



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

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October 16, 2017

Christina Gabriel, Project Manager  
Bureau of Land Management  
Attn: Greater Phoenix DEIS PM  
Mount Lewis Field Office  
50 Bastian Road  
Battle Mountain, NV 89820

Re: Comments on *Draft Environmental Impact Statement (DEIS) Greater Phoenix Mine Project (DOI-BLM-NV-B010-2016-0009-EIS)*

Dear Ms. Gabriel,

Great Basin Resource Watch (GBRW) does appreciate the cooperation of Newmont staff in providing digital version of requested documents soon after GBRW requested.

#### Public Process

The Bureau of Land Management (BLM) did the public a great disservice by providing a frustrating short comment period for a large complex mine project. In addition the Phoenix Mine is of great regional importance since the proponents (Newmont Mining Corp.) are proposing to treat toxic fluids in perpetuity – past 500 years by BLM definition. GBRW sent a letter to BLM by email and fax requesting an extension of the comment period, and received no response even after repeated telephone calls. The lead staff was apparently out of town for a period of time, but BLM should have made sure that there was someone to field questions regarding the project during her absence, especially for a project of this significance.

GBRW attended the public meeting on September 29, 2017 in Battle Mountain.. The meeting provided a minimum of information about the project especially negative implications of the mine. These poster sessions are next to useless, and GBRW would like to see a return to more of hearing style process that allow the public to collectively hear the questions and answers from everyone in attendance. The hearing format is more in the spirit of the National Environmental Policy Act (NEPA) by increasing transparency and allowing for meaningful input to BLM on the project. A fundamental aspect not illustrated in the poster session was the significant acid-mine drainage issue. Indeed, the BLM allows the industry to present a “whitewashed” version of the project. This is not the role of publically employed land managers.

In attendance with GBRW was a University of Nevada student learning about environmental and environmental justice issues in Nevada. Below is his assessment of the public meeting:

## **Summary of Public Comment Requirements under NEPA**

On September 26, 2017, a public comment hearing was held in Battle Mountain, NV for a draft environmental impact statement (DEIS) of the proposed expansion of Newmont USA Limited's Greater Phoenix mine pursuant to the National Environmental Policy Act (NEPA). Under NEPA federal agencies must provide advice and information in restoring, maintaining, and enhancing the quality of the environment to states, counties, municipalities, institutions, and individuals, (section 102 (2) (G)). The intent of this process is to allow the public to aid the agency in identifying impacts that would not be adequately addressed, and gaps in information/analysis. Additionally the federal agency, BLM, must request comments of appropriate state and local agencies which are authorized to develop and enforce environmental standards; including Native American communities when reservations are affected. This public comment hearing did not address impacts to current treatment issues, and did not adequately involve Battle Mountain Western Shoshone.

## **Critique of Comment Hearing**

Recent efforts to “streamline” the EIS process have resulted in open house style meetings rather than traditional public hearings. This format allows for mine representatives and agencies to answer questions on an individual basis without being accountable to the entire community in their answers. Similar concerns have been recognized in the courts. In *Sierra Club v. U.S. DOT* the plaintiffs argued that use of an open house style meeting violated NEPA's public hearing requirement. Due to the vague language of “public hearing” in NEPA the court's asserted that open house does satisfy the law, yet observed that open house meetings “limit the opportunity for citizens to directly and publicly confront agency decision-makers with opposing views.”(310 F. Supp. 2d 1168 (Nev. 2004)).

The requirements mentioned above in section 102 (2) (G) of NEPA were not adequately met. The open house meeting included information on Newmont's intent to create on site agriculture using treated water from the mine site, yet none of the long term mitigation efforts that are in progress to address the treatment in perpetuity nature of this site were addressed. The public was provided with no geochemical maps that would indicate how much more sulfide (source of acid) would be exposed given the proposed expansion.

In addition to gaps in the information provided to the public, the proposed expansion could result technical flaws in well monitoring. Monitoring wells located beneath the current mine tailing storage will be moved due to expansion of the tailings storage. This will result in incongruent data, and a decrease in the validity of the analysis of drainage off the tailings.

The Battle Mountain Shoshone were not adequately involved in this public comment process. The Shoshone environmental office in Battle Mountain was not aware of the public comment hearing until 2 hours prior during a meeting with Great Basin Resource Watch. This provided them minimal time to prepare. When a BLM biologist was asked why this occurred, the response included the phrase “the boss is on vacation.” Since this hearing was an open house style, the official was not

held accountable by the community at large for the inadequate response. Historically the site has not been managed according to the expectations of the Shoshone. For example, during the initial construction, a cultural resource assessment was conducted without the aid of Shoshone advisors. All artifacts found were sent to a repository in Carson City, for the Battle Mountain Shoshone do not have a federally permitted repository for artifacts, which represent their cultural heritage.

The lack of communication between federal agencies and the Shoshone arise in part through two major problems; federal agencies refusal to respect Shoshone standards/practices of communication, and a perception of not being welcome at the table on the part of the Shoshone. Given the special government to government relationship of the Shoshone and the BLM, the Shoshone demand a face to face invitation (posting in the local newspaper does not suffice). If the federal agencies desire to create a productive rapport with the Shoshone government they must acknowledge culturally permissible forms of communication, and submit an invitation face to face.

