Great Basin Resource Watch

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

PLAN

Progressive Leadership Alliance of Nevada

www.planevada.org

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Re: Scoping comments on *Notice of Intent To Prepare an Environmental Impact Statement Robinson Mine Plan of Operations Amendment and Proposed Resource Management Plan Amendment, White Pine County, Nevada*

Great Basin Resource Watch (GBRW) and the Progressive Leadership Alliance of Nevada (PLAN), (collectively for these comments 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 BLM needs to assess whether this mine may require treatment in perpetuity.

The original EIS for the Robinson Mine dates back to 1994, and there have been numerous changes over the years and the current expansion is now the second major change in the past two years. GBRW urges BLM to conduct a detailed analysis of the mine and its closure plan that would be consistent with an Environmental Impact Statement (EIS) under NEPA and BLM's duties under the Federal Land Policy and Management Act (FLPMA).

Public Engagement Process

A more transparent and adequate public process is needed. Public engagement was not sufficiently catered to in the online format at the scoping meeting on June 17th, 2020.

Virtual Meeting Structure

During the June 17th, 2020, scoping meeting, the chosen virtual meeting format infringed upon the transparency and effectiveness of the public process. The settings chosen in zoom for the meeting (ie, that all participants were muted and kept from being seen on the shared screen) entirely prevented attendees from having awareness of other community members present.

Due to this, public attendees' presence was essentially made invisible through the virtual meeting's structure. Participants did not appear on the screen at all during the meeting, and only the names of attendees who asked questions ever became public. In order for an attendee's voice to be heard, their question first needed to be "accepted" virtually by the moderator. While moderators were free to speak and provide information or thoughts at any time, members of the public had to be given permission to do the same...which presents a clear inequity and opposition to the true spirit of genuine public process.

Furthermore, members of the public who did not have specific questions to ask during the meeting (or were unable to utilize the virtual tools in order to ask their questions) were not seen or heard at all. In itself, this likely discouraged public engagement and inhibited collective learning ability—since feeling as if you are *a part* of a space contributes to your ability to actively and meaningfully engage with one. An invisible public is, in many ways, a marginalized public. Since community members are unable to feel and be included in a space as they would have been able to during previous times (through the means of being physically present in the room), other measures must thoughtfully be put in place in order to address this natural deficiency in the transition to virtual public meetings. A more transparent structure, where all attendees and moderators are given equal opportunity to be seen, heard, and understood is needed for future public meetings. As the process for the Robinson expansion continues, the space for public engagement must intentionally be designed to be an equally shared and equally accessible—albeit virtual—one.

Scoping meetings, as a collective public process and a means for community members to come together to better understanding a proposed action, require an awareness of others that was clearly withheld from this virtual meeting. The value of scoping meetings comes not only as a means for community members to hear and engage with sources of knowledge from public agencies and the mining operator, but to share knowledge, concerns, and related lived experience with others in their community. At the June 17th meeting, there was no way for attendees to engage directly with other members of the public. All information was one-sided and prevented a collective learning that comes from the conversational format that exists during in-person meetings.

A means for attendees to see one another, as well as have conversations or ask questions directly to one another, is a vital component of the public process that must be remedied and incorporated into future virtual meeting spaces. The best solution for this would be to allow all attendees to have the choice to un-mute themselves and turn their computer cameras on (to be seen on the shared screen). If this is not possible, at the very least, there should be a sign-in sheet where attendees can see both who and how many others are present. Creation of the space in this way is also needed for the process to stay accountable towards the public.

Lastly, the recording of the virtual meeting, as well as the questions and answers from it, were not made available online in ample time before scoping comments were due. Such records need to be publicly available for the process to remain transparent and accessible as long as it must be virtual.

Address Public Questions

Many questions asked during the meeting were insufficiently answered, and opportunities for follow-up were further limited by the virtual format.

Many of the answers given during the meeting were short and failed to provide an ample amount of background information, context, or detail to be helpful for individuals who did not possess extensive knowledge beforehand. The way of answering questions did not seem to cultivate a collective understanding of the proposed actions or assist attendees in gaining holistic clarity.

The virtual format perhaps further contributed to this inadequacy, since there was less opportunity for follow up if the person asking the question (or others in attendance) still had uncertainties after the answer was given. Since attendees were primarily writing their questions and were hindered in clarifying them live while the moderators were answering them, this allowed there to be less accountability during answering and less room for assuring that questions were thoroughly answered.

Furthermore, not being able to ask clarifying questions during the presentation section also proved to inhibit collective understanding about the proposed actions. Attendees were entirely unable to ask questions while the presentation was being given, which is something they would have been able to do if need be at scoping meetings in person. This change likely contributed to the lack of accessibility in asking meaningful questions and obtaining meaningful clarity during the meeting. For example, the presentation mentioned but did not explain what a visual class is or what it would mean for the visual class to be moved from Class 1 or 2 to a Class 4—and since participants could not speak during the presentation, there was no opportunity to clarify this at the time that a clarification would have been most meaningful and contextualized. Participants, later during the question and answer, did not have the critical information accessible at the time they would have needed it in order to further inquire or better understand. Additionally, in this way, individuals without extensive background knowledge were not placed in an adequate position to ask meaningful questions. Incorporating suggestions given about the virtual format in the former section could potentially assist mine operators to answer questions more comprehensively, as members of the public are better able to engage and clarify with both the operator and one another.

Lastly, public concerns were discouraged from being shared during the question and answer section on multiple occasions. This was particularly problematic in the way moderators dismissed questions and concerns brought up about how the EIS process was being carried out during the pandemic. For example, someone asked if there would be more time or modifications made for public comment due to the extenuating circumstances around the pandemic and inability of the public to meet in the traditional manner. Instead of verifying the difficulties of the pandemic and asking for other suggestions for how to make the process more accessible during the present situation, the difficulties were primarily invalidated and reasons were listed for how the process was already accessible. Although not all suggestions from the public need to be incorporated, they should still be welcomed and listened to...particularly in this given context and referring to this current context.

Overall, more malleability is needed in order for the public process to best be upheld in these unpredictable times. The most effectively moderated virtual public process is likely one where moderators acknowledge and actively listen to difficulties members of the public have in accessing the new virtual tools for participating—and subsequently ask for input and suggestions for how to make the process more accessible. Whatever the exact solutions are for continuation of effective and genuine public process in this COVID-19 world, they must be amenable to the needs expressed by members of the public during this time. And the space for expressing these needs must be widened.

The insufficient public engagement process with the project thus far should be critically evaluated and improved upon.

