

State of New Mexico  
Energy, Minerals and Natural Resources Department

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February 18, 2013

Mr. Andre Douchane  
New Mexico Copper Corporation  
2424 Louisiana Blvd, NE, Suite 301  
Albuquerque, NM 87110

**Re: Comments on Application for New Mine Permit No. SI027RN, Copper Flat Mine, Sierra, New Mexico**

Dear Mr. Douchane:

On October 2, 2012 the Mining and Minerals Division (MMD) received an application from New Mexico Copper Corporation (NMCC) requesting a Permit to mine at the Copper Flat Mine site. The application has been reviewed by MMD. The application is composed of a Sampling and Analysis plan (dated September 10, 2010), a Baseline Data Report, and a Mining and Operation and Reclamation Plan, received July 17, 2012.

**602.D.13: Baseline Data Report:**

These comments address Section 3.13, Baseline Data of the Mine Operation and Reclamation Plan. The comments address the identified Sections of the Baseline Data Report. The corresponding section of the Part 6 regulation is also identified.

**Section 4 Vegetation, 602.D(13)(c):**

1. Section 4.3.1.5; Please replace the word “besides the arroyo” with a word of clarity (i.e., “parallel to”, “physically next to”, “in addition to”, etcetera).
2. Section 4.4.1.5; Please revise this section to clearly describe which areas (through stratified sampling) were adequately sampled, and which were not and the associated reasoning. Additionally, provide a discussion of the number of transects statistically required for sample size adequacy, and the number of transects actually conducted.

**Section 5 – Wildlife, 602.D(13)(e):**

1. Please correct or remove the reference (bottom of page 18 of the MORP) to a coachwhip as a “lizard”.

**Section 6 – Topsoil Survey and Sampling Results, 602.D(13)(e):**

The following comments and questions address the *Order 1 Soil Survey of Permit Area* that is reported within **Appendix 6-A** of the June 2012 *Baseline Data Characterization Report for Copper Flat Mine Sierra County, New Mexico*.

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Section 1 Introduction:

1. Please provide a geo-referenced map, at least 1:6,000 scale or larger to identify the individual soil units, 21 soil pits and 183 log sites of the soil survey. A supplementary table should identify the location of soil pits and log sites along with a brief description of family-level taxonomy at each location. Any notes that identify special characteristics such as CaCO<sub>3</sub> content, rock content, induration or gradation of character from one soil unit to another should be included with this table.
2. In reference to Table 5; Please provide constituent concentrations of [Na<sup>+</sup>], [Mg<sup>++</sup>] and [Ca<sup>++</sup>] from paste extracts that were used to calculate SAR.
3. Please provide a clarifying discussion of the methods cited to conduct hydrometer and sieve tests as it is not clear if pretreatment methods were employed to remove carbonates from samples before dispersion or sieving.
4. During sieving, were fine and very fine sand fractions separated and accounted for? Please provide more discussion. Note, the only indication of sand size partitioning was for tailings substrate, on page 44.
5. On page 3 of the introduction the scale for 1:6,000 is equivalent to 1 inch = 500 feet rather than 0.5 inches = 1,000 feet. Please update.

Section 2.2 Criteria for Topdressing Suitability

6. Table 1. MMD agrees with the observation on p. 7 that soils dominated by coarse grained materials (up to 70% rock content) can produce vigorous vegetation if the remaining fine earth fraction is sufficiently loamy. On long steep slopes rocky substrates increase resistance to erosion. Please include stone with the cobble + gravel component for a maximum content of rock in the "fair" limit to a range of 35-70%. Please note, MMD regards "good," "fair" and "unsuitable" as qualifying characteristics in general, but "fair" materials, such as relatively high rock content, may be more appropriate for steep slopes.
7. Table 1. Hot-water extractable boron should be limited to no more than 5 parts per million for suitable materials. Please correct Table 1 to demonstrate this.
8. Table 1. Calcium carbonate limits for "good" materials is listed as 15 percent CaCO<sub>3</sub> equivalent and for "fair" materials as 15-40 percent. After a review of pertinent literature, a series of discussions with other reclamation practitioners and our own experience with carbonate-rich soil materials in the field these limits are not judged appropriate for topdressing. There is a great deal of literature on the deleterious effects of CaCO<sub>3</sub> on agronomic and native plants ability to utilize P, Mg, and other metals. Elevated CaCO<sub>3</sub> in subsoil horizons may not be problematic or, may indeed increase available water to shallow rooted vegetation, in some situations. However, CaCO<sub>3</sub> content should not be above 10 percent equivalent in the upper six to twelve inches in a reconstructed soil profile. Please adjust CaCO<sub>3</sub> limits for "good" materials to less than 10 percent and for "fair" materials to 10-40 percent. No suitable materials should be salvaged from indurated horizons that are continuously cemented, regardless of CaCO<sub>3</sub> content.
9. Table 1. MMD views available water holding capacity (AWHC) as a critical component in evaluating soil suitability. Please define AWHC as bulk volumetric water holding capacity of soil materials to hold water between -0.033 and -1.5 MPa of tension, corrected for rock content.
10. Either as part of Table 1 or as a separate table, please estimate a range of values or a bulk value for each of the criteria listed in Table 1 for each soil unit and, if variation exists, for depth phases of soil units. AWHC and the method used to estimate it should be included as part of this table and discussion.

