NOTICE OF DECISION – Bureau of Mining Regulation and Reclamation

Web Posting: 06/22/2022

Deadline for Appeal: 07/02/2022

Robinson Nevada Mining Company
Robinson Operation
WPC Permit NEV0092105

The Administrator of the Nevada Division of Environmental Protection (the Division) has decided to issue renewed and modified Water Pollution Control Permit NEV0092105 to Robinson Nevada Mining Company. This Permit authorizes the construction, operation, and closure of approved mining facilities in White Pine County, Nevada. The Division has been provided with sufficient information, in accordance with Nevada Administrative Code (NAC) 445A.350 through 445A.447, to assure that the waters of the State will not be degraded by this operation, and that public safety and health will be protected.

The Permit will become effective **07 July 2022**. The final determination of the Administrator may be appealed to the State Environmental Commission pursuant to Nevada Revised Statute (NRS) 445A.605 and NAC 445A.407. All requests for appeals must be filed by 5:00 PM, **02 July 2022**, on Form 3, with the State Environmental Commission, 901 South Stewart Street, Suite 4001, Carson City, Nevada 89701-5249. For more information, contact Matthew Schulenberg at (775) 687-9409 or visit the Division public notice website at https://ndep.nv.gov/posts/category/land.

Written comments were received during the public comment period from John Hadder, of Great Basin Resource Watch (GBRW). The text of all comments, in some cases excerpted, and the Division responses (in *italics)* are included below as part of this Notice of Decision.

GBRW, Written Comment 1:

GBRW is very concerned about the trajectory of this mine as it moves to closure. There exists significant acid mine drainage at this mine, and the state of Nevada, Nevada Division of Environmental Protection (NDEP) needs to assess whether this mine may require treatment in perpetuity. Furthermore has current mine operator, KGHM, and the state of Nevada has adequately informed the surrounding community of the likely need for long-term management, including the Giroux tailings facility?

Division Response 1:

The Division distributed the Notice of Proposed Action to interested parties on the BMRR Listserv and was available on the Divisions website for the entirety of the public comment period. In addition, the notice was mailed to residence within a mile of the project and sent to the Chairman of the Ruth Town Council for distribution to residents of Ruth. The Fact Sheet has extensive detail regarding the site's geochemical nature and discussion of how these materials are handled based on modeling results. There is also extensive detail in the Fact Sheet about the Giroux Wash TSF, its impacts to groundwater, and the steps being taken to mitigate the sulfate plume.

In addition to the Division's notices, the U.S. Bureau of Land Management also informs the public of the project throughout the Environmental Impact Statement process.

While there are some aspects of the project that will require long term monitoring and management, treatment is not currently determined to be necessary. If this changes, the Division will require that appropriate mitigative measure be implemented and financial assurances placed to protect waters of the State.

GBRW, Written Comment 2:

Some of the comments in this section reference older pit lake and waste rock management plans; however, GBRW views current plans as based on the same underlying data and analysis. Therefore, we see these comments as relevant, and if there are substantive changes in the data and analysis relevant to these comments, we appreciate NDEP response so we can modify our understanding of the site.

Division Response 2:

Comment noted.

GBRW, Written Comment 3:

The model used to estimate groundwater degradation from waste-rock assumes, incorrectly, that laboratory weathering tests indicate directly pollutant concentration under field conditions.

The estimate of pollution release from the proposed King and Tripp waste rock facilities assumes that "MWMP and HCT data can be used in modeling without applying scaling factors" (Stantec 2020, p. 7).1 This is based on the finding that the composition of humidity cell leachate on acid-leached rock (ALM) is similar to the composition of ALM effluent that accumulated under field conditions in the Intera Pond. This assumption may work OK for the acid leached material, where are high concentrations of moderately soluble acidic

solids form in the rock. There are examples where acid generating rock has oxidizing for decades in a Nevada, and then produced a relatively
constant solute composition when suddenly flushed with water.