Potential for Water Pollution

The geochemistry of waste rock must be thoroughly analyzed for potential acid production, including crystallographic analysis to determine the extent of fracturing expected upon blasting. In this regard the full range of static and kinetic tests need to be preformed. Data contained in the Robinson 2016 Water Pollution Control Permit Annual Report[1] shows that there exists a significant amount of potentially acid generating (PAG) material at the site. Of the 281 acid-base accounting analyses on the rock samples from across the mine that are represented in the Waste Rock Management Plan, 45 percent are net-acid generating, based on simply having more acid-generating potential than acid-neutralizing potential. Further, 43 percent of the samples contain > 1% sulfide S—enough to be a significant source of sulfate and associated metals to percolating water, even when the individual material does not produce acidic leachate.[2] **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.**

Across the entire Robinson Mine, there are ~691,000 m^2 of waste rock area (Waste Rock Management Plan ver 5.1, Table 5-1; RNMC 2014), which at an estimated pollution production rate of 1.61 kg SO_4/m^2-yr, will release ~803,000 kg SO_4/yr. The current Waste Rock Management Plan dramatically underestimates the pollutant discharge from waste rock, and thus does not include a realistic assessment of the impacts to surface or groundwater quality. Given that the studies of the existing Robinson waste rock facilities show that oxidation is still occurring primarily in the top 3 to 30 ft of the waste rock facilities even after several decades of weathering, it is reasonable to assume that sulfide oxidation and the associated release of sulfate and metals will continue at close the current rate for many centuries. Absent some dramatic change to the proposed closure plan, the Robinson Mine will almost certainly be a perpetual-care site, meaning that it will require long-term (several centuries) of active management to prevent degradation of surface and groundwater quality.

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. The EIS 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.

Under NEPA and FLPMA, BLM is required to fully analyze the current/baseline conditions of the site (including on public and private lands), and all direct, indirect, and cumulative impacts from existing and proposed facilities and operations. Under FLPMA, the Clean Water Act, Nevada law/regulation, and other applicable laws, BLM must ensure that all facilities and activities comply with all federal and state water, air, and environmental quality standards, which does not appear to be the case at the site.

Giroux Wash Tailings Storage Facility

The pumpback system for the sulfate plume pumped about 12.3 million gallons of water in 2017,[3] and state of Nevada required quarterly monitoring reports since indicate that the pumping rate has not decreased. The first quarterly report of 2020 shows highly contaminated water with sulfate and total dissolved solids (TDS) as high as 1,500 and 4,030 mg/L respectively in well PW-2.[4] Furthermore, the elevated levels are consistent and there is some indication when comparing the fourth quarter monitor report from 2017 with the first quarter report from 2020 that sulfate and TDS levels are increasing at least for well PW-2.[5] The issue of the contamination plume needs to be fully evaluated in the EIS, specifically to identify the boundaries of the plume, the specific source cause, and an estimation of how long the pumpback system will be required. The current reclamation plan has calculated a 20-year cost for the pumpback system, and BLM needs to address the potential of longer time horizon to estimate long-term closure and management costs for this facility

The proposed expansion will be adding more tailings to the facility, so there must be an analysis of of whether the expansion will increase the contamination going into the groundwater. Currently, the leaking tailings facility is in violation of Nevada law by degrading groundwater. BLM should not allow an expansion that will increase the amount of contamination and degrade groundwater further. BLM needs to address the question of whether the tails facility can be closed in the relatively short timespan assumed in the closure plan. As far as GBRW can determine from the reclamation plan KGHM is assuming a 20-year post mining period for closure, which is likely to be a significant underestimation.

Incorrect Assessment of Toxic Fluid Releases from Waste Rock Dumps

The method used in the Robinson Nevada Mining company (RNMC) Waste Rock Management Plan for estimating sulfate concentrations in seepage from existing and future waste rock facilities is incorrect. The error arises because RNMC's waste rock model estimates the concentration of sulfate in waste-rock seepage as a simple proportion to the sulfate concentration in a laboratory humidity-cell tests. In fact, solute concentrations in humidity-cell test effluent depends on the laboratory test procedures, and thus do not relate directly to solute in waste-rock facilities under field conditions, which varies with the duration over which rock are exposed to atmospheric oxidation, the net infiltration of meteoric water, temperature, and several other factors. The sulfate and metal concentrations predicted in RNMC's model is essentially arbitrary, but in the application to field conditions at the Robinson Mine, the model happens to underestimate SO_4 in waste-rock seepage by a factor of between ~6 to over 33 (e.g., predicted SO_4 in seepage ranges from ~480 to 750 mg/L SO_4, while measured SO_4 in existing waste rock is between ~4,400 and 22,000 mg/L).

GBRW has identified the following specific concerns with the RNMC Comprehensive Waste Rock Management Plan (CWRMP) Rev #7[6]

The description of the model used to estimate the composition of waste rock leachate is too vague to understand.

The CWRMP Rev#7 model (Geomega 2018)[7] references curves fit to humidity cell test (HCT) concentration versus time data ("chemical release functions") that are then used directly to estimate concentration in seepage under field conditions, but there is no equation presented to describing how lab results scale to field conditions, leaving entirely unanswered:

- How the concentrations measured over a few weeks in lab tests, where water: rock ratios are hundreds of times higher than encountered by rock in the field, are extrapolated to estimate concentrations in the field;
- How the relatively short duration of oxidation in lab HCT tests (a few weeks), are used to extrapolate to the long duration of oxidation under field conditions (decades to centuries); and
- What assumptions, if any, are made about the rate of sulfide mineral oxidation in the Keystone waste rock. (Overdumping with low-sulfide rock should reduce the oxidation rate in the PAG rock some, but the proposed construction method

—end dumping in 50-ft lifts--facilitates advective air flow along coarse rock in inclined slopes.)

The CWRMP Rev#7 makes the erroneous assumption that solute concentrations in humidity cells will indicate directly waste-rock pore water concentrations under field conditions.

Although the CWRMP Rev#7 does not provide an equation directly linking lab tests to field conditions, several passages suggest that estimates of solute concentrations in waste rock under field conditions can be equated to concentrations in HCT effluent.

First is a direct linkage between laboratory concentrations ("composite chemical release function" [i.e., curves fit to concentrations vs time data from laboratory HCTs]) to seepage under field conditions (draindown chemistry), followed by comparison to regulatory thresholds for groundwater (NDEP reference values):

> "*The composite CRF for SO_4 (Figure 6-5) illustrates the broad ABA-dependent contribution of all lithologies to draindown chemistry, with SO_4 concentrations gradually decaying with pore volume to reach a steady state well below the NDEP reference value (500 mg/L) within the first 10 weeks.*"

Next is in the analysis of the "worst case scenario" for draindown chemistry (Geomega 2018, Section 6.5.3.2). Results of this calculation for each Profile I solute are in Table 6-7 of Geomega 2018 (inserted below). Here the WRMP text states that concentrations in HCT lab tests (i.e., lab concentrations, estimated as "chemical release functions") were used directly to estimate pore-water concentrations in the field: "The **draindown chemistry**, calculated in the composite CRF, was allowed to equilibrate with the same representative mineralogical consortium used in Section 6.5.3.1" (Bold text added).

Table 6-7. Summary of solute concentrations calculated for weeks 0,1,2 of the composite CRFs for the worst case scenario for RE-3.