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11. In reference to Section 3.1, with map units 102, 101 and 109 NMCC has differentiated several depth phases to estimate the median thickness of suitable salvage within individual soil unit phases. Please describe how these depth phases were determined among soil units with multiple depth phases and units which were not described by backhoe pits.

**Section 7 – Geology, 602.D(13)(f):**

1. After receipt of recent information from New Mexico Copper Corporation regarding the “coarsely crystalline porphyry” rock-type, it appears that NMCC’s conclusion is that this is not a unique rock-type as originally hypothesized, but is instead part of the quartz monzonite. MMD recommends modification of Table 7.2 in the BDR to reflect this updated hypothesis as it relates to the major material types in the proposed project area.
2. Pg. 7-10, Section 7.5.2.7 states that a conceptual model will be developed to describe predicted geochemical trends of reactivity from waste management facilities, final pit walls (pit lake chemistry) and the tailing facility. In addition, this model will be used to provide quantitative numerical predictions of the potential impacts of seepage or runoff from mining facilities to regional groundwater. Because these models relate to the MMD requirement to address “probable hydrologic consequences”, MMD will require submittal of this information in a revised or amended BDR/PAP prior to MMD being able to deem the PAP as technically approvable.
3. Pg. 7-11, Section 7.5.1.3 states that a single comprehensive report of the complete geochemical testing program, including both static and kinetic testing analysis, and results will be provided when completed. Because the geochemical program relates to the requirement to address “probable hydrologic consequences,” MMD will require this document to be submitted in a revised BDR, or as an addendum to the BDR, prior to MMD being able to deem the BDR/PAP as technically approvable.
4. Appendix 7-D, page 6 of 6, states that a geologic block model is required to determine the relative percentages of each material type and determine if the number of samples selected for each material type is adequate for the characterization program. MMD will require this evaluation to be submitted prior to MMD being able to deem the BDR/PAP as technically approvable.
5. Appendix 7-E, Section 5 states that the 1997 and 2010 geochemical databases are comparable although the 1997 data show a trend toward having a generally greater acid generating potential than the 2010 data. A possible explanation provided in this appendix is that there may be a bias in the 1997 sample collection toward high sulfide/highly weathered materials. Although not discussed in this appendix, the opposite is also a possible explanation; that there may be a bias in the 2010 sample collection toward materials that are low sulfide/low weathered materials. Hopefully the block model analysis will shed light on the overall adequacy of the characterization program.

**Section 8 – Surface Water and Groundwater Information, 602.D(13)(g):**

1. Page 8-3, Section 8.1.2.1.2 states that the NMED SWQB has collected flow data along Las Animas Creek, however there are no historical flow data available in published reports. Although perhaps not published, this data should be available through a request for information to NMED SWQB. Although the historical and baseline flow data (quantity data) presented appear to adequately document Las Animas flow at this time, MMD recommends incorporation of any additional quantity data from NMED SWQB related to Las Animas creek as further documentation of historic flow variability.

