First Deficiency Review, Pending Operating Permit 00188

The Department of Environmental Quality (DEQ) has reviewed the application for an operating permit submitted on December 15, 2015. While this first deficiency review is extensive many of the comments fall under the category of needed corrections and clarification, which dramatically increased the length of the letter. Despite the length of this letter the Bureau appreciates the efforts and approach taken by Tintina regarding this project. Please address the following comments:

The notations after each deficiency comment refer to the Metal Mine Reclamation Act or rules and in a few cases to MEPA (75-1-201, MCA). Errors, needed clarifications, or simply incorrect statements, have been noted that should be corrected, although there is no corresponding rule to cite.

Page ii, Table of Contents, Section 2.3.3, Wetlands Indictors, and page 54, Section 2.3.3 title: Please change “Indictors” to “Indicators.”

Page vii, Tables 3-13 and 3-14: Change “Hazzard” to “Hazard.”

Pages xi-xvii, Glossary-Acronyms-Abbreviations, general comments: Please format subscripts and superscripts for chemical formulas (ions and minerals) and dimensions (e.g. m^3), being consistent in the capitalization of proper vs. common nouns. For instance, “SC” is defined as Specific Conductance in the Acronym section, but “Sc” is then defined as Specific Conductivity in Abbreviations. Please update the document text to ensure consistent usage of conductance or conductivity.

Page xii, Glossary of Terms: The brand is LECO not LECOS. Please correct.

Page xiii, Glossary of Terms: TCLP is listed twice.

Page xv, Acronyms: MSDS is no longer used. Please change all references to MDS (Material Data Sheet).

Page xv, Acronyms, MSDS bullet: Please update all references to Material Safety Data Sheets to say “Safety Data Sheets” (SDS) to comply with recent OSHA updates to the Hazard Communication Standard.

Page 1, Section 1.0, first paragraph, first sentence: Please provide Township, Range, and Section.

Page 1, Section 1.0, third paragraph: Please note that one of the ventilation raises will be a secondary escapeway in this section. The first mention of escapeway is in Section 3.6.3 on page 171.

Page 1, Section 1.0, fourth paragraph, last sentence: Please add, ‘The addition of the cement should help neutralize the amount of ARD generated.’

Page 2, Section 1, second full paragraph, fifth sentence: As read, the NCWR would be filled during the irrigation period of the year to offset consumptive use during the non-irrigational months of the year. Should it not be filled during the non-irrigation times and released during the irrigation times to make up for mine consumptive use?

Page 2, Section 1.0, paragraph 2, 2nd sentence: The document states that a mitigation plan will be prepared and submitted by DNRC. DEQ assumes the plan would be prepared by Tintina and submitted to DNRC. Please clarify.

Page 2, Introduction, third paragraph, second sentence: Please correct the typo- “will be prepared and submitted *to* the DNRC.”

Page 2, Section 1, fourth full paragraph: Please add; ‘the addition of cement will help to reduce ARD.’

Page 2, Section 1.0, third paragraph: Please note that alternative regional railhead locations will need to be noted as part of the MEPA effects analysis. 75-1-201(1)(b)(iv)(C), MCA

Page 3, Section 1.0, first paragraph, first sentence: Please add; MPF after Maximum Probable Flood and MCE after Maximum Credible Earthquake.

Page 3, Section 1.0, first paragraph, last sentence: Please rewrite to include that Senate Bill 409 deals with high hazard dams.

Page 3, Section 1.0, second paragraph: Tintina lists a number of process variations and modifications to facility siting and construction. What process variations and modification are being considered for the CTF and PWP given that they will be partially constructed in the water table?

Page 3, Section 1.0, second paragraph, last sentence: Since tailings piping will be double-walled to help contain any leakage, will the interstitial space be monitored or would any leakage be detected by a pressure drop or tailings running out of the end?

Page 3, Section 1.0, fourth paragraph, eighth sentence: Please spell out CWP and capitalize Contact Water Pond.

Page 3, Section 1.0, fourth paragraph, eighth sentence: Please indicate if the land owner wishes to retain any of the buildings/structures? 82-4-335(5)(o), and (336)(9)(i), MCA

Page 4, Section 1.1, first paragraph, first sentence: Please provide Township, Range, and Section.

Page 4, Section 1-2, End of first paragraph: For clarification, CRH Old Castle currently operates the open pit Black Butte Iron Mine on a seasonal basis.

Page 4, Section 1.2, second paragraph, second sentence: Please insert “and” after district.

Page 8, Section 1.3, third paragraph: The sections 1 and 12 in Township 11North, Range 5 East is repeated (third line and last line of paragraph), also delete the second "and" in the third line.

Page 10, Section 1.4.1, second sentence: Please add to the glossary of terms: 'facies' and 'craton.'

Page 10, Section 1.4.1, sixth line: Using lies" for "lay" and line 10 "lie" for "lay" are better grammatical fits. Line 9, *VVF* and following acronyms for faults and sulfide zones: there is no need to italicize any of these acronyms. Paragraph 2, line 1: Please change "Its" not "It's."

Page 10, Section 1.4.1 last sentence: '….mass wasting events from a shallow water shelf to the north.' For clarity, please indicate that this is to the north of the embayment.

Page 10, Section 1.4.2, Line 1: Please change to "lie" not "lay." There are references in the text to the Buttress Fault on figures 1.5 and 1.7, but it is not labeled.

Stratigraphic terminology: Be consistent with capitalization of formation names and stratigraphic terms: Newland Formation, Flathead Sandstone, Neihart Quartzite, Middle Cambrian, etc. . Are "Upper" and "Lower Newland" formal stratigraphic names or just descriptions?

Page 10, Section 1.4.2, third sentence: Please consider rewriting to put Volcano Valley Fault at the start of the sentence.

Page 14, Section 1.4.4, second paragraph: Please correct the typo- correct the spelling for strontianite.

Page 15, Section 1.4.5, second paragraph, line 4: LSZ would be replaced with LCZ.

Page 16, Section 1.5, third paragraph, line 1: Please strike "including." Also, in the fourth paragraph, the hyphens in "re-contouring" and re-vegetation" are not needed.

Page 21, Section 2.1: Please correct the typo- section heading should read *Meteorological*

Page 21, Section 2.1.2: first paragraph, third sentence: Please edit and clarify this sentence. It appears that two separate thoughts were spliced together.

Page 24, Section 2.1.3, second paragraph, second last sentence and third paragraph: Using the highest evaporation estimate may not be the most conservative approach. By using high evaporation rate it minimizes available water for use in milling, etc. However, if evaporation is lower it increases the amount of water needing storage and treatment. It may be best to present a range of values and show that all facilities can handle the range of values presented. The site is probably a net precipitation area as characterized in Section 2.2.1. ARM 17.24.116(3)(a)

Page 24, Section 2.1.3, second paragraph, fifth sentence: The text notes that "…the study applied the most conservative approach to the water balance analyses, and used the highest evaporation estimate (20.2 in., 513 mm) for the Project site for modeling purposes." How would the assumptions for water balance modeling change be if the lower evaporation rate (16.7 in/yr) was used, and the site is considered a "net precipitation" area? For instance, how would pond capacities, LAD usage, water handling, etc., change to account for additional water not being evaporated? ARM 17.24.116(3)(a)

Page 26, Section 2.2.1, last paragraph, second sentence: Please change "Figure 9" to "Figure 11."

Page 32, Section 2.2.1, first paragraph at top of page: There is no Appendix B-1. Appendix B is in 4 sections, B-A through B-D. Please correct.

Page 32, Section 2.2.2, second paragraph, last sentence: Please explain how artesian conditions in PW-7 and other wells complicate protecting water quality in the area. Please expand the discussion on implications of artesian conditions on water flow and quality. 82-4-335(5)(k), MCA

Page 35, Section 2.2.3, paragraph 1, sentence 2: Please correct the typo- "dolomitic and silicic shales and argillaceous dolomites of the Newland Formation *form* the bedrock of the Project area."

Page 35, Section 2.2.3, first paragraph, third sentence: GWIC "…indicates wells completed in the area generally produce low yields." Please provide a reference/context for low yields in the area (i.e. range or average values). What further information is available about the completion depths and/or units encountered by those wells? ARM 17.24.116(3)(a)

Page 35, Section 2.2.3, first paragraph, last sentence: Where were the artesian bore holes located? Has artesian flow been encountered in more recent drilling investigations (besides PW-7)? How will that influence dewatering and water control efforts underground? ARM 17.24.116(3)(a)

Page 35, Section 2.2.3, last paragraph: Tintina may need to drill another well next to PW-7 to document the influence of drilling muds on water quality in this well, especially since PW-7 is the only well in the LCZ. 82-4-335(5)(k), MCA

Page 36, Section 2.2.4.1, second sentence: Please indicate which six sites had water quality sampling during the quarterly sampling? Fig. 2.2 is small and hard to read.

Page 37, Section 2.2.4.3: There are no appendices B-1 through B-3. All appendices are labeled B-A through B-D. Please correct.

Page 37, Section 2.2.4.3, first paragraph, fourth and fifth sentences: Hardness and bicarbonate are mentioned in the text, but not included in the baseline parameter list (Table 2-8). Were these values quantified by a specific analysis or calculated from other data (e.g. sum of other measured constituents or derived from alkalinity)? ARM 17.24.116(3)(a)

Page 38, Section 2.2.4.4, second sentence: Please add 'were' after, '…and test wells'

Page 39, Section 2.2.4.5, first sentence: Please correct the typo—"…water elevations in *this area indicate that*…"

Page 44, Section 2.2.4.6, second paragraph, first sentence: Please consider re-ordering the geologic descriptions and well numbers in this sentence, as it would be less confusing if they corresponded in respective order.

Well MW-1A is then described as being completed in fine sediments, which seems to imply alluvium or unconsolidated overburden, when it is actually the example of highly weathered shallow bedrock in Table 2-10. ARM 17.24.116(3)(a)

Page 44, Section, 2.2.4.6, third paragraph, third sentence: Please correct the typo—"…the human health standard of *0.002 mg/L*."

Pages 44 and 45, Sec 2.2.4.6, last paragraph: The discussion of PW-7 water quality makes it clear that low yield and drilling mud/fluid compromises the reliability of the samples. However, the static water level has risen significantly since drilling, so is there a chance to sufficiently flush the well over time or is it permanently compromised? Have any attempts been made to resample this well or drill a replacement? Water quality information is important from this lower zone, and is not provided from any other monitoring point. ARM 17.24.116(3)(a)

Page 50, Section 2.2.6, first paragraph, first sentence: Please clarify distinguishing "upstream (USGS-SC1 & SC-2) to downstream (SC-1)?" Figure 2.2 indicates USGS-SC-1 and SW-2 are upstream, SW-1 downstream.

