

Permit Documents



P E R M I T



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QATESTOCR

STATE OF
COLORADO

M-2014-045

Cazier - DNR, Tim <tim.cazier@state.co.us>

Response to DRMS October 20, 2014 Comments

1 message

FROM:

Art Braun <braunenv@msn.com>

To: "Cazier - DNR, Tim" <tim.cazier@state.co.us> (DRMS)

Cc: lbarker@aumining.net

Wed, Dec 10, 2014 at 8:21 AM

Tim,

As we discussed on the telephone yesterday, attached are my responses to your October 20, 2014 comments. Per our conversation, I am sending them only via email, but if you decide you want a paper copy, I can provide that also.

Give me a call with any comments or questions. If there is anything else you need before Monday's meeting let me know, but I will plan on checking in with you one more time this week just to make sure. I spoke with Lance this morning and he can also make the meeting (Monday, December 15, 2014, 1:00 pm).

I will plan on seeing the four of you on Monday afternoon.

Art

**141209 Response to DRMS Oct 20 letter.pdf**

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**Responses to Division of Mining Reclamation and Safety (DRMS) Adequacy Review of Letter Dated
October 20, 2014**

By C. A. Braun PE-CPG – December 9 , 2014

Following are brief synopses of the comments made by DRMS personnel in their October 20, 2014 Second adequacy review, followed by our responses. As discussed by Art Braun, Tim Cazier, and Tom Kaldenbach in the meeting at DRMS headquarters on November 18, 2014, the individual issues are easily addressed, but the requirement and reasoning behind DRMS forcing the project into a 110(d) permit appears less apparent when comparing the Order to the physical facts and applicable regulations and statute applying to this issue. In summary, DRMS appears to be jumping to a conclusion that the project will be acid generating, when in fact the collected evidence shows that it is not, this conclusion being necessary for them to force the project into a 110(d) status. It is hoped that the facts generated can overcome whatever biases DRMS might have, and the permit can be properly designated per current the regulations. I have no specific interest in this project, but as an engineer, I have certain responsibilities and obligations to my licensing board. These responsibilities include doing my best to ensure that the sound engineering principles are used and implemented in conjunction with laws and regulations. The statutes task DRMS with the responsibility and authority to protect the environment and in order to implement this task it has authority to secure sufficient bond money to insure that the reclamation of disturbed land can be completed in the event the operator fails to do so. The statute is clear, and for me to not address the issue is a liability to me per my licensing board.

Application

Comment 1

Permitted Area – Provide a Metes and Bounds Description

Response:

A description of the Mineral Mountain Project permit area is as follows:

The basis of bearing being the end-line from Corner 3 to Corner 4 of the Elk Claim (MS 9572) having a bearing of N 67°43'W. The area within the permit being described as follows: Beginning at Corner 4 of the Elk Claim (MS 9572), thence N 67° 43' W a distance of 330 feet, thence N 41°51' E a distance of 663 feet, thence S 38°3' E a distance of 714 feet, thence S 0°11' E a distance of 370 feet, thence due west a distance of 199 feet, thence N 42° 10' W a distance of 335 feet, thence N 67°43' W, a distance of 168 feet, more or less, to point of beginning. This information has been added to the Exhibit E map.

Comment 2**Range 70 West – Now Adequate**

Response:

No response necessary

Comment 3**Item 14 - Toxic materials/acid mine drainage**

This is the appropriate place to discuss the Tom Kaldenbach report. I believe that DRMS incorrectly wants to move the project from a 110(2) permit to a 110(d) permit. In order to do this, they are drawing conclusions based on suppositions instead of facts, and I believe this to be wrong.

The very cursory DRMS review by Tom Kaldenbach showed no particular detailed thought regarding any of the data provided in the Braun report nor did it consider any outside data which has already been thoroughly reviewed and discussed by DRMS concerning the chemistry of the Cripple Creek breccia. Mr. Kaldenbach moved directly to his statement that “conditions can change when mining reactivates and exposes fresh rock and possibly encountering groundwater”.