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2. Section 8.2.4.1. The crystalline bedrock aquifer appears adequately characterized for the BDR. However, MMD recommends submittal of groundwater quality data for GWQ-5R, GWQ11-24 A&B, and GWQ11-25 A&B (which were all installed after the 4<sup>th</sup> quarter monitoring for the BDR) in a revised or amended BDR as further documentation of groundwater quality within the crystalline bedrock aquifer.
3. Pg. 8-21, Section 8.2.4.1 states that nine wells were used for water elevations, however only 8 (or 12, depending on whether you count wells like GWQ96-22A&B as one well or two) appear to have been measured (GWQ-5R, GWQ96-22A&B, GWQ96-23A&B, GWQ11-24A&B, GWQ11-25A&B, LRG 04158, LRG 04159, Pague). Please make appropriate change to this section.
4. Pg. 8-22, Section 8.2.4.1.1 refers to GWQ-5 as a crystalline bedrock aquifer well and is used to compare groundwater chemistry trends to other crystalline bedrock wells. Figure 8-20 also identifies GWQ-5 as a crystalline bedrock well. However, it seems somewhat doubtful to this reviewer that GWQ-5 is a crystalline bedrock well given the description that “GWQ-5 was a 20-ft deep rock-lined hand dug well...”. It seems more likely to this reviewer that GWQ-5 was representative of the Grayback alluvial aquifer system based on the description of its completion and its location in the Grayback arroyo. Please make appropriate change to this section.
5. In reference to Section 8.2.4.3 (Quaternary Alluvium), the groundwater quality within the alluvial aquifer of Las Animas Creek appears adequately characterized in the BDR through the use of monitoring well MW-11. However the water quality of the alluvium aquifers within Percha Creek, Grayback Arroyo, Hunkidori Gulch and Greenhorn Arroyo appear to be under-characterized for the purposes of the BDR.
  - a. Percha Creek alluvium: Please provide any historic or recent groundwater quality data for the alluvium within these systems.
  - b. Grayback alluvium: Historic water quality data for wells GWQ-1, GWQ-3 and GWQ-8 is provided in the BDR, which may represent water quality from the Grayback alluvium due to their locations in or near the Grayback arroyo. However, the BDR does not appear to contain completion/construction data for these wells/sampling locations. Please provide any historic or recent groundwater quality data for the alluvium within these systems. MMD recommends providing the completion data for these three wells/sampling locations.
  - c. Hunkidori Gulch alluvium and Greenhorn alluvium: Currently there do not appear to be any shallow alluvial wells located within Hunkidori Gulch or Greenhorn arroyo. MMD recommends installation of at least one shallow alluvial well downgradient of the proposed tailings dam within each of these alluvial systems to characterize the potential alluvial aquifer for the BDR, or provide any historic or recent groundwater quality data for the alluvium within these systems.
6. Table 8-9 identifies well “UNKNOWN” as being in the Qal aquifer system, however this well is shown in Figure 8-20 to be in the Santa Fe Group aquifer. Table 8-9 or Figure 8-20 should be corrected in a revised BDR or addendum to the BDR to correct this discrepancy. Additionally, this well appears to be identified as “15.6.31.431” in Table 8-11. The naming convention for this well should be corrected between the tables and figures if well “15.6.31.431” and well “UNKNOWN” are the same well.
7. MMD recognizes that the results of the aquifer pump tests and associated studies (i.e., geochemical and hydrologic models) are on-going, therefore MMD will withhold comments

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on these critical studies that help to define the probable hydrological consequences of the proposed operation until those studies are complete and integrated into the PAP.

**Section 9 – Prior Mining Operations, 602.D(13)(h):**

1. The last sentence of Section 9.1 “Mining History” indicates that “More detail about copper exploration activities can be found in Section 11.3.” However, “Section 11.3 Soil Survey” neither mentions nor provides any detail about copper exploration activities. Please correct.

**Section 10 – Cultural Resources – Summary, 602.D(13)(i):**

1. Throughout Section 10, the authors describe the permit area as being situated within the “Las Animas Historic Mining District” that is “yet to be defined” but also seems to interchangeably define the permit area as also being situated within the “Hillsboro Mining District” and/or/also as the “Las Animas Historic District”. Also, within Section 11 “Present and Historic Land Use” the area is defined as the “Hillsboro District” This is confusing and suggests that there are two separately defined Districts, and it seems as though the intent is to describe the permit area as being in the “Hillsboro Mining District” which is situated within a larger encompassing “Las Animas Historic District” that is yet to be delineated or defined. Please provide clarification.
2. MMD previously provided comments to NMCC, upon submittal of the Sampling and Analysis Plan (SAP) suggesting that locations the four (4) referenced cultural resource surveys be depicted on Figure 10-1 of the SAP. Please provide an updated Figure 10-1 with the needed information to be inserted into the SAP.
3. Please describe any cultural surveys that have been conducted in the areas of the water supply pipeline and associated well field and update Figure 10-1 of the SAP to include those survey locations and include with the submittal of the response to the comment above.
4. Section 10.2 “Eligibility and Management Summary” indicates within the last paragraph of the Subsection that “Detailed management recommendations will be presented in a future cultural resources report” and also indicates that “avoidance will most likely not be feasible for all of these resources, it is recommended that they be included in a testing and data recovery plan...”. This testing and data recovery plan should be provided.