Page 60, Section 2.3.7, third paragraph, second sentence: Figure 2.10 is a comparison of NAG pH, not wetlands assessment.

Page 60, Section 2.3.7, between the second and third paragraphs: The hyperlink to MDT Montana Wetland Assessment Method is broken. Please establish the correct link for this reference.

Page 62, Section 2.4, general comment for section: This section discusses previous geochemical test results and the preliminary results from ongoing tests (e.g. kinetic tests for tailings and USZ, Ynl B, and LZ-FW; static tests of near-surface Ynl and granodiorite, etc.) There are multiple instances where interpretations may change, depending on future results of laboratory tests. This section is closely tied to information included in Appendix D and sub-appendices (not complete) and Appendix N (not submitted). When laboratory tests and modeling are completed, please submit a new revision of this section with updated figures and summarized discussion, as part of the final draft of the permit document. There must be consistency and continuity within sections of the permit and the associated appendix reports. ARM 17.24.116(3)(a)

Page 63, Section 2.4.1, first paragraph, first sentence: This is the first mention of 'ABA.' Please add, 'Acid Base Accounting' prior to this acronym.

Page 63, Section 2.4.1, first paragraph, last sentence: DEQ will need geochemical test results to be submitted before the application can be called complete and compliant.

Page 63, Section 2.4, second paragraph, third sentence: Please update the discussion to include the lower, and more realistic, range of cement and binder added to the CTF-bound tailings (0.5-2.0%).

Page 63, Section 2.4.2, second paragraph, sixth sentence: Please update the discussion to include the additional disposal of waste rock in the CTF during operations, primarily around the access ramp (i.e. the "lenses" of waste rock discussed during February meetings). ARM 17.24.115(1)(i)

Page 63, Section 2.4.2, fourth paragraph: Although it is unlikely to find asbestiform minerals in this deposit, will additional testing be conducted periodically during operations?

Page 65, Section 2.4.2.2, first paragraph, first sentence, second paragraph, and third paragraph: DEQ will need geochemical test results before the application can be called complete and compliant.

Page 68, Section 2.4.2.2, first full paragraph, second sentence: Tintina proposes to treat all collected waters to nondegradation standards for groundwater prior to discharge. DEQ questions whether the plan for discharge of treated water to underground infiltration galleries will avoid discharge to hydraulically connected surface waters. As stated on Page 222, Section 3.7.4.2 (Underground Infiltration Galleries), fifth paragraph, first sentence: "Tintina will construct the underground infiltration galleries no closer than 400 feet to any wetland or surface water." If the high end of stated hydraulic conductivities for infiltration galleries in Table 2-12 (10,000 feet per day, page 47) is correct, then the travel time from the infiltration gallery to adjacent surface water could be as little as one hour. Assuming the average hydraulic conductivity is closer to that stated in Section 3.7.4.2 (32 feet per day, page 221, fourth full paragraph, second sentence), then the travel time could be as little as 12.5 days. The groundwater modeling report (Appendix M, Page 5-6) states that "During the initial mining simulations the discharge to the primary infiltration gallery resulted in excessive mounding…" DEQ notes that water levels in the monitoring wells (MW-6A, MW-6B) located between the proposed infiltration gallery and Brush Creek are very close to the elevation of Brush Creek, and that slight groundwater mounding would likely result in discharge from the shallow aquifer to the creek at this location. DEQ recommends that additional groundwater modeling be conducted using a reasonable range of hydraulic conductivities measured during onsite testing to evaluate the potential for water discharged to infiltration galleries to reach surface water. If the potential for discharge to surface water exists, coverage of the discharges via an MPDES permit is recommended. Baseflow in Brush Creek is very low (0.1 cfs = 45 gallons per minute; Appendix B, Pages 4-1 through 4-4, Figure 13, and Table 10); therefore an increase in Brush Creek base flow of as little as 5 gpm could require an authorization to degrade due to change in base flow. If the project will result in discharges to surface water, water treatment goals should be revised to achieve nondegradation criteria for surface water rather than for groundwater. ARM 17.24.116(3)(a)

Page 68, Section 2.4.2.2, last paragraph: The predictive model will need to be submitted before the application can be called complete and compliant.

Page 69, Section 2.4.2.2: The kinetic test results will need to be submitted before the application can be called complete and compliant.

Page 70, Section 2.4.3, second paragraph, fourth sentence: The diffusion tests were conducted using deionized water, but methods indicate that "either synthetic or site groundwater" should be used as the leaching solution for ASTM C1308/1308-08. Please clarify that deionized water is also an accepted leaching solution, and although it does not account for some reactions that could occur with actual site groundwater (e.g. ion exchange, precipitation, adsorption), it is likely a more conservative estimate for the leachability of cemented paste backfill constituents.

Page 70, Section 2.4.3, third paragraph, sixth and seventh sentences: The text notes that; "A similar relationship was observed in the aerated HCT tests of these materials, which exhibited higher overall oxidation. The 4% cemented paste maintained a pH between 5.0 and 5.5 through week 10 and the 4% cemented paste with waste rock column declined to a pH of 4 in week 6." The text is not consistent with the graphs shown in Figure 2.13. The pH of the 4% cemented paste is only shown through week 5 and is < 4.0; the pH of the 4% + ROM is only shown through week 3 or 4 and is > 6.0. Please ensure consistency between the test materials and related chemical data presented in these figures, particularly for the more recent kinetic test data. When geochemical tests and modeling are completed, please update the descriptive text and the associated graphs in Section 2.4 (related to update to Appendix D).

Page 71, Section 2.4.3.2, last paragraph, last sentence: The geochemical test results will need to be submitted before the application can be called complete and compliant.

Page 75, Section 2.4.4, third paragraph, first sentence: The element symbol TI needs to be corrected(Ti or Tl) and should this be added to the list of acronyms.

Page 75, Section 2.4.4, third paragraph, last sentence: Please add the word, 'both' after 'reducing.'

Page 75, Section 2.4.4, first paragraph, first sentence: The text notes; "…a thin upper surface that will be exposed to some degree of oxidation before being covered by fresh cement-amended paste tailings within days of placement." Please provide more context for the estimate of how many days could lapse before sequential tailings coverage (scale of weeks, later in paragraph; up to 30 days, in Sec 4.2.4). ARM 17.24.115(1)(i)

Page 75, Section 2.4.4, fourth paragraph, third sentence: Waste rock is described as being scattered throughout the tailings, is this consistent with the plans to dump waste rock in lenses adjacent to the ramp, which extends down into the CTF? In that scenario, the 2% cement results are likely more representative of much of the tailings mass, while the 4%+ROM results would represent only the material adjacent to or within the coarse rock lenses. ARM 17.24.115(1)(i)

Page 75, Section 2.4.4, fourth paragraph, fourth sentence: The application states that the tailings surface in the CTF will be exposed to the atmosphere for weeks at most before being covered with additional cemented paste tailings. However, DEQ notes that exposure time could be extended considerably if there are periods when mining activities are suspended, and during the final mine closure phase. This may result in greater oxidation of sulfide material, and poorer resultant water quality. Please respond to this possible situation.

Page 77, Section 2.4.4: Tintina discusses the potential weathering of paste tailings in the CTF. The site will receive periodic rain showers and various levels of snow which will affect placement of paste and potential settling of paste when tailings thaw in the springtime. Please discuss operational problems with paste tailings at other sites with similar rain and snow patterns. ARM 17.24.116(3)(d)

Also, if paste tailings settle during closure, how would that affect reclamation contours and geotextile membrane integrity? 82-4-336(10), MCA

Page 81, Section 2.5.3.1, third paragraph: Please note that DEQ considers rock that can be picked up in the belly of scraper (up to 24" in diameter) as suitable for salvage.

Page 84, Section 2.6.2, fourth paragraph: Extraneous text; Please delete "observed was."

Page 109, Section 3.0, Operating Plan: Please indicate the location of the electrical feeds and electrical equipment installations. Figure 1-3 shows minimal detail. Would power be supplied by overhead outside feeds or on site gensets? Please indicate how many, and placement of, electrical poles. ARM 17.24.116(3)(p)

Page 109, Section 3.1.1 (Mine Permit Boundary): DEQ notes that additional groundwater quality compliance wells may be necessary downgradient of the mine workings, and that the permit boundary may need to be expanded to encompass these wells. Also, Section 3.7.4.1 describes a proposed Surface LAD area to the northwest of the project area. This LAD area should be included within the permit boundary and should be indicated on other maps of the project area. The power line may also need to be added to the permit boundary. 82-4-335(5)(e), MCA and ARM 17.24.116(4)

Page 109, Section 3.1.1, first paragraph, first sentence: Please provide the survey coordinates of the permit boundary corners. What is the point of origin of the mine coordinate system? What Northerly and Easterly values would it have? Please provide a full size exhibit showing the mine permit boundary with the corner coordinates. ARM 17.24.116(4)

Page 109, Section 3.1.2, second sentence and Table 3-2: Is the 26 acres referenced in the section the same 26.83 acres referenced in Table 3-2 Material Stockpiles?

Page 110, Section 3.2: Will an engineering evaluation or model for the potential for subsidence over the underground mine be presented?

Page 113, Section 3.2.2.1, first paragraph: The construction and reclamation of a temporary waste rock storage pad is discussed, followed by the construction of a mill feed storage pad at the same location. Please discuss why the same pad cannot be re-purposed for ore storage after the waste rock is removed.

Page 113, Section 3.2.2.1, second paragraph, third sentence: Please provide a detailed waste rock/ore/tailings material balance. There seems to be an error in the calculation, and it is not clear how much of each component is staying on the surface or going back underground. ARM 17.24.116(3)(i)

Page 113, Section 3.2.2.2, second paragraph, third sentence: Please provide an underground rock mechanic/ subsidence engineering analysis to support the claim that "there is no risk of future ground subsidence at the surface."