He goes on to reference a 1994 Environmental Protection Agency (EPA) guidance document, stating that the acid based accounting values reported by the testing laboratory classify Samples MH-1 and MH-2 in an uncertain category, and further put Sample MH-3 in a potentially acid producing category. He then concluded that the “uncertain” category in the DPA document leads straight to the conclusion that the project will be acid generating. He then follows up with two additional points.

His first numbered point reasoned that the sulfate complex had been excluded from the acid base potential number in the Braun report, thus leading him to make the statement that the analysis “may” underestimate acid generation for the rock. His second point was that Sample MH-3 (explained by the author of the report multiple times to be high-grade and uncharacteristic of any average mining grade possible on the project), indicated to him that solid veins of acid generating pyrite are going to be encountered. The data supports neither of these two comments, and it is purely supposition on his part, thus allowing DRMS to reach what appears to be an already preconceived conclusion.

Response:

First, a bit of history regarding the 1994 EPA guidance document needs to be discussed. The document was prepared by the U.S. Environmental Protection Agency (EPA) with assistance from Science Applications International Corporation (SAIC) in partial fulfillment of EPA Contract Number 68-WO-0025, Work Assignments 247 and 248. It might be of additional interest that I was working for SAIC at the time when this document was being assembled. I was involved with parts of it along with other documents that were being produced simultaneously. I am quite familiar with the reasoning that went along with the text in that document. On the other side of the issue, regarding the original Mined Land Reclamation, I was a guide on the first field tour that was given to the first group of people that signed up with the group. The tour was of a mine near Silver Plume. I was also around to remember the development of the regulations we are using today, and was also present to hear the promises that were made to industry when the regulations went into effect. Those promises appear to be in a somewhat bastardized form today.

The EPA's intent in the early 1990's was to incorporate all available useful information on acid rock drainage (ARD) into one document. The document included the commonly used ARD testing method (modified Sobek) that was summarized in Section 2.2 of that report. It relied on a simple calculation based on total sulfur (as sulfide) content and the method did, and still does, a pretty good job of predicting whether the material would be acid generating within limits discussed. The conclusion was that an acid neutralizing ratio, expressed as the ratio of calcium carbonate, to test material of greater than 20 tons per kiloton (-20 in my report) would, with near certainty, produce free acid, while a ratio of minus 20 tons per kiloton (+20 in my report) would certainly be non-acid generating (acid neutralizing). The area in the middle of the two values, labeled as "uncertain", was not quite as simple to define and the EPA (also SAIC and Braun) recognized that more thought needed to be used to make definitive conclusions with respect to acid generation. I have included a portion of the text from Section 2.2.1 of the document as follows:

"For NNP values between -20 and 20 it was difficult to determine the acid potential. Assumptions of the test are that all the sulfur in the sample is reactive. This assumption does not take into account the presence of gypsum and other non-reactive sulfur minerals. A shortcoming of the technique is the potential to overestimate NP in one or more of the following ways: (1) use of strong acid may dissolve minerals that would not otherwise react to maintain drainage pH within an environmentally acceptable range; (2) use of boiling acid may cause an overestimation of NP by reacting with iron and manganese carbonates, which would not otherwise factor in the natural NP (this observation is problematic with

samples that contain large quantities of these carbonates; (3) the NP may be underestimated by contribution from metal hydroxides that precipitate during the titration with sodium hydroxide.”

From being involved on the EPA contract, I know for a fact that the “uncertain” designation was definitely not intended to mean “acid generating”, as concluded by Mr. Kaldenbach. He has ignored the text in the EPA guidance and simply jumped to a conclusion based on the values being between +20 and minus 20. Given his conclusion, nearly all the rock and soil located in the state of Colorado would fall in the “uncertain” category, including our farmland in eastern part of the state and even my wife’s petunia planter at our house. Using this simple definition, all the corn and wheat farmers in the state would need a 110(d) permit if they should unfortunately happen to fall under the umbrella of DRMS, even though their soils would not be found to contain any detectable concentrations of sulfur. This seems goofy.