PLAN and Great Basin Resource Watch will continue to work with the Battle Mountain Shoshone, federal agencies, and Newmont moving forward toward the final EIS for this project in order to advocate responsible mining that protects the rights of all people in Nevada and beyond. In addition we are advocating for the creation of legislation concerning treatment in perpetuity sites similar to current legislation in New Mexico, Michigan and Maine.

- Ian Bigley, October 2017

GBRW concurs with Ian's analysis here, and we would also wish to highlight the lack of proper consultation with the Battle Mountain Tribe.

#### Long Term Water Treatment of No Action Versus Proposed Action is not Delineated Clearly

The DEIS does not give the public a clear comparison of the relative severity of the long-term water treatment under the existing Plan of Operation versus the Proposed Action. At a minimum the proposed action should not create a increased water treatment process either in the volume of water to be treated, the quality of the water to be treated, nor the time line for treatment. The DEIS appears to indicate, but does not make it clear, that there will be a need to treat on the order of 331 billion gallons of contaminated water annually (DEIS 4-32, notes 320 gallons per minute (GPM) groundwater infiltration and 310 GPM surface runoff) under the proposed action. However, the constituent profile of this water that requires treatment is not given, so the public is not given information of the level of toxicity of the water for treatment. The no action discussion does not discuss either the amount of water to be treated nor the constituent profile of the water to be treated. Therefore, the public has no basis to judge as to whether the Proposed Action will improve the situation at the mine or not.

GBRW did locate some data<sup>1</sup> on constituent release under the existing Plan of Operations. The report concludes that the Reona, Midas, and Phoenix backfilled pits will be flow through at rates of 3.1 GPM minimum, 52 GPM steady-state, and 56 GPM steady-state respectively. The same report gives mass loading of the various constituents showing exceedences of Nevada

standards of many of the constituents over the period of 500 years and many dropping below Profile I levels by the 500 year mark, while other constituents, such as Fe and Mn showing an increasing trend. This kind of analysis needs to be in the DEIS with parallel data under the proposed action.

Our analysis to date indicates that the proposed action will result in a greater amount of toxic water to be treated forever. The limited time period for comment has not allowed for a complete review to make the needed determination. Again, the general public would also have no way to make this determination based in the incomplete information in the DEIS.

#### The DEIS does not Provide Sufficient Information to Evaluate Groundwater Quality Affects and it appears as though the Project Violates Nevada State Law on Groundwater

According to the DEIS (p. 4-33) the project will degrade groundwater. Map figures 4-11, 4-12, 2-13 illustrate contours for sulfate, total dissolved solids, and arsenic levels at the maximum allowed Nevada Profile I levels at 500 years since the end of mining. At these levels groundwater has been degraded, since these levels are well over background levels in general. The DEIS does not give data on the levels of potential pollutants for the any of the period leading up to the 500 year mark or beyond, nor is it clear whether the contours in the map figures represent the maximum contamination.

The DEIS needs to report on the complete suite of constituents. Given the acid generating potential of the waste rock and ore at the Phoenix site it is important for there to be clarity on all possible contaminants including pH. Information on additional constituents could be included in an appendix. The DEIS needs to show trend data for constituents in groundwater over the 500 year period, so the public to assess whether the quality of the groundwater is expected to improve or become worse over time. In addition, there should be estimates past 500 years.

#### Alternatives to Perpetuity Treatment is Needed

Mining projects like the Greater Phoenix Proposed Action, which explicitly anticipates perpetual active management as virtually certain outcome, are inherently controversial. Explicit engineering plans to capture and treat water, funded by a diversified financial trust, leaves the public uncomfortable with the cross-generational obligations. There is good reason for this, since the status of governments, laws, and financial institutions are not guaranteed in perpetuity (500 years or more by the BLM definition).

At it's core, the Proposed Action provides a private mining entity with short-term profit while leaving to society an obligation to maintain for centuries an active treatment system amidst the unavoidable uncertainty in future institutional stability.

Nowhere in the DEIS is there a stated goal to eventually close the Phoenix Mine in a manner that allows compliance with water-quality regulations that is passive, or at least minimally active. GBRW finds this unacceptable. There must be a detailed analysis of 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). The DEIS does not present a clear case that all other options that avoid treatment in perpetuity have been considered.

#### The Proposed Action will Pump an Excessive Amount of Groundwater Causing Unnecessary and Undue Degradation to Surface Waters

The long-term treatment plan calls for continuous pumping to minimize pit lake formation and to provide water to blend with treated water to be discharged to the environment (used for crop irrigation). One effect of this pumping is a permanent reduction in the flow of Willow Creek (from 0.36 to 0.2 cubic feet per second, CFS) and springs (DEIS 2-81). The DEIS (p. 4-217) states, “Continued dewatering as a result of the Proposed Action would result in lowered groundwater, which may result in less water supplied to seven springs and Willow Creek and result in moderate to major impacts to riparian/wetland areas lasting in perpetuity within the Project area;” however, the DEIS does not quantify the effect on wetlands and springs, which is likely to be significant as on the order of 2,000 Acre-feet per year is planned to be pumped in perpetuity. Some of the springs on federal land may also qualify as Federal Water Reserves, Public Water Reserve No. 107.

