November 9, 2018

Stacy Holt, Project Manager
Bureau of Land Management
Ely District Office
702 North Industrial Way
Ely, NV 89301

Re: comments on Preliminary Environmental Assessment Keystone Overdumping Amendment (Robinson Mine) DOI- BLM-NV-L060-2019-0001-EA, October 2018

Public Process

Great Basin Resource Watch (GBRW) appreciates the efforts made by BLM staff to get documents we requested for our review. However, BLM needs to develop a systematic and rapid method to upload citations as a part of the NEPA (National Environmental Policy Act) process. As it turned out BLM was not able to fully complete our documents request in a timely manner. BLM should have an easily accessible repository for citations that appear in the NEPA documents.

The comment period was much too short to review the document and supporting documents. As a result we were unable to review all that we wished. BLM needs to allow for more time for the public to review all documents connected to the EA.

We also wish to acknowledge the cooperation of KGHM mining for coordination of a limited site tour on November 6 2018, which was helpful in preparing our comments here.

General Concerns

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).

Water Quantity

The affect of mine dewatering in the region is not adequately addressed in the EA. There appears not been a clear and complete analysis in any NEPA documents of the dewatering since 1994 when the EIS (Environmental Impact Statement) was completed. The EA references a few
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Dewatering has increased significantly since the 1994 EIS from an estimated 3,500 gpm (gallons per minute), to over 10,000 gpm over the years (current dewatering was estimated by KGHM staff at between 10,000 and 12,000 gpm).¹ The EA only presents the following statements,

“… monitoring location PZ07-07, which is located approximately 2.5 miles southeast of the Ruth Pit perimeter and near the southeast edge of the South Block, has shown groundwater declines of approximately 270 feet between 2008 and 2016, to an elevation of approximately 6,350 feet amsl (Piteau, 2018a). In comparison, only 17 feet of drawdown has been observed between mid-2009 and 2017 at the nearest monitoring location (PZ-09-05), also referred to as the Kolkman Well) east of the range front fault, which acts as a South Block hydraulic boundary (Piteau, 2018a). This suggests that affects from dewatering within the South Block are largely contained to the South Block and do not propagate significantly to the east.” (EA, p. 18)

The EA does not provide a map showing the locations of these wells or any analysis. What is expected in a NEPA review and needed for clarity is a contour map that shows the drawdown for the region and accompanying discussion of the hydrology. Given the data that must be available a map should be able to be reproduced in the EA. Using data from only two wells does not justify the broad generalization that dewatering has little effect on the regional aquifers. In fact, Murry Springs was once an artesian spring where on the order of one million gallons of water had been bottled per day, now no longer flows freely, and water must be pumped from that location to provide water to the town of Ely. Additionally, resident well water depths in Lane City have also dropped on the order of 60 to 80 feet with no compensation from the Robinson mine. The timing of the apparent lowering of water table in Lane City coincides with the increased dewatering beginning around 2007.

BLM needs to require a full hydrographic analysis to determine and present the full affect of mine dewatering and which springs and residential wells have been affected by this dewatering. In 2010, GBRW contracted Dr. Tom Myers to review (attached to this letter) the available data and determine whether mine dewatering is a likely suspect in the loss of flow at Murry Springs. Dr. Myers’ conclusion was this:

“The deep dewatering does likely draw from groundwater that recharged long ago, as indicated by isotope data, so this suggests that dewatering would have caused the springs to dry. Drought in the late 1980s and early 1990s definitely coincided with decreased flow in Murry Springs, as shown on Figure 3. This was not a period with significant dewatering occurring at the mine site. Both drought and dewatering would affect flow gradients and directions which would change gradients and potentially divert flow from the springs. Due to connections with groundwater flowing from the south, it is likely that the dewatering does intercept some regional flow before it reaches Murry Springs. Because the current period is not as dry as early 1990s, dewatering seems to be the larger cause of the springs going dry, but drought has certainly affected it over the long run.”

Dr. Myers review is credible, and as suggested an analytical study using current data and possibly obtaining additional data to determine the full affects of mine dewatering on the region is needed for a clear determination.