Going back to the details, the Braun report, dated August 6, 2014, reached exactly the opposite conclusion as was reached by DRMS. Braun’s investigation was detailed and sufficiently thorough to allow a solid conclusion to be reached; that conclusion being based on laboratory data, petrologic data, surface water and ground water information, and historical and present district-wide physical conditions as suggested in the EPA guidance document. Braun’s conclusion was that the small amount of sulfide present within the Cripple Creek breccia would be neutralized in the surrounding and underlying volcanic rock. That same conclusion had already been reached years before by both the Cripple Creek and Victor Mining Company (CC&V) and the former Colorado Division of Mines and Geology. The answer to the acid issue was already obvious long before Braun performed any testing and wrote its report. Mr. Kaldenbach’s first comment that “conditions can change when mining reactivates and exposes fresh rock and possibly encountering groundwater” is entirely speculation. While we are engaged in wild speculation, let’s also predict that the operator will break into a “crystal cave full of gold nuggets the size of a man’s fist”. In both cases, the statements have no basis, and instead, we must restrain ourselves from making speculations by adhering to the facts and available data. There is no data available that suggests that this small project will either expose acid generating rock or that the project will ever reach groundwater. Current available information based on drilling indicates that the top of the groundwater surface is located no closer than 300 feet from the ground surface within the permit area. There is no proposed mining below this depth based on the available information, thus no chance of intercepting the deep groundwater.

Specifically referring to Mr Kaldenbach's additional comment 1, Braun is correct in excluding sulfur derived from sulfate in the calculations. These samples were all (intentionally) collected from non-weathered and non-oxidized materials to represent the sulfide bearing zone and not the weathered zone. If a sample had been collected from within the oxidized weathered zone, it would have been described as such and the laboratory results would have been obvious, showing little or no sulfide. If the samples had been collected from the oxidized zone then the remaining sulfur from the sulfides would be expected to be tied up as various sulfates. However, since the Braun samples were collected from non-weathered non-oxidized material, any sulfates found in the samples could only be primary in origin. It has been well documented in the past by multiple authors and in CC&V reports that have been reviewed by DRMS, that the mineral assemblages in the district includes primary sulfate. These sulfates are common and that was an additional key piece of information that Braun relied on to exclude them from the calculation. We stand by this decision, and our conclusions.

I specifically refer to as evidence that DRMS knows the truth about acid production, a recent memorandum, dated August 7, 2012 from Berhan Keffelew to Tim Cazier in regards to Permit M1980-244. In the third paragraph starting on page 1 and continuing onto page 2, the discussion is specifically on acid neutralization, and excerpted as follows: "The geochemistry of the District has been extensively investigated as it relates to ground water hydrology. . . .The Division agrees that impacts to the probably hydrologic balance will be negligible. . . . This is due to the abundant Net Neutralization Potential (NNP) at depth (within the diatreme) which limits the release of additional metals." The project area is located within the diatreme.

In response to Kaldenbach comment 2, Braun's report discussed in detail that a 1-inch vein cannot be physically mined by today's methods, thus is only a benchmark of what I could physically "high-grade" in the area. Since this sample could not be physically mined, then the proper sample to best represent the veins is Sample MH-1. The facts are that our testing found that no net acid generating rock could be physically mined, and there is no reason to believe that the geologic conditions at this project will change significantly from what is currently known specifically about Mineral Hill and the rest of the district. Secondly the exploration drilling has occurred on the property down to depths of 300 feet and has not encountered groundwater, thus there are no mysterious "changing conditions" that can be currently envisioned that could significantly alter the currently known chemical and hydrologic régimes. If DRMS has additional data stating otherwise, I would welcome that it be shared, and then our

assessment can be updated. It is my professional opinion that the facts are fairly clear and consistent that no acid generation will occur. However, if in the future the conditions are found to change, a modification in the permit would be appropriate and should be made at that time. Based on this physical information, and DRMS regulations, the 110(2) permit is corrects. A 110(d) designation would be incorrect.

Specific Exhibit Requirements – 110(2) Limited Impact Operations

Comment 4a Exhibit A -Legal Description – Now Adequate

Response:

No response necessary

Comment 4b Exhibit B - Site Description – Adequate

Response:

No Response necessary.