Pursuant to FLPMA and the Part 3809 regulations, BLM cannot approve any operations that may result in the degradation of either the quality or the quantity of surface and ground waters. Relatedly, dewatering of streams and springs violates the FLPMA/3809 standards. Further, no degradation or loss of flows for springs protected by Public Water Reserve 107 (and its authorizing statutes such as the Stock Raising Homestead Act) is allowed. The lands around these PWR 107 springs are also protected from entry, use, or degradation by PWR 107.

#### Project Approval would Violate FLPMA’s UUD Mandate

Taken together, the significant, and in many cases unmitigated, damage to critical environmental, cultural, historical, and religious resources noted herein fails to comply with FLPMA’s mandate that BLM “shall . . . take any action necessary to prevent unnecessary or undue degradation of the lands.” 43 U.S.C. § 1732(b). This is known as the “UUD” standard. As the leading FLPMA and mining federal court decision states, this duty to “prevent undue degradation” is “the heart of FLPMA [that] amends and supersedes the Mining Law.” *Mineral Policy Center v. Norton*, 292 F.Supp.2d 30, 42 (D.D.C. 2003).

FLPMA, by its plain terms, vests the Secretary of the Interior [and BLM] with the authority – and indeed the obligation – to disapprove of an otherwise permissible mining operation because the operation, though necessary for mining, would unduly harm or degrade the public land.

Id. “FLPMA’s requirement that the Secretary prevent UUD supplements requirements imposed by other federal laws and by state law.” *Center for Biological Diversity v. Dept. of Interior*, 623 F.3d 633, 644 (9th Cir. 2010).

BLM complies with this mandate “by exercising case-by-case discretion to protect the environment through the process of: (1) approving or rejecting individual mining plans of operation.” Id. at 645, quoting *Mineral Policy Center*, 292 F.Supp.2d at 44. The Ninth Circuit has stressed the “environmental protection provided by the MPO [mining plan of operation] process.” *Center for Biological Diversity*, 623 F.3d at 645 (emphasis in original).

BLM cannot approve a mining plan of operations that would cause “unnecessary or undue degradation.” 43 C.F.R. § 3809.411(d)(3)(iii). BLM’s mining regulations further require that all operations “must take mitigation measures specified by BLM to protect public lands.” 43 CFR § 3809.420(a)(4). This, and the other performance standards in §3809.420 (especially those requiring reclamation and environmental protection), must be complied with. As just one example, a mine that requires perpetual treatment is essentially never reclaimed. Under FLPMA and the Part 3809 regulations, BLM cannot approve operations that cannot be reclaimed.

Under the BLM’s Solid Minerals Reclamation Handbook, H-3042-1, “it is a statutory mandate that BLM ensure that reclamation and closure of mineral operations be *completed* in an environmentally sound manner.” (3042-1 at p. I-1, citing FLMPA and the 1970 Mining and Minerals Policy Act)(emphasis added). Allowing perpetual discharge and treatment is not “completing” reclamation, as required. The Handbook also notes that FLPMA precludes BLM from authorizing operations that may result in “permanent impairment of the productivity of the lands and the quality of the environment.” *Id.* (emphasis in original). Under more specific “reclamation standards”, “there shall be no contaminated materials remaining at or near the surface.” *Id.* at p. I-4. Overall, perpetual pollution and treatment does not comply with the reclamation and other requirements of the Handbook.

<https://www.ntc.blm.gov/krc/uploads/239/Solid%20Minerals%20Reclamation%20Handbook%20H-3042-1.pdf>

As noted herein, BLM violated these overarching duties.

### Cumulative Impacts

As noted herein, the DEIS failed to fully consider all “direct and indirect impacts” under NEPA. These failures are in addition to the DEIS’ failure to review the “cumulative impacts” from all “past, present, and reasonably foreseeable future actions” under NEPA. 40 CFR § 1508.7. In this case, the DEIS’ does not address the cumulative affect of perpetual treatment at the site or the affect if there is a failure to continue the existing treatment regime.

*Klamath Siskiyou Wildlands Center v. BLM*, 387 F.3d 989, 995 (9th Cir. 2004):

[T]he general rule under NEPA is that, in assessing cumulative effects, the Environmental Impact Statement must give a sufficiently detailed catalogue of past, present, and future projects, and provide adequate analysis about how these projects, and differences between the projects, are thought to have impacted the environment. See *Neighbors of Cuddy Mountain v. United States Forest Serv.*, 137 F.3d 1372, 1379-80 (9th Cir.1998); *City of Carmel-By-The-Sea v. United States Dept. of Transp.*, 123 F.3d 1142, 1160-61 (9th Cir.1997).

*Lands Council v. Powell*, 395 F.3d 1019, 1028 (9th Cir. 2005):

The [agency] cannot simply offer conclusions. Rather, it must identify and discuss the impacts that will be caused by each successive [project], including how the combination of those various impacts is expected to affect the environment, so as to provide a reasonably thorough assessment of the project’s cumulative impacts.

*Klamath Siskiyou*, 387 F.3d at 1001. In a major mining and NEPA decision, the Ninth Circuit recently specifically rejected the type of brief mention or listing of projects/acreages as found in the DEIS:

In a cumulative impact analysis, an agency must take a “hard look” at all actions. An EA's analysis of cumulative impacts must give a sufficiently detailed catalogue of past, present, and future projects, and provide adequate analysis about how these projects, and differences between the projects, are thought to have impacted the environment. ... Without such information, neither the courts nor the public ... can be assured that the [agency] provided the hard look that it is required to provide.

