



Working with Communities to Protect Their Land, Air, and Water

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State of Nevada Environmental Commission
901 South Stewart Street, Suite 4001
Carson City, Nevada 89701-5249

Re: Agenda Item 7: SEC Update Regarding Eureka Moly LLC's Mount Hope Mining Project

Dear Commissioners,

Great Basin Resource Watch thanks the Commissioners and the Nevada Division of Environmental Protection (NDEP) for providing this opportunity to express and discuss the outstanding concerns with the proposed Mt Hope Mine Water Pollution Control Permit (WPCP) and related issues. We also wish to convey our appreciation to this Commission for the attention provided to the concerns that GBRW raised in the permit appeal process.

We have met twice with personnel at NDEP, once to focus on regulations involving mining pit lakes and again on specific technical aspects of the WPCP for the proposed Mt Hope mine. Both meetings were engaging and fruitful in the exchange of thoughts and analysis. We do not see this process as concluded, and are planning to follow up soon to resolve differences and develop a policy to address mining pit lakes, improved permitting transparency, and reduce long-term pollution at mine sites.

Concerning mining pit lakes.

Our understanding is that this Commission can designate beneficial uses for pit lakes. NDEP seems to concur on this; however, there remain concerns on the implementation and potential liabilities that could fall to the state. Nevada has an opportunity to pioneer policy on mining pit lakes that could serve as a model for other states and countries just as we did for the control of mercury emissions from precious metal mines. Our current estimate is on the order of 1.5 million acre-feet of water will effectively be lost to mining pit lakes – i.e. almost all of it indefinitely unusable to Nevadans.

In order to satisfy the post-mining use of pit lakes mines plans would need to be developed differently than they are now. The regulations should allow for case-by-case evaluation assessment of how to satisfy the designated beneficial use. Alternatively, to avoid wasting the water the open pit could be backfilled, so long as groundwater would not be degraded. As we stated during the Mt Hope hearing groundwater surrounding a mining pit lake could have a number of beneficial uses prior to flowing into the pit lake. Once in the pit lake the water is unusable under current regulations.

NRS 445A.520 gives the SEC powers to establish standards necessary to maintain the designated beneficial use or uses of the water:

NRS 445A.520 Standards of water quality.

1. The Commission shall establish water quality standards at a level designed to protect and ensure a continuation of the designated beneficial use or uses which the Commission has determined to be applicable to each stream segment or other body of surface water in the State.

Our read of this statute is that only if a body of water has a “designated beneficial use” can a water quality standard be applied. And, since mining pit lakes have no designated beneficial use the current regulation that is applied to pit lakes, NAC 445A.429, is not applicable. In our discussion with NDEP on this point it seems that the NDEP perspective was that NAC 445A.429 provides for any number of beneficial uses; such that, a beneficial use could be designated. That being understood, GBRW still does not see that the regulation is not applicable, since the NRS 445A.520 uses the term “designated,” which we infer to mean that the designation of beneficial use comes first then the standard follows. In our view this application of Nevada Law needs to be cleared up.

GBRW is motivated to continue to work with NDEP and mining companies for a coherent policy on mining pits for the following reasons:

- The water destined for pit lakes is on the order of 1.5 to 2.0 million acre-foot.
- There is no beneficial use assigned to pit lakes water, and as a result, water that was previously useable (primarily groundwater) then becomes unusable water in the pit lake.
- Pit lakes will pose an entry risk over time: People will probably find their way to these abandoned bodies of water eventually, and with no safe entry point they will pose a danger to the public and a liability to the state of Nevada.
- Predictions of water quality of pit lakes are almost always unreliable, or, at least fraught with uncertainty, and thus the ecological risk based standard currently used is subject to contention.

Concerning Community Engagement in Permitting.

