previously known Antler Pit and Basalt Pit);
- Mud Pit (includes the previously known Mud Pit and the Northwest 29 Pit); and
- Valmy Pit.

The Permittee's August 2015 acquisition of the Valmy Area land parcels from the neighboring Trenton Canyon Project, added the Trenton, NW 29, Valmy, and Mud pits, located less than one mile east of the Marigold Target 2, Antler, and Basalt pits, within portions of T33N, R43E, Sections 29 and 32. The Trenton, Valmy, Mud, and NW 29 pit floors are approximately 5,680 feet above mean sea level (amsl) and have since been backfilled. Groundwater depth within the Valmy Mine Area is in excess of 550 feet below ground surface (bgs) and 5,200 feet amsl. At this time the Permittee has not indicated any intention to disturb the Valmy Area pits.

The Mackay Expansion Major Modification/Renewal proposes to create three pits at the Marigold Project. The proposed pits are:

- The Mackay Pit will be a combination and expansion/deepening of the existing Target 1, Target 2, Target 3, and East Hill Pits. The Mackay Pit will be approximately 15,000 feet long, 5,820 feet wide, and mined to a depth of 3,975 feet above mean sea level (1,400 feet deep).
- The Mackay North Pit will be a combination and expansion/deepening of the existing Terry Zone and 8-Pit. The Mackay North Pit will be approximately 7,500 feet long, 5,500 feet wide, and mined to a depth of 4,200 feet above mean sea level (825 feet deep).
- The 5 North Pit will be expanded to approximately 4,400 feet long, 3,700 feet wide, and mined to a depth of 4,350 feet above mean sea level (425 feet deep).

The three Mackay Expansion pits will have a total of approximately 1.8 billion tons of material proposed to be mined. A total of 790 ABA samples, 22 MWMP, and 37 HCTs were completed for the expansion. The characterization completed on the mined material indicated the material was benign with an overall neutralizing character. If any potentially acid generating material (PAG) is mined, the material will be actively blended or encapsulated with a minimum of 20 feet of non-PAG waste rock.

The Valmy Project Major Modification/Renewal proposes to create an additional three pits at the Marigold Project. The proposed pits are:

- The New Millennium Pit will be a combination and expansion/deepening of the existing Antler Pit and Basalt Pit. It will be approximately 6,200 feet long, 6,200 feet wide, and mined to a depth of 5,080 feet above mean sea level (1,340 feet deep).
- The Mud Pit will be a combination and expansion/deepening of the existing Mud Pit and the Northwest 29 Pit. It will be approximately 1,750 feet long, 2,800 feet wide, and mined to a depth of 5,100 feet above mean sea level (510 feet deep).
- The Valmy Pit will be expanded to approximately 6,100 feet long, 4,560 feet wide, and mined to a depth of 5,350 feet above mean sea level (1,330 feet deep).

Dewatering: As part of the Mackay Optimization Project, Marigold Mining Company is planning to consolidate multiple existing pits into three larger pits. Within these main pits, eight sub-pits are proposed to extend below the pre-1992 water level, thus requiring dewatering. Seven of these sub-pits will be backfilled, and five of the backfilled pits will have groundwater recover into the backfill material after mine dewatering terminates. Two of the pits will have groundwater recovery that does not enter the backfill material but will recover to within 50 feet of the pit bottom. One pit will not be completely backfilled thus resulting in formation of a pit lake after mining ends.

The cessation of dewatering at the neighboring Lone Tree Mine (WPCP NEV0090058) has affected the regional groundwater table at the Marigold site. Since dewatering at the Lone Tree Mine ceased in November 2006, a gradual rebound of the groundwater table has been observed by an increase in monitoring well water elevation. The Permittee has installed groundwater monitoring wells around the property to monitor groundwater elevations associated with mining activities and will continue to monitor the water table rebound.

Future Pit Lake: As part of the Mackay Expansion Major Modification/Renewal, the Permittee plans to mine below the groundwater table in all pits (Mackay, Mackay North, and 5 North pits). The Permittee is proposing to backfill the Basalt and Antler Pits (as previously approved), the 5 North Pit, and North Mackay Pit to preclude formation of a pit lake. Backfill will be placed in lifts to at least 50 feet above the highest modeled groundwater rebound elevation. The Mackay Pit will be partially backfilled in the southern portion of the pit, allowing formation of a pit lake in the deepest portion of the pit. At the end of mine dewatering, groundwater levels in the Mackay Pit area are predicted to be 3,950 ft amsl. The Mackay Pit Lake is predicted to fill from its base elevation (4,000 ft amsl) to ~4400 ft amsl within ~30 years after the cessation of dewatering. At this state, the pit lake will spill over a ridge at the northern end of the Mackay Pit and expand onto its upper benches, resulting in substantially increased evaporation rates that will exceed filling rates. The pit lake is expected to gradually continue recovering to an elevation of ~4430 over the following 100 years. The terminal nature of the Mackay Pit Lake will result in solute accumulation over time; however, all solutes are expected to meet NDEP Profile III standards, with the exception of fluoride for the last three years of the 200-year modeled period.

Temporary approval to begin placing backfill in the northern lobe of the Mackay Pit was

granted by the Division in January 2023. The saturated zone backfill reduces the surface area of the permitted Mackay Pit Lake by approximately 21.8 acres. This backfill will be tied into the Ultimate Resort overburden storage area.

As part of the Valmy Project Major Modification/Renewal the Permittee does not plan to mine below the groundwater table; therefore, pit lakes are not expected to form in the New Millennium, Mud, and Valmy pits. Additionally, the permittee will not mine within 50 feet of the naturally occurring groundwater level in the New Millennium Pit. Measured water table levels are 5029 feet above mean sea level in the New Millennium Pit and 4940 feet above mean sea level in the Valmy Pit. Piteau Associates investigated the pre-1992 groundwater elevation for this area, which estimates the groundwater level prior to Lone Tree Mine dewatering. This study was used to infer the groundwater level for the Mud pit, estimated at 4700 feet above mean sea level. Additional information will be presented to the Division as future data becomes available.

Backfilled Pits: The 2017 update of the Groundwater model predicted steady-state flow-through rates of ~ 13 gpm and 1 gpm, for the backfilled Mackay North Pit and 5 North East Pit respectively. Groundwater elevation is expected to re-bound to its pre-1992 level, reaching 4450 ft amsl in the backfilled Mackay North and 4435 ft amsl in the backfilled 5 North Pit. Fluxes from the groundwater flow model for the Marigold area were coupled with the chemical release rates for all backfilled materials to compute the porewater chemistry through a 200-year modeled period. Porewater in the Mackay North backfill is predicted to exceed Profile I standards for Cd, Hg, Sb, Tl, and pH for the entire period. Similarly, pore water in the 5 North East Backfill is predicted to exceed for As, Cd, Tl, and pH for the same period. Due to these predicted exceedances and flow-through conditions, a fate and transport model will be prepared for these pits to demonstrate that porewater will not degrade nearby Waters of the State. This Study will be reviewed and approved by the Division prior to authorization of mining below the water table.

Waste Rock Characterization and Management: To date, waste rock characterization, using static and kinetic testing data have indicated very little PAG material due to the minimal amount of sulfidic material available and the abundance of limestone waste rock which inhibits acid generation potential.

Waste rock material is hauled to the Top Zone, Old Marigold, Resort, 5-North, 8-North, South, North-West, and North-West Expansion waste rock disposal facilities (WRDFs) and end-dumped on the active bench face at the angle of repose. The dumps are constructed at an overall slope of 3 horizontal: 1 vertical (3H:1V) with average lift heights of 50 to 60 feet.

Backfilling of open pits with waste rock and overburden material commenced in 1998. In written correspondence to the Permittee dated 5 May 2003, the Division provided specific pit backfilling criteria at the Marigold Mine. The Permittee is required to submit waste rock characterization results, geologic formation identification and hydrologic data for evaluation and approval by the Division prior to the placement of waste rock in any pit not specifically identified in the correspondence.

Four geologic formations have been approved for use as pit backfill material: Valmy,

Antler; Edna Mountain, and Havallah. The Edna Mountain and Havallah formations have also been approved for placement below the pre-1992 water table. Backfill with these formations will also eliminate the potential for a pit lake to form and is authorized for use in the 8-South Pit (now part of the 8-Pit) and the Terry Zone Pit.