Page 113, Section 3.2.2.2, bullet four: Please provide a reference for the reported conductivity values for tailings and host bedrock. The conductivity reported here for the host bedrock (10^{-7} ft/day) disagrees with the range provided in Table 2-12 (Newland bedrock ~ 10^{-3} to 10^{-5} ft/day). The conductivity assigned to the paste backfill is also quite different, as 2.85 x 10^{-4} ft/day was used in the groundwater modeling report. ARM 17.24.116(3)(a)

Page 113, Section 3.2.2.2, bullet 5, and Page 117, Section 3.2.2.4, fourth paragraph: The text describes how individual active working headings would only be exposed to atmospheric oxygen for a limited time prior to being backfilled with cemented paste tailings. However, DEQ notes that portions of the decline and ventilation raises will penetrate sulfide zones surrounding the ore deposit and would be exposed to atmospheric oxygen for the duration of the mining operation. It may be possible to minimize oxidation of these surfaces via application of bactericides or other compounds including shotcrete. Please discuss the potential to minimize oxidation of sulfide bedrock that will be exposed in these areas. Despite the rapid backfilling of drifts with cemented paste tailings, mine dewatering would continue and the tailings as well as the overlying fractured sulfide bedrock are likely to remain unsaturated and exposed to oxygen until after closure and flooding of the mine. Infiltrating water is likely to oxidize sulfides in bedrock and on surfaces of the cemented paste tailings, potentially resulting in the dissolution and release of stored oxidation products when the mine is ultimately flooded. Tintina should evaluate the potential need to maintain the water treatment facilities and to continue to pump water from the decline to maintain groundwater flow toward the mine workings until groundwater chemistry stabilizes post-closure and non-degradation criteria are achieved in downgradient monitoring wells. Please provide an estimated duration for post-closure water treatment until groundwater quality in compliance wells downgradient of the mine achieves non-degradation criteria. 82-4-335(5)(m), MCA

Page 114, Section3.1.1: Please describe the location of the secondary escapeway for miners in this section.

Page 116, Section 3.2.2.3, second paragraph, first sentence: How will the mine be dewatered? Would a series of pumps be stationed along the decline? Would underground sumps be constructed adjacent to the decline? How many pumps in series are expected? Would the decline be grouted to limit groundwater infiltration? How would additional volumes of ground water be handled? What would the dewatering facilities look like then? ARM 17.24.116(3)(k)

Page 116, Section 3.2.2.3, second paragraph, first sentence: Wouldn't surface dewatering wells be more effective than pumping from the decline in terms of electrical and water treatment costs?

Page 116, Section 3.2.2.3, third paragraph, fifth sentence: Please replace 'of' with 'off.'

Page 116, Section 3.2.2.3, first paragraph, first and second sentences: It is stated that very little to no water will be encountered in the first 1,700 feet of the access decline (angled). What is the vertical depth from ground surface associated with that groundwater elevation? ARM 17.24.116(3)(a)

It further notes that a shallow surface pond near the portal will provide storage for this water—is that the Contact Water Pond mentioned previously or an additional temporary pond? Please reference the feature accordingly.

Page 116, Section 3.2.2.3, second paragraph, first sentence: Are these underground storage sumps shown on any maps of the workings (e.g. Figures 3.1 and 3.2)? Given groundwater flow rates from 530 to 680 gpm (depending on inflow controls), short-term increases as high as 1,000 gpm, and a controlled pumping rate of 500 gpm coming out of the mine, it seems like significant storage capacity will be needed underground. What are the individual and combined capacities of the sumps? How many sumps would be needed, and would they be uniformly constructed, and are engineer designs provided for them? ARM 17.24.116(3)(d)

Page 117, Section 3.2.2.4, first paragraph: This section provides the total lengths of the main access ramps, cross-cuts, and mining drifts. Please also include the lengths of ventilation raises in this section. ARM 17.24.116(3)(d)

Page 117, Section 3.2.2.4, second paragraph, first sentence: Please provide a detailed waste rock/ore/tailings material balance. There seems to be an error in the calculation, and it is not clear how much of each component is staying on the surface or going back underground. ARM 17.24.116(3)(i)

Page 117, Section 3.2.2.4, second paragraph, first sentence: The text notes; "The mine will produce a total of approximately 14.5 million tons of copper enriched rock and 0.77 million tons of waste over its life." These same volumes are reported on page 113, but as the volumes to come solely from development mining, contradicting the terminology definitions on page 110. Which stage of mining do these volumes correspond to, development work or the life of mine? Of the 14.5 million tons of copper-enriched rock, what percent would actually contribute to ore concentrate and what tonnage would be produced as milled waste, i.e. tailings? The use of "waste" at only 0.77 million tons can be misleading. ARM 17.24.116(3)(i)

Page 117, Section 3.2.2.4, second and third paragraphs: These two paragraphs report roughly the same information, but inconsistent production rates and mixed-up unit abbreviations are used. Please clarify the correct units and rates (given below), and consider condensing the paragraphs:

Paragraph 2: Annual production (peak years) 1.3 million tons (1.2 million tonnes per year)
2,700 tons per day (2,500 t/d = tonnes/day) from UCZ
880 tons per day (800 t/d) from LCZ
Design production rate = 3,600 tons per day (3,300 tonnes per day)

Paragraph 3: Annual production (peak years) 1.3 million tons (1.2 million tonnes per year)
912,500 t/a (tonnes per year) or 2,500 t/d (tons per day) from Upper Johnny Lee
292,000 t/a (800 t/d, preceding definition is tons/day) from lower zone
Design production rate = 3,300 tons per day ARM 17.24.116(3)(i)

Page 117, Section 3.2.2.4, fifth paragraph, first sentence: The quantity of waste rock reported to be produced (453,600 tons) slightly exceeds the storage capacity of the temporary WRS pad reported on page 113 (453,000 tons). Which volume is correct? If reported values are correct, would other storage areas or other uses for waste rock be needed? ARM 17.24.116(3)(i)

Page 117, Section 3.2.2.4, fifth paragraph, first and second sentences: These sentences indicate that all waste rock removed from developing the portal and primary decline will be placed on the waste rock storage pad. However, the geochemical evaluation (Appendix D) indicates that "Shallow, weathered near-surface bedrock deposits of the *Ynl* and sill-form granodiorite intrusives will be excavated in a 2:1 ratio during construction and used to build mine facilities." What volume of waste rock will be used for facility construction, would it be stored and segregated from the other waste? Based on testing, there is the potential for acid and/or metal release from some Ynl material (granodiorite results have not yet been submitted), how will that material be assessed for proper construction use, and how will runoff be handled/treated? ARM 17.24.116(3)(i)

Page 117, Section 2.2.2.4, last paragraph, fifth sentence: What are the estimates for the amount of waste rock from the WRS that would be processed for the CTF top liner cushion? ARM 17.24.116(3)(i)

Page 118, Section 3.2.2.5, first paragraph, first sentence & Figure 3.5: Should there be a secondary underground crushing station, and underground equipment repair shop included in the mine plan?

Page 121, Section 3.2.2.7, second paragraph, first sentence: Where would the electric power be coming from? Would Tintina upgrade existing powerlines, or would an entirely new power line be required? How much total power will be required to run the mine? ARM 17.24.116(3)(p)

Page 121, Section 3.2.2.7, third paragraph, second sentence: Where would the grout/shotcrete plant be located?

Page 121, Section 3.2.2.7, fifth paragraph, second sentence: The maximum weight of explosives per 8 millisecond delay is based on the location of the nearest public structure. Based on the figures provided, the proposed decline and Upper and Lower Sulfide Zone are very close to the residence at the county road intersection. Therefore, the pounds of explosives used would have to be controlled to prevent unnecessary shaking of the residence. Please provide a blasting plan describing how the company plans to blast close to the residence. ARM 17.24.159

Page 121, Section 3.2.2.7, fifth paragraph, sixth sentence: The text notes that "Tintina will educate and train employees on nitrate issues, proper housekeeping, spill cleanup, and explosives management practices to minimize the potential release of nitrates…" Does this commitment extend to the contracted workforce as well as to Tintina's employees?

Page 122, Section 3.2.2.7, underground sumps: What is the estimated size of the sumps? What is the estimate on the number per level? What is the estimate of storage capacity? ARM 17.24.116(3)(g)

Page 122, Section 3.2.2.7, underground sumps, second paragraph, last sentence: The text notes that sumps would gravity drain from one to the other prior to pump-out from the lowest level. Would there be cut channels from one sump to the other, or will inflows be allowed to sheet flow downhill? If cut channels, would they be marked? ARM 17.24.116(3)(g)

Page 125, 3.3.2.1, first paragraph and Figure 3.6: The text notes there is a mill laydown area of 1.78 acres, and an additional 3.9 acres for construction laydown. Figure 3.6 does not show these areas. It is noted on Figure 3.6, that the Paste Plant, Tailings Thickener tank, and other water tanks are located on the east side of the mill, yet incoming water feeds (PWP and water treatment) are on the west side. Tintina may wish to swap locations for these structures with the Concentration Storage. This would allow all piping to stay on one side of the mill.

Page 125, Section 3.3.2.1, second paragraph, last sentence: One inch bedding material is noted. Please provide the liner manufacturer's specification for liner bedding gradations.

Page 130, Section 3.3.2.6: Please submit all tailings data for the fly ash and slag additives. 82-4-336(10), MCA

Page 131, Section 3.3.2.6, first full paragraph: Please indicate which figure shows the location for the fly ash and slag silos.

Page 133, Section 3.3.3.1, third paragraph, last sentence: Would used oil be used for heating, or recycled?

Page 133, Section 3.3.3.2: On-site fuel storage would consist of two-13 thousand gallon tanks erected on site, the assumption is that they will be above ground. If above ground, please contact the area Fire Marshal's office. If underground, please contact the Underground Storage Tank section at DEQ. ARM 17.24.116(3)(n)

Page 134, Section 3.3.2.4, fourth paragraph and Page 136, Table 3-10: Please provide conceptual concentrations of reagents, flocculants, and the anti-scalant to be used in the tailings or process water streams. Please discuss how sodium, phosphorus, and other reagent ingredients will meet water quality standards. ARM 17.24.116(3)(k)

Page 134, Section 3.3.2.6, first paragraph: Please provide chemical analyses of the proposed cement, fly ash, and slag to be used as binders. Please provide conceptual concentrations of these binders used with tailings to be placed in the underground as backfill and the surface CTF. ARM 17.24.116(3)(k)

Page 134, Section 3.3.3.5, second paragraph: If WTP brine is added to the cemented tailings, will the salts have any effect on the structure of the cemented tailings? ARM 17.24.116(3)(k)

Page 138, Section 3.4.2.3, first paragraph, second sentence: Please add 'were' after 'holes; '…geotechnical holes *were*….'

Page 139, sec 3.4.2.4, second paragraph: What is the anticipated maximum depth the CTF will intersect groundwater? 82-4-335(5)(l), MCA

Page 139, Section 3.4.2.5, first sentence and p. 159, Section 3.6.2, second sentence: Please consider placing a geomembrane liner under the portal pad, in case of a spill.