We discussed the need to provide more meaningful public engagement. On a transparency and accountability level we do not see that reports provided by Eureka Moly LLC to NDEP and thus the public are written in a complete and understandable manner. These reports must explain the analysis done so that an independent third party reviewer can understand and critique the analysis. Our in-house geochemist with 20+ years of experience was stymied by the lack of clarity in the Mt Hope documentation regarding both the fate of the mining pit lake and the management of the potentially acid generating waste rock dump. We understand that NDEP is endeavoring to expand its capacity to scrutinize technical reports, but this does change the need for clarity for independent review.

A consequence of the lack of clear technical documentation is that the hosting community may not be aware of all of the consequences of hosting a mining operation. For example, in the case of the proposed Mt Hope mine, there is evidence which the Commission heard during the hearing last fall, that the mining pit lake could have much poorer water quality than suggested by the analysis provided by Eureka Moly LLC (EML). In addition, waste rock at the Mt. Hope Mine may require very long-term (hundreds of years) of capture and treatment of toxic seepage, and monitoring/mitigation of acidic drainage that bypasses the drainage system and reaches groundwater. In our discussion with people in the community it was clear that only a few were

aware of these possible outcomes. The community has a right to know what is the range of possibilities for a proposed or existing mine.

Generally, the public is not aware of a new permit or renewal until after NDEP has put the permit out public comment. The public then has 30 days to review the permit, and any supporting documentation. For many projects, including the Mt Hope project, the 30 days is not enough time if a detailed review is needed. GBRW would like to see a notification when a permit application is filed, so that the public becomes aware of the mine project proposal well in advance. This would allow the public time to review supporting documents as needed, and provide for an early opening to discussions of concerns.

In our discussions with NDEP we perceive that the agency does understand our concerns on community engagement and transparency. We foresee discussing this further and GBRW is proposing some additions or modifications in the regulations to ensure that communities are informed in a meaningful way and if they choose to have an independent review, the effort will not be frustrating and a waste of money. We believe that these changes will not require legislative direction and can be promulgated through this Commission.

Inter-generational Pollution Requiring Treatment in Perpetuity.

We have discussed possible legislative language with NDEP regarding mine sites that will or are expected to create the need for perpetual active treatment. The Phoenix mine near Battle Mountain is one of these, as mentioned below, we see the Mt Hope mine as proposed also requiring perpetual management. Nevada regulations do not specifically address the issue of perpetual treatment/management, but will allow for it so long as the pollution remains contained and is treated. Banning perpetual treatment/management will need to be a legislative decision, equitably informed by the general public.

If Nevada is to continue to allow perpetual management mine planning, then GBRW proposes the following objectives. The objectives outlined in the following paragraphs can be achieved without a ban on perpetual management, but look to create significant restrictions.

1. A definition of perpetual treatment/management could be in terms of a specific time as it is in some states or in terms of an indefinite end date for treatment.
2. As part of the permitting process the proponent should make a defensible perpetual determination. The determination needs to be accountable to the public and amenable to independent third-party review, including access to any analytic tools (including proprietary software) used for the determination. Transparency is critical here.
3. Communities and public interest groups (with membership in the community) should have access to a fund that would provide financial resources to pay for independent assessments. This is especially needed for the perpetual treatment determination to ensure public acceptance and validity of the results. GBRW proposes the creation of a fund to be managed by NDEP to which communities or public interest organizations can apply to get a grant for technical support. Money for the fund would come from the permittee.
4. Incorporated into the determination for perpetual management should be a genuine analysis of alternate mine plans that will avoid perpetual management. Every effort should be made to avoid mine plans that call for perpetual management. In general, we should not be creating requirements for treatment at mine sites that last for centuries and beyond.

5. The proponent of a mine plan that requires perpetual management needs to conduct a complete failure of the treatment system analysis. The analysis will estimate environmental and human related consequences.
6. Any existing mine that will require perpetual management should only be permitted to expand (major modification to the Plan of Operations) if it can be demonstrated that the expansion will not result in a greater amount or hazard of pollution to be treated *in perpetuity*.

We know NDEP is also concerned about mine plans that will entail perpetual management, and changes to the regulations will give the agency the authority to minimize perpetual pollution outcomes.

Technical Concerns.