**Section 11 Present and Historic Land Use, 602.D(13)(j):**

1. Section 11.3 “Soil Survey” seems out of place and makes reference within this section to a Section 6.0 “Topsoil Survey and Sampling Results” where the soils surveys are discussed in detail. Section 11.3 “Soils Survey” seems irrelevant and out of place under Section 11 “Present and Historic Land Use” and perhaps this information would be better presented within Section 6 “Soils Survey”. Please provide clarification.
2. Please update this section to include a description (present and historic land use) of the water supply pipeline, associated well field, and the electrical power supply lines.
3. Please provide a description of land capability and productivity based up Soil Conservation Service land use capability classes or similar classification.

**602.D.15: Mining Operation and Reclamation Plan (MORP).**

These comments address Section 3.15, Mining Operation and Reclamation Plans, of the Mine Operation and Reclamation Plan. The corresponding section of the Part 6 regulation is also identified.

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Comments and requests for additional information on the MORP are as follows:

**602.D.15(a):**

1. The description of the mining process provided includes a general description of the proposed mining of ore and rock but does not include a description of the milling and tailings impoundment processes. Provide a complete description of the mining operation proposed including the milling and tailings disposal processes.
2. Provide a description and/or reference (i.e., Chapter 4 of PAP) to how the reclamation plan will meet the performance standards required in Rule 603.

**602.D.15(b):**

3. Please update this section of the PAP to include a construction sequencing schedule for the development of all roads, pits, stockpiles, and operation/administrative facilities. Describe how the sequencing and construction will be facilitated to maximize contemporaneous reclamation. Please note, MMD does recognize the figures provided as Appendix C (IMC Mining Sequence Maps) for the sequenced development of the pit and stockpiles, however this does not completely satisfy the requirements of this part.

**602.D.15(c):** Please provide the following;

4. Provide updated maps and figures to include, within the proposed permit area, the water supply infrastructure(s) including the water supply production well field and pipeline.
5. Provide detailed maps and plans of the surface water and stormwater impoundments. Note, Figure 6 was provided in overview scale (1:16,500) subsequently lacking sufficient detail and making it difficult to evaluate the proposed plan of managing stormwater.
6. Provide an updated Figure 7 (map) with the permit boundary more clearly identified as it appears misaligned and shows proposed facilities outside the boundary. Please be certain all other figures with the permit boundary illustrated are consistently depicted.
7. Appendix C, Preliminary Tailing Facility Design Drawings, Figure 2 – The footprints of the WRDF and LGOS in Figure 2 differs from the footprints presented elsewhere in Appendix C (i.e., Figure “End of Year 10”) and in Figure 2 within Appendix D. Appendix C Figure 2 also shows the WRDF footprint to exceed the project permit boundary. Please provide.
8. Provide a more detailed plan for how suitable growth material, both topsoil and subsoil, will be segregated, the volumes, quality, and the owners of this material.
9. Identify the area west of the pit, and east of the west-side diversion, and update the MORP and maps to illustrate and address this area and/or feature in the reclamation plan.
10. Provide maps and plans for areas designated for storage of chemicals and solutions, equipment and vehicles.

**602.D.15(d):**

11. Please provide additional details regarding how wildlife mortality (especially regulated game animals and species of concern) would be properly recorded and reported.

**602.D.15(e):**

12. Provide a map with the specific location of all stormwater and sediment control and containment features, the size and dimensions of those features, and the storm event these features are to be designed for.

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**602.D.15(f):**

13. To support wildlife and grazing PMLUs please develop plans to provide variability in cover soil type, layering and depth, e.g. lower carbonate content for grasslands.
14. Provide a discussion of how re-vegetation plans would be designed and developed to address variability in cover soil type, layering and depth, (i.e.. lower carbonate content in surface materials for grasslands; rocky material for steep slopes).
15. Please provide clarification how “wildlife” and “grazing” post mining land uses will be distinguished from one another and be self-sustaining. Provide BLM’s written approval for the post-mining land use(s) proposed.