The Permittee's August 2015 acquisition of Valmy Area land parcels from the neighboring Trenton Canyon Project also added the V-1, V-2, V-3, V-5, and V-6 WRDFs, located less than one mile east of the Marigold Mine pits and WRDFs. With the exception V-5, all of the WRDFs were constructed and have since been reclaimed.

The Trenton Canyon Project WRDFs were constructed by end-dumping from mine haul trucks, typically constructed with lift heights between 50 and 100 feet. During active waste rock disposal operations, the slope of each lift was at the angle of repose (approximately 1.5H:1.0V) but have since been reclaimed to approximately 2.5H:1.0V. At this time the Permittee has not indicated any intention to disturb the Valmy Area WRDFs.

In 2017, the Rock Characterization for the Mackay Expansion was conditionally approved due to the Northern Zones of the expansion had no humidity cells tests completed for the area. The Permittee will need to complete the humidity cell tests to have approval to mine the Northern Zones of the Mackay Expansion. As of February 2020, the Permittee has received termination approval for five of the six additional humidity cell tests from the Northern Zone Area in addition to approval by the Division to manage the Northern Zone waste rock material under the approved Waste Rock Management Plan.

The Valmy Project Geochemical Characterization Program Workplan was approved by the Division in 2021. The results of this work indicated that the Valmy Project overburden can be placed in the Overburden Stockpile Areas (OBSA) without isolation and used as pit backfill. To supplement this work, as of 6 December 2023, an additional 31 MWMP samples were tested and an additional 9 humidity cell tests (HCTs) have been run with 8 terminated. Of the additional samples tested only one Valmy-Oxide HCT sample returned as potentially acid generating. SRK Consulting (U.S.) has been retained to investigate the nature of the material and results will be presented to the Division once available.

Within the 2023 Valmy Project Major Modification/Renewal MMC intends to make the following changes to their waste rock management facilities:

- Create the Valmy Overburden Storage Area, which will consume the previously authorized V-1, V-2, V-3, V-5, and V-6 facilities. The Valmy OBSA will be 600 feet in height with 2.5H:1V reclaimed slope angles and a storage capacity of 351.4 M tons.
- Bring the Northeast overburden stockpile area into the Northwest overburden stockpile area. The Northwest OBSA will be 600 feet in height with 3H:1V reclaimed slopes and a storage capacity of 1,165.1 M tons.

- Construct the Ultimate Resort Overburden Stockpile area, which will consume the previously approved Top Zone and Resort Overburden stockpile areas. The Ultimate Resort will be 600 feet in height with reclaimed 3H:1V slopes and a storage capacity of 394.0 M tons.
- The Section 8 overburden stockpile area will be 350 feet in height with 3H:1V reclaimed slopes and a storage capacity of 312.0 M tons.

Heap Leaching: As of April 2021, approximately 1,100 acres of heap leach pads (HLPs) and ponds have been constructed at the Marigold site. Twenty-seven HLP cells (Cells 1, 2, 3, 2/3 Infill, 4, 5a, 5b, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15R, East Side Extension, 16, 17, 18, 19, 19B, 20, 21, 22, and 24) have been constructed, of which 16 cells (Cells 10, 11, 12, 13, 14, 15R, East Side Extension, 16, 17, 18, 19, 19B, 20, 21, 22, and 24) are currently active.

The HLP cells were constructed in the following sequence: Cells 1, 2, 8, 7, 6, 5a, 5b, 4, 3, 2/3 Infill, 9, 10, East Heap Leach Pad Extension, 11, 12, 14, 13, 15R, 16, 17, 18, 21, 19, 22, 24, and 19B (will be constructed next). Each successive construction featured design improvements over the previous construction.

Leach solution is applied selectively to different areas of the constructed HLP and approximately 4.29 million square feet of pad area is being leached at any given time. Currently, HLP Cells 1, 2, 7, and 8 are inactive and in draindown with the remaining cells active. Future plans include the 5-North HLP, which will be constructed in conjunction with the development of the 5-North Pit.

Cells 1, 2, and 8: HLP Cells 1, 2, and 8 were constructed during 1989-90, on a 24-inch compacted clay surface. Since the construction of these cells pre-dates the promulgation of Nevada Administrative Code (NAC) NAC 445A.350 through NAC 445A.447, as-built drawings, liner QA/QC, and compaction data were not required at the time.

HLP Cells 1 and 2 were constructed with an authorized ore stacking height of 85 feet above the liner surface; Cell 8 was constructed with an authorized ore stacking height of 100 feet above the clay surface.

The existing pipeline corridor between HLP Cells 1 and 2 was constructed in 1988, pre-dating the implementation of NAC 445A.350 through NAC 445A.447. The corridor is comprised of 40-mil very low-density polyethylene (VLDPE) liner placed on a minimum 12-inch clay layer, overlying a layer of re-compacted soil. The pipeline corridor runs south to north and reports to Pregnant Pond 1 and/or 2. The corridor provides secondary containment for a pressurized line and gravity flow solution lines that collect solution predominately from HLP cells 1, 2, 3, 11, and the East Extension. In 2004, a new corridor was constructed directly to the east and parallel to the old corridor in conjunction with the Cell 12 HLP construction to facilitate closure of the older HLP cells. This corridor reports to Pregnant Pond 2.

An Engineering Design Change (EDC) approved 30 October 2008, authorized the re-lining of the old VLDPE-lined piping corridor to facilitate concurrent closure activities and operational flexibility. The Permittee's future plans include the potential relocation of the material on HLP Cells 1 and 2. Whether or not these cells are relocated or

reclaimed in-place, relining the old piping corridor must be completed prior to either of these activities.

A thorough re-evaluation of the solution storage requirements for the Marigold HLP was performed by the Permittee in 2008. The Permittee evaluated the effects of the proposed HLP Cells 1 and 2 relocations and the “in-place” reclamation on the east side of the solution corridor along HLP Cells 1 through 3. The Permittee and the Division agreed that the solution corridor design and solution storage system have sufficient capacity to handle any storm event run-off resulting from the 100-year, 24-hour storm event and that no modifications to the solution corridor design or solution storage system were necessary at that time.

Cells 6 and 7: Cell 7 was constructed prior to Cell 6. Both were constructed with a 12-inch thick low permeability soil layer with a permeability of 1×10^{-6} centimeters per second (cm/sec) overlain by a gravel drainage layer and a 60-mil high-density polyethylene (HDPE) synthetic liner. The cells were each constructed with multi-pipe leak detection/collection systems. Leakage has been observed in the Cell 7 Leak Detection System and was significant enough to require its premature removal from operation in March 2001. Cell 7 was constructed to an authorized height of 120 feet above the liner surface; Cell 6, which is still active, has an authorized ore stacking height of 350 feet above the liner surface.

An investigation was undertaken by the Permittee to investigate the increase in leakage from Cell 7 that was first noted during the Third Quarter of 2003. In January 2005, the Permittee concluded that a significant portion of the leakage could be attributed to an increase in natural recharge. This recharge corresponds to construction events that may have altered surface drainage, resulting in the capture of direct precipitation and runoff. Based on the January 2005 report, a remedial action and monitoring plan was developed, submitted to and approved by the Division.

In an effort to preclude surface accumulation of fluid, Marigold constructed a positive drainage system on top of Cell 7, covered the southeast corner of Cell 7 with clay, regraded the eastern slope of Cell 7, and installed an evapotranspiration (ET) cover.

Determination of Cell 7 compliance is via a comparison of modeling results and quarterly Profile I criteria monitoring results at downgradient monitoring point (e.g. monitoring well) LDMP-13. Compliance is determined based upon previously submitted (February 2006) and approved (March 2006) HYDRUS-2D modeling results. Cell 7 monitoring port LPLD7 is monitored weekly for flow rate and quarterly for Profile I constituents with the results reported quarterly. A separate report regarding the performance of the Cell 7 Remedial Action is also submitted quarterly.

Cells 5a, 5b, 4, and 3: In response to the leakage problems associated with Cell 7, construction for Cells 5a, 5b, 4, and 3 (in that sequence) included a 12-inch thick soil layer with a permeability of 1×10^{-6} cm/sec overlain by a 60-mil HDPE synthetic liner. A leak detection system was not installed for the cells since the minimum design requirements pursuant to NAC 445A.434.1(a) were met. All four of these active cells have an authorized ore stacking height of 350 feet above the liner surface.