But in the great majority of situations where pollutants are released by the simple oxidation of sulfide S minerals (e.g., all of the sulfide-bearing waste rock at the Robinson Mine that has not been subject to acid leaching), leachate concentrations in the field varies widely relative to leachate from the same rock under laboratory conditions. This is unsurprising: two of the most important parameters controlling concentration—the duration over which oxidation has occurred to releases solutes between rinsing, and the water-to-rock ratio in the rinse step—vary widely between lab and field conditions. Very broadly, because waste rock under field conditions at the Robinson Mine experiences a longer period of oxidation and a lower water-to-rock ratio than rock in lab tests (i.e., more pollutants are released into less water), pollutant concentrations in leachate from sulfidic waste rock are expected to be higher under field conditions than in lab tests.

The magnitude of this model error is illustrated by comparing predicted effluent sulfate concentration in the proposed King Waste Rock facility to measure pore water compositions in existing Robinson Mine waste rock. Sulfate (SO4) is used in this comparison because it is a direct product of sulfide S mineral oxidation.

In the model presented in the WPCP, the initial pore water in the proposed King Waste Rock Facility is predicted to be ~1,000 mg/L SO4 under the “worst case” assumption. This model concentration is for “the first flush,” and is then “followed by exponentially decreasing concentrations,” with “worst case” concentrations decrease to ~600 mg/L during the “second flush” (Stantec 2020, p. 16).

For a field comparison, estimates for measured pore-water composition in non-acid leached sulfidic Robinson waste rock are presented in an earlier waste rock management plan (RNMC, 2014). In samples collected from borings in the Lane City waste rock facility (sulfide S between 0.99% and 3.4%, but with pH above ~6), sulfate concentrations in pore water ranged from ~4,500 to 15,000 mg/L (RNMC 2014, Figure 7-3). [Parameters used to estimate pore water sulfate from measured electrical conductivity in waste rock are based on 0.091 gravimetric moisture in the rock sample, electrical conductivity measured in 2: 1 water: rock mixtures using deionized water, ~0.65 mg TDS/L per uS/cm conductivity, and ~60% of the TDS as sulfate.] That is, pore water sulfate concentrations measured in an existing waste rock facility that is not acidic ranged from ~4 to 15 times higher than the “worst case” model estimate for the proposed King waste rock facility. In existing waste rock from the Lane City waste rock that was acidic (pH between ~4 and 6), pore-waters contained up to ~20,000 mg/L sulfate, or 20 times higher concentration than the “worst case” expected in the permit application..

Division Response 3:

The Division appreciates the provided rational for estimating sulfate concentrations from the specific conductance testing performed on drilled dump materials as discussed in CWRMP 5.1. However, the Division is not convinced that this thought process is necessarily correct and that the methodology utilized for seepage predictions for the Robinson Operation is incorrect.

The assumption that the chemistry observed in a 2:1 water-to-rock ratio test could effectively be scaled up (through reduction in water volume thereby increasing concentration) to determine pore water chemistry does not make sense based on the methodology of the test. The slurry created by mixing water and rock/soil together would have 100% contact with the available reactive surfaces as opposed to a smaller value that would rinse and contribute to seepage in a waste rock facility. This results in a higher measured specific conductance and subsequently an overestimate of the sulfate concentrations in this calculation.

The materials from Lane City Dump exhibit chemistry similar to acid leached materials, unlike the materials produced from the Liberty East Expansion (Keystone Overdump Materials) with an aggregate ANP/AGP ratio of 5.25. Thus, the seepage quality would be greatly improved compared to the Lane City Dump, which is a known PAG dump.

Meteoric Water Mobility Procedures and HCTs have displayed that both non-PAG and PAG materials at the Robinson Operation have the ability to leach sulfate below and in excess of hydrogeologic block standards. However, when these materials are intermixed during placement and the weighted first flush chemical averages are used to calculate a predicted seepage chemistry, the concentrations meet hydrogeologic background values.

A drilling campaign was completed in the North and South Tripp Dumps in October and November of 2021 to collect waste rock geochemical data. Collected data will be summarized and submitted to the Division for review. This will assist in determining the adequacy of the predicted seepage chemistry as outlined in the Division's 02 March 2022 response to Comment 13 (NDEP, 2022).

GBRW Comment 4:

The model used to estimate the pollutant load from the proposed waste rock facilities assumes, incorrectly, that the vegetated cover will exclude oxygen; as a result, the model dramatically underestimates the long-term rate of pollution release.