**Reclamation Plan**

**602.D.15(g):**

16. Please provide a detailed description of how the mine pit will meet the requirements of achieving a self-sustaining ecosystem, at reclamation. It appears that the current proposal for reclamation of the pit does not meet this requirement. Partial backfilling of the pit, may be required along with the laying back of pit highwalls. Additionally, the appropriate placement of cover materials and revegetation, on regraded benches and slopes may also be required. Cross sections of the reclaimed pit highwalls will be needed to make this argument. The final elevation of the pit lake will be factor in achieving this requirement.
17. Provide the forthcoming modeling results to identify the net input rates of expected salt and metal species, identify the equilibrium concentration of those species expected to precipitate and the long-term solution chemistries of pit lake water.
18. Please provide alternatives to reclamation of the pit, in the event that the long term water chemistry of the pit does not meet surface or ground water quality standards.
19. Please provide a description of how the pit walls would be determined to be “stabilized” as mentioned in the reclamation plan.
20. Please update this section, and other relevant parts of the PAP, to include a “non-mining scenario” for the proposed low grade ore stock pile in order to properly plan and estimate the costs for the financial assurance using a “worst-case-scenario”.
21. Please revise the tailings impoundment reclamation plan to commit to a top-surface re-grading of at least 1% and no steeper than 2% aided through tailings discharge plans in the latter years of mine operation.
22. Please make changes to Table 9 as it lists 3,798,351 cyd for “Reclamation Cover Requirements” where the sum for the column is actually 3,859,657 cyd. Assuming 166 acres at 0.5 ft. depth, the correct cover requirement for “Ancillary” is 133,907 cyd rather than the 195,213 value listed; similarly the correct value for “Open Pit” is 58,080 cyd. Based on these corrected values the recalculated total “Reclamation Cover Requirements” is 3,796,173 cyd, very close to the listed value for the table (rounding error?).
23. Please provide clarification to the topdressing availability estimates, as the Stetson soil survey estimated 3,391,000 cyd of suitable soil materials, a deficit of 405,173 cyd (ca. 251 acre-feet) from the 3,796,173 cyd required for proposed reclamation.
24. Please note, the volume and distribution of topdressing resources needed for reclamation may vary with the quality of materials being covered by soil cover, the quality of soil cover materials, topography and climate. If waste rock is inert, and unlikely to produce toxic weathering products, a shallower depth of soil cover may be appropriate. MMD will reserve judgment on the soil cover

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requirements until static and kinetic testing of overburden materials has been completed and evaluated.

25. In reference to the statement at the top of Page 49, stating that consolidation seepage into the underdrain system of the tailings facility can be anticipated to continue at declining rates for an indefinite period following the cessation of the tails discharge operations. Please provide a more thorough description of how NMCC anticipates managing this discharge post-mining. Additionally, provide an estimate of the amount of time needed to achieve tailings seepage drain-down to a *de minimus* volume. This comment also applies to section 3.16 of the MORP entitled “post-mining acid or other toxic drainage”, and should be addressed in that section as well.
26. In reference to Page 50 – stating that the production wells and buried pipeline would remain in place “for other uses.” Leaving the production wells and pipeline for other uses appears inconsistent with the proposed post-mining land use of wildlife habitat and grazing land. As such, the wells and supply pipeline will be required to be properly abandoned for closure. Please clarify.
27. Please provide a commitment to avoid topsoil application and seeding activities during wet periods to reduce compaction regardless of slope.
28. Please include a commitment to rip the haul roads to a depth sufficient to ensure the relief of extreme compaction.
29. Please describe the alternatives that were considered in determining the proposed use of hydro-seeding as MMD believes drill-seeding to be more efficient and appropriate for this arid environment.
30. Please describe the location and approach for developing the referenced test plot(s) as MMD believes this to be an integral part of demonstrating the effectiveness of the proposed cover material and will assist in developing a robust seed mixture to employ during the reclamation phase.
31. In reference to the proposed weed free straw mulch, please describe the alternative mulching materials that were considered and how straw is the most appropriate for this climate and location. MMD believes straw should not be used as it shatters during crimping and readily moves in the wind.
32. The reclamation plan for the waste rock disposal, and low grade ore stockpile, facilities indicate that these facilities will be regraded and blended into the surrounding topography. Another section, of the plan, indicates that the contemporaneous reclamation approach, will involve a bench and terrace approach to achieve slopes of 3H:1V or flatter. Please provide how NMCC will be using a geomorphic reclamation approach on these facilities, or explain why these is not feasible.