Cell 2/3 Infill: In October 1998, the heap leach pad area was increased by construction of the Cell 2/3 pad infill area. A portion of the Cell 2/3 pad infill area was constructed with a 12-inch layer of compacted native material with permeability not greater than 1×10^{-6} cm/sec and was overlain by a 60-mil HDPE non-textured synthetic liner. The remainder was constructed similarly except that an 80-mil HDPE with one textured side (textured down) was used. A leak detection system was not required since the minimum design requirements pursuant to NAC 445A.434.1(a) were met when the Cell 2/3 Infill was permitted. The maximum authorized ore stacking height for the Cell 2/3 Infill is 350 feet above the liner surface.

Cell 9: The Cell 9 leach pad was completed in July 1999, and added 9.5 acres of lined pad surface. With Cell 9, an additional stormwater pond with a capacity of approximately 2.6 million gallons was completed. The Cell 9 liner system consists of a 12-inch layer of compacted native material with permeability not greater than 1×10^{-6} cm/sec, overlain by 4 inches of non-segregated tails, covered by a 60-mil HDPE non-textured synthetic liner. A leak detection system was not installed since the minimum design requirements pursuant to NAC 445A.434.1(a) were met at the time Cell 9 was permitted.

Cell 10: In July 2000, the construction of Cell 10 added an additional 6 acres of lined pad surface. In October 2000, another 6.7 acres of leach pad area were added with the completion of the East Heap Leach Pad Extension. Cell 10's liner system was constructed similar to that of Cell 9. A leak detection system was not installed since the minimum design requirements pursuant to NAC 445A.434.1(a) were met at the time Cell 10 was permitted. Allowable stacking height of ore above the liner for both Cells 9 and 10 is 350 feet.

Re-Leach Pad, Cells 9 and 10 Slope Regrade: Prior to the full-scale cyanide leaching of "Millennium Ore", the Permittee conducted a series of larger scale leaching optimization tests on approximately 400,000 tons of the ore on a test HLP (Re-leach Pad). The Re-leach Pad and solution collection system were constructed along the western flank of Cells 9 and 10 and adjacent to the 8-South Pit. This configuration required an extension of the existing Cell 9 and 10 liner systems approximately 160 feet from the toe of the existing pad and regrading of the existing Cell 9 and 10 heap slopes. In addition, a liner and solution collection system was installed to further segregate the "Millennium" test ore material and leach solution from the existing leached ore.

The liner expansion overlapped and was welded to the existing liner. A portion of Cells 9 and 10 were regraded for installation of a supplemental liner to be placed on top of regraded area in large pre-welded panels or sheets shingled in the downslope direction overlapping the existing pad liner and liner extension. The supplemental liner was not welded to facilitate removal following the completion of testing. The initial design plan described above called for the Releach Pad to be graded slightly inward toward Cells 9 and 10. However, during the pad preparation, it was found that it would be more prudent to have the pad grade slightly outward.

On 11 April 2007, the Permittee submitted an EDC and a slope stability analysis to the Division requesting a revision from the previously approved design for the change in pad

gradient. Engineered designs approved in May 2006 included the construction of a synthetically lined perimeter berm around the entire perimeter of the test pad to contain the ore, leachate, and divert any external runoff away from the Releach Pad. The change in Releach Pad gradient did not require any design changes to the perimeter berm.

The Permittee performed a slope stability analyses to evaluate what impact (if any) a change in the regrade direction may have on slope stability. Stability modeling results indicated nearly identical factors of safety (FOS) under both static and pseudo-static conditions and that both FOS were well within the acceptable range, demonstrating that the slight change in regrade direction would not impact Releach Pad slope stability. The EDC was approved by the Division on 2 May 2007.

Cell 11: In April 2002, construction began on the Cell 11 leach pad (also referred to as the Southwest Heap Leach Pad Expansion), which added an additional 64 acres of leach pad area. The Cell 11 liner system consists of a 12-inch layer of compacted native material, with permeability not greater than 1×10^{-6} cm/sec, overlain by an 80-mil HDPE non-textured synthetic liner. The authorized ore stacking height is 400 feet above the liner surface.

Cell 12: In September 2004, construction began on the Cell 12 leach pad as part of the Millennium Expansion. The final permitted height of Cell 11 was increased to 400 feet as part of the Cell 12 design with Cell 12 constructed in the northeast corner of Section 17, abutting against the current leach pad on its east side against Cell 11, Cell 3, and Cell 4. The Cell 12 pad utilizes a dual liner system consisting of 80-mil HDPE overlying a compacted 12-inch layer of low permeability (1×10^{-7} cm/sec) soil liner. A protective layer of gravel drain rock containing perforated drainage piping is placed on top of the HDPE liner to facilitate drainage and provide a cushion during ore stacking activities. In addition, a perimeter berm has been constructed around the pad.

Cell 14: In May 2006, the Division authorized the construction of Cell 14. Cell 14 is located on the north and west sides of a knoll, upgradient of the existing Cells 11 and 12 and southwest of Cell 13. Cell 14 adds approximately 41.5 acres of additional heap leach pad area to the existing facility. The pad area has been regraded so that all process flow is directed to the north and northeast into Cell 12. The authorized ore stacking height for Cell 14 is 400 feet above the liner surface.

The Cell 14 leach pad is a lined system consisting of 80-mil HDPE overlying a compacted 12-inch layer of low permeability (1×10^{-6} cm/sec) soil layer. For areas located within steep terrain and where soil placement and compaction is not possible, the Permittee has replaced the soil layer with 0.25-inch thick geosynthetic clay liner (GCL) where external slope buttressing already exists or can be implemented. A protective layer of gravel drain rock containing perforated drainage piping is placed on top of the HDPE liner to facilitate drainage and provide a cushion during ore stacking activities. In addition, a perimeter berm has been constructed around the pad.

The Cell 14 solution collection system consists of external berms, internal sloped drainage areas, and the installation of perforated HDPE lateral and header collection piping. The header pipes will be connected to the existing header pipes within Cell 12.

Cell 14 will drain into three headers on the pad, pass into the solution collection system of Cell 12, through a manifold system on the north side of Cell 12 and flow in the collection piping down to the existing collection ponds.

Cell 13: HLP Cell 13 was approved for phased construction in August 2005 and all phases have been completed. Cell 13 is located within the northwest corner of Section 16 and abuts the existing Cell 12. Cell 13 utilizes a liner system consisting of 80-mil HDPE overlying a compacted 12-inch layer of low permeability (1×10^{-7} cm/sec) soil liner and GCL. A protective layer of gravel drain rock containing perforated drainage piping is placed on top of the HDPE liner to facilitate drainage and provide a cushion during ore stacking activities and a perimeter berm has been constructed around the pad.

The existing fluid management system has sufficient capacity to ensure adequate fluid management for additional process solutions generated as a result of the operation of Cell 13. The authorized ore stacking height for Cell 13 is 400 feet above the liner surface. Because of timing constraints and contractor availability, only Phases-1A and -3West (approximately 26 acres, total) were completed. The phased construction was considered to be an interim measure and required several changes to the geometry of the prior-approved Cell 13 design, including a significantly smaller footprint and a lower HLP height.

Cell 15R: The original Cell 15 design was approved for construction by the Division in July 2005 and intended for construction within the northwest corner of Section 16, abutting the existing Cells 12, 13, and 14 to the south. The location was revised (designated as Cell 15R) to optimize the construction, operation, and closure at the original Cell 15 location.

HDPE pipelines in HDPE lined ditches were constructed to convey leach solutions via gravity from the new pads to the process solution ponds. Cell 15 utilized a dual liner system consisting of 80-mil HDPE overlying a compacted 12-inch layer of low permeability (1×10^{-7} cm/sec) soil layer or GCL. A protective layer of gravel drain rock containing perforated drainage piping will be placed on top of the HDPE liner to facilitate drainage and provide a cushion during ore stacking activities.