Analyte	Week 0	Week 1	Week 2
Aluminum	**2.1**	**1.2**	**1.0**
Antimony	0.003	0.002	0.002
Arsenic	**0.042**	**0.033**	**0.028**
Barium	0.16	0.11	0.08
Beryllium	0.007	0.002	0.002
Cadmium	**0.012**	**0.005**	0.004
Calcium	136	83	61
Chloride	8	3	2
Chromium	0.016	0.013	0.012
Copper	**24**	**21**	**19**
Fluoride	2.4	2.0	1.8
Iron	**31**	**29**	**27**
Lead	0.028	0.014	0.009
Magnesium	20	10	7
Manganese	**12**	**9.1**	**8.1**
Mercury	0.0003	0.0003	0.0002
Potassium	9	5	4
Selenium	0.039	0.032	0.028
Sodium	17	10	7
Sulfate	**594**	285	194
TDS*	**885**	464	335
Thallium	**0.011**	**0.005**	**0.003**
Total Nitrogen	1.0	1.0	1.0
WAD Cyanide	0.02	0.02	0.02
Zinc	**28**	**5.2**	2.9

* Calculated by summation

Bold indicates solute concentrations in excess of the NDEP reference values for Profile I.

Finally, another discussion of how the attenuation process was simulated seems to state directly the use of HCT concentrations as a proxy for field conditions:

> *"The draindown chemistry calculations were based directly on HCT results, and indicate which solutes in the draindown could be transported to groundwater after attenuation in the vadose zone below the Keystone overdump WRF."*

Solute concentrations in humidity cell tests are artifacts of the test procedure, and do not provide reasonable estimates of solute concentrations in weathering material under field conditions.

Errors in the model of waste rock weathering cause the CWRMP Rev#7 to dramatically underestimates pollutant release.

Given that CWRMP Rev#7 does appear to use concentrations in laboratory HCT leachates as direct estimates for pore-water concentrations under field conditions, our comment is that this calculation method will grossly underestimate expected solute concentrations in leachate.

The CWRMP Rev#7 justifies the assumption that solute concentrations in humidity cells can be applied directly to estimate concentrations under field conditions by comparing concentrations measured in leach tests on acid-leached material (ALM) to the concentration collected from acid-leached rock under field conditions in the Intera pond.

> *"The chemistry of Intera pond is remarkably similar to the leachate chemistry observed in six modern HCTs and 20 MWMPs23 on ALM (Table 6-1). . . . . **The conclusion is that HCT leachate reasonably represents draindown chemistry**." (*Geomega 2018, bold added*).*

[Note: The comparison of field conditions includes both HCT results (first flush of water only) and MWMP lab tests is reasonable, because both leach the rock using a 1:1 water:rock ratio, by mass.]

The effluent from lab leach tests on acid-leached mine rock is in fact remarkably similar to the concentration of solutes in the Intera pond (Table 6-1, from Geomega 2018):

Table 6-1. Comparison of average Intera Pond water chemistry and week 0 HCT leachate from Mollie Gibson ALM.

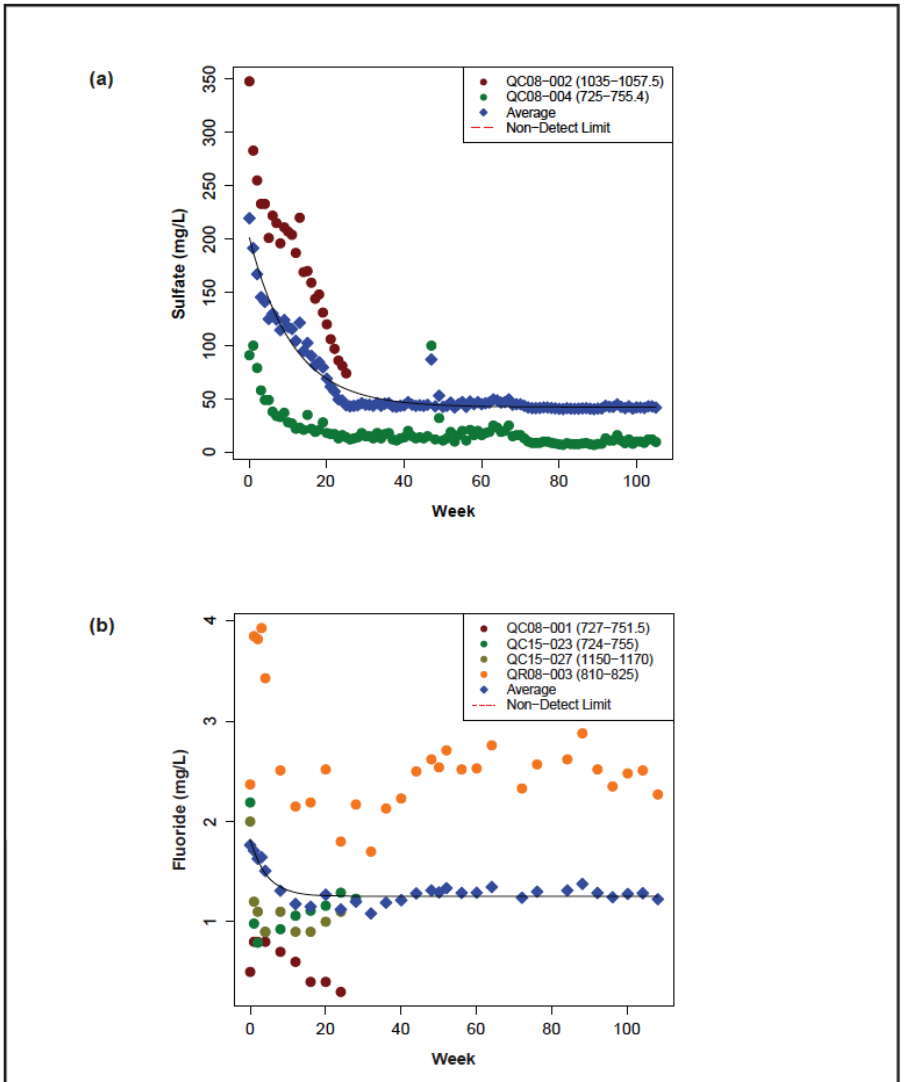
Analyte	Intera	MG ALM HCT
Acidity	3,375	2,520
Aluminum	377	118
Arsenic	0.002	0.32
Beryllium	0.03	0.04
Cadmium	0.16	0.59
Calcium	406	514
Copper	245	644
Fluoride	25	47
Iron	229	79
Magnesium	364	178
Manganese	101	364
pH (su)	3.32	3.53
Selenium	0.04	0.5
Sulfate	6,266	5,530
Zinc	27	234

All concentration except pH in mg/L.

But the acid-leached materials, and the leachate from similar ALM that is represented by the Intera pond water, represent extreme chemical conditions. Specifically, the water in the Intera pond and MWMP leachates from ALM samples appear to be close to saturation for gypsum ($CaSO_4 \cdot 2H_2O$). For these rocks, repeated rinses would produce similar concentration of sulfate, and any other constituents that were dissolving from soluble solid, until the soluble solid phases were completely dissolved.