**602.D.15(h):**

33. Please update this section to include scheduled reclamation of the roads, removal and reclamation of all sediment control features/structures, removal and reclamation of all wildlife control structures, and removal of all institutional controls.

**602.D.15(i):**

34. Please update this map (and all related maps/figures) as needed per all comments contained in this correspondence and from the other state agencies (attached).

**602.D.15(j):**



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35. MMD recognizes the workplan description (Section 7.5 of the BDR) of the on-going materials characterization testing. For the sake of expediency it may be helpful for NMCC to meet with MMD and the other interested state agencies to discuss the progression of the testing in order to gauge the potential compliance, or non-compliance, with the regulations. The PAP will need to be updated at the completion of the geochemical testing to include the results, and update the MORP accordingly.

**602.D.15(k):**

36. The PAP mentions temporary stabilization (seeding) and “contemporaneous” reclamation of the waste rock stockpile. Please describe how all facilities and mine features will be constructed to *facilitate* contemporaneous reclamation to the maximum extent possible. Additionally, describe how contemporaneous reclamation (as described) of the WRSP will be possible without compromising the cover material with run-on, seepage, and/or windblown or unintended contaminants (i.e., low grade ore) being placed with, migrating in to, or alongside, or from up-gradient of the clean cover material. The PAP needs more description of how all planned stockpiles and structures will be designed, sited and constructed to facilitate contemporaneous reclamation to the maximum extent possible.

**603 Performance and Reclamation Standards and Requirements:**

These comments address Section 4.0, Performance and Reclamation Standards and Requirements, of the Mine Operation and Reclamation Plan. The corresponding section of the Part 6 regulation is also identified.

**603.A:**

1. Please provide a description of the different reclamation alternatives considered and how the proposed reclamation plan was developed and designed using the most appropriate technology.
2. Provide a detailed description of how the seepage collection system will be protective of groundwater.
3. In the event geochemical testing reveals a potential to generate poor water quality in the pit, post-reclamation, describe how the pit will be reclaimed using the most appropriate technology.
4. This section should also provide justification for the design of the waste rock storage facility without a synthetic liner as the most appropriate technology.
5. Please provide a description about the use of geomorphic reclamation techniques and how they might be integrated into the reclamation plan for the waste rock piles and the tailings.

**603.B:**

6. The PAP, and this section, needs more detail as to how the reclamation plan is designed to maximize contemporaneous reclamation. Please provide.

**603.C.(1):**

7. Please provide a discussion about the referenced existing and historic mine workings within the proposed permit boundary and how they will be safeguarded against unauthorized entry during operations and after reclamation.

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**603.C.(2):**

8. Please provide additional discussion about the specifications of referenced wildlife exclusionary fences, the locations, and how these features are to protect wildlife without harm or mortality (i.e. barbed wire).

**603.C. (4)(d) –**

9. Describe how the post-reclamation hydrologic balance will be affected with the existence of a pit lake and subsequent cone of depression. Please address water quality and quantity.
10. Provide a description of how the long term integrity of the proposed liner (HDPE) beneath the tailings impoundment will be protected against structural cracking and/or differential settlement that could subsequently compromise the hydrologic balance.
11. Provide the designs (as stated in this section) for the stormwater management. Additionally, address the comments above (602.D.15(e)) requesting more information about stormwater and sediment retention.
12. Please note, the additional information (reclamation plan) requested in this correspondence will need to be integrated into an updated description of how overland flow will be managed to minimize potential adverse impacts and the hydrologic balance.

**603.C(5)**

13. Please demonstrate that the configuration of the site-wide diversion system is capable of successfully diverting a 10-year, 24-hour precipitation event and a 100-year, 24-hour precipitation for the permanent diversions.
14. Please provide engineered drawing(s) of all diversion certified by a New Mexico professional engineer.

**603.C.(6) –**

15. Pursuant to this requirement, please provide the number and a map of locations of the planned impoundments (excluding the tailings storage facility) that will require design by a certified professional engineer registered in New Mexico.

**603.C.(7) –**

16. Please describe how the WRDF, LGO stockpile, and the topsoil stockpile will be constructed and maintained to minimize mass movement (erosion) as compared to other potential reclamation technologies and associated grading plans.