Our second meeting with NDEP focused on technical disagreements that we had with the analysis provided by EML. The meeting was useful in clarifying points of view and understanding. We still believe that the proposed Mt Hope mine waste rock dump containing potentially acid generating rock will be a long-term source of pollution to the groundwater. The main issue at hand is whether the design of the waste rock dump will in fact capture acidic drainage as proposed. This is a matter of how the pollution-laden moisture will flow in the unsaturated zone of the waste rock dump. The concept of flow by preferential pathways that EML plan requires does not seem to be technically supported. On this issue data would be good to help resolve the different of opinion. NDEP did commit to require additional analysis to justify the waste rock management plan, and review the unsaturated flow modeling, to which we look forward.

Predictions of water quality at mining pit lakes can be very difficult, and we see agreement on this with NDEP. Technical discussions included preparation and exchange of critical reviews of recent mine pit-lake water quality model reports, one by Houston Kempton (GBRW) and one by Christine Olsen (NDEP). Houston expounded to great length on the Northmet project in Minnesota and pointed out some key aspects that allowed for independent review of the work, and how the analysis overall was very collaborative. We do still think that the Mt Hope pit lake analysis is faulty, and expect that our suggestions and concerns will be incorporated into the expected revised pit lake analysis.

During the Mt Hope hearing Dr. Miller expounded in some detail regarding faulty conceptual/physical modeling of pit lakes, particularly in those cases, where chemically reactive rock exists. We did discuss this aspect with NDEP as well as during the first meeting. Newmont consultants have used the “rind model” (which considers only wall rock extending meters from the surface of the mine pit walls) to predict water quality at the Lone Tree with little success. The model that Dr. Miller discussed includes a mechanism that is not included in the commonly used “ride-model” was acknowledged by the team involved in the Northmet mine project. In this case, the void created when the water table is lowered by several hundred meters, is filled with air, which will be a major contribution to the oxidation products that contaminate the pit lake. We also pointed to evidence that this mechanism has likely been in play at the Lone Tree mine site which could account for the poor predictions of the Lone Tree pit lake water quality by Newmont consultants. We detected reluctance on the part of NDEP to fully explore the additional mechanism that Dr. Miller proposes, and we will be looking for ways to work with the agency to clarify the important of this mechanism for pit lake modeling in Nevada.

In the Northmet project the state of Minnesota sought outside expertise to help evaluate the proposed mine plan and the environmental consequences. Nevada may be wise to do the same in

some instances, and require that the proponent of the mine to be responsive for the addition expense of independent consultants.

For several years now, the technical comments we submitted on the effects of proposed mining on water quality have been based on our concern that the models used to forecast the release of pollutants are inadequate. Our starting position derives from two guiding principles of predictive modeling used to support public policy: a model of environmental effects has virtually no value if it does not include an estimate of forecast uncertainty or is presented in an un-intelligible report. Only when models meet these minimum thresholds, providing transparency in methods and a realistic assessment of forecast accuracy, can all parties can have an honest assessment of whether potential environmental effects are acceptable and/or manageable.

In 2018, NDEP released the first version of its “Guidance for geochemical modeling at mine sites.” Great Basin Resource Watch supports having such guidance, as it identifies the standard components predictive modeling of natural systems, including:

- A conceptual model that includes “processes that are reasonably expected to occur and may result in significant water-quality impacts.”
- A call for site-specific data that describes “the characteristics and spatial distribution of all potential sources for constituents of concern,”
- An accounting for the changing behavior of mine waste over time, requiring that the “characterization data” be “inclusive of the variability that is observed on the site or reasonably expected to occur in the subsurface or through time.”
- A computational model that includes “all processes identified in the conceptual model.”
- An accounting for the mass of pollutants in the model, where “all geochemical solutions must display mass balance”, and “all predictions should be checked for charge balance.”
- An assessment of sources of model uncertainty, including “uncertainty in the value of input parameters (intrinsic error) and uncertainty caused by incorrect model structure or lack of applicability of the model to the site (epistemic error),”
- The inclusion of uncertainty in model forecasts, with the guidance emphasizing the “importance of geochemical modeling reports to indicate the sources of uncertainty in their predictions and conclusions (Drever, 2011),” and stating that it is “desirable for the magnitude of the uncertainty to be described (e.g., using standard deviation or other statistical measures).”
- A model report that “must be written in a technically rigorous but simple and straight-forward manner that is understandable to scientifically-inclined non-modelers (Nordstrom, 2012).”