But the rock extracted from the Ruth Pit for the Keystone over-dump layers will be fresh, and only begin oxidizing after it is excavated. In this material, there is no reason to expect that solute concentrations under field conditions will be related to concentrations in HCT effluent.

The description of the calculation method described in Section 6.4 (Future Draindown Chemistry and Optimal Cover Thickness; Geomega 2018) makes many references to constructs called “Chemical Release Functions.” Figure 6-4, from Geomega 2018 (inserted below) is an “example of a good [chemical release function] fit to data.” The sample in Figure 6-5(a) represented by the blue circles is a typical concentration vs time pattern for sulfate in a humidity cell with sulfide-bearing rock.



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Example of a good CRF fit to data for
(a) SilPy ANP/AGP 0.1-0.3 (G10) sulfate and
(b) Pel 0.3-1.2 (G11) fluoride.

Figure
6-4

The concentration versus time data for sulfate (and thus the curve fit to create a “chemical release function”) is largely an artifact of the test procedure. First, the high concentrations in early weeks are largely arbitrary, depending on the unknown duration and conditions under which the sample was stored before humidity cell testing started. There is no reason to think that a curve fit to the initial solute concentration would relate directly to concentrations under field conditions. Next, the period of flat concentration, after ~22 weeks of testing, is typical behavior for a rock sample that has a relatively uniform oxidation rate.

All of values for sulfate concentrations in an HCT test shown in Figure 6-4(a) are artifacts of the method, in particular the water-to-rock ratio used in HCTs, and the duration between rinses. If the standard humidity cell test procedure happened to require half as much water, and the duration between rinsing samples happened to be two weeks instead of one, then the concentrations observed in the lab, and thus the model concentrations predicted for field conditions, would be approximately 4-times greater. This general condition—a model in which predicted concentrations under field conditions will change in proportion to arbitrary lab-test procedures—indicates a fundamental computational error. Specific to the estimate of leachate concentration in waste rock from the Ruth Pit (RW-5), using the concentrations of sulfate (and other solutes) measured in weekly humidity-cell effluents as a direct proxy for field conditions will dramatically underestimate solute concentrations in waste rock seepage.

Finally, the CWRMP #7 seems to make a complete break with the standard conceptual model of mine-waste weathering. In broad concept, sulfide-bearing mine waste oxidizes when excavated and exposed to the air, and solutes release by oxidation are carried down in percolating water. Humidity cell tests are a type of "kinetic test," meaning that they measure a rate, typically sulfide mineral oxidation, as indicated by the release of solutes associated with this chemical reaction. Concentrations in HCT tests thus reflect the rates of sulfide-mineral oxidation and pore-water flow. Yet the CWRMP #7 does not uses HCT results to indicate this rate of oxidation and associated pollution release (which could be linked to solute release under field conditions), but instead appears to focus on the early flush of solutes from the HCTs, which are due almost entirely to the arbitrary handling and storage procedures applied to the samples before HCTs began:

> *"HCT leachates indicate that the solutes released from the sample were predominately present in readily soluble phases prior to the start of the HCT, exhibiting a flushing effect, rather than being released from reactive, insoluble minerals over time due to sulfide oxidation."*

This erroneous assumption—that early HCT solute concentrations would somehow reflect concentrations under field conditions--appears to have been applied in previous reports on Robinson waste rock (e.g., "This comprehensive WRMP (Revision #7) used the previous WRMP as a template, modeling the chemistry and volume of infiltrating precipitation (draindown) to demonstrate that waters of the State will be protected")

The model in WRMP #7 used to estimate pollutant concentrations in the Keystone waste rock facility needs to be revised so it incorporates in a logical fashion and describes clearly in an accompanying report, the standard components used to estimate water quality emanating from mine waste. These include: 1) The rate of sulfide mineral oxidation in the rock, 2) The mass of solutes released in association with this oxidation process, 3) The duration over which oxidative weathering is simulated, 4) the flux of water carrying solutes through the rock, and 5) The effect of aqueous geochemical reactions that alter solute concentrations in water percolating through the waste.

The CWRMP #7 model is underestimating pollution concentrations in seepage from existing Keystone waste rock

A comparison of two estimates for pore-water sulfate--one from a model prediction and the other from a direct measurement on a sample weathering under field conditions--illustrates the magnitude of the underestimates expected in the CWRMP #7 calculations. This comparison is based on two materials with similar acid/base accounting values. Both are strongly acid generating (ANP = 35 and 38.4 kg $CaCO_3$/tonne), but with enough neutralizing potential that the samples have not yet produced acidic leachate. The material characteristics are listed in the table below ("Comparison of Estimated Sulfate in Pore Water, Model value (CWRMP #7) Vs. Measured in Weather Keystone Dump Waste Rock").

Comparison of Estimated Sulfate in Pore Water, Model value (CWRMP #7) Vs. Measured in Weather Keystone Dump Waste Rock			
		Source Material	
Parameter	Units	Ruth Pit Area	Existing Keystone Waste
Weathered condition:	--	Fresh sample	Aged in waste rock facility
Sample ID	--	QC08-004 (725-755.4)	KDH07-12
ANP	Ton/kTon CaCO3	35	38.4
AGP	Ton/kTon CaCO3	170	120
ANP/AGP	--	0.21	0.32
Paste pH	S.U.	8.09	6.42
Sulfur	%	6.6	5.07
Maximum SO4 in HCT	mg/L	**220**	**1870**
Source (in 2018 WRMP)	--	Figure 6-4 (SO4 in humidity cell), and Table 4-2b (acid/base accounting)	Table 4-7

or the fresh sample from the Ruth Pit area, solute concentrations are shown in Figure 6-4 of Geomega 2018 ("Example of a good CRF fit to date for (a) SiLPy ANP/AGP 0.1-0.3 (G10) sulfate," shown above in these comments). The sulfate concentration data and "Chemical Release Function" shown for sample QC08-004 (725-755.4) indicate that, based on the initial HCT leachate, the model will predict a maximum sulfate concentration of **~220 mg/L**, and that this concentration will decreases thereafter, leveling off at ~50 mg/L at week 22, after which it remains approximately stable through week 100.

In contrast, a sample of material with similar acid/base characteristics that has weathered in the Keystone Waste Rock facility for several years (Sample KDH07-12) produced a sulfate concentration of **1,870 mg/L** in an MWMP test (i.e., equivalent to the first flush in an HCT test). Thus for two similar materials, the measured sulfate concentration in pore-water, 1,870 mg/l, is ~8.5 times higher than the 220 mg/L maximum concentration that would ever predicted by the CWRMP #7 model.