**603.C.(8) –**

17. Given that the mine will operate partly on captured surface water (zero discharge), potentially impacting the riparian and wetland areas, provide a description of how the potential hydrologic impacts to these riparian and wetland areas will be minimized, and describe how these potential impacts will be mitigated during reclamation.
18. In reference to Figures 6 & 7 of the MORP, which portray operational areas, the operation area appears to include the Goodding's willow forest/wetland/riparian area near the mine entrance. Please provide a description of how these areas will be impacted and reclaimed, and/or how these areas will be protected from disturbance during mining.
19. Please provide plans for habitat replacement for the referenced patches of salt cedar to be removed within the permit area, and any plan to mitigate with native species?

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20. Please provide a description of plans to monitor the Arizona sycamore “recruitment zone” for stress related to the hydrological consequences of groundwater pumping for the mine project?

**603.D(1) –**

21. This section of the MORP states, “The topography, slopes and aspects of the disturbed areas would be developed to blend in with the surrounding topography as much as practicable.” Slope and terrace designs are functionally and aesthetically far removed from natural surrounding topography. Please incorporate geomorphic design into the reclamation plan to promote slope and drainage stability, and a diversity of topographic slopes to promote vegetation diversity. MMD regards geomorphic designs as BMPs (19.10.6.603.A NMAC) that should be employed at this site

**603.D(3) –**

22. Provide a detailed description of how a bench and terrace design (WRDF) will minimize mass movement at reclamation. See comment above.

**603.E:**

23. Provide a description of how the proposed growth media stockpile will be protected from potential contamination provided by the neighboring and up-gradient WRDF, or other potential sources.

24. The BDR contains an appendix (Appendix 6-A) that details a comprehensive Order 1 soil survey of salvageable and suitable soil materials for reclamation that, with some reservations, is viewed by MMD as the most accurate and complete depiction of topdressing resources across the permit area. However, soil maps used for the survey depict soil units that do not correspond to mine facilities and a map showing the intersections of soil units and mine facilities is not provided. Please provide clarification.

25. The Mining Plan of Operation (MPO) that was submitted to the BLM appears to reference much coarser Order 3 soil surveys performed by the Soil Conservation Service (now the Natural Resource Conservation Service) and limited data sets from subsequent sampling efforts that were later used to support a proposed Sampling and Analysis Plan for the MMD. Between the BDR and MPO (submitted to BLM) documents there are a number of inconsistencies that need clarification. For example:

- a. In Section 5.9.1 of the MORP, the authors refer to salvage of the O-horizon. No O-horizon exists within Copper Flat soils.
- b. Table 5-2 of the MPO lists a total of 2,905,629 cyd of required topdressing materials to cover a total of 911.5 acres of reclaimed surface area. In contrast, the more recent MORP lists a requirement of 3,798,351 cyd to reclaim 1096 acres of disturbance.
- c. Section 5.9.3 of the MPO discusses the need for organic and fertilizer amendments in reclamation while the MORP argues that amendments are not required.

26. In the introductory paragraph of Section 4.5, NMCC asserts that “The majority of the topdressing or cover materials required to support revegetation and reclamation efforts will be obtained from within the footprint of the new TSF [Tailing Storage Facility].” The volume listed for the Tailings Storage Facility of Table 14 estimates that 391 acres will provide 3,060,441 cyd of available cover materials. However, the soil survey of the BDR suggests far less reserves. Depending upon the bounds of the TSF, anticipated by Table 14, and the correlation with soil units described in the

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BDR (Section 6, Soil Survey), MMD estimates a maximum of about 1,552,000 cyd that could be salvaged from the TSF, about one half of that listed in Table 14. Please provide clarification.

27. Please provide a geo-referenced map of at least 1:6000 scale or larger that correlates the boundaries of BDR soil survey soil units and the location of proposed mine facilities to show overlapping acreages. Please provide additional discussion of salvage volumes soil units within facility areas and perhaps a table to clarify this discussion.