According to the EA the dewatering rate will increase with the deepening of the Ruth pit. The EA states, “The lowering of the Ruth Pit floor would result in an increased excavation depth below the ambient (pre-dewatering) groundwater level. Additional dewatering in the South Block is required to safely mine the Ruth pits (Robinson, 2017b). In the simulated future active dewatering scenario pumping rates peak in mid-2019 at 20,500 gpm in the South Block and approximately 21,560 gpm for all Robinson Mine dewatering (Piteau, 2018b).” (EA p. 19)
statement is at odds with statements made by KGHM staff on November 6, 2018 during the mine tour. GBRW was informed on that tour that there will be “no increase in mine dewatering,” so dewatering at 21,560 gpm will not occur. BLM needs to clarify this with KGHM, and make appropriate changes to the EA. If indeed the EA is correct then this further underscores the need for a dewatering analysis as stated above.

Again the EA states, “In the simulated future active dewatering scenario pumping rates peak in mid-2019 at 20,500 gpm in the South Block and approximately 21,560 gpm for all Robinson Mine dewatering (Piteau, 2018b).” (EA p. 19). And, the EA needs to detail this. A full EIS is needed to update the impacts of this mine on the region.

Water Quality
BLM needs to determine if the Robinson mine is expected to be a perpetuity treatment site. In our preliminary analysis we expect there to be very long water quality problems with a likelihood of perpetual care. The site is generally 40 to 45 percent potentially acid generating rock (PAG), which just that aspect alone puts the mine in the likely perpetual care category.

GBRW is still reviewing all the technical documents associated with the Robinson Mine, but what we see so far would indicate that there will be a much greater flux of drainage even after reclamation is completed and the level of contamination will also be greater than KGHM is stating. For example, the waste rock management plan cited in the October 2016 Preliminary Environmental Assessment for the Robison Mine Expansion Project (RNMC 2014) contains a calculation error that underestimates by a factor of 52 the load of sulfate and other pollutants from waste rock to groundwater. Specifically, in the example calculation of sulfate concentrations is pore-water percolating through sulfide-bearing waste rock (Section 6 WRF Draindown Geochemistry, RNMC 2014), the average amount of sulfate released form a humidity cell “kinetic test” in one week (mg SO₄/kg rock/week) is then scaled to field conditions by assuming that this represents the amount of sulfate released from rock under field conditions in one year (mg SO₄/kg rock/year; see Section 6.2.4 Step D: Normalizing HCT Sulfate to WRF Leachate, RNMC 2014). This error in the Robinson Project waste rock management plan needs to be corrected, and closure plans updated to include waste-rock cover designs that reduce water and/or oxygen fluxes enough to prevent degradation of groundwater quality by pollutants leached from the Robinson waste rock facilities.

The reclamation expectations by KGHM at the Robinson mine are overly optimistic. The reclamation plan as far as GBRW can determine and which is consistent with KGHM staff statements on November 6, 2018 calls ultimately for the creation of a number of evapotranspiration (ET) cells. KGHM staff indicated that 6 of these will be needed to capture up to 6 gpm of the polluted water drainage at closure. GBRW does not think that reductions to total drainage to 6 gpm is realistic given the errors in the calculations as typified above and the level of precipitation at the site.

The approach for reclaiming acid generating rock dumps has some merit, but will be unlikely to achieve the stated goal. The mineralized zones at the site are generally surrounded by limestone formations, which will provide some buffering and encapsulating PAG rock with this non-PAG material will reduce the acidity. However, given the amount of PAG at the site and the relative reactivity of the PAG material GBRW does not expect that the strategy will arrest the acidic drainage sufficiently to allow a “walk-away” solution.

It is vital that BLM take a hard look at the Robinson mine as required by NEPA and determine the likelihood that perpetual care will be needed.
Pit Lakes

The Ruth pit lake is likely to degrade waters of the state. Although not analyzed in the EA or the 2016 EA the Ruth Pit lake is expected to be flow through. The west Ruth pit lake is expected to be feed by high quality South Block, but the east Ruth pit lake will be feed but lower quality water, and there is considerable PAG material in the Ruth deposits. Overall, the east and west pits will merge mixing the water and the resulting water is likely to be of poorer quality than the water in the aquifer into which the pit water will flow. Therefore, it seems that there will be degradation of groundwater and thus a violation of Nevada law. This issue needs to be addressed in detail to avoid violations of state law.