Comment 5 Exhibit C – Mining Plan - Temporary Structures – Adequate

Response:

No response necessary

Comment 6a- Exhibit C– Paragraph 1(f) – Adequate

Response:

No response necessary

Comment 6b Shaft Location – Adequate

Response:

No response necessary

Comment 6c Tunnel portal vs. Adit – Adequate

Response:

No response necessary

Comment 6d Justification for 4.4 acre limit on seeding and finishing- clarification on removal of safety berms removed-waste dump re-contouring for reclamation-material volumes

Response:

Based on the interpretation of mine safety regulations, a berm will only be necessary at the locations shown on the map. So, as shown on the reclamation map (Exhibit E-1), the amount of safety berm that will be in place will be approximately 500 linear feet. The volume of berm material can be approximated by a triangle with a height of 2.5 feet and a base of 4 feet having an area of 3 square feet. Based on site mapping, the surface area of the waste rock pile is about 1.6 acres and the other total miscellaneous disturbed areas add an additional 1.7 acres to make a total of 3.3 acres of disturbance requiring reclamation. This 1.7 acre area is currently in various stages of reclamation with some showing significant disturbance, and other areas where vegetation is nearly reaching reclamation objectives. As for the portion of access road that will remain after mining ceases, this road has been the historic access to the permitted property, along with other properties located on the north side of Mineral Hill. The total length of the road that will be left in place will about 1,500 feet, having a total area of 1.1 acres.

Specifically referring to the dump, Tim and Art, in their meeting at DRMS Headquarters on November 18, 2014, discussed the subject of the final configuration for the waste rock pile at the adit. The highest use currently anticipated will be for agriculture, but use for a domestic residence cannot be ruled out either. Both uses are best served by the maximization of level land. For agriculture, the more level "terraced" surface will be better at retaining precipitation water, better at producing and supporting a better grade of soil, and increase available direct sun angle to receive increased solar radiation allowing increased production of vegetative mass. As a result, the closure design would be to only slightly reduce the angle of the dump face to an average of just below the angle of repose, terrace the face, and plant with the specified grass mix. Portions of the dump face were already supporting vegetation and I believe this can be achieved. I can show several good examples of grass growing and being supported