A perimeter berm was also constructed around the pad. Because of the Division's permeability concerns with the local soil and clay material used previously, the Permittee has agreed to increase the number of permeability tests to demonstrate that the permeability criteria will be met. The authorized ore stacking height for Cell 15R is 400 feet above the liner surface.

Cell 16: In February 2011, the Division authorized the construction of HLP Cell 16 as a Minor Modification. In an effort to increase existing HLP capacity, the Permittee constructed an entirely new HLP (Cell 16) within the previously approved Cell 13 boundary, capable of accommodating future cell construction. When completed, the Cell 16 HLP expansion will occupy a footprint of approximately 57 acres, located east of Cell 13 Phase-1A in an area previously assigned to the proposed Cell 13 Phase 1B and Phase 2 expansions. The expansion required additional carbon column circuit and an expansion of the existing pregnant solution pond capacity.

The Cell 16 leach pad is a lined system consisting of 80-mil HDPE overlying a compacted 12-inch layer of low permeability (1×10^{-6} cm/sec) soil layer. For areas located within steep terrain and where soil placement and compaction is not possible, the Permittee has replaced the soil layer with 0.25-inch thick GCL where external slope buttressing already exists or can be implemented. A protective layer of gravel drain rock containing perforated drainage piping is placed on top of the HDPE liner to facilitate drainage and provide a cushion during ore stacking activities. In addition, a perimeter berm has been constructed around the pad.

The Cell 16 solution collection system consists of external berms, internal sloped drainage areas, and the installation of perforated HDPE lateral and header collection piping. Cell 16 drains into three headers on the pad and flows through the collection piping to the Pregnant Pond 4.

Cells 17 and 18: In March 2012, the Division authorized the construction of two additional HLP cells (Cells 17 and 18) as a Major Modification. These cells added an additional 90 acres of leach pad area to the existing HLP circuit. Cells 17 and 18 are located east of Cell 15 and south (upgradient) of Cell 16 on alluvial deposits that slope about two to four percent to the north-northeast. The cells are graded to follow the natural and existing topography and to direct process solution to the north and northeast into the new solution corridor on the east side of Cell 17. Additional fill materials were required in some areas of the pad; however, the fill depth did not exceed five feet. Fill materials were obtained from excavations of areas within Cells 17 and 18.

Each cell is divided into three sections, each with its own dedicated solution collection system. Solution collection is controlled by internal berms, internal sloped drainage areas, and installation of perforated lateral and header HDPE collection piping. Four-inch diameter perforated laterals drain to 18-inch diameter perforated headers located along the divider and perimeter berms within the pad. Typical flow within each section is estimated to be about 2,333 gallons per minute (gpm).

Assuming a design leach solution application rate of 0.0035 gpm per square foot and a maximum application flow rate of 15,000 gpm, the total calculated area under leach is about 4.3 million square feet (98.4 acres).

The Cell 17 and 18 HLP liner system consists of compacted clay overlain by 60-mil HDPE or GCL overlain by HDPE alternative composite liner will consist of the following (from bottom to top):

- Minimum one-foot recompacted low-permeability soil with a maximum permeability of 1×10^{-6} cm/sec or 0.25 inch thick GCL;
- Minimum 60-mil HDPE; and
- Minimum 1.5 feet of free-draining crushed rock protective cover/drainage gravel over the 60-mil HDPE liner and 1.2 feet over the lateral pipes.

A water balance was calculated and presented in the original design of Cell 16 to determine how much additional pond volume was required during upset conditions. This

design analysis also included examination of the water storage requirements for Cells 17 and 18. The analysis determined that a new pond would be necessary for the heap leach expansion of Cell 16 as well as Cells 17 and 18. This new pond, Pond 7 (Pregnant Pond 4), was authorized for construction as a Minor Modification in February 2011 and completed that summer.

Surface water is diverted away from the Cell 17 and 18 areas through the use of ditches, sloped roads, and lined perimeter berms. A diversion channel has been constructed on the south side of Cell 18 and east side of Cell 17 and Cell 18 to capture and control surface runoff from the watershed to the south of the leach pad. In addition, surface runoff from the area to the south of the pad may also be diverted by the pad perimeter berm and the external haul road under more extreme or emergency conditions.

Cell 19: In December 2013, the Division authorized the construction of Cell 19. Cell 19 is within a portion of the Cell 13 footprint and was originally proposed as the last phase of the Cell 13 HLP construction. Because of seasonal construction constraints and contractor availability, only Phases-1A and -3 West of Cell 13 (approximately 26 acres, total) were completed.

The phased construction was initially considered to be an interim measure and required several changes to the geometry of the prior-approved Cell 13 design, including a significantly smaller footprint and a lower HLP height.

In an effort to increase existing HLP capacity, the Permittee submitted a Minor Modification in October 2013 for the construction of an entirely new HLP cell (Cell 19), to be constructed within a portion of the previously characterized Cell 13 area. Once constructed, the Cell 19 HLP Expansion will occupy a footprint of approximately 57 acres in an area north of the existing Cell 16 HLP. The Permittee submitted an EDC in August 2017 to Cell 19 to aid in operational management of solutions. The Division approved the as-builts and application of solution in January 2019 to the Cell 19 HLP.

The Cell 19 HLP area will be regraded so that all process flow is directed to the north into the new solution corridor on the north side of Cell 19. Cell 19 is located on alluvial deposits that slope at about 2 to 4 percent to the north-northeast. As with previous construction, the pad will be graded to generally follow the natural and existing topography. Cell 19 overlies relatively high strength alluvial soils; therefore, foundation failure will not occur and the most likely failure mode is sliding along the HDPE liner/soil layer interface. A stability analysis was performed to examine the potential for sliding along the soil layer.

The liner for HLP Cell 19 will consist of the following from bottom to top:

- Minimum 1-foot of re-compacted low-permeability soil with a maximum permeability of 1×10^{-6} cm/sec or 0.25 inch thick GCL;
- Minimum 60-mil single-side textured HDPE; and
- Minimum 1.5 feet of free-draining crushed rock protective cover/drainage gravel. (1.5 feet over the HDPE liner and header pipes, 1.2 feet over lateral pipes).

The solution collection pipes which are ran in the channel north of Cell 16 will be modified to have the solution collection pipes continue through Cell 19 to the new solution collection ditch north of Cell 19.

Cell 19B: In April 2021, the Division approved the minor modification for HLP Cell 19B. Cell 19B will be located west of exiting HLP Cells 19 and north of existing HLP Cell 12 and will add approximately 20 acres of additional leach pad area to the HLP. The proposed HLP area will be regraded so the process solution will be directed to the north into the existing solution corridor where it will flow to the west and join the existing solution channel. This will be accomplished by smoothing the natural ground and filling swales to provide a suitable slope and foundation for the liner system.

The liner system will consist of, from bottom to top, the following: a prepared subgrade, one foot of low-permeable clay layer, a minimum 60-mil HDPE geomembrane, and 1.5-foot layer of overliner material. The low-permeable clay layer will have a maximum compacted permeability of 1×10^{-6} centimeters per second.

HLP Cell 19B is proposed to be constructed in two sections, each with its own solution collection system. Solution collection will be controlled by construction of internal berms, internal sloped drainage area, and installation of perforated lateral and header HDPE collection piping. Four-inch diameter laterals will drain to 18-inch headers located along the divider and perimeter berms in the HLP. The max height of the stacked ore on HLP Cell 19B is 400 feet above the liner.

Two 18-inch header pipes will collect solution from the 4-inch diameter collection and convey the solution to the northwest corner of the Cell 19B pad. The solution will be conveyed to the existing process ponds. The existing pond system will still have an excess capacity of 9.16 million gallons. The excess capacity becomes greater as ore is placed on the HLP due to its adsorptive capacity.

Cells 20 and 21: In December 2014, the Division authorized construction of HLP Cells 20 and 21. Although HLP Cell 19 was approved for construction eleven months earlier, Marigold chose to delay construction of Cell 19 and proceeded with the construction of HLP Cells 20 and 21 due to their close proximity to the existing ore haul route. Cell 20 was approved for commission September 2015 and Cell 21 approved for commission March 2017.

HLP Cells 20 and 21 are located south of Cell 18 and adds approximately 108 acres of leach pad area to the existing system. The HLP area is graded to direct all process solution flow east into the solution corridor on the east side of Cells 20 and 21. Including Pond 8 (approved for construction in December 2013 but not yet constructed), the existing process and stormwater ponds have more than enough capacity to accommodate the proposed Cells 20 and 21 expansion.