(Quoted text above is all from the NDEP 2018 guidance for geochemical modeling at mine sites.)

Toward this goal of improving the reliability of Nevada’s mine-water-quality models, GBRW is providing comments on NDEP’s 2018 “Guidance for Geochemical Modeling at Mine Sites.” These include minor comments on the existing guidance where we believe slight changes to the wording would make the guidance clearer. Primarily, however, we are proposing the addition of text to the section on Reporting (Section 10) that address the 3 points identified below. We believe that these additions to NDEP’s guidance will focus model developers on the steps that needs to be particularly transparent in their reports. We also view this as an ongoing discussion to ensure that the permitting process identifies potential pollution sources and long-term water quality issues that may arise.

Importantly, NDEP's guidance goes beyond listing general model components, providing also an extensive overview of geochemical principles related to mine waste that is supported by references to applicable peer-reviewed publications. The result is a set of specific recommendations for how water quality modeling studies for mining can be better formulated, more accurately implemented, and more clearly reported.

Further, we respect that NDEP's guidance has explicitly avoided being overly prescriptive, and instead identifies the required model components in a general modeling framework. With this approach, mine operators and their consultants can develop water-quality models that include the required components of accepted scientific analysis, but that can be tailored to individual site-specific conditions. Importantly, this type of flexible guidance reduces barriers to incorporating new discoveries and innovations in new or existing models.

As valuable as NDEP's 2018 guidance is, we believe that adding detail in three areas would greatly improve the guidance by pointing modelers to critical topics where mine-water-quality models have frequently faltered in implementing and describing the modeling methods.

- 1) Model forecasts need to describe explicitly how they have accounted for this fundamental characteristic of mining in sulfide-bearing rock: Sulfide mineral oxidation is a time-dependent process, so the amount of pollutants that are mobilized increases over time.
- 2) The report needs to describe clearly the method used in the model to extrapolate from the primary mechanisms that causes pollutants to dissolve - the oxidation of sulfide minerals - to then estimate the release of secondary pollutants, such as heavy metals and acidity.
- 3) Describe in detail the physically grounded assessment of how pollutants released from mine rock will move to the receiving waters.

The first two items above require model reports to explain how it calculates the release of pollution from mine waste. The third item is the logical next component, requiring that model reports describe how pollutants are transported away from the solid waste.

As a final note, we emphasize that none of three points we propose adding to NDEP's guidance are requesting that mine operators or their consultants necessarily alter their model methods. In fact, all geochemical models of mine water quality must be making these calculations internally, the items we are asking for: the rate of sulfide mineral oxidation over time, the resulting release of metals and acidity, and the movement of these solutes over time from the source rock down to either a groundwater, a lake, or a water capture system. Our proposed additions to NDEP's guidance are only for the sake of better reporting, toward the goal that models of future mine projects will be presented with more clarity and thus can be evaluated more quickly by NDEP and any external reviewers. Therefore, if there are errors in the modeling they can be clearly identified and corrected.

We all need to increasingly recognize that the pit lakes created in Nevada during our present times, will be affecting the environment, availability of water and the economy of Nevada for centuries. We, as Nevadans, need to establish policies that allow a better understanding of how to manage these pit lakes, encourage beneficial uses of them, and require those companies that created these large bodies of water to work with the public to minimize the negative impact that are likely to have of future Nevadans.

On behalf of Great Basin Resource Watch, its board and members we take you for your time and attention to the issues raised here and your service to the people of Nevada.

Sincerely,

A handwritten signature in black ink that reads "John Hadder". The signature is written in a cursive style with a large, looping initial "J" and a stylized "H".

John Hadder,
Director