In fact, the model underestimate is probably much larger. The MWMP test dilutes the actual pore by a factor of ~10 (i.e., gravimetric moisture content in the Robinson waste rock is probably ~0.12 kg water/kg rock, and the MWMP test dilutes this pore water with another 1 kg of water to each kg or rock). Thus pore-water concentrations in existing waste rock could be up to ~10× higher than indicated by the MWMP results on these materials reported in the CWRMP #7 (Geomega 2018). Some of the weathered rock from the Keystone dump appears to be at equilibrium with the mineral gypsum, meaning that multiple leach cycles may produce a constant pollution concentration until gypsum and other soluble minerals were depleted. But once the net-acid generating rock actually does become acidic, which will happen eventually to nearly all of the legacy Keystone waste rock as weathers over time, the concentrations of most solutes in the pore water are expected to increase dramatically.

Most of the existing rock within the Keystone WRF will eventually become acidic.

The samples from deeper than 6-ft below the surface of the Keystone dump are all acid generating, but have not undergone oxidative weathering for long enough to produce acidic leachate. Forecasts of future water quality in seepage from the Keystone waste rock facility needs to acknowledge that future seepage from the Keystone waste rock facility will be strongly acidic.

When the rock in the Keystone WRF does eventually becomes acidic, solute concentration in pore water will increase dramatically.

In acid-generating waste rock, like most of the existing Keystone WR, acid and metals are solubilized by the rate of oxidation. Under strongly acidic conditions, such as exist in the near-surface Keystone waste rock today, many metals and anions are highly soluble, and the solute concentrations in the pore water concentrations may not be limited by mineral solubilities and adsorption to surfaces. Thus, while reducing water infiltration is a standard method to reduce pollution release, in the absence of concentration caps on the dissolved concentrations, pollutants released by oxidation just dissolve into available water, causing concentrations to increase and leaving the flux of pollutants unchanged. The limited effectiveness of reducing water flow in acidic mine waste was identified over 25 years ago in field studies of net acid-generating waste, where researches noted that the neutralization capacity will eventually be exhaust, after which "the load exiting the base of the dump... will be independent of the rate water infiltrates" (Ritchie, 1994).[8]

Conditions that will arise in the Keystone waste rock when the PAG rock does eventually becomes acidic can be seen in the four near-surface samples of Kimbley waste-rock facility (i.e., between 0 and 6 ft below the surface, see Table 4-7 in Geomega 2018).

Table 4-7. MWMP analysis for Keystone.

Analyte	Result KS-T1-0-3FT		Result KS-T1-3-6FT		Result KS-T2-0-3FT		Result KS-T2-3-6FT	
AGP								
ANP								
NNP								
ABA ratio								
Pyritic Sulfur								
Sulfate Sulfur								
Total Sulfur								
Non-extractable Sulfur								
Paste pH								
Extraction Fluid pH	5.94		5.94		5.94		5.94	
Final Fluid pH 7.65	3.6		2.5		2.6		2.7	
Aluminum	35.5		634		123		133	
Barium	0.1	U	0.1	U	0.1	U	0.1	U
Beryllium	0.048		0.139		0.025		0.015	
Bismuth								
Boron								
Cadmium	0.008		0.145		0.013		0.042	
Calcium	420		506		417		357	
Chromium	0.01	U	0.44		0.05		0.03	
Cobalt								
Copper	63.8		345		50.9		199	
Iron	0.4		798		28.6		16.9	
Magnesium	30		170		19		61	
Manganese	5.03		36.4		4.34		12.2	
Nickel	1.04		3.06		0.07		0.14	
Potassium	3		1	U	1	U	1	U
Silver	0.01	U	0.01	U	0.01	U	0.01	U
Sodium	10		6		14		12	
Zinc	1.23		24.5		1.84		2.61	
Antimony	0.003	U	0.003	U	0.003	U	0.003	U
Arsenic	0.005	U	0.039		0.009		0.01	
Lead	0.002	U	0.006		0.002	U	0.002	U
Selenium	0.013		0.138		0.033		0.008	
Thallium	0.001	U	0.001	U	0.001	U	0.001	U
Uranium	0.018		0.255		0.091		0.069	
Mercury	0.001	U	0.001	U	0.001	U	0.001	U
Cyanide (WAD)	0.01	U	0.01	U	0.01	U	0.01	U
Nitrate/Nitrite as N	0.2		0.1		0.2		0.1	
Total Alkalinity	5	U	5	U	5	U	5	U
Bicarbonate	5	U	5	U	5	U	5	U
TDS	2950		12000		3940		4690	
pH	3.17		2.37		2.55		2.62	
Fluoride	1.9		0.4		0.3		0.5	
Chloride	1	U	4		2		3	
Sulfate as SO4	1720		7090		2430		2880	

U indicates that value is below the detection limit.

Although Table 4-7 does not report acid/base accounting for these four samples, the acidic MWMP effluents (pH values = 3.17, 2.37, 2.55, 2.62), demonstrate that available neutralizing potential has been depleted. The concentrations of dissolved sulfate in these acidic effluent samples (1720, 7090, 2430, and 2880) are higher and more variable than in the deeper pH-neutral Keystone rock. Unsurprisingly, the concentrations of several metal cations are also much higher in this acidic pore water (e.g., MWMP copper concentrations are 63.8, 345, 50.9, and 199 mg/L). Finally, the concentrations in Table 4-7 are after diluting pore-waters ~10x in MWMP tests, so if solutes in these acidic samples are not limited by mineral solubilities, then the actual pore-water concentrations in could be up to ~10x higher than shown.

The CWRMP #7 needs to provide an estimate for the effects on groundwater quality when the net-acid-generating rock in the Keystone waste rock facility eventually produces acidic effluent.

Acid neutralization and metal attenuation in leachate from the Keystone WRF is only partially effective, and will probably diminish in the future.

Neutralizing acidic seepage from rock in the Keystone waste rock facility will effectively reduce the concentrations of sulfate and most metal. This effect is apparent in the existing Keystone waste rock, where the MWMP extracts from the deeper waste rock (i.e., > ~6 ft below the surface) has near-neutral pH and solute concentrations are much lower than in the near-surface acidic rock (Table 4-7 MWMP analysis for Keystone, Geomega 2018; shows above in these comments). The CWRMP #7 incorporates the effect of chemical reactions with carbonate bedrock below the Keystone waste rock. But the effectiveness of limestone neutralization of acidic mine water can be severely inhibited by the precipitation of minerals (often sulfate, aluminum, and iron phases) that coat the acid-neutralizing rock. This decrease in effectiveness of calcite neutralization is difficult to quantify but commonly observed, and means that the Keystone WRF, as design, is likely to pose a long-term risk to groundwater quality.

The CWRMP #7 model would be improved by calibration to undiluted pore water samples collected from the existing Keystone facility.

A simple option to improve the estimates of pollution migration in the Keystone waste rock (i.e., to remedy the ~10-fold dilution of pore water involved in MWMP testing) is to just measure directly the solute concentrations in existing pore water. This actual pore-water concentration, when multiplied by the water flux, yields the flux of pollutants moving through the waste rock. There are methods to extract pore water (e.g., with pressure plates or centrifuges), and forecasts of environmental impacts from Robinson waste rock would benefit from calibrating predictive models to values for this undiluted pore water samples.