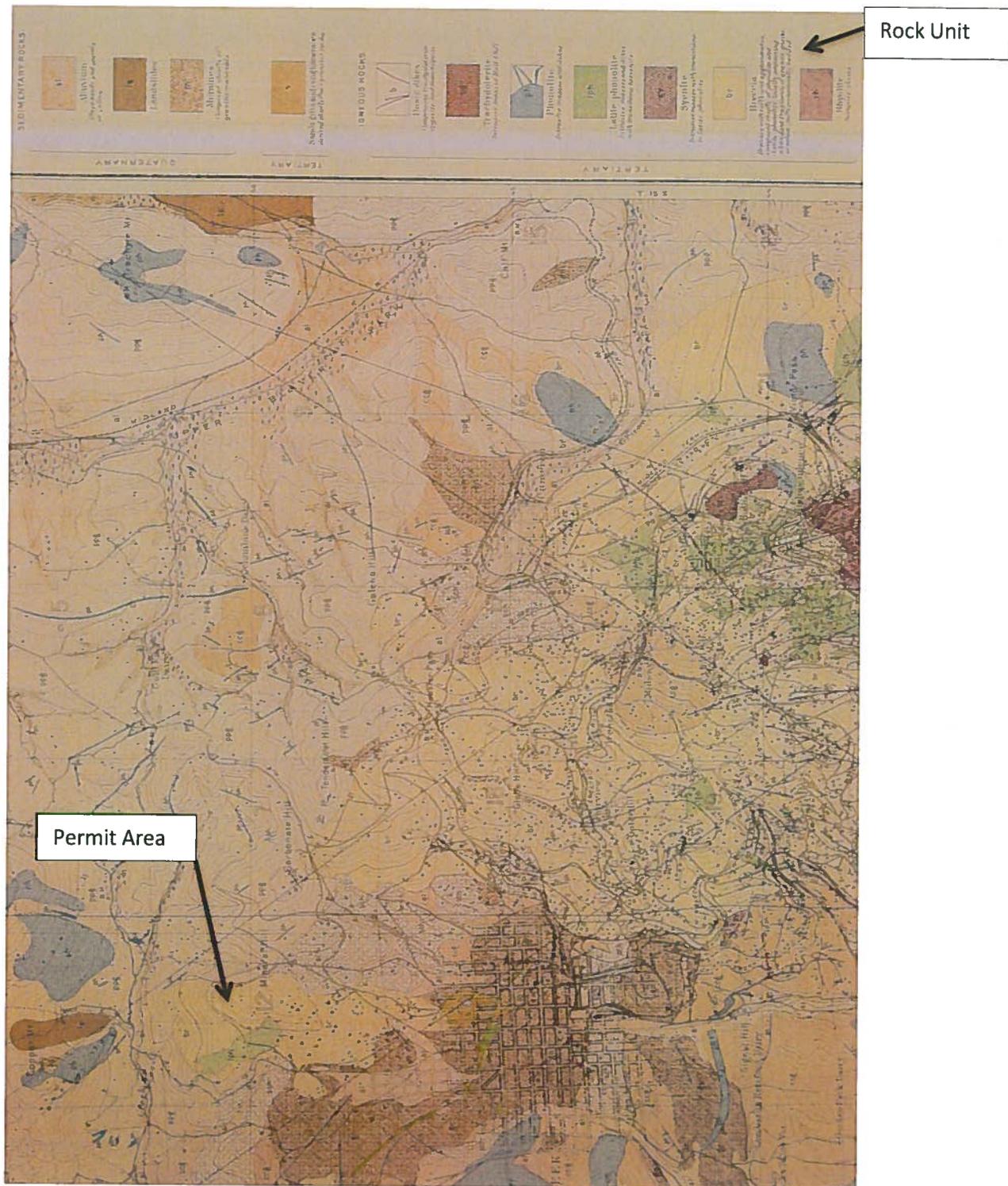
on steep north facing slopes. This approach would be preferred by the operator and owner. In the event the design does not work, DRMS still has the ability to correct any negative issues since it will continue to hold bond money until the surfaces meet the standards for vegetative cover.

The rock face on the south side of the waste rock pile was also discussed. Inspection of that face found it to be stable, with a height of ranging from about 6 feet to approximately 15 feet. The factor of safety from falling of livestock from the top was discussed. The general Cripple Creek area normally has very steep rugged topography with natural hillsides and cliffs that are similar. There appears to be no problem with animals falling off of the surrounding hillsides, either of the wild or domestic kind, so no abnormal hazard exists here. However, it is recommended that at the time of closure, an earthen-rock ramp be dozed up at some point along the face to allow passage of animals somewhere near the center. This will allow easy passage by livestock and wildlife saving them the need walk around. I estimate that this movement of material on the waste rock pile can easily be accomplished using a small to medium sized excavator in two working days. That cost is already included in my original reclamation estimate.

Comment 7 – Paragraph 1(k-l) “DRMS knows that gold-bearing ore outside of the diatreme can have significant sulfides”

Response:

The district was mapped by Penrose in the mid 1890's with a report published in 1894. The work was updated again in the early 1900's with a report published by Lingren in 1906. My more recent mapping in the area of the permit is in agreement with Mr. Lingren's. I have attached a portion of Lingren's geologic map from the 1906 report that shows the permit area to be in lithic tuff (Cripple Creek Breccia).



Portion of USGS Geologic Map of Cripple Creek, Colorado (Lingren, 1906)

Comment 7a Confirm if water in the rock size reduction process -Adequate

Response:

I am in agreement with the DRMS conclusion. I think that is the correct approach. If something develops in the future that has the ability to cause potential negative environmental issues, then it can be addressed at that time.

Comment 7b How are crusher fines handled?