By assuming that the waste rock becomes completely anoxic as soon as the 1.5-ft vegetated closure cover is emplaced (Stantec 2020, p. 11), the water quality model ignores the rate at which further oxidation in the proposed waste rock facilities would release pollutants to percolating water. Considerable research has gone into designing mine-waste covers that effectively exclude oxygen, and results demonstrate that excluding oxygen is in fact an effective means for stopping sulfide mineral oxidation. But the proposed 1.5-ft thick vegetated cover for the King or Tripp waste rock facilities will

almost certainly not drive the pore-gas oxygen concentration to zero. The cover ineffectiveness is particularly true in semi-arid climates like at the Robinson Mine, where low levels of moisture saturation produce higher values for air conductivity.

What would actually happen in the proposed King or Tripp waste rock facilities is that the sulfide S minerals in the rock would continue to oxidize, releasing pollutants to percolating pore water. The solute concentrations would decrease over time as sulfide S minerals oxidize, but rather than a rapid decrease predicted by the waste rock management plan model (e.g., ~70% decrease predicted in concentration after the first pore volume is flushed), concentrations would be more likely to decrease very slowly over centuries to millennia.

The model of pollution release from the proposed waste rock facilities needs to be revised so that it incorporates realistic estimates for oxygen flux into the waste rock facility, and then provides the associated concentration of pollutants in seepage from the waste rock.

Division Response 4:

To clarify for the reader, the Division was not able to permit the King or Tripp dumps with this modification due to the predicated seepage quality not meeting the requirements of Nevada Administrative Code 445A.424.

The Division agrees that a 1.5-foot thick evapotranspiration cover would not be expected to minimize oxygen ingress into the facility unless otherwise demonstrated. The cover's primary benefit would be the reduction of meteoric precipitation that would come into contact with these materials via evapotranspiration.

Humidity cell testing is designed to mimic a highly oxidizing environment and to determine the acid generating characteristics of the materials as well as possible constituents of concern that can be released through oxidation of the material. Due to the testing requiring material size reduction (< ¼-inch) and the dry and moist cycles that promote sulfide oxidation, the Division considers the unscaled usage adequate for this modeling effort. In the approved WRMP 7.1, the modeler utilizes the first flush chemistry only for the attenuation calculations and does not assume a reduction in seepage concentrations.

As stated above, a drilling campaign was completed in October and November of 2021 that will assist the Division in determining the adequacy of the predictive methodology.

GBRW Comment 5:

Because the proposed King and Tripp waste rock facilities would be a perpetual source of pollution and would release pollutants much faster than predicted in the DEIS, the facility designs should be enhanced to include covers that permanently exclude oxygen.

As detailed in GBRW's previous comment, the impacts on groundwater from the proposed King and Tripp waste rock facilities are based on a model that dramatically underestimates actual expected rates of pollution release. Model error #1 is to assume that solute concentrations measured in laboratory weathering tests (humidity cells) will represent directly concentrations under field conditions. Model error #2 is to assume that the pore space in the waste rock will be totally anoxic as soon as a vegetated cover is emplaced, so that pollution release by sulfide mineral oxidation ceases as soon as the cover was emplaced.

NDEP needs to require a design, delineated in the Plan of Operations and permit, for the proposed King and Tripp waste rock facilities that actually does include a capping layer that will permanently exclude oxygen. Emplacement of the waste rock excavated from the Liberty Pit under such an oxygen barrier would dramatically slow the dissolution and transport of pollutants bound in sulfidic minerals. Numerous model and field studies have been conducted to design layers in mine-waste that can permanently
impede oxygen flow. See for example the recent presentation by Steven Pearce, given at the December 2020 Metal Leaching/Acid Rock Drainage conference, which is freely accessible on line (Pearce et al., 2020).

Division Response 5:

Please see the Divisions response to comments 3 and 4. Current modeling efforts do not predict the necessity for perpetual treatment.