The 2018 CWRMP does not include available design components that could decrease long-term release and transport of pollutants.

A waste-rock facility design that limited oxidation, such as could be achieved by including layers with very low air diffusivity, would provide a long-term decrease in the rate of sulfide-mineral oxidation, and thereby decrease the rate at which pollutants perpetually leach from the facility. But the Robinson Mine 2018 CWRMP plan for over dumping on the Liberty Waste Rock facility does not include design elements to reduce oxidation, and instead proposes end-dumping in 50-ft lifts, which produce zones of coarse waste rock that facilitate advective air flow into mine waste.

The Keystone Waste Rock management plan needs to acknowledge that, as designed, the existing waste rock facility and proposed over dump will require perpetual monitoring and management to avoid contaminating of groundwater.

Under the proposed CWRMP #7 design, the Keystone waste rock facility will leave in place strongly acid-generating rock, most of which will reside below the mixture of PAG and non-PAG rock produced by mining in the Ruth Pit. Samples from the existing Keystone waste rock demonstrate that as it weathers, the migrating pore water becomes strongly acidic, and at a minimum can contain a up a few mg/l of some metals (nickel and zinc), a few tens of mg/l to a few hundred mg/l of other metals (e.g., copper, aluminum, and iron), and several thousand mg/l sulfate (Table 4-7 CWMMP analysis for Keystone, Geomega 2018, see above in GBRW's comments). The proposed closure design does not include any elements to reduce oxygen flow into the facility, and the proposed end-dumping construction will leave conductive sloped layers that actually facility air advection into the waste rock. Vegetated cover will reduce, but not eliminate the percolation of water, and the side slopes are left to revegetate naturally. Although the underlying limestone bedrock is a large source of acid neutralization, preferential flow paths in carbonate bedrock and the development of armoring precipitates on calcite mineral surfaces can eventually reduce or eliminate the effectiveness of limestone neutralization. The Keystone waste facility is thus, by design, a perpetual source of pollution to the underlying groundwater. As a result, closure should include a plan for perpetual monitoring of the groundwater, and the development of a contingent long-term groundwater management plan to be implemented if monitoring at some point in the future determines that concentrations of pollutants in groundwater increase dramatically at some future time.

Incorrect Assessment of Water Quality for the Ruth Pit Lake

The estimate of solutes leached from wall rock is based on humidity cells, but many of the net-acid generating samples were not tested long enough to generate acidic leachate.

The humidity cell tests (HCTs) used to estimate solute release from wall rock and waste rock contains numerous samples that have large acid generating potential (e.g., AGP > 50 kg $CaCO_3$/tonne) and are strongly net-acid generating (e.g., ANP/AGP ratios < 0.5) (Table 3.6: Ruth West 5 eligible HCT, Piteau 2019).[9] Yet in terms of their acid generating potential, many of these are classified as "None." As described in the 2019 pit lake report text: "Multiple HCT samples with ANP/AGP ratios < 0.3 did not generate acid, suggesting that the current PAG classification criteria is conservatively chosen."

In fact, the absence of acid production from strongly net-acid generating rock almost certainly reflects that fact that the HCTs were not run long enough for the acid produced to exhaust the available neutralizing potential. (All but one of the HCT tests used for the pit lake study were run for <50 weeks, see Table 3.6, Piteau 2019). Using humidity cell tests run for less than a year to estimate solute release from rock exposed to oxygenated weathering for years to decades will almost certainly cause the pit lake models to underestimate the load of pollutants to the Robinson Mine pit lakes.

The estimate of solutes released by runoff over sulfide-bearing wall rock to the pit lake does not account for the time over which wall rock oxidizes.

Pollutants that are released from the oxidation of minerals in the Ruth Pit wall rock and then loaded into the pit lake by runoff were estimated using results of humidity cell tests on representative samples of wall rock. Specifically, for pit wall runoff, "Late term HCTs data is selected as surrogate geochemical source terms for exposed lithology in final pit wall. Data is scaled from laboratory to pit wall setting."

Inferring from the description presented in "Table 4-6: Chemical release function algorithm for HCT weeks" (inserted below) and discussion of scale factors (Piteau 2019), the model appears to use the number of *pore volumes* from HCTs (where 1 week in an HCT is estimated to be 2.5 pore volumes of water) to estimate solute released from wall rock released over time to runoff. Looking at *Pit Lake step (yr) 10*, in Table 4-6, this appears to indicate that the cumulative amount of runoff under field conditions corresponded to 12.5 pore volumes in the reactive pit walls, and the model then estimated the runoff load per unit mass of sulfide rock using the solute released from laboratory HCTs between the lab equivalent of 5 to 12.5 pore volumes.

This method neglects a fundamental characteristic of sulfidic mine waste: under oxygenated conditions, pollutants are released from sulfidic mine waste in proportion to how long it is exposed to oxidizing condition, until all of the sulfide minerals have oxidized. The effect of approach used by Piteau is to introduce into the model a large underestimation error for the load of pollutants from wall rock to the Ruth West 5 lake. As a rough estimate for the magnitude of this error, note in Table 4-6 that runoff up to model year 10 is based on the cumulative leachate extracted from a humidity cell test out to week 4. That is, the amount of oxidation that will occur in 520 weeks in the field is estimated using the measured amount of oxidation that occurred in 4 weeks in a lab test--a potential factor of 130 underestimate in pollutants released from the wall rock.

Table 4.6: Chemical release function algorithm for HCT weeks

Pit Lake step (yr)	Calculated Pore Volumes	Min PV	Max PV	HCT Week (Pore Volume)					
				0 (2.5)	1 (5)	2 (7.5)	4 (12.5)	8 (22.5)	12 (32.5)
1	0.5	0	2.5	100%	-	-	-	-	-
5	3.4	0	5	50%	50%	-	-	-	-
10	11	2.5	12.5	-	33%	33%	33%	-	-
50	27	12.5	60	-	-	-	33%	33%	33%

The estimate of solutes released by sulfide-bearing wall rock to the pit lake when the rock is submerged does not account for the time over which the wall rock oxidizes.

For solutes release upon pit wall submergence--i.e., solutes flushed by groundwater flowing into the pit lake when a section of wall rock is flooded--the model appears to estimates solute loads in the field by assuming that some number of the pore volumes in the reactive wall rock zone (called the *DRZ* in Piteau 2019) have the same composition as the initial effluent ("time zero") from a laboratory HCT. The text is inconsistent as to how many pore volumes of wall rock are assumed to have this higher concentration. Table 4.2 in Piteau 2019 states that, "Early term HCT data is scaled for mass loading terms to the pit lake. 20 pore volumes are used to simulated pit wall flushing;" but then on Page 36 the text says that "Experience with other pit lakes in arid climates indicates that 10 flushed pore volumes (week 0 HCT results) . . . is appropriate to account for the accumulation of solutes from flushing the rind around an open pit." In either case, this is not a sensible method for estimating pollutant release from sulfide-bearing wall rock. The composition of the initial flush from an HCT is essentially arbitrary, reflecting how long the rock sampler happened to have been in storage before it was tested and the conditions under which it was stored. In contrast, the composition leached from wall rock under field conditions will reflect the accumulated solutes produced by oxidation over the period—years to decades--that the rock was exposed to the atmosphere.