Te-Moak Tribe of Western Shoshone, 608 F.3d 592, 603 (9th Cir. 2010) (Rejecting EA for mineral exploration that had failed to include detailed analysis of impacts from nearby proposed mining operations. Although that case involved an EA, the need for a complete cumulative impacts analysis also fully applies to an EIS).

In *Great Basin Mine Watch v. Hankins*, 456 F.3d 955, 971-974 (9th Cir. 2006), the court struck down the same sort of acreage listing and brief, generalized descriptions of mining impacts in the region. The court required BLM to include “mine-specific ... cumulative data.” *Id.* at 973. Relying on *Klamath-Siskiyou*, and *Lands Council*, the court highlighted the need for a “quantified assessment of their [other projects] combined environmental impacts” and “objective quantification of the impacts.” *Id.* at 972. That has not been done here.

#### Air Quality Analysis is Inadequate

The DEIS does not apply a reasonable background level for many key air constituents: SO<sub>2</sub>, NO<sub>2</sub>, and CO. Table 3.3-3 shows zero background levels for these constituents and does not even consider ozone, O<sub>3</sub>, at all. The DEIS states that, “For gaseous pollutants (SO<sub>2</sub>, CO, ozone [O<sub>3</sub>], and NO<sub>2</sub>), concentrations are representative of typical background for remote areas of the West because of the scarcity of major sources and the great distance between the few sources that do exist.” (DEIS 3-50). Just as with the Mt Hope proposed mine, where constituent values were zeroed out, zero baseline is an unacceptable assessment of background and BLM needs to acquire background constituent levels that are reasonably near or provide a defensible justification for the values used. Without an adequate and on-site baseline air quality analysis, BLM cannot ensure that the operations will comply with all state and federal standards under the Clean Air Act (as required by the Clean Air Act, FLPMA, and the Part 3809 regulations).

#### Sage-grouse Protection Strategy is Inadequate

There is a significant sage grouse habitat at adjacent to the project with two active leks within 4 miles of the operations. GBRW does not accept the banking program as a viable approach to preserve sage grouse populations. This method is unproven and trades known viable habitat, which supports sage grouse populations, for potential habitat that may not support populations.

#### Springsnail Special Status Species Could be Severely Affected

The significant groundwater pumping and the affects on streams and springs could substantially reduce springsnail populations, if not entirely eliminate them from the region. It is essential that BLM have the springsnails ID'd by a qualified expert, of which there are very few, so that sufficient mitigation measures can be enacted.

#### Hydrogechemicals Analysis is Incorrect and Underestimates the Chemical Releases to the Environment

The water quality model used to estimate concentrations of pollutants leached from the waste rock

facilities [Geomega 2015] does not appear to include any analysis of mass balance. Mass balance is a critical component of any simulation of pollutant release and transport. To illustrate the importance of mass balance in hydraulic modeling, the Hydrochemical Characterization report states that the MODFLOW-SURFACT model used to simulate water and solute transport “controls the model time-step size to maintain model mass balance criteria” [Geomega 2015, pg 64].

The text of the Hydrochemical Characterization does state that “Appendix H contains the validation information (i.e. observed and simulated water levels) and mass balance information for the transport models” [Geomega 2015, pg 68]. However, this statement appears to be incorrect about presenting mass balance results. Appendix H of the Hydrochemical Characterization report includes graphs of predicted concentration versus time in waste rock and waste rock backfill, and tables listing predicted versus simulated hydraulic head in the study area. But, Appendix H does not present any figures or tables that list mass of anything in general; and in particular, there are no tables or figures indicating solute mass of pollutants mobilized by oxidation and water flow in relation to the total pollutant mass in the waste rock and pit walls that are the long-term sources of these constituents. In response, there needs to be a presentation showing the model mass balance, such as the mass of pollutants released from the various sources--the waste rock and pit walls—over time, in comparison to the total amount of pollutants in each source.

The “chemical release functions” (CRFs) modeling approach used to estimate the rate at which solutes (other than sulfate) are leached from waste rock, appears to contain a calculation error. As background, the chemical release functions are curves fit to the measured concentration of each solute leached from humidity cell tests (see Geomega 2015, Figure 2-1). That is, the CRFs estimate solute concentration, in mg/L, versus pore volume, using humidity cell tests. While concentration versus humidity-cell pore volume is helpful information, the specific values produced reflect in large part the laboratory protocol. In this case, the humidity cell test leaches a fixed mass of rock with a fixed volume of water over a set time interval in a laboratory setting. Solute concentrations in these laboratory tests reflect these specific test conditions, and can’t just be applied directly to estimate solute concentration and associated leaching rates under field conditions. This is because the dissolution of pollutants from waste rock that are correlated to sulfide  $S^{2-}$  oxidation (e.g., acidity, iron, and metals bound as sulfide minerals) are related to the amount of sulfide  $S^{2-}$  that oxidized, but not to the amount of water flushing through the rock. Humidity cells are called “kinetic tests” because they use measured solute release over time to provide an estimate for reaction rates. Thus, for solutes released in proportion to sulfide  $S^{2-}$  oxidation, their rate of release is related to the duration of oxidation, not the volume of water flushed through the rock. The error in the solute release model is illustrated in Equation 5-2 (Geomega 2015, Pg. 34), which calculates the solute release from rock by integrating the CRF [mg/L/Pore Volume] over the number of pore volumes of water, where pore volumes relate directly back to humidity cell tests. The assumption here is that during the humidity tests essentially all of the sulfide is oxidized, which is not the case. Indeed, declining constituent concentrations is typically a short-term result that does not reflect field behavior. Under field conditions, the solute release from the rock is related to the duration over which it oxidizes, not the volume of water.