Air related issues

Air quality analysis is unclear and inadequate. The EA states, “Due to the lack of monitoring data available for rural areas, NDEP-recommended background concentrations for rural areas of Nevada is assumed as the Robinson Mine baseline level (Air Sciences Inc. [ASI], 2016a).” But, there is no table showing these background levels. Furthermore, if the background data is not available then BLM must require KGHM to get the nearest background data. There, needs to be a defensible argument for using the data in Air Sciences Inc. [ASI], 2016a, and not just that NDEP says its ok.

Cultural/community related issues

BLM did not discuss 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. 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.
Cumulative impacts

Cumulative impacts analysis is incomplete. There has not been a comprehensive cumulative analysis since 1994 and there have been many changes to the operations since the 1994 EIS. Therefore, the cumulative analysis must be deficient and cannot fully rely of previous assessments. 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.

Conclusion

Overall, there needs to be a detailed and comprehensive NEPA level analysis of the Robinson mine. GBRW would like to see BLM initiate a closure EIS process so the public can fully understand and evaluate the long-term care of this mine. In the limited time allowed to review the EA, GBRW also reviewed some of the background documents and what we found was an incomplete and incorrect assessment of the affect of the mine on the region and importantly reclamation and closure plans that are unlikely to achieve the stated goals to complete closure by 2053. BLM needs to get ahead of this situation and clarify if perpetual is to be expected and adjust the bonding requirements and create a long-term trust as needed to address the cost of perpetual care.

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

Sincerely,

John Hadder,
Director

1 RGHM, Mine site tour, November 6, 2018.
Technical Memorandum

Review of Dewatering at the Robinson Mine and Connections with Murry Springs

Prepared for Great Basin Resource Watch

August 31, 2010

Prepared by:
Tom Myers, PhD
Consultant, Hydrology and Water Resources
6320 Walnut Creek Road
Reno, NV  89523
tommyers@gbis.com

Murry Springs is the primary water supply for the City of Ely, NV. Within the past year, spring flow from that source has ceased. The purpose of this technical memorandum is to consider whether dewatering at the Robinson Mine, which lies from three to eight miles west to northwest of Ely (Map 1), could have caused the spring to dry. Murry Springs lies about one-half mile south-southwest of Ely (Map 1). The technical memorandum outlines the basic facts of the situation and concludes that it is possible that dewatering has caused the spring to dry, but it is not certain. Additional information would help to dispel the possibility or to increase the certainty supporting the conclusion.

Robinson Mine Geology, Topography, and Hydrogeology

The Robinson Mine has existed since the early 1900s, if not before. It combines large open pits and a deep underground mine, known as the Deep Ruth Shaft (Map 2). A ridge rising to 7800 ft amsl separate the mine from the Murry Springs (Map 1), but both are within the Steptoe Basin. The geology is primarily limestone and dolomite (Map 3). Although very complicated especially at the minesite, rock between the mine and Murry Springs is primarily of Pennsylvanian to Permian age, with Pr and PIP being the dominant formation. PIP is Riepe Spring Limestone or Ely Limestone and Pr is Rib Hill sandstone. In the northern Egan Range, the Riepe Spring or Ely limestone is about 2300 feet thick (Hose and Blake, 1976). The Rib Hill sandstone generally lies above the PIP and separates it from Kaibab limestone (Hose and Blake, 1976); it contains interbedded dolomite.

Many faults cross a section from the mine to the spring. Jupiter Fault runs from vicinity of Ruth Pit to just south of Murry Springs (BLM, 1992, Figure 3-3). There is no hydrologic data on this fault, but it does not appear to offset the adjacent formations (BLM, 1992, Figure 3-2b, section E-E) which can cause a fault to be a flow barrier.
The north Egan Range (Figure 1), which separates the White River Valley from Steptoe Valley, would allow flow among the basins. Within the carbonate aquifer, there is a 6500 foot AMSL groundwater contour centered on the Egan Range. Welch et al (2008) predicted the flow direction is from Steptoe to White River Valley, with 8000 af/y from Steptoe to WRV and 14,000 af/y from Steptoe to Jakes Valley, just north of WRV and tributary to it. The prediction depended on water balance calculations with interbasin flow occurring only where geology would allow it. They also verified the flow path and water balance with isotope mixing calculations.