Cells 20 and 21 are divided into three sections, each with a separate solution collection system. Solution collection is controlled by internal berms, internal sloped drainage areas, and installation of perforated lateral and header HDPE collection piping. Four-inch diameter laterals drain to large diameter (18-inch) headers located along the divider

and perimeter berms within the pad. Solution is applied to the heap at a rate of 0.0035 gpm per square foot (sq ft) and the area of the heap under active leach is approximately 4.3 million square feet. The combined heap leach facility has a total application rate of 15,000 gpm.

The Cells 20 and 21 HLP liner system consist of a minimum one-foot thick low-permeability soil layer compacted to a maximum permeability of 1×10^{-6} cm/sec overlain by 60-mil HDPE. A minimum 1.5-foot-thick layer of free-draining crushed rock serves as protective cover and as drainage gravel.

Cells 20 and 21 are located on alluvial deposits that slope about two to four percent to the north, northeast. As with previous construction, the pads are graded to generally follow the natural and existing topography. Additional engineered fill may be required in some areas of the pad; however, the fill depth is not anticipated to exceed five feet.

The maximum permitted height of Cells 20 and 21 are 265 and 245 feet above the liner surface, respectively, based on the geotechnical evaluations. For any height increase above the currently permitted limits, the Permittee will be required to submit an Engineering Design Change (EDC) including a slope stability analysis for Division review and approval. Cells 20 and 21 overlay relatively competent bedrock and relatively high strength alluvial soils; therefore, foundation failure will not occur. The most likely failure mode is sliding along the composite liner interface.

Surface water in the immediate area of Cells 20 and 21 HLPs is diverted away from the cells through the use of sloped roads and perimeter berms. Surface runoff from the area south of the pad is diverted by the pad perimeter berm, perimeter access road, the external haul road, and construction of a diversion channel. A diversion channel constructed south of the Cells 20 and 21 collects run-off from the large watershed (the easternmost unnamed drainage) to the southeast of the heap leach facilities. This diversion channel starts approximately 300 feet southeast of the southeast corner of Cell 21 and next to the existing main haul road and then it runs east about one mile around the Cell 21 and existing protected area (east of Cells 20 and 21). The diversion channel turns north to discharge into a native dry wash.

The channel has been sized to control the peak run-off from 100-year, 24-hour storm. The peak run-off from the watershed was determined for sizing of the channel using the computer program TR-55. The peak runoff is calculated at 913 cubic feet per second (cfs). The channel varies in geometry depending on the location within the alignment (going from small to larger as it picks up runoff). The largest segment has a channel floor width of 15 feet and depth of 6.5 feet with 2H:1V side slopes. The channel is lined with rip rap.

Cell 22: In March of 2019, the Division authorized construction of HLP Cell 22. HLP Cell 22 will be located south of the existing HLP Cell 21 and will add approximately 59 acres of additional leach pad area to the existing system. The proposed HLP area will be regraded so that all process flow is directed to the northeast into the new solution corridor on the east side of HLP Cells 21 and 22. The existing process and stormwater ponds have enough capacity to accommodate the proposed Cell 22 expansion.

HLP Cell 22 will be divided into four sections, each with its own solution collection system. Solution collection will be controlled by construction of internal berms, internal sloped drainage area, and installation of perforated lateral and header HDPE collection piping. 4-inch diameter laterals will drain to 18-inch diameter headers located along the divider and perimeter beams within the HLP. No proposed changes to the heap application rate or total application rate were proposed and will remain at 0.0035 gpm per sq ft and 15,000 gpm, respectively.

The liner system is the same as HLP Cell 21 and 22. The maximum permitted height is 200 feet above the liner surface. Similar to HLP Cell 21 and 22, HLP Cell 22 overlays relatively competent bedrock and relatively high strength alluvial soils; therefore, foundation failure will not occur. The most likely failure mode is sliding along the composite liner interface.

The existing diversion channel to the south of Cell 21 will be constructed on top of with Cell 22 and a new diversion channel will be constructed. The diversion channel constructed south of HLP Cell 22 collects run-off from the large watershed (the easternmost unnamed drainage) to the southeast of the heap leach facilities. This Diversion channel starts approximately 700 feet southwest of the southwest corner of Cell 22 and next to the existing main haul road and then it runs east about a mile around HLP Cell 22 and ties back into the Cell 21 diversion channel to the east of the HLPs.

The diversion channel has been sized to control the peak run-off from 100-year, 24-hour storm. The peak run-off from the watershed was determined for sizing of the channel using the computer program TR-55. The peak runoff is calculated at 535 cubic feet per second (cfs). The channel varies in geometry depending on the location within the alignment (going from small to larger as it picks up runoff). The largest segment has a channel floor width of 15 feet and depth of 5 feet with 2H:1V side slopes. The channel is lined with rip rap.

Cell 24: In March of 2020, the Division approved the minor modification to construct the HLP Cell 24. HLP Cell 24 is located east of exiting HLP Cells 16, 17, and 18 and will add approximately 80 acres of additional leach pad area to the HLP. The HLP area was regraded so the process solution is directed to the northeast into the new solution corridor to the east where it flows to the north then west along Cell 24 and joins the existing solution channel at Cell 19. This was accomplished by smoothing the natural ground and filling swales to provide a suitable slope and foundation for the liner system. The Division approved the as-built report in May 2021.

The liner system consists of, from bottom to top, the following: a prepared subgrade, one foot of low-permeable clay layer, a minimum 60-mil HDPE geomembrane, and 1.5-foot layer of overliner material. The low-permeable clay layer will have a maximum compacted permeability of 1×10^{-6} centimeters per second.

HLP Cell 24 was constructed in six sections, each with its own solution collection system. Solution collection is controlled by construction of internal berms, internal sloped drainage area, and installation of perforated lateral and header HDPE collection piping. Four-inch diameter laterals drain to 18-inch headers located along the divider and

perimeter berms in the HLP. The max height of the stacked ore on HLP Cell 24 is 400 feet above the liner.

The existing solution corridor along the east side of Cell 17 is tied into the new Cell 24 corridor near the north east corner of Cell 17, and a new 24-inch solid header pipe will convey the solution from Cell 17 through Cell 24 to the new solution channel on the north side of Cell 24. Cell 16 already flows to the north through Cell 19. Cell 18 exits the pad and flow in the new solution channel along the southern edge of Cell 24. The new main 24-inch preg and 18-inch lean return piped coming from Cell 24 was connected to the exiting pipes which run from Cell 18, 20, 21, and 22 ultimately to the proves ponds.

With the addition of Cell 24 an additional process pond was constructed to provide containment of process solution, including an increased application rate to 20,000 gallons per minute. The new process pond is Pond 9 Preg #6 (Pond 9). Pond 9 is double lined and leak detected and was constructed, from bottom to top, of the following: prepared subgrade, 60-mil textured HDPE liner, geonet, and 80-mil textured HDPE liner. Pond 9 will have the approximate volume not including free board of 18,400,000 gallons. With the addition of Pond 9, there is an excess capacity of 5.6 million gallons in the pond system. The excess capacity becomes greater as ore is placed on the HLP due to its adsorptive capacity.

Vertical Expansion of Cells 12 through 24: In October of 2023 the Division approved an EDC to increase the vertical height of Cells 12 through 24 to a maximum height of 500 feet, with final reclamation slope angles of 3H:1V. This change will represent an increase of 100 vertical feet for Cells 12 through 19, 23A, and 24. For Cells 20 through 22 the height increases between 250 to 300 vertical feet.

Cell 23A: The Mackay Expansion Major Modification/Renewal also included one additional HLP expansion: Cell 23. Cell 23 is proposed to be constructed as a valley fill structure. The proposed Cell 23 has the approximate loading capacity of 44.4 million tons with a proposed to a height of 400 feet. A Minor Modification for Cell 23A was approved by the Division in March 2022. Cell 23A was constructed in 2022 with the as-built approved in February 2023.

The construction activities will generally include clearing and grubbing; growth media stripping and stockpiling; subsurface preparation; processing pad liner and solution collection system placement; and completion of other ancillary work within the proposed disturbance area for access control and stormwater management.