Because the composition of the initial "time zero" flush of water from an HCT is arbitrary, it is difficult to estimate the magnitude of the error this assumption introduces into the water-quality model. But given that much of the net-acid generating wall rock will be exposed for a decade and more before it is inundated, much more of this net-acid-generating wall rock will probably have started producing acidic leachate than was indicated in the shorter (<50 week) HCTs. It is thus reasonable to assume that this model assumptions has introduced a large systematic underestimate of pollution load to the Ruth West 5 lake.

The Ruth West 5 Pit lake model study needs to refine the model so that it incorporates the effect of wall-rock oxidation over time, and then provide a plan for treating the lake water to meet discharge standards.

> It is important that the Ruth West 5 pit-lake water quality model be refined so that it considers oxidation in wall rock over the actual duration that the rock will be exposed to the atmosphere. Given that the Ruth West 5 Pit Lake is expected to have outflow to groundwater, the updated chemical model should then include technical options for treating the expected water in the Ruth West 5 pit lake to meet the standards for discharge to groundwater.

Reclamation Schedule Underestimates Long-Term Management

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.[10] KGHM clearly does not anticipate the need for perpetual management or even very long-term management on the order of 100 years or more. GBRW believes this to be in serious error as discussed above the extent of water pollution is likely to be much greater than presented by KGHM, and monitoring will be needed well past 2052 even under the current plan of development, especially the Keystone waster rock dump.

Alternatives to Perpetuity Treatment is Needed

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).

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.

Project Approval would Violate FLPMA's UUD Mandate

As delineated above the methodology for the determination of water pollution is fundamentally flawed, and long-term active management will be required to avoid degradation at the very least of groundwater. However, KGHM in its documentation and reclamation plan erroneously do not anticipate and therefore do not plan for very long-term perpetual management lasting hundreds of years. At a minimum the Ruth Pit Lake and Keystone Waster Rock Dump are likely to cause "unnecessary and undue degradation" at the Robinson site._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 or other potentially affected resources.

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).

The fact that the Keystone dump and other facilities may have been approved or begun operations prior to FLPMA's passage in 1976 does not eliminate BLM's current duties to protect public land and resources from all activities that threaten public resources (including those activities that may originate on non-federal land).

BLM complies with this mandate, among its other authorities, "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, or allow activities on federal land to continue that do not fully protect all public resources, now and in the future.

For example, 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. In addition, BLM must comply with its duties under FLPMA Title V and Special Use Regulations (43 CFR Parts 2900/2920) for the access roads, required rights-of-way, and other routes across public land that are proposed.

Cumulative Impacts Must be Addressed

he EIS should also examine how the various impacts of this mine will add to the collective impacts of other ecosystem disturbing projects in the region. For example, could mercury and other air pollutant emissions from the mine when taken together with other mercury and other sources in the region result in mercury and other pollutant exceedance(s) according to the Clean Air Act. Or, does the mine disturbance further impair the regional ecosystem resulting in impacts to public resources, including air/water, cultural, recreation, fauna and/or flora?

The direct, indirect, and cumulative impact analysis needs to address cultural traditions as well, such as the pine nut harvest.

A cumulative impact is "the impact on the environment which results from incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR § 1508.7.) This definition is critical to determining the proper area to be studied in a cumulative impact assessment.

The DEIS must fully consider all "direct and indirect impacts" under NEPA, and review the "cumulative impacts" from all "past, present, and reasonably foreseeable future actions" under NEPA. 40 CFR § 1508.7. In this case, if 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, then it will be in violation of NEPA. BLM's duties to fully analyze all direct, indirect, and cumulative impacts include the duty to analyze baseline conditions and all impacts from the existing facilities, all proposed facilities, and all other "past, present, and reasonably foreseeable future" activities in the region.

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.

General Considerations Involving Water

The EIS needs to describe the existing contamination at the mine with analysis of the sources of the contamination and current activities to prevent degradation of surface and groundwater. In addition, there needs to be a detailed discussion of how the site is to be closed including any potential for long-term treatment. The environmental analysis need to provide a timeline for closure that shows the volumes of contaminated water that needs to be treated over time.

There needs to be an assessment of water use compared to available resources and existing water needs including other water users in the region. Any dewatering must be evaluated for impacts to flora and fauna as well as rangeland watering holes, and springs.

The EIS needs to endeavor to determine the water quality baseline in the various groundwater aquifers prior to mining.

The impact to local flora and fauna due to changes in water dynamics needs to be examined; for example, potential loss of springs or changes in the water table. Analysis must address the potential loss of riparian areas, and whether the springs are on wildlife migratory routes, and, if so, how migrations will be affected.

BLM must also do a thorough analysis of the effects of activities within the broad cumulative impacts area including rights reserved under Public Water Reserve # 107. Due to the importance of these water rights, the EIS must catalogue each potentially affected water right and the ongoing and potential impacts from the proposed project plus reasonably foreseeable future activities/projects in the region.

There must 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.

Consideration of Land Related Issues

A full inventory of the loss of plant and animal species, examining both estimated numbers and variation of specie, needs to be done as a result of land disturbance and waste rock coverage. An understanding of migratory routes needs to be resolved, and the impacts of the loss of these migratory routes from the various land disturbances should be addressed. There needs to be particular emphasis on the impacts to migratory bird nesting sites and raptors. In some cases of migratory birds very limited nesting locations exist, thus there is the potential for the mine to seriously threaten such species. The degree to which the action may adversely affect an endangered or threatened species or its habitat must be addressed. In particular is the potential loss of Sage Grouse habitat. The BLM needs to examine how seasonal impacts to plant and animal species would be mitigated or avoided.

There also needs to be an analysis of whether the loss of scenic views will affect economic viability of the area.

A complete land and water restoration plan for all aspects of the mine needs to be detailed.

Air related issues

Mercury and all other current and potential air emissions must be evaluated. There needs to be a mercury capture plan with anticipated mercury   It is also necessary to analyze the environmental impacts, both local and regional, from expected mercury and other air pollutant emissions. The EIS should contain a plan for minimizing the mercury/pollutant emissions and the impact of the emissions to the surrounding area.

In addition to considering mercury emissions from thermal processes the EIS should discuss impacts from fugitive emissions off of heap leach, tailings, and waste rock facilities. Work publicly presented in November 2009, measured these mercury emissions determining that they are not insignificant.[11] Two mines were used in the study, Twin Creeks (Newmont) and Cortez-Pipeline (Barrick), where it was estimated that the fugitive emissions accounted for 19% (12 to 21%) and 17% (15 to 31%) of total at Twin Creeks and Cortez-Pipeline respectively. Thus, according to this analysis the increase in emissions due to fugitive emissions was calculated at 23% (13 to 27%) and 20% (17 to 46%) for the mines respectively.