The behavior of humidity cell tests that are temporarily stored illustrates this conceptual model error: when a humidity cell is stopped and the rock temporarily stored, it continues to oxidize, so that when the test starts again, the first effluent has a higher concentration than before it was



stored. The same effect happens to waste rock under field condition—sulfide minerals oxidize continuously over time, but the solubilized pollutants mobilize only when they are flushed with water. Solute concentrations in effluent from waste rock, (particularly under acidic conditions, where there are fewer limits on solute concentrations), thus varies up and down, depending on the duration of oxidation between flushing events. Assuming a monotonic decrease in solute concentrations, as assumed in the chemical release function approach used for the DEIS, is thus inaccurate. In particular, relatively short-duration humidity cell tests (range from 32 to 87 weeks for the Greater Phoenix modeling) is likely to oxidize only a small fraction of the total sulfide  $S^{2-}$ , and fitting a curve to leachate concentration without regard to the total leachable mass of each constituent is expected to produce a **systematic underestimate of actual leachable solute in the waste rock**. As with the discussion of sulfate, the addition of a rigorous accounting for each pollutant, including total mass in the source material and cumulative mass leached out over time, would help clarify the model design and simplify the evaluation of the model reliability.

#### Various Errors and Needs for Clarification

*1. The details of the plan for treating water seeping into the Phoenix Pit (groundwater, pit-wall runoff, and seepage from backfilled waste rock) need to be included in the DEIS text*

The plan in the Proposed Action to perpetually capture and treat the acid leachate that enters the partially backfilled Phoenix Pit is a central component of the environmental viability of the project, and the DEIS needs to provide enough detail to allow an independent feasibility assessment of this alternative. Here we use the term feasibility as it is typically applied in evaluating environmental options: effectiveness, implementability, and cost. The Phoenix Project developed models and produced the associated estimates for the critical water-treatment parameters. These now need to be summarized in the DEIS so that they can be used to assess the feasibility of the proposed treatment plan.

Specific values required to support a feasibility assessment of the Proposed Action water management plan include:

- Long-term total water flow rate into the Phoenix Pit that will require treatment. (e.g., the DEIS indicates that this long-term average flow will be 593 gpm (DEIS 3-16));
- Predicted concentration of all regulated solutes in the water captured in the Phoenix Pit over the model simulation period;
- Estimate for the annual lime amendment required to treat the water,
- A figure illustrating results of the empirical tests demonstrating that proposed lime amendment treatment will reduce the concentrations of capture water in the Phoenix Pit to the target discharge concentrations;
- Expected annual ranges in flow rates and solute concentrations in captured water, based on weather and climatic predictions;
- Comparison of the predicted long-term composition of water captured in the Proposed Action Phoenix pit to observed water quality in existing and past waste-rock seeps; and
- Model confidence intervals on the estimates of annual volumetric flow and solute concentrations in the water that will be captured and treated.

Some of the above information is presented in the DEIS and supporting technical documents, but all of the above information needs to be presented in summary form in the DEIS.

*2. How long does BLM/Newmont expect to need to capture & treat ARD?*

The water quality model simulations are run for 500 years, but there is not even a rough estimate

for the actual duration over which Newmont expects to actually need to capture and treat the effluent from the Proposed Action waste rock facilities. This is related to the absence of any mass balance accounting in the model of solute release from waste rock (Geomega 2015). Specifically, the DEIS should present the total sulfide  $S^{2-}$  and associated leachable metals in each of the proposed waste-rock facilities, and the fraction of the total pollutants in each source that are leached out over the 500-year simulation period. Further, assuming that the model of sulfide oxidation and solute transport are somewhere accounting for mass balance, the models should be run out to provide at least an estimate for the total duration of pollutant release from the proposed waste facilities. Thus, providing model prediction that can be used to estimate pollutant release over the first 500 years beyond closure, and the associated need for active water treatment.

*3. What environmental effects would occur if the perpetual active treatment system was temporarily interrupted? Or fails?*

The DEIS does not describe the distribution and quality of water that would pond in the Phoenix Pit if the Proposed Action post-closure water treatment system became inactive for a period of time. Based on analysis of seep water quality from the existing facilities waste rock facilities the pond that would form in the Phoenix Pit could have very elevated constituents (e.g., the North Fortitude seep contains >100,000 mg/L sulfate, is acidic [pH <3] exceeding NDEP profile III concentrations for multiple metals [Geomega 2015, Table 3-2 North Fortitude seep chemistry sample used for attenuation testing]). The DEIS needs to address as to whether the ponded pit water; (a) Has the potential to degrade the groundwaters of the State; or (b) Has the potential to affect adversely the health of human, terrestrial or avian life.