The Cell 23A HLP was constructed on the gently sloping alluvial deposits to the west of Cells 20 to 22 and is also located to the south of Cell 15. The Cell 23A Expansion added approximately 50 acres of additional leach pad area. The HLP area below Cell 23A was regraded so the process solution is directed to the east into the existing solution corridor where it will flow to the west and join the existing solution channel to the ponds. This was accomplished by smoothing the natural ground and filling swales to provide a suitable slope and foundation for the liner system. Cell 23A was constructed with four sections as defined by the internal phase diversion berms.

The liner system consists of, from bottom to top, the following: a prepared subgrade, one foot of low-permeable clay layer, a minimum 60-mil HDPE geomembrane, and a minimum of 1.5-foot layer of overliner material. The low-permeable clay layer will have a maximum compacted permeability of 1×10^{-6} centimeters per second.

HLP Cell 23A was constructed in two sections, each with its own solution collection system. Solution collection will be controlled by construction of internal berms, internal sloped drainage area, and installation of perforated lateral and header HDPE collection piping. Four-inch diameter laterals, at 40-foot centers, will drain to 18-inch headers located along the divider and perimeter berms in the HLP. The max height of the stacked ore on HLP Cell 23A is 400 feet above the liner.

An eighteen-inch header pipe collects solution from the 4-inch diameter collection and convey the solution to a 24-inch header pipe that ties into the exiting 24-inch HDPE pipe located in Cell 20. The solution is conveyed to the existing process ponds. The existing pond system still has an excess capacity of 7.5 million gallons. The excess capacity becomes greater as ore is placed on the HLP due to its adsorptive capacity.

Cell 23B: A Minor Modification to construct the second phase of Cell 23 (Cell 23B) was approved by the Division in October 2023. Construction activities will mimic those of Cell 23A described above.

The Cell 23B HLP is proposed on a hillslope to the west of Cells 20 to 22 and to the south of Cell 23A. The new cell will add approximately 73 acres of additional leach pad area. The proposed HLP area will be regraded so the process solution will be directed into an existing header located at the northwest corner of Cell 22.

HLP Cell 23B is proposed to be constructed in four sub-sections, each with its own solution collection system. Solution collection will be controlled by construction of internal berms, internal sloped drainage areas, and installation of perforated lateral and header HDPE collection piping. 4-inch diameter laterals will be placed on slopes flatter than 2.5H:1V and will drain to large 18-inch diameter headers located along the divider and perimeter berms within the HLP. For slopes 2.5H:1V and greater, 4-inch pipes will not be utilized, as the slope is great enough to carry the solution to the headers. The max height of the stacked ore on HLP Cell 23B is 400 feet above the liner.

Cell 23B will be constructed using both a standard composite soil liner system and a composite GCL system. For slopes flatter than 2.5H:1V the proposed liner system will consist of, from bottom to top, a prepared subgrade, one foot of low-permeable clay layer, a minimum 60-mil HDPE geomembrane, and a minimum of 1.5-foot layer of overliner material. The low-permeable clay layer will have a maximum compacted permeability of 1×10^{-6} centimeters per second. For slopes 2.5H:1V and steeper, the proposed liner system will consist of, a prepared subgrade, GCL, a minimum 60-mil HDPE geomembrane, and a minimum of 1.5-foot layer of overliner material.

Cyanide Addition Line and Design Revision: In an effort to more effectively leach older sections of the heap leach pad and enhance concurrent closure of the heap leach facilities, the Division authorized the construction of a new pipeline for cyanide delivery to the

heap leach pad. The design called for an 8-inch diameter, standard dimension ratio (SDR)-11 HDPE pipeline to convey cyanide solution from the Cyanide Addition Tank (located on containment adjacent to the new carbon columns) to the top of the heap leach pad where Cells 3 and 12 intersect. A portion of this pipeline would have been installed within the existing solution collection ditch, in those areas where placement within the ditch is not possible; the cyanide addition line was designed to be installed utilizing pipe-in-pipe configuration with drainage to existing containment.

The cyanide solution application pipe at the Cells 3 and 12 intersection are either HDPE or stainless steel construction, between 3 and 6-inches in diameter and able to withstand pressures between 100 and 300 pounds per square inch (psi). In accordance with the Permittee's International Cyanide Management Code (ICMC) Certification Procedures for the development and/or expansion of cyanide transportation, delivery, storage, and use systems, the Division-approved addition line (and other potential alternatives) were evaluated for environmental, health and safety considerations. During this evaluation, it was determined that although the approved design adequately addressed the Permittee's ICMC certification procedures, incorporation of several minor design revisions would further reduce any environmental, health, and safety risks. These design changes were approved by the Division on 20 October 2006 and became effective on 4 November 2006. Descriptions of the modified and constructed system include:

- The installation of a 12,000-gallon skid-mounted horizontal storage tank for concentrated cyanide storage is placed within existing containment at the Cell 3/12 Area. In the event of a catastrophic failure, 110-percent containment for concentrated cyanide is maintained within the Cell 12 effluent collection area and ditch which report to the solution ponds.
- The installation of a distribution system that dispenses concentrated cyanide to the existing solution application supply lines. The distribution system consists of pumps and piping systems, located directly adjacent to the horizontal tank and within the same secondary containment as the horizontal tank.
- The construction of a concentrated-cyanide off-load site with secondary containment located on an unconstructed portion of the Heap Leach Pad Cell 13, Phase 3 West expansion. This provides secondary containment during off-loading activities or in the event of a catastrophic failure of the off-loading system.
- The construction of Cell 13 Phase 3 West expansion consistent with the previously approved Cell 13 designs (approved by the Division on 13 April 2005) with some minor piping changes. All earthwork, overliner and HDPE synthetic liner specifications and QA/QC will remain unchanged and will be conducted in accordance to the previously approved Cell 13 design.

Gravity Solution Well Program: An EDC submitted February 2023 and approved in March 2023, proposed to install a solution gravity well program utilizing a network of gravity leach solution wells to be installed on the Marigold HLP. The program is designed to proceed in a phased approach. The first phase was completed in June of

2023, and approved by the Division that same month, featured 150 wells located on Cell 24. Depending on the results of the first phase the gravity wells will be expanded on Cell 24 and then expanded to Cell 19 and 19B. The proposed wells will total 247 on Cell 24 and 179 and 101 on Cells 19 and 19B, respectively. Each of the proposed HLP cells have not been loaded to the full design height. Once the gravity well program is completed then stacking will continue as designed.

The gravity well program is designed to have wells completed a minimum of 50 feet above the liner surface and be spaced a minimum of 80 feet from adjacent wells. The wells will be installed with a 50-foot setback from the crest of the HLP. The wells near the edge of the HLP may be drilled at the 30-degree angle from vertical. Of the initial 150 wells installed in Cell 24 four wells were drilled within 50 feet of the HDPE liner. However, well installation of those 4 wells met the original intent of the design. All slopes will be monitored for any seeps, additionally the adjacent wells to an operating well water elevations will be monitored. The wells will be constructed using 4-inch schedule 80 PVC.

The additional stability analysis completed for the gravity solution well program exceeded the minimum allowable factor of safety of 1.3 and 1.05 for static and pseudo-static, respectively. The lowest factor of safety was 2.06 and 1.265, respectively for the three cross-sections analyzed.

Process Solution Ponds and Stormwater Pond: As of October 2014, there are five pregnant solution ponds identified as Pregnant Pond 1 (aka Pond 3), Pregnant Pond 2 (aka Pond 4), Pregnant Pond 3 (aka Pond 6), Pregnant Pond 4 (aka Pond 7), and Pregnant Pond 5 (aka Pond 8); two barren solution ponds, identified as Barren Pond 1 (aka Pond 2) and Barren Pond 2 (aka Pond 1) that are interconnected with HDPE-lined channels. In addition, there is one single-lined pond identified as Overflow/Stormwater Pond 2 (aka Pond 5).

Pregnant Ponds 1 and 2, Barren Pond 1: Pregnant Ponds 1 and 2 and Barren Pond 1 were completed in late 1988 and early 1989 and constructed with a 100-mil HDPE liner overlying a 60-mil HDPE liner with a leak collection and recovery system (LCRS). Pregnant Pond 1 and Barren Pond 1 each have a capacity of approximately 2.3 million gallons (at 1.5-feet of freeboard). Pregnant Pond 2 formerly served as a dual-lined storm pond (Stormwater Pond 1) until 2003 and has a capacity of approximately 3.6 million gallons (at 1.5 feet of freeboard).