GBRW does not accept any argument that these fugitive mercury and other air pollutant emissions cannot be estimated and are therefore unknowable. The toxicity of mercury alone demands that every attempt be made to determine the extent of all possible sources and pathways of mercury into the environment. In fact, the Final Supplementary EIS for the Cortez Hills Expansion Project did provide an estimate of fugitive mercury emissions.[12]

Analysis and mitigation plan of other gaseous emissions (such as sulfur oxides, nitrogen oxides, ozone, carbon dioxide, particulate matter, and lead) from any portions of the operation is also necessary. The EIS should analyze the project's contribution to carbon dioxide and other significant greenhouse gas emissions.

The expected amount of airborne particles as dust from all aspects of the project needs to be determined with concentrations for varying wind factors. Impacts of the "dust" should be evaluated for inhalation health impacts, visibility impairment, and resettling on surface water and vegetation. In the case of resettling on surface water there should be a chemical analysis of the dust to determine whether the dust could have an adverse effect on the chemistry of the water. In general, there needs to be a plan for dust control.

Overall, BLM must fully analyze all baseline conditions, and all direct, indirect, and cumulative potential impacts, from all past, present and reasonably foreseeable future activities in the region. This applies to all potentially affected resources (including but not limited to air quality and ground and surface water quality, ground and surface water quantity, wildlife, recreation, cultural resources, etc.).

Cultural/community related issues

The expansion needs to specially address the affects on the community of Ruth and disclose future expansion plans and their effects on Ruth.

BLM must describe in the EIS how it will provide for Western Shoshone cultural monitors at the mine site to ensure that cultural area are recognized and protected. The project area must be surveyed for historical and archeological artifacts, and mitigation plans must be developed for any of these sites.

There also needs to be an assessment of how the various communities in the region will be affected in terms of lifestyle, economics, and overall quality of life.

In the American Indian Religious Freedom Act (AIRFA), Congress stated that "[i]t shall be the policy of the United States to protect and preserve for American Indians their inherent freedom to believe, express, and exercise the traditional religions." 42 USC § 1996 (1982). The BLM must analyze the cumulative impact to the ability of Native Americans to fully practice the traditional religions within the study area. The analysis must include both known sacred and spiritual sites as well as traditional food and medicine gathering locations, which are important components of traditional practice.

The project is within land outlined in the Treaty of Ruby Valley, between the United States and the Western Shoshone Nation, so mineral rights were reserved and therefore continue to belong to the Western Shoshone Nation. The use of "gradual encroachment" is not a legally valid method of title transfer or extinguishment under existing federal law or recognized standards of human rights. Between February 20 and March 10, 2006 the United Nations Committee for the Elimination of Racial Discrimination, issued a decision of an "Early Warning and Urgent Action Procedure" handed down to the United States of America.[13] The decision pertains to US lands and therefore BLM or Forest Service public lands on which the project may in part be located. The relevant aspect of this decision is that the U.S. is to "freeze any plan to privatize Western Shoshone ancestral lands for transfer to multinational extractive industries and energy developers, and desist from all activities planned and/or conducted on the ancestral lands of Western Shoshone or in relation to their natural resources, which are being carried out without consultation with and despite protests of the Western Shoshone peoples." Thus, the project must seek consultation and permission from the Western Shoshone on their lands.

Summary

In general, the reclamation and plan for closure of the Robinson Mine does not acknowledge the likely need for perpetual management. Of course GBRW would prefer that the mine is closed in such a manner that would not require perpetual management, but the plan as proposed fails as discussed above to correctly determine the expected water pollution at the site in the long-term. Therefore, the closure and reclamation plan is inherently wrong and must be corrected. BLM needs to work with the state of Nevada 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.

Our analysis foresees significant water pollution and likely groundwater contamination given the proposed mine and closure/reclamation plan. If BLM approves this mine plan then it will be in effect acting as an agent for the company and not engaging in supporting the public good.

In addition the public has a ***right to know*** what to anticipate in the process of closing the Robinson mine. The BLM has a responsibility to ensure that the public is fully informed as to actions on public lands and communities need to fully understand the consequences of hosting a mining operation. GBRW is very concerned that the nearby community has not been informed and that governmental agencies and the mining company have not been fully transparent in regards to the potential need for perpetual management. It is important for the public to be informed about this option and decide for themselves if perpetual care is acceptable.

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

Sincerely,

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APPENDIX: A STANDARD CONCEPTUAL MODEL OF POLLUTION RELEASE FROM SULFIDIC MINE WASTE

This appendix is included as background on GBRW's comments on the Robinson Mine CWRMP #7 to provide a conceptual model of how oxidation and solute transport from sulfide-bearing mine waste is presented in the publication describing the model "MinTox" (Wunderly et. al, 1996). [14]

In general overview, oxygen in the pore space of the mine waste react with sulfide-S minerals, producing sulfuric acid and solubilizing metals that were bound with in the sulfide minerals. Meteoric water percolating from the surface carries these solubilized constituents down through mine waste, where the pore water changes as it interacts with rock fragments in lower layers.

This produces a simple conceptualization for how oxidation in mine waste is related to the concentration in leachate:

- Water percolation into is mine waste is typically treated as a flux (i.e., volume of water per area of ground per time, e.g., [m^3 water]/[m^2 waste facility]/[Yr], which has units of velocity, [m/yr]).
- Solute release can also be considered in terms of the horizontal area of the surface of the facility (i.e., mass of solute per area of the waste facility per time, which for sulfate—the direct product of sulfide-mineral oxidation—is [kg SO_4]/[m^2 waste facility]/[yr].
- Dividing this rate of SO_4 production per area by the rate of water percolation per area yields the mass of sulfate per volume of water ([kg SO_4/[m^3 water]), which is concentration of the SO_4 in the percolating water.

Thus an estimate of sulfate concentrations in effluent from sulfidic mine waste starts with estimates for the rate of sulfide mineral oxidation and the rate of water flow. From this framework, estimates for concentrations for other solutes--metals and anions—can be added using rates of oxidation and dissolution measured in humidity cells. Very importantly, the undergirding concept for these models can be described in concise terms, and the key model parameters can be combined in simple fashion to illustrate how the model estimates solute concentrations. From this basis, estimates of solute attenuation by adsorption and mineral precipitation can be estimated using geochemical equilibrium calculations, such as the USGS PhreeqC model.

Here an axiom that is common to models used to estimate water-quality of sulfidic mine waste: **When modeling pollution release from sulfide-bearing mine waste, nothing makes sense unless it is framed in terms of the rate of sulfide mineral oxidation.** This applies because in sulfidic mine rock that is undergoing oxidation, pollutants will continue to be released over time from the solids until all of the sulfide minerals have reacted or the supply of oxidizing agents stops. In the absence of appreciable water flow, solutes released by the oxidation process will dissolve into the available pore water, and may reach saturation with solid phases, after which the pore water concentrations will remain approximately constant as solutes release by oxidation of sulfide minerals then re-precipitate as new solid phases.

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