GBRW Comment 6:

The Ruth Pit Lake as proposed is likely to cause a significant ecologic risk and degrade groundwater. The hydraulic and geochemical models used to support the permit major modification indicate that the lakes that would form in the Ruth Pit will have cause "potential ecological risks to selected bird and mammal species," and listing specifically "copper as a Constituent of Potential Concern (COPEC) in the Ruth West Pit lake and copper fluoride and pH as COPECs in the Ruth East Pit lake." As a result, closure plans will need to include perpetual funding mechanism to provide long-term monitoring and treatment of the Ruth Pit lake.

Forecasts of water quality in mine pit lakes are notoriously unreliable. In particular, the model used to forecast water quality in the Ruth Pits (Piteau 2019)4 does not meet even the basic standards expected for an environmental assessment of impacts on public land. The description of model parameters and computational implementation are vague, and the report does not present a mathematical formulation illustrating how pollution loads are summed over time. Most importantly, the Ruth Pit Lake water quality model does not account for the fundamental property of sulfidic mine waste: The oxidation and association pollution release from minerals containing sulfide S occurs over time, so that the mass of pollutants release depends on the duration over which the pit walls are exposed to atmospheric oxygen. In the Ruth pit lake model, the load of pollutant release

from wall rock by runoff and groundwater flushing are derived from "weekly HCT [humidity cell test] leachates" (Piteau 2019, Pg 35). What is missing from this model is an accounting of the cumulative amount of sulfide mineral oxidation that will occur in wall rock between when it is exposed to the atmosphere by excavation and when it is ultimately isolated again by inundation below the lake.

In fact, there is a huge potential for the production of acidic leachate to the Ruth Pits. In the lower 600 ft of the both the East and West Ruth pits (between ~5700 and 6300 ft elevation amsl), most of the wall rock will be net-acid generating (Piteau 2019, Figure 3.20). Most of this acid-generating wall rock will oxidize over decades. Oxidation will start when it's exposed by excavation, and not stop until inundated by the lake. Based on predicted Ruth lake infilling, the zone where most Ruth Pit wall rock is acid generating (below the 6300 ft amsl) won't be flooded until 20 years after mining in the Ruth West Pit, and ~45 years in the Ruth East Pit (Piteau 2019, Figure 5.10). As a result, the water quality in the East and West Ruth pit lakes will almost certainly have much higher concentrations of acid, sulfate, and metals than predicted by the model used to support the WPCP.

Given the geochemical nature of the Ruth Pits as mentioned above it is mostly likely the Ruth Pit lake will have elevated levels of a number of constituents including sulfate that will degrade groundwater once water begins to flow out out of the pit lake. The outflow character is predicted by the operator of the Robinson mine. Thus, the Ruth Pit lake can be expected to violate Nevada Law.

GBRW recommends that KGHM and NDEP consider backfilling the Ruth Pit with waste rock, which should eliminate the need for perpetual care. The water that initially floods the backfill will undoubtedly exceed NV drinking water standards, so there will need to be a mitigation plan for pumping and treating groundwater in the backfill. Other mines have proposed chemically amending backfill to precipitate solutes in place, or pumping and treating the flooded backfill until it meets applicable groundwater quality standards. But by placing sulfidic waste rock below the water table, it should stop oxidizing and therefore remain perpetually stable without requiring active long-term management.

NDEP needs to require KGHM to have a contingency plan in the event that the pit lake will require treatment. In response to the large uncertainty in the forecast of water quality in the Ruth Pit Lakes, closure planning that includes these lakes needs to set bonds based on treatment costs assuming worst-case lake water quality.

Division Response 6:

The Permittee submitted an updated Ruth Pit Lake Study in July 2020 that includes backfilling of Ruth East pit with 97 million tons of non-potentially acid generating material. This approved modification will preclude the formation of a pit lake in Ruth East pit. Apart from manganese during the first year of recovery, no Profile I or III exceedances were predicted for Ruth West 5 pit lake.