Response:

Referring to our discussion at DRMS Headquarters on November 18, 2014, Braun collected three rock samples from the mine. Sample MH-2 was wall rock, Sample MH-1 was what I believed to be the best material that could represent ore, and Sample MH-3 was a sample that had the highest visible amount of pyrite, basically a pocket piece, or high-grade sample that was not representative of what would, or could even be physically mined. It was similar to the piece of pure pyrite that I brought into our meeting. If we were to have that sample tested, we would find that it would be quite acid generating, and could even predict the exact number, based on simple stoichiometry. However, that particular sample is a single high-grade piece I picked up in literally a "sea of calcium carbonate". That sample came from the Cretaceous Niobrara formation in western Kansas where a speck of organic carbon caused the growth of this single pyrite crystal. If we were to test a representative sample of the Niobrara chinks we would find the sulfur concentrations to be less than detectable.

This same reasoning applies for Sample MH-3 taken from Cripple Creek. The sample was collected as a high-grade sample that there is no way to physically mine so it is my professional opinion that is not reasonably possible to produce this sample by simple mining, followed by comminution. Comminution of the material will only serve to make the material smaller in size, and the operator anticipates retaining all size fractions of material, thus not physically altering its composition by this process. Since the site is still under exploration, insufficient information is available to make any final decisions at this time. However, the operator's current idea is to segregate ore from country rock during the mining process. Country rock would be placed on the dump, and ore would be presumably hauled off for sale. At this time, the nature of the ore with respect to acid generation potential is best approximated by Sample MH-1 and the country rock is represented by Sample MH-2.

Exhibit D – Mining Plan

Comment 8 - Temporary Structures – DRMS acknowledges slopes of up to 1 to 3 from a topo map paragraph (b) and demands photographic proof of establishment of grass on steep slopes

Response:

Over twenty years have gone by and times changed regarding what works and doesn't work for reclamation. The economic conditions have changed in the United States, and also in Teller County Colorado. DRMS requiring current reclamation to meet 1980 objectives is similar to saying that mining must be accomplished using horse and steam-powered equipment since that was what was in use at the time the original claims were staked. Since the land had become more valuable, and farm and rangeland practices have moved forward, it is appropriate to consider and tailor our work to meet these changes.

As for the request for evidence of successful reclamation on steep hillside slopes, we all see examples of if we look around. There are numerous examples on many road embankments on State and County roads across the state. If grass is given a chance to grow, and the growth media is suitable, it will grow and thrive. I have assembled a set of photos showing examples of successful vegetation on steep slopes. All of the locations photographed are from elevations above 7,000 feet and have similar grasses to those listed in the reclamation plan.



Photo 1 is a view of an access road on westerly-facing slope – The lower embankment of the road ranges from 6 to 10 feet in height. The area shown is completely vegetated and stable.



Photo 2 is a view of a reclaimed mine road on a hillside slope of just under 30 degrees. A trace of upper road bank can be seen in the snow at the center right in the photo. Care was taken to cover rocks with all available soil during reclamation, along with diligence in covering the seed. Note the smooth surface with no rilling.



Photo 3 shows an area located less than 75 yards from the Photo 2. Note the lack of the thick grass visible in the previous photo. This area is undisturbed and natural. Disturbance has improved the soil.



Photo 4 is of a mine road crossing an area having an average slope of greater than 30 degrees. The lower bank of the road cut is at the higher angle of 33 degrees, just below the angle of repose. Vegetation has been successfully established on that road bank and the interface between the disturbed soils and the non-disturbed soils is difficult to recognize in the photo.