*4. Identify the location of the Fortitude and Bonanza in-pit waste rock facilities on DEIS figures.*

The description of the Proposed Action includes a statement that “two in-pit WRFs, Fortitude and Bonanza, would be utilized within the Phoenix Pit.” [DEIS 2017, pg. 2-49]. This is confusing because neither the Fortitude nor the Bonanza waste rock facilities are shown on DEIS Figure 2.2-1 (Authorized Phoenix Mine Facilities), Figure 2.3-1 (Greater Phoenix Project Facilities), or Figure 2.3-2 (Final Phoenix Pit Configuration and Waste Rock Facilities).

*5. Need to clarify the location of waste rock facilities in all DEIS text and figures.*

The DEIS indicates that “Figure 2.3-2 shows the locations of the WRFs,” and “Figure 2.3-2 shows the locations of the WRFs.” [DEIS Pg. 2-42]. But Figure 2.3-2 does not show the Fortitude Waste Rock Facility (31.7 million ton capacity) or the Bonanza Waste Rock Facility (384 million tons) [tonnages from DEIS page 2-49, Table 2.3-4 Waste Rock Facility Capacities].

*6. The DEIS needs to show post-closure facility layout and flow paths for water managed for treatment.*

Given that the Greater Phoenix Project Proposed Action is based on an external document (the *Greater Phoenix Pit Water Management Conceptual Closure Design*, Golder 2015), the DEIS needs a figure that clearly illustrates facility locations and hydraulic flow under the proposed closure. In particular, the description in the DEIS makes extensive references to the “Fortitude Pit Area,” the “Bonanza Pit Area,” and the “Reona Pond” (e.g., see DEIS pages 2-52 and 2-53). The location and size of these critical facilities proposed for the perpetual capture and treatment of polluted water are not shown on the site maps (e.g., Figure 2.3-1 Greater Phoenix Project Facilities). Given the importance of the post-closure configuration, the DEIS should include

several detailed figures that illustrate, in plan view and cross section, the location of the proposed post-closure Phoenix Pit, “Fortitude Pit Area,” “Bonanza Pit Area,” “Reona Pond,” the waste rock backfill areas, and general post-mining surface topography.

7. *DEIS Figure 2.3-3 is not presented at high enough resolution to identify visually surface topography.*

In addition to DEIS Figure 2.3-3 (Post Reclamation Topography), the DEIS would be greatly improved by the addition of a topographic map of the Phoenix Pit with all WR backfill areas clearly labeled, and a separate shaded relief map so that readers can conceptually determine the surface elevation gradients.

8. *Provide more detail on components to assure operation of the long-term funding mechanism (LTFM).*

GBRW is glad to see that the DEIS includes a description of the Long Term Funding Mechanism to “assure completion of post-closure monitoring and mitigation obligations in perpetuity” [DEIS 2-61]. Given that stable operation of the perpetual-care plan is probably the largest source of uncertainty in estimating environmental impacts, this funding mechanism should include greater detail in the DEIS.

Specific components that should be included in the discussion of the Long Term Funding Mechanism include:

- An screening-level engineering cost estimate for implementing treatment (drawing on a predicted annual values for volumetric flow rates of contaminated water, concentrations of representative pollutants, reagent costs, labor costs, operation and maintenance costs, and ranges of uncertainty for each of these parameters);
- A financial plan for long-term growth management funds (including ranges in portfolio diversification, taxes, management costs, expected annual returns, and uncertainty ranges for the financial parameters);
- A framework for a robust legal structure that will guide decision-making (including checks and balances to ensure appropriate financial investment and discourage misappropriation of funds);
- A risk management vehicle, reviewed every few years, to reduce uncertainty inherent in maintaining environmental compliance beyond the duration of most existing human institutions (e.g. environmental insurance tools, such as cost-cap and legal-liability insurance).
- Proposed options for durable institutions to be stewards of the long-term management planning and funding (e.g., a team that includes Newmont, the BLM, the State of Nevada, and a private banking trust).

The overview of the long-term funding mechanism in the DEIS needs to include enough specifics to allow screening-level independent assessments of the funding costs. These key parameters include ranges for the assumed discount rate, long-term annual treatment costs, and environmental liability insurance.

9. *Need to improve the DEIS figures to illustrate pit, rock and water flow paths under the Proposed Action.*

The detailed cross section in DEIS Figure 2.4-6 “Proposed Action Cross Section Through North Fortitude And Bonanza Pits Showing Water Levels And Potential Dewatering Scenario” needs to be presented earlier in the DEIS, so that it is available for the description of the Proposed Action. In addition, this figure needs a project facility map showing the cross section trace, and also showing the location of the “Phoenix/Fortitude Pit” and the “Bonanza Pit Area”

*10. Make creek names in text consistent with figures.*

The interchangeable use of Duck Creek and Galena Creek [DEIS 3-8] is confusing, particularly where the text refers only to Duck Creek, but only Galena Creek is shown on the referenced DEIS Figure 3.2-1 “Greater Phoenix Project Facilities”.