Fifteen unique geochemical units in Ruth pit were represented by 47 humidity cell tests (HCTs). First flush chemistry was used to represent solute loading from pit wall submergence and late-term chemistry was used to represent solute loading from pit wall runoff. HCTs are designed to accelerate weathering by exposing the material to high humidity and temperature conditions in the lab. In addition, the samples are finely crushed to maximize solute loading from sulfide oxidation and mineral dissolution. BMRR requires HCTs to be run until solute concentrations stabilize in order to replicate long-term solute loading of weathered material in the field. Sulfide oxidation reaction rates can vary widely depending on a number of factors including sulfide mineral type (Lindsay et al., 2015; Sunkavalli et al., 2013), degree of weathering, temperature, pH, and ferric iron and oxygen concentrations (Williamson and Rimstidt, 1994). GBRW's recommendation to construct a water quality model based on sulfide oxidation rates may not be as reliable since such an approach excludes other chemical processes that are known to occur in the field including silicate and carbonate weathering and dissolution. The standardized approach of using HCT chemistry to predict pit lake water quality ensures that competing chemical processes (e.g., oxidation, sorption, neutralization, dissolution, etc.) are considered in the model.

The Ruth pit lake model incorporated ten different sensitivity analyses to bracket a range of possible chemistry outcomes. These include a sensitivity analysis to expand the damaged section of highwall that could contribute solutes from 15 to 50 feet, not allowing the removal of dissolved ions through mineral formation and utilizing the most acidic HCT week available from each geochemical unit to develop the composite chemical release functions. The predicted chemistry of Ruth pit exhibited minor changes in response to the sensitivity analyses which demonstrates that the model construction and predictions are reasonable.

The Division concurs that the lower portion of Ruth West pit is predominantly characterized as acid generating material; however, due to rapid filling of the pit with surrounding high alkalinity groundwater (approximately 180 mg/L), acidic pit lake conditions are not expected. Additionally, out of the 47 HCTs that were used in the model, 72% of the samples produced circumneutral chemistry.

GBRW Comment 7:

Potential for Water Pollution - There must be a contingency plan of how to deal with an unexpected increase in acid generation in the waste rock piles and the leach pads as mining proceeds.

GBRW is also very concerned about the long-term evolution of the various mining open pits that have degraded water and in particular is the expected flow through nature of the Ruth West Pit Lake, and thus would degrade groundwater in violation of Nevada law. NDEP needs to deeply analyze the groundwater model, geochemical characteristics, and

hydrodynamics of the entire site to clarify how the various components of the site will behave over time and to fully understand the potential to degrade waters of the state.

Division Response 07:

Please see Division responses 3, 4, and 6.

GBRW Comment 8:

GBRW still questions the wisdom of the revised PAG/non-PAG cutoff of 0.3 from the standard 1.2. Clearly, the mine operators are struggling to have enough acid neutralizing and non-PAG material. Given all of the acid generating aspects of this site and existing MIW, GBRW does not support this revision in general. Given the available test data some liberalizing of the cutoff a little is probably ok, but not a reduction by a factor of four. In general, it would seem that a more conservative approach is called for
at Robinson. The company will just have to import the material needed.

Division Response 8:

The Division based its decision on the observation that analytical data collected from 177 HCTs (number performed when approved in 2015) has failed to display that rock types with an ABA ratio of >0.3 will produce acid. Materials with even lower ABA ratios generally do not produce acid, making f 0.3 a conservative cut-off value. Humidity cell characterization performed since the approval has continued to display the adequacy of the approved cut-off. The ability for a sample to generate acidity depends upon a number of physical and chemicals factors that can be observed by data collected as part of the characterization process.

From the information currently reviewed, there appears to be an overall excess of neutralization for the Keystone Overdump (ANP/AGP of 5.25) and Ruth East Backfill (ANP/AGP ratio of 4.35).

GBRW Comment 9:

There are numerous site monitoring wells that show significant exceedances. The most striking is well W-19, which appears to be monitoring groundwater Robinson Canyon just downgradient from Lane City Dump. This well shows consistently low pH between
2 and 3 beginning just after 2015 continuing through 2021with initial decrease in pH occurring in 2011. This appears to be a gross violation of state law with enormous groundwater degradation. What is that source of this contamination and what actions are required by NDEP to arrest this contamination?