Welch et al (2008) also established subbasins in Steptoe Valley. The mine and south along the Egan Range to south of Ward Mountain are in the central subbasin, which may be seen by the thin grey dashed line running SW-NE south of Ely (Figure 1).

Figure 1: Snapshot from Plate 3 (Welch et al, 2008) showing steady state groundwater contours in the carbonate aquifer near Ely. Green boundaries would allow flow between valleys; yellow boundaries probably allow flow between valleys; red boundaries are flow barriers. The premise for interbasin flow is geology, not groundwater contours; in other words, a groundwater divide may prevent flow under steady state conditions.
Recharge of precipitation is the source of flow to Murry Springs, although the question is the distance from which the flow could travel. Figure 2 shows that most recharge in the Egan Range east of Ely occurs along the crest southwest of Ely and south of the mine site, which is west of Ely. Recharge requires receptive geology, meaning primarily carbonate rock outcrops, which occurs all along the Egan Range, from Ward Mountain south of Ely to northwest of Ely, and including the Robinson Mine area. Recharge also requires precipitation that exceeds the transpirative needs of the vegetation; precipitation in the mountains is two to three times that in the valley. High precipitation on carbonate rock leads to substantial recharge in the mountain block, as seen on Figure 2.

Figure 2: Local recharge distribution from vicinity of Ely. The blue area has recharge up to 1 foot/year and the white area has not recharge. Source Flint and Flint (2007).

Murry Springs

The Basin and Range Carbonate Aquifer System Study (BARCASS, Welch et al, 2008) describes Murry Springs as discharging from carbonate rock at an average rate of about 3000 gpm. The altitude is 6615 ft amsl. This water surface elevation approximately equals some of the water levels observed in the carbonate rock near the mine.
BARCASS reports flow rates for a period preceding the NSE pumping data showing that the spring has fluctuated from more than 5000 to less than 1000 gpm. A hydrograph (Figure 3) shows the spring flow has trended downward from 1984 to 1994, which coincides with climate transition from a very wet period to a very dry period.

![Figure 3: Observed flow rates from Murry Springs. Data source: Welch et al, 2008.](image)

The BLM completed an environmental impact statement in 1992 in support of reopening the mine. Supporting documents discussed the connection between the mine and Murry Springs. They suggest that the springs discharge from regional aquifers and that water is hundreds of years old.

Information exists to conclude that flow at Murry Springs is derived in large part from lower intermediate to deep zone groundwater flow paths. The results of isotopic analysis of a water sample from Murry Springs indicate that most of the water emanating from the springs is hundreds of years old or older. In addition, spring discharge records for the period from 1970 to 1986 indicate that the spring flows continuously, even following years of very low precipitation. Data are available to indicate that flow at Murry Springs has never ceased. Such continuous flow, even during drought periods, is suggestive of discharge from a lower intermediate to deep zone regional groundwater flow path. (BLM, 1992, p. B4-23).

BLM (1992) also suggests that the source for Murry Springs is Ward Mountain, which might correspond to the recharge distribution, and that low permeability mineralized zones will prevent pumping north of the mineralized zones from affecting flows south of the zone. Model results suggest that pumping from the Deep Ruth Shaft (1700 gpm), well K-2P (3000 gpm), and NRC-
2M and -3m (3000 gpm) have little effect to groundwater south of the zone (BLM, 1992, p. B4-24). Reviewing that model in detail is beyond the scope of this memorandum, but it must be remembered that model results will show whatever the conceptualization inputs to the model. The Deep Ruth shaft reportedly derives most of its water from a fault at elevation 6383 amsl (Id.).

BLM (1992) does not reflect descriptions of flow around the Deep Ruth Mine as discussed by Brashears (1959). He found that hundreds of feet of drawdown would recover within hours in some shafts and that recovery was due to rapid recharge of precipitation and high transmissivity. It seems unlikely that local recharge is significant (Figure 3) and that most recovery was due to flow from nearby carbonate rocks. The faults do not form the blocks as efficiently as newer analyses may suggest.