**603.E (2):**

28. To support a whole-site compositing approach to soil salvage and stockpiling within the permit area NMCC states that “Most soils have poorly developed and thin topsoil (A horizon) that are generally similar both physically and chemically compared to underlying soil horizons and parent materials.” A casual reader might imply from this statement that soils are nearly uniform site-wide and monolithic in profile. The soil survey provided in Part 6 of the BDR illustrates that many soil pedons at the site are differentiated from one another and within a particular profile by pedogenic clay and calcium carbonate translocation as well as by large variations in rock content. These differences present challenges to site-specific reclamation techniques and warrant careful consideration. Please note, MMD does not support compositing salvaged soils.
29. Many soils at the site have developed one or more pedogenic calcic horizons at depth that often contain high contents of calcium carbonate. Over time, eolian or rainfall contributions of  $\text{CaCO}_3$  to a soil surface are translocated to depth and, unless there has been significant landform deflation, these deposits do not typically occur at the surface. While some native plants are able to thrive when exposed to these materials in shallow root zones MMD and other reclamation practitioners have found that sparse, diminutive vegetation, often results when  $\text{CaCO}_3$  content is elevated near the surface. In addition to concerns about  $\text{CaCO}_3$  MMD believes that rocky soil materials, while a reliably valuable resource on long steep slopes, may not be appropriate as a cover for near-level surfaces when less rocky materials are available.
30. As a means to encourage diverse vegetative composition, MMD promotes diverse variations in cover depth and character, whenever possible. In the case of the Copper Flat Mine, the opportunity exists, with careful planning, to provide this diversity with a minimum of complication or expense. MMD will require that materials at Copper Flat be segregated during salvage and stockpiling to provide a range of cover material characteristics for use in reclamation. At a minimum, high- $\text{CaCO}_3$  substrates, above 10 percent  $\text{CaCO}_3$  equivalent, should be segregated from other materials for later application of high- and low- $\text{CaCO}_3$  layers to a reclaimed landscape. Likewise, topdressing substrates with high rock content (> 35 percent) should be segregated from materials more dominated by fine fractions for reclamation of slopes and near-level surfaces. Please provide plans to conduct careful salvage operations including advance surveying, additional sampling as required, training of equipment operators and oversight by qualified soil scientists.
31. In MMD’s experience there is often some loss of soil volume during salvage, storage and reapplication to reclaimed areas from stockpiles. At coal mines, where soil volumes are closely tracked through the life of the mine, this loss usually amounts to about 10-15 percent. Please incorporate a reasonable estimate for loss in reclamation plans and in Table 14.

**603.E(3):**

32. Direct transfers of topsoil from undisturbed areas to areas of reclamation are seen as the best way to preserve seed banks, soil organic material, labile nutrients and microflora as opposed to long-term soil stockpiling. While this scenario can sometimes be practiced at coal strip-mines it will

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not likely be practicable at Copper Flat. However, as a “second-best” option, desirable topsoil properties may be preserved or promoted if the surface area of stockpiled materials is maximized to promote biological activity and nutrient cycling with exposure to vigorous interim vegetation and aeration. Please develop a plan to maximize the surface area footprint of stockpiled materials.

**603.F:**

33. Please revise the reclamation plan to describe how the reclamation plan will meet this performance standard and more specifically how erosion will be minimized through land shaping and reduced slope lengths.
34. Describe how constructing a berm on the top surface perimeter of the WRDF will result in a condition that controls and minimizes erosion that could be accommodated by concentrated flows around this berm.

**603.G:**

35. Please provide a detailed description of how site-specific re-vegetation success standards will be developed (i.e., reference area and/or test plots) for the site and how those standards would be applicable to both a wildlife and grazing PMLU. Please note, approximately 50% of the transects conducted for the BDR were in areas of little to no vegetation (i.e. pit bottom, tailings dam, diversion channel, disturbed areas/waste rock piles, prospector disturbances, heavily grazed areas, etc..) therefore MMD does not believe these data alone will develop the needed success standard. Furthermore, MMD believes sample transects (stratification) would need to be collected from the arroyos, riparian areas, and other areas of potential higher biological diversity and density to effectively develop those success criteria.

**603.H:**

36. Though NMCC commits to an operations and reclamation design that meets the proposed PMLU without perpetual care, please provide a more thorough plan demonstrating how this performance measure will be met.

MMD has attached the comments received from other agencies regarding the technical review of the Copper Flat Mine Operation and Reclamation Plan. Please address these agency comments and include those responses with your response to this correspondence.

Please contact me directly regarding these comments or in setting up a meeting to discuss this comments with MMD and the other commenting agencies.

Sincerely,



Chris Eustice, Permit Lead  
Mining and Minerals Division

Cc: Holland Shepherd, MARP Program Manager  
Clint Marshall, NMED-MECS Program Manager  
Dr. Wunder, Department of Game and Fish  
Mike Johnson, OSE  
**File SI027RN**