*11. Check the consistency between the DEIS figures and text on Philadelphia Canyon.*

(1) Philadelphia canyon is mentioned in the text on DEIS page 3-9, but is not labeled in Figure 3.2-1. Features discussed in the text, and referenced to a specific figure for orientation, should then be labeled on the figure. (2) Philadelphia Canyon is the site of the Philadelphia Canyon waste rock facility [DEIS Figure 2.2-1], which is scheduled to contain 332.5 million tons of waste rock [DEIS Table 2.2-4]. The DEIS notes that “limited water quality data for Philadelphia Canyon that was collected in the mid- to late-1990s; however, since these data are not up-to-date they are not considered relevant to impact analysis in the current EIS” [DEIS Pg. 3-9]. This does not seem correct, because Philadelphia Canyon drainage flows to the Reese River and eventually to the Humboldt River. Thus, the effect of waste rock on this ephemeral drainage seems to be of very high relevance to the assessments of environmental impact. In particular, water samples collected in the “mid-to-late-1990s” would presumably include the surface flows collected during the El Nino in 1998, and would thus indicate possible water quality and flow rates that could be expected in future El Nino events. The surface water quality data collected from Philadelphia Canyon in the “mid-to-late-1990s” should be included in this current EIS.

*12. Typographical error in DEIS page 3-28.*

DEIS page 3-28 cites “ppt” as “parts per trillion,” but it is actually parts per thousand.

*13. Include a figure demonstrating the effectiveness of lime treatment for rock leachate.*

The water-treatment tests are an extremely important component in the DEIS, as they demonstrate that pollutants in the perpetual flow of water from the PAG rock can be reduced to below agricultural use standards with a lime treatment. An illustrative figure should be in the DEIS.

*14. The DEIS description of pit locations and water elevations needs to be corrected to match the cited figures.*

The following description in the DEIS needs to be revised so it is consistent with the referenced figures:

“Under the Authorized Plan, groundwater levels could be allowed to recover to an equilibrium elevation following operations. **Figure 4.2-4** shows how this would work, conceptually, in the Bonanza Pit, if it remained as several pits separated by intact bedrock walls (HCI, 2006). Under the Proposed Action, as shown on **Figure 2.4-6** and **Figure 4.2-5**, the elevation of the water table at the northern (upgradient) highwall would be approximately 5,600 feet amsl, while the top of the southern (downgradient) highwall would be less than 5,400 feet amsl. Thus, if groundwater were to fully recover to the 5,600 feet amsl level it would overtop the southern edge of the pit and become an outflow onto the surface.” [DEIS 4-15 and 4-16].

(1) Regarding Figure 4.2-4 and the text discussions of this figure: (a) This figure illustrates “Authorized Phoenix Facilities;” but the label on the figure is “Greater Phoenix Project,” suggesting that it is the current Proposed Action. (b) The text indicates that “under the Authorized Plan, groundwater levels could be allowed to recover to an equilibrium elevation

following operations,” and that “Figure 4.2-4 shows how this would work, conceptually, in the Bonanza Pit.” But there is no information on water levels in Figure 4.2-4. (c) While figure 4.2-4 shows the location of the Fortitude and Bonanza pits from a 2006 document, there is no plan view in the DEIS showing the relative location of either the Fortitude or Bonanza pits in the context of the project. In particular, the primary figure used to illustrate the “Authorized Phoenix Mine Facilities (Figure 2.2-1) does not contain labels for either the Fortitude Pit or the Bonanza Pit.

(2) Regarding Figure 4.2-5 and the DEIS text discussing this figure: (a) While the text cites Figure 4.2-5 following the phrase “Under the Proposed Action,” the title of Figure 4.2-5, “Cross-Section Midas Pit,” does not indicate that the pits are “Proposed Action,” or refer to this using the “Greater Phoenix Project” euphemism that is used to imply that the figures is showing proposed action facilities. (b) While the text indicates that we should see that “the elevation of the water table at the northern (upgradient) highwall would be approximately 5,600 feet amsl,” the highest elevation in the cross section showing in Figure 4.2-5 is 5,200 ft. Thus, the DEIS text what would happen “if groundwater were to fully recover to the 5,600 feet amsl level” makes no sense, as everything in the cross section would be more than 500 ft under water. (c) The elongate “Midas Pit” shown in Figure 4.2-5, which is apparently referring to conditions under the Proposed Action, is not represented graphically or by label in the primary illustrations of the proposed action (i.e., Figure 2.3-1 Greater Phoenix Project Facilities, or Figure 2.3-2 Final Phoenix Pit Configuration and Waste Rock Facilities.). (d) Globally throughout the DEIS, the names of project features should be consistent, so that readers can look back to a single figure to see the relative location of all features (pits, waste rock facilities, heap leach pads, etc.) under the Currently Authorized Phoenix Project, and also to a single figure the Greater Phoenix Project Proposed Action. (e) Where there are multiple names for features (e.g., the “Bonanza Pit” is used in some places in the DEIS to refer to the combined area covered by the Midas and Reona pits), the primary figure illustrating the scenario (e.g., Figure 2.2-1 for Authorized Phoenix Mine Facilities, and Figure 2.3-1 for Greater Phoenix Project Proposed Action facilities) should show the location, and also label, each of these facilities, with explanation of where there are duplicate labels applied. Citations in the text to each of these facilities can then refer back to these complete facility location maps.

