

NOTICE OF DECISION - Bureau of Mining Regulation and Reclamation

Date of Posting: 02/13/2024

Deadline for Appeal: 02/23/2024

Marigold Mining Company
Marigold Mine
WPC Permit NEV0088040

The Administrator of the Nevada Division of Environmental Protection (the Division) has decided to issue modified and renewed Water Pollution Control Permit **NEV0088040** to Marigold Mining Company. This Permit authorizes the construction, operation, and closure of approved mining facilities in Humboldt 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 1 March 2024. 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, 23 February 2024, on Form 3, with the State Environmental Commission, 901 South Stewart Street, Suite 4001, Carson City, Nevada 89701-5249. For more information, contact Natasha Zittel at (775) 687-9413 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, Director, Great Basin Resource Watch. 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.

John Hadder, Written Comment 1:

Great Basin Resource Watch appreciates your assistance in gathering materials to review this permit renewal. We do have some questions and concerns regarding this project and the permit as written.

Division Response 1:

Comment noted

John Hadder, Written Comment 2:

Pit Backfilling: GBRW notes that there will be backfilling of some of the pits, which we generally support. However, there should also be an analysis for backfilling the Mackey Pit as well at least to a point of avoiding a mining pit lake. The formation of pit lake will result in about 27,000 acre-feet (AF) of water becoming unavailable to the public even though this is still “waters of the state,” and an annual loss of about 500 AF per year to the basin. Especially given that Nevada cannot afford to waste water this option should be fully explored.

We have not seen the written request as required by **NAC 519A.250** (Exemption of open pits and rock faces from requirements) “that the Division grant an exception to the requirements for reclamation for open pits and rock faces which may not be feasible to reclaim.” It is understood that the regulation refers to reclamation and this request may have accompanied the reclamation permit application. However, management of the mine, including water and land, will be different if backfilling of pits occurs, and this affects the WPCP as well. Has this request been made? If so, is there analysis supporting the request? If the request has not been made, then Nevada regulations appear not to have been followed and NDEP needs to require this request be made in writing. Both the request and agency response should then be available to the public.

Division Response 2:

The items above are not part of our evaluation per NAC 445A nor required. Documents are available to the public through the State records request additionally many of the documents are available online through the State portal at <https://ecms.nv.gov/ndep/>.

John Hadder, Written Comment 3

Water Quality Standards: As currently designed, the Marigold Mackay Pit Lake will be another one of Nevada’s significant permanent surface-water features. Scheduled to form initially in year 2036 and predicted to be “95% full” after 25 years of recovery, it will eventually be 424 ft deep, have a surface area of 119 acres, and contain 26,592 ac-ft of water (BLM, 2019).

Because the Mackay Pit Lake is expected to be a hydraulic sink (i.e., when full, losing 502 ac-ft/yr of water, or ~2%/yr of it volume, to evaporation), the concentration of many solutes are forecast to increase perpetually (Table 4.1-5, Water Quality Comparison of Modeled Mackay Pit Lake results to NDEP Profile III Water Standards; BLM 2019).

GBRW agrees that it was reasonable to end the quantitative pit-lake water-quality model forecasts at two hundred years into the future, given the uncertainty in model parameters, climate, and future human development.

But based on uniformitarianism--the undergirding principle of geology that “the present is the key to the past”—it is also reasonable to assume that the Marigold Pit Lake will remain as a perpetual evaporative sink, and thus that the concentration of most solutes in the lake will in general continue increasing for centuries and millennia into the future.

Based on rate at which solute concentrations are predicted to increase between year 100 and 200, regulated solutes that area heading toward exceeding the Nevada Division of Environmental Protection Profile III water-quality criteria include:

- Arsenic (exceeds the 0.2 mg/L standard in post-mining year 300)
- Cadmium (exceeds the 0.1 mg/L standard in post-mining year 1000)
- Fluoride (exceeds the 2 mg/L standard in post-mining year 200), and
- Selenium (exceeds the 0.1 mg/L standard in post-mining year 900).

(Table 4.1-5, Water Quality Comparison of Modeled Mackay Pit Lake results to NDEP Profile III Water Standards, BLM 2019).

The Marigold WPCP needs to acknowledge that the Mackay Pit Lake, as proposed, will require perpetual monitoring and, possibly at some point in the future, treatment to reduce solute concentrations in the lake.

Division Response 3:

The Division continues to evaluate the models with each Permit renewal and requires per NAC 445A.446 requires a post closure monitoring period for post closure monitoring.

John Hadder, Written Comment 4:

Pit Lake Solute Concentrations

Beyond the effect of evaporative concentration of solutes in the lake, the water quality forecast does not account for the fact that there is huge uncertainty in the estimates of sulfide-mineral oxidation rates in the pit wall rock. Fortunately, only a small fraction of the Mackay mine pit will be acid generating, and thus there is no realistic chance that the Mackay Pit Lake will be acidic.

But there will be significant pyritic sulfur in the pit wall rock. Specifically, estimated mean pyritic sulfur content in the Mackay Pit wall rocks include:

- 0.2% in the Valmy Transition rock,
- 0.8% in the Valmy sulfide rock,

(Table 6. Acid-Base Accounting and Net Acid Generation Results, Piteau Associates, 2021)

Thus, the huge uncertainty in the estimate of wall rock oxidation rates means that there is a similarly large uncertainty in the number of metals and other solutes that will leach from pit walls into the lake. This effect of solute-loading from sulfide wall rock may be particularly pronounced for arsenic and selenium: both of these elements are often bound in sulfide minerals and, when released to solution, tend to be very soluble under the neutral-pH conditions expected in the Mackay pit lake.

In response to this uncertainty in the lake water-quality model, the plan for implementing and funding the monitoring of the Mackay Pit Lake should also include specific accommodations for long-term contingent lake treatment to ensure that it never becomes a risk to wildlife or human health.

Division Response 4:

The Water Pollution Control Permit will have a post closure monitoring period per NAC 445A.446. Based on Division policy and experience a “significant” amount of pyrite is considered to be greater than or equal to 1%.

John Hadder, Written Comment 5:

Potential for Groundwater Degradation

The groundwater model from 2017 does predict a small outflow (0.8 gallons per minute) from the pit lake into the surrounding groundwater once equilibrium is established.² The report does not indicate the uncertainty associated with the outflow result, but GBRW can only assume that the out flow could be greater than the modeled value. As discussed above the pit lake will likely exceed groundwater standards for arsenic, cadmium, fluoride, and selenium, which if flows into the surrounding aquifer will result in groundwater degradation. This must be addressed to avoid violation of Nevada Law. NDEP should require a more detailed analysis of the potential to degrade groundwater under this scenario and based on that analysis a plan to avoid groundwater degradation.

Division Response 5:

As required per Part I.N.1, an updated groundwater model and pit lake study are to be updated with each renewal to include any new information.