Page 140, Section 3.4.2.6, fourth sentence: What would be the thickness of each layer of the basin underdrain protective rock? 82-4-335(l), MCA

Page 141, Section 3.4.2.8, first bullet: Please clarify if vibrating wire piezometers will be installed solely above the top liner, or in between liners, within the interstitial drain? Will there be any type of conduit installed for easy retrieval or replacement of malfunctioning units, or will new units need to be installed (how would that be done)? ARM 17.24.116(3)(l)

Page 141, Section 3.5.1, second bullet, last sentence: The word 'periodic' is open-ended. Please provide the actual time interval.

Page 143, Section 3.5.2, first sentence: FEMA regulations only apply to concrete dams. Please remove the citation.

Page 143, Section 3.5.2, first sentence: Please provide a table listing the conceptual design criteria for the waste and water management facilities.

Page 145, Section 3.5.4, general comment: Please provide more information about the range of cement pastes that were generated for design studies, and the tests that were performed in order to arrive at the proposed tailings mixtures (e.g. varying curing time periods, varying composition, uniaxial/triaxial compressive strengths). Please explain which binder will be used, and why it is preferred, rather than listing "cement, slag, or fly ash" throughout the document.

Cemented paste tailings research indicates that changing the type of binder (cement, slag, or fly ash) and the binder content (0.5-10%) can have significant effects on the cemented paste's short-term strength and setting time, long-term strength, and resistance to internal expansion and fracturing. Expansion and fracturing are likely to occur due to long-term mineral reactions, like the formation of calcium silicate hydrate gels or sulfate attack. The latter seems likely for the tailings at the BBC, whether the sulfate is sourced from internal sulfide oxidation or occurring in the original cement materials and/or make-up water. This ultimately controls: the ability of the underground backfill to provide short-term stability during adjacent stope work, long-term stability to prevent significant ground movement/subsidence, and the reactivity of the high-sulfide tailings after deposition in the workings or the CTF. Please provide a more comprehensive discussion of the cemented paste compositions that were considered, with regard to using different binders in different ratios and the use of fresh water or RO brine during paste production (not found in this section or in Appendix K).ARM 17.24.116(3)(k)

Page 146, Section 3.5.5.4: If the foundation drains were to plug, would the increased ground pore pressure/saturation effect the impoundments? 82-4-335(l), MCA

Page 153, Section 3.5.6.3, second bullet: Please submit engineering specifications for the grout curtain. 82-4-335(l), MCA

Page 153, Section 3.5.6.3, second paragraph, first sentence: The volumes reported in gallons are incorrectly converted. Please clarify.

Page 156, Section 3.6.1.2, second paragraph: Please use salvaged soils, top and subsoil, to the extent possible in constructing berms. This could limit the footprint of the soil stockpiles. ARM 17.24.116(3)(b)

Page 158, Section 3.6.1.4, second paragraph: The text notes that drainage from the CTF road would be considered contact water. Would this criterion apply to the other ponds? For ditches to be lined, would there be any protective cover over the top of the liner, or would the liner be exposed to atmospheric conditions? 82-4-33(5)(l), MCA

Page 158, Section 3.6.1.5: Would berms be required on the service roads? If so, please consider using stockpiled soils and subsoils in their construction. ARM 17.24.116(3)(b)

Page 159, Section 3.6.1.7, second paragraph: Please contact the Air Quality Bureau on whether or not gensets would need to meet the tier 4 exhaust requirements.

Page 159, Section 3.6.2.1: Please provide more detailed figures showing the drainage system for the portal pad. 82-4-335(l), MCA and ARM 17.24.116(3)(g)

Page 162, Section 3.6.2.1, second paragraph, first sentence: The text states "the flanks of the portal pad will consist of compacted, angle of repose fill slopes." Note that all figures depicting the portal pad (e.g., Figure 3.14, Figure 3.15) show the portal pad to have slopes graded to 2.5:1. Please correct the text and verify that the stated cut and fill volumes are correct.

Page 165, Section 3.6.3, Ventilation Raises: Please provide drawings and additional information on the design of the ventilation raises. It is noted that the raises would be bored from the bottom up with raise-boring machines, and that the one exhaust ventilation raise to be used as a secondary escapeway would have a concrete collar. Would all of the raises include ground stabilization and inflow control measures such as grouting, wire mesh, rock bolting, shotcrete, and/or other means of reinforcement? Figure 3.2 (page 112) indicates that the exhaust raise that extends from the Lower Zone appears to be off-set each time it intersects the primary access ramp (decline). If this is the case, how would the hoist lift miners from the lower workings through this offset raise? ARM 17.24.116(3)(d)

Page 165, Section 3.6.3, general comment: Considering that a ventilation raise is analogous to a very large well, what volume/rate of groundwater flow can be expected to enter these voids (with and without inflow controls)? Was that loss of groundwater incorporated into the hydrogeologic model?

Page 165, Section 3.6.4.1: Please note that Figure 3.17 is a cross-section of the Process Water Pond, not a cross-section of the waste rock storage facility.

Page 165, Section 3.6.4.2, first paragraph, second sentence: The text notes; “The temporary WRS pad is designed to contain 551,155 tons (500,000 tonnes) of waste rock.” This is inconsistent with the volume reported in previous sections (page 113). Please clarify. Also, update and correct all descriptions of the WRS pad accordingly. If the lower volume is correct, it is not sufficient to handle all waste rock produced during development mining. Would other storage areas or uses of waste rock be needed? ARM 17.24.116(3)(g)

Page 168, Section 3.6.4.3, first paragraph, first and second sentences: To what extent would groundwater be encountered by this facility? What is the groundwater elevation at this location, and are elevations depicted in the associated cross-sections? ARM 17.24.116(3)(a)

Page 168, Section 3.6.4.2, second paragraph, first sentence: The text notes that the WRS pad and liner will be sloped… and references Figure 3.17. However Figure 3.17 is of the Process Water Pond. Please correct.

Page 168, Section 3.6.4.3, Foundation Drain System: The section states that piping and gravel would be used to route predicted groundwater flows from beneath the Waste Rock Storage (WRS) pad. As this pad would be constructed adjacent to the Portal Pad, isn’t the depth to groundwater approximately 170’ at this location? Please clarify.

Page 168, Section 3.6.4.3: WRS Foundation drains are not shown on Appendix K drawings 7001, 7002, and 7003, or on Figure 3-16. Please clarify if the WRS will have foundation drains constructed under it. ARM 17.24.116(3)(d)

Page 168, Section 3.6.4.4, general comment: There is no specific discussion of the foundation drain system in this section. Would the network of pipes and gravel under the HDPE liner also be removed, or will that system be buried when the excavated area is backfilled? 82-4-336(12), MCA

Page 168, Section 3.6.4.5: Instead of reclaiming the temporary waste rock storage area, can it be modified to become the operational copper enriched rock storage facility. This could reduce the overall amount of disturbance.

Page 169, Section 3.6.5.2, first full paragraph: The text notes that per Figure 3.18, the process pond should never be more than half full. Figure 3.18 is an aerial view drawing with the liners highlighted in yellow. Please provide cross-sections indicating elevations, embankment slopes or fill elevations. ARM 17.24.116(3)(g)

Page 169, Section 3.6.5.2, first sentence: Please consider impacts to waterfowl and if placing bird netting over the brine pond is needed. ARM 17.24.116(3)(u)

Page 172, Section 3.6.5.4, fifth sentence: Please provide a stability analysis with the conceptual design. ARM 17.24.116(3)(g)

Page 175, Section 3.6.6.1, last paragraph, third sentence, and Page 176, Figure 3.22: The text describes the Contact Water Pond (CWP) as being divided into two sections by constructing a central berm in the excavated basin prior to placement of the liner system. Figures and cross sections depicting the CWP, however, do not show a central berm or a divided pond. Please revise the maps and cross sections to clearly indicate the proposed pond design. ARM 17.24.116(3)(d)

Page 175, Section 3.6.6, second paragraph, third sentence: The figures that are provided for the CWP do not show a central berm, meant to separate contact water from RO reject (brine). What is the height and slope of the berm? What material will be used for its construction? Is the storage capacity that is given (97,000m^3 of water) based upon one single pond, or does that account for two cells, compensating for the volume lost by the berm? Please update figures accordingly and provide reference to construction designs for the CWP berm. ARM 17.24.116(3)(d)

Page 177, Section 3.6.6.4, fifth sentence: Please consider impacts to waterfowl and if placing bird netting over the brine pond is needed. ARM 17.24.116(3)(u)

Page 177, Section 3.6.6.4, second paragraph in section, last sentence: The text states that potential seepage through the lower geomembrane (of the CWP) will be intercepted by the PWP Foundation Drain System. Please explain how seepage from the Contact Water Pond would be intercepted by the Process Water Pond's foundation drain system. These two ponds, as proposed, would not be located near each other.

Page 177, Section 3.6.6.4, 3rd paragraph in section, and Appendix K: This paragraph states that details of the CWP Liner System are shown on Drawings C3003 and C3005 in Appendix K; however, Drawing C3003 presents cross sections of the Process Water Pond (PWP), not the Contact Water Pond (CWP), and no Drawing C3005 is provided in Appendix K. Also, this paragraph states that details of the Seepage Collection System (for the CWP) are shown on Drawings C6500 to C6520 in Appendix K. Again, these figures actually pertain to the PWP rather than the CWP. Would the CWP also have a foundation drain collection pond? It is not shown on the figures provided. Please provide appropriate design drawings for the CWP.

Page 178, Section 3.6.5.4, second paragraph, second sentence; and page 190, section 3.6.7.3, third paragraph, second sentence: Please predict a conceptual volume and provide a place where the organics and loamy overburden materials removed for facility construction would be stored and reclaimed. Is this the material described in Section 3.6.9 in paragraph 2? ARM 17.24.116(3)(b)

Page 181, Section 3.6.6.1, first paragraph, second sentence: Please describe how spillage of contaminant water in the mill area would be collected as well as spillage of PAG rock from underground. 82-4-335(l), MCA

Page 184, Section 3.6.7.5, first sentence and Figure 3.29: Please provide additional detail on the internal basin drain system. Please include two (2) cross sections perpendicular to each other. ARM 17.24.116(3)(g)

Page 184, Section 3.6.7.5, 1st paragraph, and Page 188, Section 3.6.7.9, 4th and 6th paragraphs: The basin drain system is described on Page 184 and on Page 188 (paragraph 6) as being constructed with crushed waste rock generated during the pre-production phase, but paragraph 4 on Page 188 states that "the basin drain comprises a lined trench filled with drainage gravel and a drain pipe…" These features are not shown on Figure 3.29. Please indicate which portions of the basin drain system are constructed with gravel and which portions are constructed with waste rock. What would be the source of the gravel? What are the hydraulic conductivity requirements for the drain system, and has the waste rock been tested to verify that it can achieve these requirements over the duration of impoundment operations? DEQ is concerned that the drain will be constructed with pre-production waste rock of mixed lithology and that some rock types (e.g. sulfidic shale) may decompose over time resulting in low permeability ramp and basin drain material. Excavation of this material from the temporary Waste Rock Stockpile and re-depositing it in the CTF ramp may result in greater compaction and lower permeability of this material.