Barren Pond 2: Barren Pond 2 was constructed west of the existing Barren Pond 1 during September 2004, to ensure adequate fluid management for process solutions. The pond was double lined, with 60-mil HDPE as the primary liner, followed by a layer of geonet and a 60-mil HDPE secondary liner over a prepared surface. Barren Pond 2 has an LCRS and has been designed to maintain 2.0 feet of board after a 100-year, 24-hour storm event has a capacity of approximately 16 million gallons.

Pregnant Ponds 3 and 4: Pregnant Pond 3 was initially permitted as the “Dual Lined Stormwater Pond/Surge Pond” in July 2005, in the event additional capacity is necessary. The double lined pond is located south of the existing Stormwater Pond (see

below), with 60-mil HDPE as the primary and secondary liners with a layer of geonet in between, all overlying a prepared surface. The pond is equipped with an LCRS and is designed to maintain a 2.0 feet freeboard after a 100-year, 24-hour storm event, with a capacity of approximately 7.6 million gallons.

Pregnant Pond 4 was authorized for construction in February 2011 and is identical in design and construction to Pregnant Pond 3. Pregnant Pond 4 is located east of Pregnant Pond 3. The pond is also equipped with an LCRS. A monitoring point was added for Pregnant Pond #4 (PP4) and the Pregnant Pond #4 leak detection sump (PPLDS4).

Pregnant Pond 5: The Cell 19 Minor Modification and EDC also included designs for an additional process solution pond (Pregnant Pond 5) for operational flexibility. When constructed, Pregnant Pond 5 will be located north of Pregnant Pond 4 and is designed to collect any overflow from Pregnant Pond 4 via a lined spillway. Pregnant Pond 5 has a design capacity of approximately 7.4 million gallons, not including freeboard. When combined with the existing process and stormwater ponds, there is more than enough capacity to accommodate the proposed HLP Cell 19 expansion.

Pregnant Pond 5 was constructed with primary and secondary HDPE liners and an internal leak detection system in between the two liners. The liner system consists of an 80-mil textured HDPE primary liner, overlying an HDPE drainage net leak detection layer, overlying a 60-mil textured HDPE secondary liner placed over a prepared subgrade.

HDPE drain liner may be used in place of the drainage net and one of the HDPE liners and a geotextile cushion may be installed on the prepared subgrade to protect the liner if the surface is deemed unsuitable for direct placement of the secondary liner. Vents will be installed around the crest of the pond in the primary liner to equalize pressure between the HDPE liners. Each vent will be covered with a rain flap to prevent precipitation from entering into the leak detection layer.

The pond bottom will be sloped to the southwest corner to a leak collection and recovery sump (LCRS) system with an effective capacity of 1,200 gallons. Two solid HDPE riser pipes will be installed between the two liners with perforated sections within the LCRS for collection. The top of the secondary liner and the bottom of the primary liner will be protected from puncture using a geotextile cushion layer which will encase the collection gravel used to fill the sump area between the two liners.

Overflow/Stormwater Pond 2: The Overflow/Stormwater Pond 2 was constructed in 1997 to accommodate run-off from the 25-year, 24-hour storm event. The Stormwater Pond has a capacity of 5.9 million gallons (at 2.0 feet of freeboard) and is constructed with a 100-mil HDPE liner overlying a 12-inch layer of compacted soil with permeability no greater than 1×10^{-7} cm/sec.

Gold Recovery (ADR Circuit): Gold is recovered in the Adsorption/Desorption/Recovery (ADR) Circuit. The current ADR Circuit consists of thirty-five carbon columns in five trains of five columns each referred to as “A” through “E”, “G” and “H”.

The original ADR Circuit consists of twenty-five carbon columns in five trains of five

(referred to as “A” through “E”) and chemical storage, located adjacent to and interconnected with Barren Pond 1. Each train can process up to 2,000 gpm of pregnant solution. Gold is adsorbed onto carbon within the ADR columns and the resulting barren solution reports to the barren pond where fresh water, sodium cyanide, and caustic soda can be added prior to its recirculation back to the leach pads. Cyanide is typically added at the toe of the heap utilizing the new cyanide addition system. Lime is added to the run of mine ore before stacking to buffer the pH in the solution as it migrates through the heap.

The ADR Circuit and chemical storage area have secondary containment in excess of the minimum 110-percent (of the largest tank or vessel) design criteria and is integral to the pond system.

The loaded carbon is stripped using hot caustic solution under pressure and following the stripping operation, the carbon is washed with nitric acid, neutralized with caustic, and rinsed with freshwater, thermally regenerated in a rotary kiln and then recycled back to the adsorption tanks. The resulting pregnant solution from the hot caustic stripping undergoes additional processing, including electrowinning. The electrowinning removes the gold from solution and produces a gold bearing precipitate. The gold bearing precipitate is then further refined using a retort and smelting furnace, with doré bars as the final end product.

The Permittee replaced the existing carbon kiln and added improved mercury abatement controls pursuant to new mercury emission requirements developed by the Bureau of Air Quality Planning. These changes resulted in the removal of the existing carbon columns, storage tanks and vessels within the processing facility. A new kiln and replacement tanks were constructed on the existing elevated platform without a reduction in the minimum secondary containment volume. Original design parameters required 110 percent containment of the largest vessels, the 2,500-gallon carbon-in-column (CIC) tanks. New tanks installed in 2007 are significantly less (approximately 1,500 gallons).

In May 2018, the Division approved an EDC for an additional two CIC trains next to the current CIC facilities and a new reagent storage pad adjacent to the ADR facility. Construction of the new facilities completed in January of 2021. In order to provide containment for the additional carbon trains, the containment of the facility was expanded 30 feet to the north with a 60-mil HDPE liner trench linked to Barren Pond #1. The new reagent pad provides secondary containment for the cyanide and caustic storage vessels and is located to the west of the carbon columns. This new pad allows for truck deliveries via a ramp down into containment and up out of containment. The containment is hydraulically linked to Barren Pond #2 via a 60-mil HDPE spillway. The 8-inch slab was constructed over a prepared subgrade and 4-inches of compacted road base. All the new containment slabs have water stops in the cold joints and both locations are equipped with emergency eyewash/shower stations for worker’s safety.

In August 2019, the Division approved an engineering design change to upgrade the ADR strip circuit. The proposed changes included replacing the existing 2 ton and 3 ton strip vessels with two new 3 ton strip vessel systems, replacing the three 75 cubic foot

electrowinning cells with two 100 cubic foot cells, and reorganization on the layout of the mill building. The existing pregnant and barren solution holding tanks will not be changed out and there is not proposed changes to the existing containment.

In May 2022, the Division approved the installation of a new Barren Tank and pump in the exiting CIC secondary containment. Construction of the system was completed in July 2023 and the as-built was approved in August 2023. The constructed system upgrades allows the Permittee to pump solution to the higher elevations of the HLP.

Ancillary Operations/Activities: Ancillary operations and activities at the Marigold Mine include the water supply system, support facilities, and surface water diversions.

Petroleum-Contaminated Soil Management: On 3 August 2010, the Division approved the PCS Management Plan for the Marigold Mine. The PCS Management Plan is a series of sequential actions to be used by Marigold to guide PCS screening, classification, and segregation; temporary storage; hazardous waste characterization; evaluation of risk to human health, the environment, and waters of the State; and final disposal of the materials. The PCS Management Plan uses a risk-based assessment to determine how various PCS materials are handled and disposed. The Marigold PCS Management Plan includes:

- PCS sources that will be managed under the plan;
- Sampling, monitoring, and reporting plans;
- PCS temporary storage and holding pad design;
- Hazardous waste determination for each source;
- Information for an A-K evaluation;
- A risk assessment to establish the maximum screening levels for the proposed on-site disposal location;
- A closure plan for the proposed disposal facility; and
- A contingency plan in the event the established screening levels are exceeded.