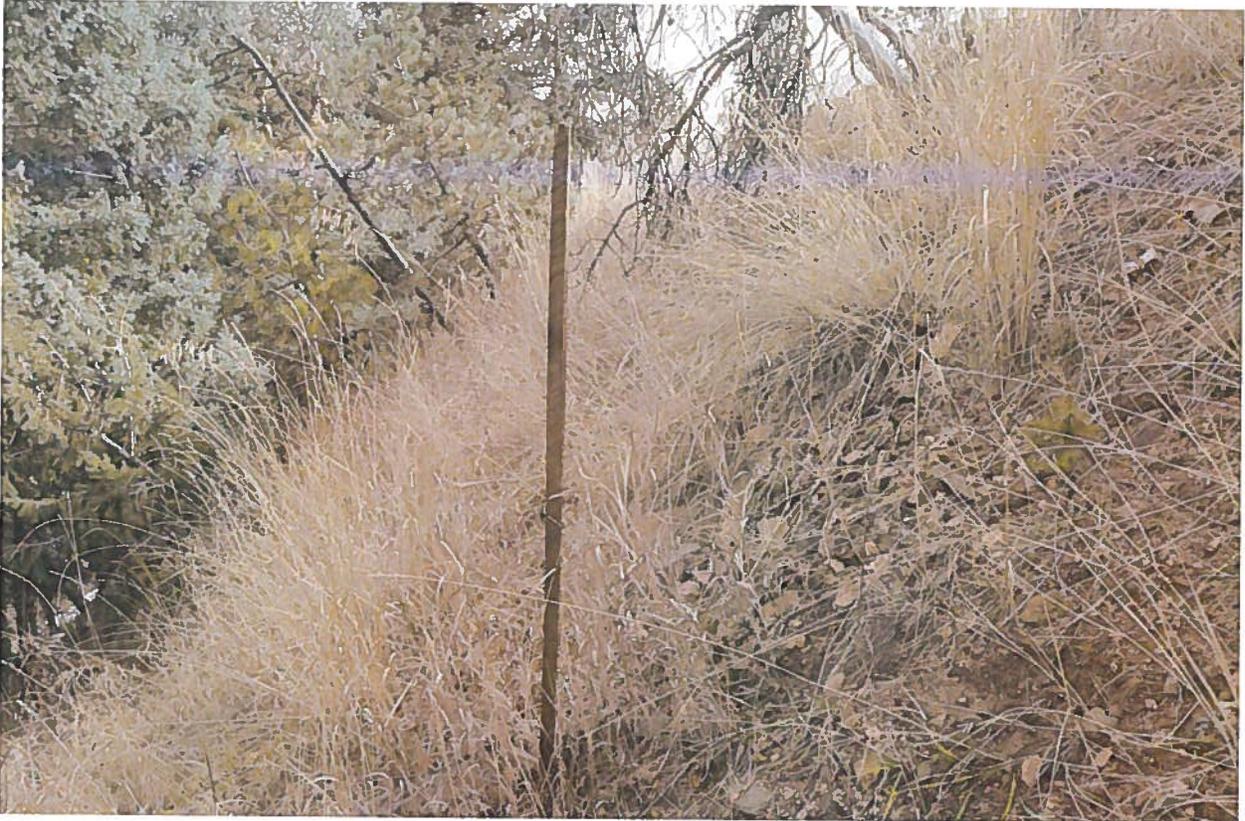


Photo 5 is of a north facing slope on a newly deposited waste rock surface. The stake was placed in the photo to provide a reference point to show that the slope is clearly at angle of repose. The grass visible in the photo has been successfully established and a small sapling tree is also visible at center right. Note that even though the grass on the right is thinner than the lush grass on the left, there is still a great deal of growth and root mass. The lower volume in this area is due to shading from trees. Reclamation at this location was initiated in 2012 and the total bank height is approximately 25 feet, a similar magnitude as the waste rock pile in contention. This site survived a 3-inch storm event which occurred in 2012 with no damage to the grassed slope.

Thus, I have provided proof that this concept is achievable. As can be seen in the photos, grass is growing nicely on multiple photographed reclamation locations. What makes this concept practical at this location is the small size of the project. The whole disturbance associated with the waste rock pile is only slightly over an acre, approximately the same size as the disturbance needed for a residence with detached garage. Thus, it is not that difficult to implement the proposed reclamation plan on this size project. Conversely, we would never recommend that these steep of slopes be considered for a project the size of the larger mine in the district. Implementation on a larger sized project would be difficult and

nearly impossible due to the large areas and the associated larger volumes of water generated by precipitation over those areas.

As for this project, I believe that the objectives laid out in the reclamation plan can be met, and those level areas will provide locations for animals to collect and rest, whereas the steeper hillsides cannot. As an incentive to that commitment and goal, the bond money that will continue to be held by DRMS until vegetation has been satisfactorily established, effectively ensures that adequate growth of vegetation and soil stabilization will occur.