DEQ notes that the ramp would consist of pure waste rock and not the blended waste rock mixed with paste tailings and 4% cement as analyzed during kinetic testing. As a result, waste rock oxidation and acid production within the drain system may exceed anticipated rates. Please discuss.

Page 187, Section 3.6.7.7, first paragraph: As the text notes that part of the CTF would be excavated tens of meters into the native ground, would the excavation reach un-weathered rock? If so, what are the possibilities of encountering sulfate bearing material? 82-4-335(l), MCA

Page 187, Section 3.6.7.7, second bullet: The reported particle sizes for tailings (100% less than 0.001 inches or 30 microns, and 80% smaller than 0.0003 inches or 10 microns) are inconsistent with the sizes given on page 145, “Approximate grain size of the tailings: 94% of the tailings pass the 75 micron (No. 200 sieve).” Please update and correct accordingly.

Page 187, Section 3.6.7.8, first paragraph, second sentence, Figure 3.29: The text notes that; ‘Water collected in the sump (Figure 3.29) will be pumped through a riser pipe…’ Aside from the dashed drawing, no riser piping is shown. Figure 3.29 needs to be expanded showing greater detail for the seepage reclaim system sump system. ARM 17.24.116(3)(g)

Page 187, Section 3.6.7.8, third paragraph and Figure 3.26: Please expand on the foundation drain system by providing cross-sections for the drainage system. ARM 17.24.116(3)(g)

Page 188, Section 3.6.7.9 and Section 3.6.7.1: Please check the section numbering. Section 3.6.7.9 is followed by Section 3.6.7.1. The numbering is out of sequence through Section 3.6.7.3 on page 190.

Page 190, Section 3.6.7.2, second sentence: Would waste rock need to be crushed before placing on the CTF? Would a secondary underground or surface crusher be required? ARM 17.24.116(3)(j)

Page 190, Section 3.6.7.2, first paragraph, first sentence: Please explain how seepage through the tailings mass collected above the internal basin drain would be conveyed through the liner system or out of the tailings/water rock mass to the PWP.

Page 190, Section 3.6.7.1, third paragraph, second sentence: Please correct the portion of the sentence that contains ‘…insulated or *het traced* to…’ Was this meant to say: heat taped?

Page 190, Section 3.6.8.1 (NCWR and Water Rights), first paragraph: When Tintina submits a mitigation plan to DNRC, please provide a copy to DEQ. How will water be diverted into the NCWR? DEQ assumes a pump station would be established on Sheep Creek and the water would be pumped up to the NCWR via a pipeline. Associated disturbances should be described and also presented on a map. What pump size would be required, and what would be the maximum pumping rate? 82-4-335(5)(l), MCA

Page 191, Section 3.6.8.2 (3.6.6.2)(NCWR Overview), first paragraph, third sentence: "It is anticipated that water stored in this reservoir will be allowed to seep from the reservoir floor to the downstream catchment as required." This statement implies that Tintina would be able to control the rate of seepage from the NCWR. However, the seepage rate would be controlled by the hydraulic conductivity of the underlying bedrock and to a lesser rate by the depth of water in the reservoir. Given that the bedrock is highly weathered at the surface and is assumed to decrease in hydraulic conductivity with depth, the likely flow path for water seeping from the reservoir would be near surface, with the potential for springs to develop beneath the embankment. What design features will be required to prevent embankment instability due to seepage? What geotechnical monitoring will be required? 82-4-335(5)(l),MCA

Page 191, Section 3.6.8.3 (3.6.6.3), fifth sentence: Partial lining of the dam upstream face and not the entire impoundment may produce exceptionally large hydraulic gradients at edges of the liner. Please discuss this concern. ARM 17.24.116(3)(g)

Page 195, Section 3.6.8.1, first paragraph, last sentence. Please measure the temperature of the water that is discharged from the NCWR to ensure it is protective of aquatic life. ARM 17.24.116(3)(u)

Page 195, 3.6.8.3, second sentence: The text references a diversion ditch on Figure 3.31. A review of Figure 3.31 does not show diversion ditches. Please correct.

Page 195, Section 3.6.9: Please commit to using salvaged top and subsoils in berms. This would reduce the overall disturbance footprint of the site. ARM 17.24.116(3)(b)

Page 196, Figure 3.33: Pipelines will also be necessary to convey tailings from the mill to the underground workings, as well as to convey water to the Surface LAD area, to the Underground Infiltration Galleries, and from Sheep Creek to the Non-Contact Water Reservoir. Foundation drain systems are noted on this figure for the CWP and the PWP, but not for the CTF, WRS, or Ore Storage pad. Please update the figure to include all required pipelines. 82-4-335(5)(l), MCA

Page 200, Section 3.7.1, last sentence: The text notes that potable water would be used for pump gland lubrication. Potable water should not be used for anything other than human consumption and sanitary uses. Using potable water for things such as pump gland lubrication runs the risk of cross-contamination from backflow. Backflow preventers may be used but final system design should be approved by the DEQ Public Water section.

Page 200, Section 3.7.1.1, first paragraph, last three sentences: Please provide more information on the applications to PWS and DNRC. Have they been submitted, or approved?

Page 200, Section 3.7.1.2, first paragraph, second sentence: The text implies that fresh water (from WTP) would be used to prepare paste tailings, instead of RO brine. Is that the case? What ratio of fresh water vs. brine would be used to produce paste tailings? ARM 17.24.116(3)(k)

Page 201, Section 3.7.1.3: What is the volume in gallons of this tank? 82.4.335(5)(l), MCA

Page 201, Section 3.7.2.1: The text notes that the water balance was estimated using the CTF, PWP and the NCWR. The Contact Water Pond, (CWP) may need to be included in the water balance. ARM 17.24.116(3)(K)

Page 206, Section 3.7.3.2, Operational Phase Bullet, second sentence: Please provide more details about the use of RO brine in the paste plant (whether here or in Section 3.5.4). What is the effect on concrete properties from high concentrations of chloride, sulfate, and other deleterious ions in the brine? What fraction of the cement make-up water will come from RO brine? ARM 17.24.116(3)(k)

Page 206, Section 3.7.3.2, Construction Phase, last sentence: The discussion includes a mention that the CWP would be segmented. Drawings of CWP are not included in Appendix K. Would the CWP be divided into segments? Please provide an accurate drawing of the CWP. Please show the design of the segmented CWP in appropriate figures (e.g. Figure 3.22). ARM 17.24.116(3)(g)

Please show the design of the segmented CWP in appropriate figures (e.g. Figure 3.22). ARM 17.24.116(3)(g)

Page 207, Section 3.7.3.2, closure phase, fourth sentence: The text notes that; '…water level….' As currently written, there is a parenthesis after the word 'level.' Please remove.

Page 207, Section 3.7.3.3, second paragraph: If the Ynl-A contributes approximately 25% of the flow from the mine workings, what does the UCZ contribute to the overall flow? What percentage of the total do the other zones contribute? ARM 17.24.116(3)(K)

Page 207, Section 3.7.3.3, third paragraph in section, second sentence, and Page 210, Table 3-24: It is stated that all water would be treated to the ENDMTL levels presented in Table 3-24. Tintina has not demonstrated that the proposed infiltration galleries will not result in discharges to surface water, so the proposed treatment levels may not be appropriate. Achieving non-degradation criteria for surface water may be required. The ENDMTL for arsenic presented on Table 3-24, 0.003 mg/L, is the 75^{th} percentile concentration for arsenic as presented on the table. Treating to the 75^{th} percentile concentration of background arsenic concentrations may not be adequate to comply with non-degradation criteria for groundwater; achieving the average or 25^{th} percentile concentrations may be required. AMR 17.24.116(3)(k)

Page 211, Section 3.7.3.5, first paragraph, last sentence: If stored on site, where would the treatment residuals be stored? ARM 17.24.116(3)(K)

Page 211, Section 3.7.3.5, Clarifier bullet point: What would the size/volume of the clarifier be? In Section 3.7.3.6, the clarifier is listed as a rental unit, which will be replaced with a more permanent structure during operations. If this would be used temporarily during the construction phase, will it be truck-mounted? Would the permanent clarifier be the same size/capacity as the rental? ARM 17.24.116(3)(j)

Page 212, Section 3.7.3.5, first paragraph at top of the page, first full sentence: Please add that after the polishing phase, clarifier overflow would report to the WTP for final treatment prior to reuse or discharge. ARM 17.24.116(3)(K)

Page 212, Section 3.7.3.5 (Water Treatment for the Construction Phase), top of page: The text states that the clarifier underflow would be dewatered and the resultant sludge hauled to the tailings facility for on-site disposal. Please note that construction of the CTF may not be completed during this phase, and therefore the CTF would not be available for sludge disposal at this time. Please propose an alternate method of sludge disposal during the construction phase. ARM 17.24.116(3)(k)

Page 213, Section 3.7.3.5, third paragraph, last sentence: Are there other options for brine disposal besides shipping the waste to an injection well in Utah? e.g. Solid disposal at US Ecology waste management in Idaho?