Division Response 9:

GBRW is correct that monitoring well W-19 shows groundwater degradation in regard to numerous Profile I parameters and that it is downgradient of the approximate 90-year-old Lane City Dump. Groundwater in the vicinity of Robinson Canyon has long been known to contain degraded groundwater (see Fact Sheet page 82). Groundwater degradation at this point is assumed to be from either one of the historic acid leaching operations in the vicinity of the historic Lane City Dump or the dump itself, which contains large amounts of acid generating materials.

Monitoring well W-19 has recently gone dry and a request was made for the well to be abandoned in April of 2022. Other monitoring wells in the vicinity have also gone dry including monitoring well W-20, which is within feet of W-19. The Division will be requiring that W-19 be replaced and that additional measures be taken to determine the source of this contamination. Other wells in the area have displayed a relatively consistent trend at this time, but all still display some form of degradation due to historic operations.

As stated above, the Lane City Dump is approximately 90 years old and has not been disturbed (aside from approved closure work) by any modern operator at the site. In 2012, the operator completed Corrective Action Plan measures in response to poor quality groundwater being observed in well R-A. These actions consisted of the re-sloping of the dump, closure cover placement, and the construction of stormwater management structures to minimize surface water contact with waste materials.

If determined to be the Lane City Dump, the Division will require that a Corrective Action Plan (CAP) be submitted and implemented. Please see "Lane City WRD Closure" in the Fact Sheet for details on the previously implemented CAP.

GBRW Comment 10:

Other site monitoring wells that appear to show groundwater degradation in addition to the Giroux Wash Tailings monitoring wells are: Jun1,2,3; P-1BR; R-A; R-B; R-H; R-F; R-6B; W-7; W-10; W-16D; W-22; W-25; W-28R.7 What are the sources of the consistent exceedances in these wells and what actions is NDEP requiring to arrest this contamination? GBRW also notes the variation in Profile I standards for these wells. What is the justification of these variances?

Division Response 10:

The variances in Profile standard for these wells were established in 2008 based on extensive studies commissioned in 1997 and 1998. The studies determined that there are 12 distinct hydrogeologic blocks separated by extensive faulting and geochemical signature. The studies identified a representative baseline monitoring well in each hydrogeologic block that exhibits little or no anthropogenic impacts to groundwater quality based primarily on isotopic and trace element analyses. Water quality data from the baseline monitoring wells were used to establish the representative pre-anthropogenic background groundwater chemistry for each hydrogeologic block.

Certain wells in the Saxton South Block, Saxton North Block, Ruth South Block, Weary Flats Block, and Tripp-Veteran Block, exhibit groundwater that exceeds some hydrogeologic block reference values, but the exceedances appear to be natural due to mineralization associated with the ore deposit. Still other wells exhibit groundwater that has been degraded above hydrogeologic block reference values as a result of mining operations from either the historic mining operations (e.g., MIWs and MIW sources in the Saxton Mineralized Block, Ruth Mineralized Block, Ruth North Block, and Robinson Canyon Block), or the current mining operation (e.g., Giroux Wash Block).

The Permittee is actively mitigating historic and current groundwater degradation at the site in accordance with Division requirements. The wells are evaluated on a quarterly basis by the compliance inspector and investigated if determined necessary. More details regarding the receiving water characteristics can be found on Page 107 of the Fact Sheet (Receiving Water Characteristics).

GBRW Comment 11:

The pumpback system for the sulfate plume pumped about 19.3 million gallons of water in 2021. The series of pumpback wells show continued elevated sulfate and Total Dissolved Solids (TDS) with some increases over the past year. GBRW notes the detailed discussion the factsheet regarding the work to address the seepage, and in particular the fact that the largest decrease in seepage, 2,010 to 980 gpm, occurred during the temporary shut down from 1999 to 2004. Other measures discussed in the factsheet are not expected to have as dramatic of an affect on seepage. Furthermore, continued use and expanded use of the Giroux Wash Tailings Storage Facility will extend the long-term management needs of the facility, which is already estimated to require well over 50 years according to the NDEP factsheet, “The base model predicts that sulfate will exceed the Divisions Profile I-R reference value in nine wells and will extend a maximum of approximately 3,900 feet downgradient of the TSF in year 2077” (NDEP factsheet). The facility is also expected to have seepage out past 100 years with yet to be estimated water quality.