Comment 8 – P-1986-023 – Applicant must reclaim any trenches and drill pads

Response:

Exploration permit 1986-023 was established for exploration of the general Mineral Hill area and it is anticipated that exploration of that area will continue in the future. That permit is separate and has nothing to do with the 110 permit that is in current process, other than the area under current active exploration is a result of it. That existing permit will continue to cover exploration outside the 110 permit area and any future surface exploration that should occur within the 110 area will be within that permit. Based on the DRMS comment, it appears that DRMS is either making an assumption that no further exploration will be done, or it is trying to actively discourage any future exploration and mining.

Comment 8 – P-1986-036 – DRMS expects a commitment by Applicant of similar reclamation as in 1986 plan

Response:

The above response for the basic comment is appropriate here also. The times and projected best uses for the ground have changed since 1985. The Applicant is committed to reclamation to agricultural purposes, which includes the maximization of useful productive agricultural land. The words used in the comments “. . .for the ‘rock dump face’ was to smooth off and/or terrace and reseed it.” Those words exactly match the current reclamation plan. The only change will be a modification of the final configuration design, as discussed in the reclamation portion of the permit application. Again, as discussed above, DRMS will have the ability to continue to hold bond, until reclamation has been satisfactorily completed.

As we discussed in our November 18, 2014 meeting at DRMS headquarters, the photo you included with your comments (Figure 1-top photo) is not really of the area of the current dump area. Instead, it is a view nearly due south of the area where I think an open stope had been located. It is my understanding that the stop was filled and the subject of the photo is of that finished fill, and possibly some other old dump and tunnel that might have been located in that area. The misinterpretation of what is visible in the photo by DRMS could either be due to mis-labelling of the photo, or more likely to simply the result of different nomenclature used by the operators at that time. This particular photo does show that the land surface has been replaced to the original slope. Since the surface in this area is gentler than it is around the current portal, its final reclamation is quite appropriate as a finished grade and produces, in our opinion, nearly the maximum quantity of grass yield possible as forage for both livestock and wildlife.

Comment 8 – P-2004-064 – Approved plan committed to removing and reclaiming existing dumps, sealing shafts and escapeways, backfilling and reseeding new haul roads, and placing topsoil (6-12 inches as available) on mine benches

Response:

That commitment was for the area described in the 2005 110 permit area, and the northern portion of this 2014 new expanded area was not included in that plan. Upon my last inspection of the site, I found much of the area within the 2005 permit to be covered by grass, and even some small trees. As it has been under an active permit since then, and further exploration and mining has always been anticipated, there has never been any request for a return of that bond money. As a result, the remaining cost of the reclamation required to finish up that area would be anticipated to be significantly less than what is currently held in the bond.

In summary, the commitment contained in the 2005 permit was appropriate for that area, and in actuality is essentially about the same as being proposed in the current 2014 permit.

Comment 9 – DRMS asks Applicant to commit to contouring area to existing adjacent slopes

Response:

As discussed in above responses, DRMS appears to want to erase evidence of the presence of man in the reclamation requirements. Instead, the Applicant and property owner both want to make the land as useful as possible. I believe that the design included in the reclamation plan is feasible, and if it is not feasible, DRMS will hold bond money until it is satisfied that the surface is stable and vegetation has been established.

We must also remember that this waste rock pile in question is a fly spec, as compared to the size of the disturbances at the other larger mine in the district. The small volume of material in this pile could easily all be moved to erase its existence with a couple of days with a dozer and excavator. There is sufficient money in the bond to do this work if found to be necessary.

Comment 10 – Reclamation Cost Estimate

Response:

It appears that DRMS has used a canned program to calculate costs. I find that these programs lack sensitivity to actual site conditions and find it best that they are reviewed by a qualified person to ensure accuracy. The costs shown are higher than what I calculated, but are still within reason. They should allow even a greater factor of safety, thus I am in agreement, and recommend no changes.

Comment 11 – Five mapped pits in Closure of waste rock dumps – Adequate

Response:

No response necessary

Exhibit F – List of other Permits and Licenses Required – All parts deemed adequate

Response: No response necessary.