Page 214, Section 3.7.3.6, tenth sentence: If RO brine reject is used in the paste plant, would the salts have any adverse effects on the cement used in the CTF? 82-4-335(5)(l), MCA

Page 219, Section 3.7.3.1 (Water Treatment for the Closure Phase), first paragraph, second sentence: The text states that RO permeate would either be discharged to the underground infiltration gallery or reused. Please describe how treated water might be reused during the closure phase. ARM 17.24.116(3)(k)

Page 219, Section 3.7.4: The section discusses disposal of treated water via surface LAD. This is the first mention of use of a surface LAD system in the application. This system should be discussed earlier in the application, and should be included within the permit boundary, shown on appropriate figures, and any associated disturbed acreage should be disclosed. 82-4-335(5)(e), MCA and ARM 17.24.116(3)(k)

Page 219, Section 3.7.4: The LAD system discussed in first and second paragraph and shown in Figure 3.38 does not appear to be included in the proposed mine permit area as shown on figure 1.2. Please include all LAD sites within the permit boundary. Also see section 3.7.4.1. 82-4-335(5)(e), MCA

Page 219, Section 3.7.4, 3rd paragraph: Discharge of water treated to non-degradation criteria (using Reverse Osmosis) via underground infiltration galleries is discussed. DEQ notes that RO permeate will likely have very low total dissolved solids concentrations compared with ambient groundwater near the infiltration galleries; consequently, the treated water may leach contaminants from the in place or disturbed bedrock adjacent to or within the infiltration trenches. Have any leaching tests been conducted on geologic materials similar to those where the galleries would be constructed, using water similar to the anticipated quality of RO permeate? If appropriate, please propose mitigations that would avoid leaching of contaminants from the native material by the treated effluent.

Pages 219-220, Section 3.7.4: Tintina commits to submitting a UIC permit application to EPA for determination whether a UIC permit will be necessary for the infiltration galleries. Please provide DEQ with a copy of this application and future correspondence when available.

Page 220, Section 3.7.4.1, second paragraph: Please show on different print size the LAD piping system. Figure 3.39 has small print size and is a ‘crowded’ figure.

Page 220, Section 3.7.4.1, third paragraph: The text notes that the proposed Surface LAD site was used for a short time period during 2014, covered 17 acres, and “could be expanded to at least 40 acres…” Please specify the exact acreage of the proposed LAD area, provide map, soil descriptions, proposed application rates and seasons, and information on depths to groundwater and baseline groundwater quality information. Include a monitoring plan for operation of the Surface LAD system. 82-4-335(5)(l), MCA

Page 221, Section 3.7.4.2 (Underground Infiltration Galleries), second and fourth paragraphs: The text states “hydraulic conductivities measurements of the deep paralithic material underlying these soils were conservatively calculated at an average rate of 32 ft/day.” Please provide documentation of these measurements, test locations, and calculations. All other data provided in the application indicate hydraulic conductivities in shallow weathered bedrock ranging between approximately 0.01 feet/day and 10 feet/day. ARM 17.24.116(3)(a)

Page 221, Section 3.7.4.2, general comment: In the discussion of maximum water disposal capacities for hypothetical infiltration galleries, the comparison is made to the maximum rate of pumping from the decline (500 gpm). It is recognized that this entire volume of water would not be discharged through the infiltration galleries, but a realistic estimate for the volume to be discharged through these galleries is not provided here. The modeling discussion in Appendix M provides values of 211 to 290 gpm, Section 7.2.3.5 indicates that 500 gpm would be discharged through the galleries (page 297), while the water balance and associated Figure 3.34 reports 771,000 m^3/year (or ~388 gpm). Please explain these differences and clarify the estimated disposal rate. Based on a shallow installation depth of 4-6 feet, uncertain discharge rates, and uncertain estimates of hydraulic conductivity, this discussion raises doubts that the infiltration galleries would dispose of water without contributing to shallow flow and surface discharge. ARM 17.24.16(3)(k)

Page 221, Sec 3.7.4.2, second paragraph, last sentence: The infiltration rate that is given (32 ft/day) does not correspond to hydraulic conductivity values provided elsewhere in the document or appendices. Some examples include: 1,000 to 10,000 ft/day (page 47, Table 2-12), 1 to 5 ft/day in the Ynl-A (page 46), 10.3 ft/day for Pn-b soil and underlying bedrock (page 81), average of 0.255 ft/day (Appendix K). Please explain the derivation of this infiltration rate and provide supporting data. ARM 17.24.116(3)(a)

Page 222, Section 3.7.4.2, first paragraph, second sentence: The text states: "The decline collar lies some 170 feet above the water table, and does not rise to intersect the existing workings until approximately 1,700 feet north of the portal." This statement is confusing and should be revised. DEQ assumes the intent is to state that the decline would descend northward from the portal, and would not intercept the water table until 1,700 feet to the north at an elevation 170 feet lower than the portal collar. There are no 'existing workings.'

Page 222, Section 3.7.4.2, fifth paragraph, first sentence: Tintina proposes to construct the underground infiltration galleries no closer than 400 feet to any wetland or surface water. Please note that the proposed separation may not be sufficient to preclude discharge of treated water to surface water via hydraulically connected groundwater, especially given the relatively high hydraulic conductivities of shallow weathered bedrock stated in this section. If further analysis indicates the potential for discharge to surface water, then an MPDES permit would be required for the discharge to the infiltration galleries.

Page 223, Section 3.7.3.5, Clarifier paragraph, last sentence: The paragraph states that clarifier sludge would be hauled to the tailings facility during the construction phase. Please revise as the tailings facility will not be ready at that point. The last paragraph and third sentence on page 223, states that dewatered solids would be stored on site until the tailings facility is completed. Please describe where and what volume of storage would be needed. ARM 17.24.116(3)(K)

Page 226, Section 3.7.5.3, fourth paragraph, last sentence: Please place mucked out sediments from storm water catchment basins onto the soil stockpile. ARM 17.24.116(3)(b)

Page 229, Section 3.7.6, third bullet: Please use erosion control mats that are made of organic materials as opposed to a geosynthetic type material.

Page 229, Section 3.7.6, sixth bullet: In addition to using an anchoring post, the disturbed side of the fencing should be placed in a prepared ditch and secured. ARM 17.24.116(3)(g)

Page 230, Section 3.7.6, third bullet: For roads with a gradient, would water bars be placed in the road(s) to aid in storm water runoff? ARM 17.24.116(3)(g)

Page 232, Section 3.7.4.2, third and seventh paragraphs: The underground infiltration gallery pipelines should contain pressure compensating emitters to ensure even distribution along the entire length of the pipeline. ARM 17.24.116(3)(g)

Page 237, Section 3.8.3 (Waters of the US), fourth paragraph: This paragraph states that Tintina would be required to file for an individual permit under the Clean Water Act Section 404. Please provide a copy of this permit application and subsequent correspondence to DEQ when available.

Page 239, Section 3.8.4 (Air Quality and Dust Control), first full paragraph: Tintina states that they will apply for an Air Quality Permit form DEQ. Please estimate when this application will be submitted.

Page 239, Section 3.8.4, fifth paragraph, seventh sentence: The text notes; "Dust control from the CTF is not expected to be problematic because the material will be moist (20%) and will be stabilized with cement additions to provide a non-flowable mass." Please explain how this is consistent with previous descriptions of the cemented paste tailings (5% water content). DEQ notes that Tintina projects that tailings may be exposed at the CTF surface for up to 30 days before being covered by additional tailings. Drying of the surface during that time may result in blowing dust, particularly given that cemented paste tailings were shown to disaggregate during humidity cell testing. Furthermore, the tailings shown in Figures 3.8a and 3.8b are very dark in color and therefore will readily absorb solar radiation which would accelerate desiccation of the surface. Please discuss potential dust control measures for the CTF surface . 82-4-336(10), MCA

Page 240, Section 3.8.5 (Visual Resource Assessment), second paragraph: The locations of the three viewpoints presented on Figures 3.44, 3.45, and 3.46 are described in the text. Please indicate the locations of these viewpoints on a map. ARM 17.24.116(4)

Page 240, Section 3.8.5: Please include a view point that includes the most prominent view of the CTF from Sheep Creek road. 75-1-201(i)(b)(ii), MCA

Page 248, Section 3.8.3, second paragraph: The analysis will need to identify the potential to indirectly impact wetlands. Please provide a discussion of potential indirect impacts to wetlands. 82-4-336(10), MCA

Page 249, Section 3.8.1: The section heading number is a duplicate of a previous section, as well as the section numbers on pages 250 and 251. Please correct these and also ensure consistency with Table of Contents entries.

Page 250, Section 3.8.2, first paragraph, Emergency Response Plan (cited as Section 3.8.12 in Table 1-2) is missing from the permit application. A reference is made in the text to a preliminary draft (Appendix P), which will need to be finalized and submitted to DEQ; "…with certification that notice of the filing of the plan has been provided to the state fire marshal" [ARM 17.24.116(3)(n)]. The plan will need to be submitted. ARM 17.24.116(3)(n)

Page 250, Section 3.8.1, second paragraph, last sentence: Please clarify the location of the proposed septic drain field, where suitable soil infiltration properties exist, and depict the facility on a map. It does not appear to be shown on Figure 1.3, as indicated on page 164, nor on any other figure. ARM 17.24.116(3)(o)

Page 251, Section 3.8.5: In this section, the acronym "SHIPO" is used. Please note that the correct acronym for the State Historic Preservation Office is "SHPO."

Page 252, Section 4.1.1 and Figure 4.6: The recharge appears to be estimated incorrectly. The model assumes that recharge equals baseflow, but baseflow has been underestimated by assuming that it is equal to annual low flow. Also, there is an assumption that a constant percent of annual precipitation becomes recharge regardless of the total precipitation or the underlying geology. The model also assumes that recharge enters the groundwater where precipitation falls, and does not take into account runoff and recharge that occurs through tributary stream bottoms and at the mountain front where runoff from bedrock meets the alluvium of the valley bottom. 82.4.335(5)(k), MCA

Page 261, Section 3.8.2, last sentence: Please submit the revised Emergency Response Plan when it is completed. 82-4-336(10), MCA

Page 262, Section 4.1.3, first paragraph, first sentence: The text references PZ-7A/7B on Figure 2.3. However, PZ-7A/7B was not found on Figure 2.3. Please correct.

Page 266, Section 4.1.6.1, third paragraph, fourth sentence, and page 269, Figure 4.8: On page 266 it is stated that Layer 1 of the groundwater model is 16 feet thick, but Figure 4.8 shows a drawdown in excess of 100 feet in Layer 1. Please explain how this is possible, or revise the figure to clarify what is actually portrayed.

Page 267, Section 4.1.6.2, first paragraph, first sentence: The "…simulated mine inflows range from 220 to 500 gpm," but these values do not correspond with the estimates provided on page 116 (Sec 3.2.2.3, Mine Dewatering), "Early modeling efforts predicted groundwater flows into the mine in the range of 530 to 680 gallons per minute, assuming lack of any inflow controls." Even higher inflows may be experienced over the short term, but 500 gpm is the estimated pumping rate for dewatering. Were these higher estimated inflows used for any sensitivity testing? How would the increase in flow to mine voids contribute to drawdown in the area? ARM 17.24.116(3)(k)

Page 267, Section 4.1.6, third paragraph, first sentence: Capitalize the 's' in sheep.