The current approved plan utilizes three, equally sized PCS temporary holding pads, approximately 50 feet by 100 feet by 5 feet deep and lined with a single layer of 60-mil high-density polyethylene liner. Each pad has a capacity of 750 cubic yards of PCS material. The pads were initially constructed in 2004 as bioremediation cells and are located approximately 500 feet northeast of the 8-South Pit. In anticipation of Marigold's proposed McKay Optimization/Expansion Project and increased operational flexibility of the PCS temporary holding pads, an EDC approved by the Division on 21 June 2016 authorized construction of a fourth PCS pad, identical in size and construction, and located adjacent to the existing PCS pads. The fourth PCS pad was approved for commission in March 2017. When completed, the PCS temporary pads will have a combined capacity of 3,000 cubic yards of PCS material. No changes to the current PCS Management Plan were proposed or determined to be necessary.

After determination that the PCS does not exceed screening levels established by risk-assessment, it is ultimately placed at the disposal location on the Resort Waste Rock Storage Area (Area 1). Before PCS may be managed under the PCS Plan, it must be determined that it is not hazardous waste. Hazardous waste must be properly disposed off site at an authorized facility.

In January of 2024 the Division approved an update to the Marigold PCS Management plan. The current proposal (Revision 4) will update the previously approved plan to include a new list of the PCS constituents of concern, permit 1 new disposal location (Area 2), and incorporate a data tracking workbook with cumulative risk evaluation. The previous version of the Plan identified an additional disposal location that was never used, and under the current plan will be removed going forward.

The new PCS final disposal location (Area 2) will be 4.5 acres (198,050 square feet) in size with a 110,000 cubic yard capacity. Soil will be re-graded to a maximum 3-foot thickness at the end of each year prior to placing an annual interim cover. PCS within the disposal location will not exceed a total of 15 feet combined thickness (not including annual covert thickness).

Inactive Process Components: The Marigold tailings impoundment has been inactive since 1999 and is in the final stages of closure. In addition, the Nevada Division of Water Resources (NDWR) has removed the tailings impoundment from their active impoundments listing as of 2012. In the event the need for a tailings impoundment occurs, a new tailings impoundment facility would be designed, permitted, and constructed a short distance north of the existing impoundment in Section 9.

The Marigold tailings impoundment encompasses approximately 180 acres and employs a 60-foot to 70-foot high dam. The design storage capacity is approximately 3,315 acre-feet. The WAD cyanide concentration for the solution stored in the impoundment ranged from 20 to 40 ppm. The impoundment is lined with a 12-inch thick compacted clay layer with a hydraulic conductivity of 5×10^{-7} cm/sec. The last discharge into the tailings impoundment was in April 1999.

Leakage of solution from the tailings impoundment has been identified in observation wells located north of the dam. Remedial actions undertaken have included both physical modifications to the impoundment, and development of a more extensive network of monitoring wells. The network of monitoring wells, within the tailings impoundment and downgradient of it, are monitored on a semiannual basis for TDS, WAD cyanide, chloride, barium, and nitrate.

With the closure of the tailings facility and placement of the evapotranspiration cover all of the internal wells were plugged and abandoned. Additionally with the evapotranspiration cover in place the seepage has been reduced such that several downgradient wells within the plume have gone dry. Several of these wells have been plugged and abandoned. The remaining wells are also monitored quarterly for arsenic, TDS, WAD cyanide, chloride, barium, and nitrate. Annually, these wells are monitored for Profile I parameters.

Downgradient wells intercept both the seepage plume, which has created a perched zone and the deeper, underlying groundwater. To date, no impacts to groundwater have been observed.

C. Site Hydrology and Background Water Quality

The Marigold Mine is located on the northern flank of Battle Mountain. Much of the project is contained within the Trout Creek drainage basin. The operations are located at elevations of 4,300 feet to 5,500 feet amsl. Two geologic rock types host the groundwater system underlying the site: alluvial basin-fill deposits and underlying bedrock.

Surface Water: Ephemeral surface water flows in the area occur in Trout Creek, Cottonwood Creek, the unnamed drainage west of the 8-Pit (previously the 8-South Pit), and the unnamed drainage to the east of the Marigold HLP. Stream flow, if it occurs, is generally in the spring following periods of precipitation and/or snow melt.

The original Trout Creek drainage ran through the area of the current Terry Zone North Pit and 8-Pit but has been diverted west of the existing facilities by a diversion channel; seasonal flows in the Trout Creek drainage in excess of the 100-year storm event are routed away from the mine and into the Cottonwood Creek drainage by the Trout Creek Diversion Dam (NDWR permit number 76425). Several other small drainages exist in and around the Project Area and have been or may require diverting in the future.

When flowing, Trout Creek is monitored quarterly for Profile I constituents at the Western Exploration Doby George (WEDG) boundary line in Section 6, and downgradient of the West WRDF in Sections 30 and 31, the WEDG-Marigold boundary lines in Section 19 and 30, and at the point where the creek leaves the Marigold permit boundary.

Several springs are present in the Project Area. Mud Spring and an un-named spring are located in the southern half of T33N, R43E, Section 20. Ames Spring is located in the southeast quarter of T33N, R43E, Section 16. Both springs result from sub-surface drainage of meteoric water off the range front of Battle Mountain south of the Project Area that comes to the surface where this shallow sub-surface drainage flow is cut off by northeast trending faults and clay rich alluvial formations in close proximity to the springs.

A third spring, White Top Spring, is located south of the Project Area in T32N, R43E, Section 6. This spring occurs where a Tertiary basalt flow dams drainage off of the Battle Mountain Range front. Physical impacts to this spring have occurred off of Marigold-controlled lands. These impacts are the results of activities by a mining/exploration company not associated with Marigold. Planned mining and processing operations are located downstream of the springs or outside of the associated meteoric water collection basins.

Groundwater: Alluvium is the main groundwater storage unit in the Project Area with bedrock storage upgradient in the primary pit development areas. The geometry and saturated thickness of the alluvium is highly variable due to the irregular topography of

the bedrock surface. The bedrock groundwater system is controlled by fractures in the Valmy and the Antler/Havallah formations. Studies have indicated the majority of the groundwater flow in the bedrock occurs below the ultimate depth of the pit expansions.

The unsaturated zone thickness ranges from 530 feet at the south end of the project site, to about 280 feet at the north end. The regional hydraulic flow gradient is approximately 0.002 feet/foot to the northeast. Groundwater levels at the Marigold Mine's water supply well field have historically experienced a decline of approximately 8 to 10 feet annually. Groundwater meets the Nevada Profile I reference values for metals. At this time, the Marigold pits do not require dewatering and no pit lakes are expected to develop after the cessation of mining.

With the closure and covering of the tailings impoundment, the perched water system above the alluvial groundwater layer near the tailings impoundment continues to diminish. Several monitor wells have gone dry reflecting the system is not being replenished.

D. Procedures for Public Comment

The Notice of the Division's intent to issue a Permit authorizing the facility to construct, operate, and close, subject to the conditions within the Permit, is being published on the Division website: <https://ndep.nv.gov/posts/category/land>. The Notice is being mailed to interested persons on the Bureau of Mining Regulation and Reclamation mailing list. Anyone wishing to comment on the proposed Permit can do so in writing within a period of 30 days following the date the public notice is posted to the Division website. The comment period can be extended at the discretion of the Administrator. All written comments received during the comment period will be retained and considered in the final determination.

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

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

E. Proposed Determination

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

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

See Section I of the Permit.

G. 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(s) except for those accumulations resulting from a storm event beyond that required by design for containment.

The primary method for identification of escaping process solution will be placed on required routine monitoring of leak detection systems as well as routinely sampling downgradient monitoring wells and visual inspections. 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 (e.g., by covering with netting), and 2) chemical detoxification. These approaches may be facilitated by minimizing the extent of the toxic water. Methods which attempt to make uncovered ponds unattractive to wildlife are not always effective. Contact the U.S. Fish and Wildlife Service at 1340 Financial Boulevard, Suite 234, Reno, Nevada 89502-7147, (775) 861-6300, for additional information.

Prepared by: Sara Jensen, P.E.

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Revision 00: 2024 Renewal and Major Modification, added T32N, R42E Section 12, T33N, R43E Section 5; Removed T34N, R43E Section 29, added Valmy Project pits, and incorporated the updated PCS Management Plan.