Giroux Wash Tailings Storage Facility continues to contaminate groundwater in violation of Nevada Law. Why is the mine operator allowed to add tailings and now increase the capacity and further add to this facility? GBRW does not support the continued use of a facility that is contaminating groundwater in violation of state law. A primary responsibility of the Water Pollution Control Permit is to prevent degradation of Waters of the State. Yet, this permit continues to allow groundwater degradation and potentially to increase the degradation under the expansion plan when there is a clear path to decreasing contamination by shutting the facility down and working towards its closure promptly. GBRW urges NDEP to require KGHM to develop an alternative tailings disposal plan and proceed to close the existing Giroux Wash Tailings Storage Facility. NDEP needs to require KGHM to provide a technical justification for not proceeding in

this direction, and not just economic analysis. This at the very least should be in the schedule of compliance to develop such plans.

Division Response 11:

As stated in the Fact Sheet, the Giroux Wash TSF was permitted in 1992 and not designed or constructed to meet the minimum design criteria for tailings facilities pursuant to NAC 445A.437. The Division's justification for permitting the facility as that time was that the processing of ores using flotation was considered a physical separation process and not a chemical process. The Division's August 2018 regulation changes removed the processing of ores by flotation methods from NAC 445A.414.

The operator continues to take mitigative measures (see definition of mitigation at: https://ndep.nv.gov/land/mining/laws-regulations) to remediate the sulfate plume in accordance with procedures outlined in NAC 445A.441. Along with TSF Water Balance and Fate and Transport modeling updates being prepared and submitted every 2-years, the pumpback well network continues to be expanded. Pumpback Well WCC-G20 is designed to be a high-flow pumpback well and to assist in remediation of the plume as shown by "Case 2" of the 2020 Fate and Transport Model update. In addition, two new wells were requested by the Division to further delineate the plume and will be added to the pumpback network if degraded water is encountered.

The 2020 predicative Fate and Transport Model utilized a transient calibration period (January 1996 through June 2020) to calibrate the model to observed groundwater elevations and sulfate concentrations. On average, the piezometric levels were within 5.1 feet and sulfate within 22 mg/L of observed values, giving confidence in the modeling results. While groundwater is being degraded from the continued operation of the TSF, modeling displays that the degradation is temporary in nature, will not impact any downgradient stakeholders, and will decrease further when additional mitigative measures are implemented (i.e., additional pumpback wells, increased reclaim of supernatant from the facility, increased tailings solids:water ratio management, etc.). Even with the sensitivity analysis that utilizes 25% higher specific yield and hydraulic conductivity, no impacts are predicted for any downgradient stakeholders.

While the possible evolution of seepage chemistry from the TSF has not been explicitly evaluated at this time, a number of humidity cells have been initiated on the tailings solids and none have generated acid even after 177 weeks of testing (please see Volume 3, Section 3.1.6 of the Major Modification). The Division previously incorporated a continuing investigation item (I.N.4) for the submittal of an updated closure report which will include a report on the possible chemical evolution of seepage into the future. This will assist in determining closure requirements of the TSF to protect groundwaters of the State.

The mine operator is currently mitigating the contamination from the Giroux Wash TSF and is actively closing historic dumps and other problematic sources constructed prior to the promulgation of the Nevada mining program in 1989. Since 2010, the operator has constructed Evaporation Cells for the Green Springs, Juniper, Jupiter, and Mollie Gibson acid seeps and has over-dumped a number of these sources with modern waste rock dumps. These modern dumps generally exhibit higher ANP/AGP ratios, encapsulate PAG materials within PAG cells that are intermixed with non-PAG waste, and will have a closure cover placed to minimize infiltration and sources to these seeps.

For these reasons and the continued mitigation of sulfate pursuant to NAC 445A.441, the Division continues to Permit the use of the Giroux Wash TSF.