Page 267, Section 4.1.6, fourth paragraph, sixth sentence: Please add 'EPM' to both the text and acronyms.

Page 270, Section 4.1.6.2, last paragraph, last sentence: The text notes; "Table 5-5 shows the base flow in Sheep Creek in the watershed upstream of SW-1 throughout the mine life, and the resultant base flow with water rights mitigation." Table 5-5 does not appear to be included in this document, is it the same as Table 5-5 in Appendix M (i.e. Table 4-6 in the application document)?

Page 270, Section 4.1.6.2, first paragraph: The groundwater model predicts a 70% reduction in stream base flow in lower Coon Creek. Are impacts to wetlands adjacent to Coon Creek also predicted, due to the lowered water table? Please discuss the feasibility of off-setting this impact by installing infiltration galleries for the disposal of treated water adjacent to Coon Creek. This may require an MPDES permit. 82-4-335(5)(k), MCA

Page 272, Section 4.2.1, general comment: The HCT and diffusion test samples are collected in different time intervals over the span of testing, and results can be highly variable between the beginning and end of the testing period. Please include more details about which set of test results will be used as model inputs for water quality predictions and reasonable comparisons to field conditions (e.g. week 1, 5, or 12 of HCT?).

Page 272, Section 4.2.1, second paragraph, fifth sentence 5 (and page 276, paragraph 2): The text notes; "Waste rock produced subsequently will be placed into PAG cells within the cemented paste backfill." Are separated cells still proposed for the waste going into the CTF? This aspect should be described in further detail or removed/updated in order to be consistent with other sections of the application, and modeled accordingly. ARM 17.24.116(3)(d)

Page 272, Section 4.2.1, third paragraph, sixth sentence: The text states that capping of the CTF with a HDPE geomembrane during closure will eliminate incident precipitation. When designing the liner systems (See Section 3.5.6.2 (CTF and PWP Seepage Analysis) it was assumed that liners will have one 2 mm defect per hectare. What is the projected rate of seepage through the proposed reclamation cover system for the CTF? 82-4-336(12), MCA

Page 275, Section 4.2.2, first paragraph, last sentence: Would the rate of sulfide oxidation within the overlying, but undisturbed, units increase as those zones are dewatered for many years? Would the neutralization potential of the host bedrock be sufficient to counteract the sulfide oxidation? Will that potential impact to groundwater quality (acidity, mobilized metals/metalloids) also be incorporated into the model? ARM 17.24.116(3)(k)

Page 275, Section 4.2.2, third paragraph, second sentence: While the diffusion of molecular oxygen has influence on the extent of oxidation in the workings, will the model also account for sulfide oxidation and acidification reactions that can occur under low-oxygen conditions (e.g. pyrite oxidation by dissolved Fe^{+3}, hydrolysis of Fe^{+3}, biologically mediated oxidation)? ARM 17.24.116(3)(k)

Page 275, Section 4.2.2, third paragraph in section, third and fourth sentences: It is stated that oxidation will be greatest along the exposed back and rib of the decline, and water contacting the oxidized rind will dissolve sulfate and metals. Please discuss whether there are mitigating technologies that can be applied to minimize this oxidation at locations where the decline (and ventilation raises) penetrate high sulfide bedrock.

Page 275, Section 4.4.4, second paragraph, third sentence: The text notes that; '…contribute significantly '***to***(?)' lower…. Should the 'to' be inserted into the sentence?

Page 276, Section 4.2.2, first paragraph: This section states that rebound of the groundwater table post closure will fully submerge backfilled stopes and eliminate the exposure of rock to oxygen, which will "essentially eliminate contributions from the decline." DEQ notes that mine flooding will not instantaneously eliminate the release of sulfate, acidity, and metals from sulfide bedrock that is either exposed in the mine workings or is located above the mine workings within the zone that is temporarily desaturated during dewatering. Stored oxidation products will accumulate on rock surfaces and within fractures while the bedrock is unsaturated, and will dissolve when the water table recovers and resaturates these areas. As a result, the quality of groundwater flooding this region is likely to be impacted, at least temporarily. Water quality compliance wells should be installed downgradient of the mine workings to document existing water quality and to verify that the groundwater is not degraded post-mining after the water table rebounds. Pumping and treating water from the flooded decline may be required for a period of time post-closure until these oxidation products are removed from the groundwater. The geochemical modeling that is in progress should estimate the length of time that pumping and treatment may be necessary. Tintina should evaluate the feasibility of alternative water management that could minimize sulfide bedrock oxidation, such as by limiting the degree of desaturation of bedrock overlying the mine. In addition to grouting to reduce inflows, please discuss the feasibility of relocating the proposed infiltration galleries to sites above the ore deposit in order to provide enhanced recharge and minimize the long-term (15 years or so) dewatering and oxidation of the Upper Sulfide Zone. 82-4-336(10, MCA

Page 276, Section 4.2.3, general comment: Please update this paragraph with new estimates that are made for the impacts from precipitation, the water volume sufficient to create flow/wetting requirement, the relative surface area of the materials (based on size of waste), etc. ARM 17.24.116(3)(k)

Page 276, Section 4.2.3, fifth sentence: The text notes that the relative surface area is unknown, but expected to be significantly smaller than the humidity cell test. Please correct or clarify the sentence as it would seem that the area would be much larger than the humidity cell.

Page 276, Section 4.2.4, first paragraph, first sentence: Please provide the value or range of values used to quantify “the small volume of dewatering seepage” in the CTF that will be used in the model. ARM 17.24.116(3)(k)

Page 276, Section 4.2.4, first paragraph, first sentence: The text notes that a ‘small’ volume of dewatering seepage will be expected. The word “small’ is an open- ended statement. Can this volume be quantified? ARM 17.24.116(3)(k)

Page 276, Section 4.2.4, first paragraph, third sentence: The reactions and neutralization occurring between tailings water and the waste rock/sump material would likely be insignificant over time (e.g. loss of transmissivity in the cemented mass, unreactive armor/rind that forms on rock), and should not be used for water quality mitigation. If this component of the CTF model will be further developed, then the uncertainties that apply to the temporary waste rock storage material, like reactive surface area and expected flow-through, are applicable here as well and should be discussed. ARM 17.24.116(3)(k)

Page 276, Section 4.2.4, second paragraph, second and fifth sentences: Please clarify the values describing the cement content in the CTF. Other sections of the document define the surficial paste to contain 0.5 – 2.0% cement, and the lower fraction is more likely. The comparisons that are made here to the humidity cell test results seem more appropriate for the 2% cement column and not the 4%. ARM 17.24.116(3)(k)

Page 276, Section 4.2.4, second paragraph, fourth and fifth sentences: Tintina projects that cemented paste tailings will be exposed at the surface of the CTF for up to 30 days before being covered with fresh tailings, and that geochemical behavior of this material is best represented by the 4% paste-amended tailings humidity cell test, rather than the humidity cell containing paste tailings with 2% cement added. Please explain why the 4% test would be more appropriate, given that Tintina is likely to add closer to 0.5% cement to most paste tailings reporting to the CTF. DEQ assumes that during exposure to the atmosphere for up to 30 days, the tailings surface will dry and crumble similar to that observed in the 2% cement-amended tailings humidity cell test. Furthermore, wind and/or runoff from rainfall or snowmelt events would likely transport and re-deposit these weathered paste tailings, potentially resulting in zones of higher permeability and greater rates of oxidation. ARM 17.24.116(3)(k)

Page 276, Section 4.2.4: Please add ‘HCT’ to the list of acronyms.

Page 277, Section 4.1.5.1: Please discuss the implications of irrigation of treated mine water over mine-life in terms of recharge of shallow groundwater systems in this section. 82-4-335(5)(l), MCA

Page 277, Section 4.2.5: Please submit the predictions for UG, WRS, and CTF when completed. 82-4-336(10), MCA

Page 281, Section 6.3 (Operational Monitoring): This section includes only a conceptual description of the water quality monitoring plan. Please provide an actual water resources sampling and analysis plan similar to the one developed and submitted for the evaluation adit project in 2013, as an appendix. 82-4-335(5)(l), MCA

Page 281, Section 6.3.1.1, general comment: In addition to Figure 6.1, this section does not indicate that any additional monitoring wells would be installed in the vicinity of the proposed underground workings, particularly in the direction of groundwater flow (with upward vertical gradient, moving to topographic low along stream, toward downstream canyon). Additional nested wells in this area could extend the range of potentiometric surface maps and provide additional water quality data for all phases of the project.

Page 281 through 289, Section 6.0: Please provide a description of the format and frequency of the reports for monitoring results, such as a table that includes monitoring frequency and the reporting requirements together.

Include a statement to the effect that; “Tintina will notify DEQ within 48 hours if any of the monitoring results indicate an operating condition outside the permitted design parameters.’ There could also be a table listing the types of incidents that would be reported to DEQ (such as upset conditions or structural impairments). ARM 17.24.116(3)(l)

Figure 2.2 shows the existing monitoring network, and the majority of sites to the north and east of the ore zones are test wells and/or piezometers (PW-2, -5, -6; PZ-4, -5), which are only regularly monitored for water elevations and not water quality. For water quality monitoring, this leaves MW-3 (USZ) and MW-9 (lower Ynl-A) projected over the footprint of the USZ, and MW-1A (shallow bedrock, perched), MW-1B (Ynl-A), MW-4A (alluvium) and MW-4B (Ynl-A) projected over the footprint of the deeper LSZ.

This array is likely not sufficient to monitor groundwater impacts that might occur in between the ore zones and the Sheep Creek alluvium, especially as regional flow continues to the north. Although the contributions to alluvial groundwater from the shallow bedrock and USZ are modeled to be relatively low, there is still potential to affect water quality due to the partial dewatering and oxidation that will occur in these units over many years.