*15. Add labels for waste rock facilities on the DEIS figures of Proposed Action facilities.*

The Proposed Action Bonanza in-pit waste rock facility cited in DEIS Table 4.2-6 “Schedule for Proposed Action In-Pit WRFs,” is not, but needs to be, labeled on the figures of Proposed Action facilities (e.g., DEIS Figure 2.3-1 “Greater Phoenix Project Facilities,” or Figure 2.3-2 “Final Phoenix Pit Configuration and Waste Rock Facilities”).

*16. What is the “post-closure timeline”?*

The DEIS section 2.3.23.7 Post-Closure Monitoring and Maintenance states that “There is a potential for additional monitoring and maintenance tasks to be required beyond the post-closure timeline that is currently not included in the reclamation cost estimate.” Please define “post-closure timeline.”

*17. What is the reference for these hydraulic data presented in Table 2-1 of Geomega 2015, Hydrochemical Characterization?*

Were they measured as part of this 2015 report, or from earlier hydraulic analyses? What methods were used?

18. *The text describing the WROC model calibration is too vague to be useful (Geomega 2015, Hydrochemical Characterization)*

The WROC model is an important component of the DEIS because it is used to estimate sulfate release from the existing and proposed waste rock facilities. But the description of the WROC Model Calibration (Geomega 2015, Section 5.1.3) appears to be a comparison rather than a calibration and is difficult to understand. First, the description of the WROC model indicates that it considers chemical heat production, advection, diffusion, and convection of oxygen; but, there is no discussion of how the model results compare to indicative parameters, such as pore-space oxygen concentration and temperature, measured in the existing waste rock facilities. Second, the discussion of “Model Calibration” on pages 5-31 and 5-32 is apparently trying to indicate something about how the model results compare to observed sulfate leaching from the North Fortitude waste rock facility, but the discussion does not lead to a conclusion. Typically, using seepage from an existing waste rock facility to calibrate an oxidation model of a waste-rock facility would involve adjust model parameters so that the model results matched observed sulfate concentrations and/or sulfate mass release rates.

In contrast, consider the text describing the calibration results:

However, not all flow/mass reports to the North Fortitude waste rock seep (Figure 5-4b). Comparing the mass at the seep (the product of seep concentration and modeled flow) with the predicted total infiltration (the product of seep  $\text{SO}_4^{2-}$  and the total flow predicted from the 1-D unsaturated flow model) demonstrates that only ~10% of the modeled  $\text{SO}_4^{2-}$  mass reports to the seep (Figure 5-4b).” [Geomega 2015, pg. 5-31 & 5-32]. Why did the model calibration calculate “the mass at the seep” as “the product of seep concentration and modeled flow”? The term “mass at the seep” apparently means the load rate of sulfate leaving the waste rock facility, but this is calculated here as the product of a measured seep concentration and the “modeled flow.”

The meaning of “the predicted total infiltration” is unclear. The phrase seems to suggest a water flux, but it is defined as “the product of seep  $\text{SO}_4^{2-}$  and the total flow predicted from the 1-D unsaturated flow model.” It is unclear why the analysis is multiplying a concentration of sulfate (measured sulfate?) in the seep and the flow predicted by the unsaturated zone hydraulic model.

Third, there is no discussion of mass balance on sulfate production. E.g., what does the model predict for the rate of sulfate production from a single Kg of waste rock as it completely oxidizes under atmospheric conditions; and what fraction of the total mass of sulfide  $\text{S}^{2-}$  in the calibration waste-rock facility simulation is oxidized over the 500-year simulation period?

Finally, the report concludes that “only ~10% of the modeled  $\text{SO}_4^{2-}$  mass reports to the seep.” It is not clear about how this conclusion is reached. The model appears to be over-estimating sulfate by a factor of 9, and if so, is this a reasonable estimate for uncertainty in model predictions? Alternately, is 90% of the net-infiltration to the existing waste rock facility recharging bedrock, and not appearing as seepage (a significant violation of Nevada law)? Or is there another explanation? This simply needs to be described using more clear language.

The predictions of long-term water quality seeping from the Greater Phoenix Project waste rock provides the basis for assessing impacts on water resources and the associated cost estimates for funding long-term water treatment. At odds with necessary transparency is this stretch of confusing text in the section of the water-quality model report that should describe most clearly

how the model predictions compare to field scale measurements of solute leaching from existing waste rock facilities.

Thank you for the opportunity to submit these comments. Please feel free to contact John Hadder if you have any questions or concerns.

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".

John Hadder, Director Great Basin Resource Watch

Bob Fulkerson, State Director, Progressive Leadership Alliance of Nevada

Patrick Donnelly, Nevada State Director, Center for Biological Diversity

Cc Governor Brian Sandoval, Senator Catherine Cortez Masto, Senator Dean Heller,  
Representative Mark Amodei, Joe Sawyer (NDEP, BMRR Bureau Chief)

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<sup>1</sup> Geomega, “Newmont Phoenix Pit Backfill Pore-water Chemistry Assessment,” June 24, 2015.

#### General References

U.S. Department of the Interior, Bureau of Land Management, *Greater Phoenix Project Draft Environmental Impact Statement, Vol. 1 and Vol. 2. DOI-BLM-NV-B010-2016-0009-EIS.*, September 2017.

Geomega, “Hydrogeochemical Characterization of the Greater Phoenix Project,” Feb 19, 2015.