GBRW Comment 12:

The Robinson mine End of Mine Life (EOML) reclamation schedule indicates that all site monitoring and management will be completed in the fourth quarter of 2051. KGHM clearly does not anticipate the need for perpetual management or even very long-term management on the order of 100 years or more. This seems to be in serious error given the extent of water pollution and need for long-term management, including the tailings facility, waste rock seepage, and potentially pit lake management, which is likely to be much greater than presented by KGHM, with monitoring needed well past 2052 even under the current plan of development. The state of Nevada needs to ensure that there exists adequate financial assurances including a long-term funding mechanism to close the mine site and protect the community and its environment. GBRW urges NDEP to require KGHM to provide a realistic reclamation plan that acknowledges these longterm management needs, and update the reclamation bond including a long-term funding mechanism.

Reclamation plans must also include a clear strategy for restoring Murray springs, which has already been affected by the project's dewatering. The full affects of dewatering on the area from the project and its expansion, including both affects to Murray springs and other water users, should be thoroughly studied. It should be understood and recognized how groundwater pumping for the project has affected and could further affect other wells.

Along with proper funding and closure plans, there should be a contingency plan of how to deal with an unexpected increase in acid generation in the waste rock piles and the heap leach pad as mining proceeds. There must also be a reclamation plan that includes how the operator will manage the occurrence of leaks in the waste water containment system; storage ponds, heap/leach, and waste rock.

Division Response 12:

Water resource and Reclamation permit requirements are not within the purview of this Major Modification/Renewal. However, closure requirements do drive the reclamation cost estimate that is updated on a 3-year basis.

Once permanent closure requirements have been implemented and completed, the facility will enter a period of monitoring (typically 2-5 years) to verify that the closure efforts have resulted in chemical stability. Once the Division agrees that chemical stability has been achieved the facility will enter post-closure monitoring (NAC 445A.446). Pursuant to NAC 445A.446.4, if the observed chemical stability of the closed components/facility has not been achieved, the Division will determine what additional actions may be necessary to achieve chemical stabilization of the component/facility. Following these actions, an additional period of post-closure monitoring will be required, not to exceed 30 years.

It would be speculative to include contingency plans on how to deal with issues that are currently not predicted. The Division will be continually re-evaluating modeling predictions and verifying their validity through monitoring into closure.

GBRW Comment 13:

There must be a detailed analysis of scientifically sound (Because of the errors in the estimation of water pollution the correct non-perpetual care mine plan is not technically sound) approaches to close the mine site without the need for perpetual treatment, even if these alternatives seem infeasible on the surface. It is important for the public to be informed about this option and decide for themselves if perpetual care is acceptable. Federal law requires that the mine operator "must minimize uncontrolled migration of leachate; and … Long-term, or post-mining, effluent capture and treatment are not acceptable substitutes for source and migration control, and you may rely on them only after all reasonable source and migration control methods have been employed," (43 CFR Part 3809.420) consistent with Nevada statues and regulations are in line with this federal regulation.

Since there knowingly exists significant acid mine drainage at this mine NDEP needs to carefully assess whether this project may require treatment inter-generationally. NDEP needs to directly address the possibility of Robinson becoming a treatment in perpetuity (100, 200, 300, etc years) site.

Division Response 13:

The Division will continue to update the predictive models on a regular basis and update these models based on observed conditions at the site. If these models determine that there is a need to bond for treatment, the Closure and Reclamation Branches will work together to ensure that an appropriate bond is in place to protect waters of the State.

GBRW Comment 14:

We do appreciate the requirements imposed by NDEP existing in the permit to better understand the potential for short and long-term water pollution at the Robinson mine site.

GBRW does not support this major modification and the revised permit as written. We view the need to correctly reflect the reclamation schedule and needs long-term management as essential. We also view the expansion as increasing the degradation of groundwater as a result of the Giroux Wash Tailings Facility which GBRW sees counter to the directives of state of Nevada statutes and regulation.

With such large and long-standing consequences at stake, it is even more vital that the company be transparent about these possibilities for perpetual treatment and degradation of surrounding groundwater and that they and NDEP adequately inform the community how their environment is expected to be affected. NDEP must ensure that the surrounding community is made aware of these possible long-term impacts before the expansion occurs. Furthermore, there is a need to specifically address and disclose the effects the future expansion plans will have on the community of Ruth and residents of Robinson Canyon.

Division Response 14:

The Division agrees that it is critical to be transparent to the public regarding these issues. Please see Divisions responses 1 – 13.

References

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