**Mine Dewatering**

Mining has required dewatering in the area since at least 1915 (Brashears, 1959). Between 1915 and 1948, the Deep Ruth shaft was dewatered at a 500 gpm rate, or more than 30,000 af from just this shaft. Other shafts such as the Alpha were similarly dewatered intermittently at rates of up to 2500 gpm.

A database obtained from the Nevada State Engineer (NSE) by Great Basin Resource Watch (GBRW)\(^1\) indicates the mine had not dewatered from 1998 through 2004. From 2004 through 2009, the total dewatering rate by year was 681, 6098, 7179, 9734, 12,523, and 14,483 af/y, respectively, with dewatering continuing at similar rates to 2009 for the first three months of 2010. The total since 2004 is 50,700 af.

During 2008 and 2009, the dewatering rate exceeded any previous year in the database; these precedes and coincides with the time the spring has gone dry. Much of this pumping is from the carbonate rock formations, including PIP and Pa (Map 4), and as indicated by the well logs of the wells located in other rock but completed in carbonate rock (well logs NSE #37967, 39052, and 50422)\(^2\). These wells were located all around the mine (Map 5).

Static water level in permit 55910 (log 37967) is 243 feet and the altitude is approximately 6820 meaning the pre-pumping water level is about 6580 ft amsl. The static water level in permit 58245 is 642 ft (log 39052) and the altitude is about 6900 ft amsl; the pre-pumping water level was about 6260 ft amsl. The static water level in permit 61745 is 740 ft with an altitude of about 7000 ft, so the water level was 6260 ft amsl. The easternmost well had the highest water level, suggesting the groundwater divide is on the east side of the mine. BLM (1992) shows a 6800 contour around Saxton Peak. It is also probable that the water levels do not represent true pre-mine conditions because the pits have been developed and dewatered for a very long time.

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\(^2\)
Discussion

The question is whether the recent dewatering has caused Murry Springs to go dry during 2010. Several factors suggest that it has but other factors suggest that drought may have had an effect.

Murry Springs elevation is very close to the elevation near the mine, in the 6600 to 6700 ft amsl range. Drawdown due to dewatering lowers the water table or potentiometric surface to as much as 1000 feet below the spring (1000 feet base on levels in the shafts). Observed flows and the necessary long-term pumping around the Deep Ruth shaft suggest that faults do not limit flow in the area. This is based on the rapid recovery of water levels when pumping ceases and the fact that dewatering likely far exceeds the recharge in the local area. However, this may not indicate that there is a fracture zone connecting the mine with the springs. Stress propagation may require significant time.

The trend in faults and carbonate rock indicates a possible hydraulic connection between the mine and springs. Such a connection would connect groundwater at the mine with Murry Springs. The apparent high groundwater level between the mine and springs may limit the connection.

Most recharge to the regional aquifer would have occurred further south near Ward Mountain. Low elevation and precipitation near the mine would limit recharge at the site, therefore the recovery from drawdown may likely be due to groundwater from the south.

The deep dewatering does likely draw from groundwater that recharged long ago, as indicated by isotope data, so this suggests that dewatering would have caused the springs to dry. Drought in the late 1980s and early 1990s definitely coincided with decreased flow in Murry Springs, as shown on Figure 3. This was not a period with significant dewatering occurring at the mine site. Both drought and dewatering would affect flow gradients and directions which would change gradients and potentially divert flow from the springs. Due to connections with groundwater flowing from the south, it is likely that the dewatering does intercept some regional flow before it reaches Murry Springs. Because the current period is not as dry as early 1990s, dewatering seems to be the larger cause of the springs going dry, but drought has certainly affected it over the long run.

References


Map 1: General vicinity map for Robinson Mine, Ely, and Murry Springs.
Map 3: Geology and faults for Robinson Mine through to Murry Springs; see star on bottom right for location of the springs.
Map 4: Dewatering and geology at Robinson Mine. See star on bottom right for location of the springs.
Map 5: Dewatering and topography near Robinson Mine.