Monitoring the flowpaths between the ore zones and alluvium would be especially important during closure and reclamation, as groundwater levels recover (include in Sec 6.4.2). If there would be any reliance on a mixing zone to meet standards/background levels, then the location of these wells and the permit boundary should conservatively encompass that mixing zone. These wells will be needed early in the project life though, so that background water quality can be established. ARM 17.24.116(3)(l)

Page 285, Section 6.3.2, first bullet: Performance Monitoring – Tailings solids content. Would this also include QA/QC analysis of the cement + binder content of tailings? What is the acceptable range of deviation from the proposed mixture? ARM 17.24.116(3)(k)

Page 285, Section 6.3.1, last paragraph: Please provide the modeling of facility hydrogeochemical performance when it is complete. 82-4-335(l), MCA

Page 286, Section 6.3.2.1, last sentence: The phrase ‘monitored regularly’ is vague. Please indicate the frequency. ARM 17.24.116(3)(l)

Page 286, Section 6.3.3, first paragraph, first sentence: The WRS pad would be a temporary facility (~2 years) that is exposed to meteoric water, but there is uncertainty about the volume of water in the dump sufficient to flow under unsaturated conditions (Section. 4.2.3 discussion). Please develop and include a scheduled monitoring plan to check for potential seepage from the WRS pad drain. Although this water would report to the CWP or WTP, periodic water quality samples from this potential seepage would serve as a valuable calibration point to test previous modeling assumptions and to guide future water/waste management. RM 17.24.116(3)(l)

Page 286, Section 6.3.3, first paragraph, fourth sentence: There is a discrepancy between statements that WRS will be constructed with foundation underdrains and drawings in Appendix K that do not show underdrains.

Page 286, Section 6.3.5, first paragraph, fourth sentence: The text notes; "…Tintina also plans to augment flows to wetlands using treated water should impacts to wetlands developed over the relatively short period of the mining…" The wetlands near Coon Creek are mentioned prior to this sentence. Is that the only wetland area that could see impacts or are other sites susceptible as well? Would this mitigation be implemented using the proposed underground infiltration galleries or a different system? This action would be considered a surface water discharge and needs to be permitted accordingly. ARM 17.24.116(3)(u)

Page 287, Section 6.3.6, first paragraph: Why was Tenderfoot Creek used as a reference? Also, please identify and map the location of Tenderfoot Creek reference reach. Please explain how the reference reach will be utilized for aquatic resource monitoring.

Page 287, Section 6.3.7: Does the statement refer to only monitoring noise at locations on the mine site, to comply with EPA, OSHA, and MSHA? Would any future noise monitoring occur at the four baseline measuring locations shown in Figure 2.21? Please conduct additional monitoring in those locations during construction and operation (+ blasting) phases to confirm the predictions made in Section 3.8.6 and Tables 3-34 through 3-36. ARM 17.24.116(3)(s)

Page 288, Section 6.4.1, first sentence: Please list the one remaining embankment.

Page 289, Section 6.4.1, first paragraph: What is the interval for the survey markers? ARM 17.24.116(3)(l)

Page 290, Section 7.1, general comments: Please expand this discussion to include a plan for any mine dewatering, water management in surface facilities, and ongoing treatment and disposal of any impacted water (e.g. surface or groundwater) that would occur during temporary closure.

Even if mine dewatering is discontinued, the effects of drawdown would remain and should be monitored until recovery to baseline conditions is complete. Would streamflow augmentation (i.e. additional flows from NCWR) continue through this time period?

Should a temporary closure occur, monitoring surface water flow, groundwater elevations and chemistry should continue, although perhaps under an augmented schedule. This information could verify or alter previous modeling assumptions and provide a realistic basis for conditions to be expected at full closure. ARM 17.24.116(3)(l)

Page 290, Section 7.1, fourth paragraph, fourth sentence: Please address how the foundation drain under WRS facility will be abandoned. Would the mine be dewatered during temporary closure?

Page 293, Section 7.2.1, second paragraph, last sentence: After the PWP residual solids are mixed with cement, where would it be disposed? Would this be standard Portland cement or would it be similar to the paste from tailings disposal? ARM 17.24.116(3)(k)

Page 293, Section 7.2.1, third paragraph, first sentence: Section 2.2.3.6 was not found.

Page 293, Section 7.2.1, third paragraph, third sentence: If the foundation drains become plugged at closure, won't 'drainage water' back up under the foundations and increase pore pressures in the foundation drain bedding material? ARM 17.24.116(3)(g)

Page 293, Section 7.2.1, third paragraph, third sentence: The drain pipes for the CWP, CTF, and PWP will be capped and buried at closure, but it appears that two of the facilities are proposed to be built into the local water table (CTF and PWP, according to KP report). There should be an alternative developed which would allow groundwater to continue along its normal flowpath, without backing up and increasing pore pressure around the drain system underneath the buried facility. The groundwater that would flow through the drain could either be infiltrated back into the subsurface, or perhaps discharged into a stock pond. Which of those options would be permissible with regard to water rights? In either case, water chemistry would need to be monitored to assess any impacts and determine if water treatment is necessary. ARM 17.24.116(3)(g) and (l)

Page 296, Section 7.2.3.2 (Underground Mine Closure), second paragraph, third sentence: It is noted that the access ramps to the lower sulfide zone would be backfilled with cemented tailings, if the lower ore zone is mined out prior to the upper ore zone. In this scenario, would the ventilation raises accessing the lower copper zone also be backfilled with cemented tailings? ARM 17.24.115(1)(i)

Page 296, Section 7.2.3.2, third paragraph, second sentence: It is noted that NAG materials would be used to backfill approximately 200 feet of the decline beneath Coon Creek. Would this consist mostly of Ynl-B material? Where would this material be stockpiled during operations? ARM 17.24.115(1)(i)

Page 296, Section 7.2.3.2, second paragraph, last sentence: The liner protection materials from the copper-enriched rock stockpile and sediment taken out of collection ponds would be transferred underground prior to closure. Would the liner protection layers from other facilities also be transferred underground (e.g. CWP, PWP)? ARM 17.24.115(1)(i)

Page 297, Section 7.2.3.4, first paragraph, second sentence: There is no discussion of a contact water pond (a separate one?) or foundation drain associated with the copper-enriched rock stockpile in the previous discussion of that facility (3.6.4.5). Please update that section accordingly and provide detailed construction designs. ARM 17.24.116(3)(g)

Page 297, Section 7.2.3.5, second paragraph, third sentence: If the PWP foundation drain does contact groundwater, then natural drainage needs to be reestablished at closure (like the CTF closure plan), so that pore pressure does not build around the buried cement waste and liner. Please provide further details about establishing drainage or infiltration for the water captured by the foundation drain, after the seepage collection pond is removed. Would any additional coarse fragment material be needed, or would ripping the ground be sufficient? ARM 17.24.115(1)(i)

Page 297, Section 7.2.3.4, second paragraph, seventh and eighth sentences: If the WTP is dismantled prior to the removal of the CWP, what would be the fate of the residual water in the CWP? i.e. Please elaborate on disposal and how “the CWP will then be closed by removing all water stored on the facility.” ARM 17.24.115(1)(i)

Page 297, Section 7.2.3.2, fourth paragraph, second sentence: Closure of the four ventilation raises with rebar-reinforced cement plugs is described in the text. These plugs would be installed “far enough down the raise to be in solid bedrock.” At approximately what depth would this occur? Would these plugs be located above or below the water table following groundwater recovery? DEQ notes that the pre-mining potentiometric surface (See Figure 2.7, page 41) is approximately 40 feet in elevation higher near the two northwestern-most proposed ventilation raises than near the southern two. Depending upon where hydraulic plugs are installed within the ventilation raises and the access ramp accessing the Upper Johnny Lee deposit, the post-mining potentiometric surface may equilibrate throughout the region adjacent to the remaining open raises and ramps. This may result in a permanent lowering of the water table in the northwestern region of the mine area, and a permanent rise in the water table in the southern portion. The current static water level in the southern area, as indicated from monitoring well MW-2B, is only about 40 feet below the surface, and an increase in head in this region could result in discharge of water from the remaining mine void either at surface or via alluvium or the underlying shallow weathered highly fractured bedrock. Please discuss mitigations to prevent such discharge, and provide detailed drawings and cross-sections of the proposed closure plan for the ventilation raises. 82-4-335(5)(m) and (336)(10), MCA

Page 298, Section 7.2.3.6: Page 297, Section 7.2.3.4 notes that the liner from the Copper-enriched stock pile will be placed in the CTF at closure. Page 297, Section 7.2.3.5 notes that the PWP liner may be placed within the CTF at closure. Please reference these in the CTF closure section.

Page 298, Section 7.2.3.7: Please consider placing the Non-Contact Water Pond embankment liner in the CTF.

Page 298, Section 7.2.3.7 (Non-Contact Water Reservoir Closure): A detailed plan for re-shaping the reservoir embankment, constructing a new spillway, and topsoil placement will be required for the purpose of estimating bonding requirements. 82-4-336(12), MCA

Page 300, Section 7.2.3.9: Would the piping infrastructure, LAD system, Non-Contact Water Pond pump, etc., be offered to the land owner(s) at closure? 82-4-336(9)(i), MCA

Page 300, Section 7.2.4: Table page 301 needs to be larger for viewing.

Page 302, Section 7.5.2, second paragraph, first sentence: The discussion of revegetation should include a map showing the "…outline of intended revegetation areas, showing plant or seed densities and species chosen." ARM 17.24.115(1)(k)(iii)

Page 305, Section 7.1, Temporary closure paragraph: The temporary closure section should address surface and underground geochemical weathering of exposed materials and development of a water treatment plan during the closure period. 82-4-336(10), MCA

Page 308, Section 7.2.2, last sentence: Solid waste regulations require fill over solid wastes. Please commit to match the solid waste regulations.

Page 313, Section 7.2.3.6, 4th paragraph, third sentence: Please add a storage area for the three feet of NAG fill needed to cap the CTF at closure. Pease provide for concurrent reclamation of the material as soon as it is placed in the stockpile. ARM 17.24.116(3)(o)

Page 320, Section 7.2.3.2, 1st paragraph: Please commit to ripping after soil placement to reduce compaction. ARM 17.24.116(3)(b)

Page 320, Section 7.2.3.2, second paragraph: Regarding hydroseeding; please commit to a two-step application process. First, applying seed and some mulch, and then the majority of the mulch and tackifier in the second application. 82-4-336(8), MCA

Drawing C1001: Topsoil storage piles and overburden stockpiles should be shown on the drawing. ARM 17.24.116(4)

Drawing C2003: As noted the CTF will be in groundwater. Please show GW elevations on sections. 82-4-335(l), MCA

Drawing C3003: As noted the PWP will be in groundwater. Please show GW elevation on sections. 82-4-335(l), MCA

Drawing C7001: What is the dimension and storage capacity of the waste rock storage pad? ARM 17.24.116(3)(d)

Acronyms: A number of acronyms are missing: Acronyms ABA, AP, CWP, HCT, NNP, NP, PWP, and WRS.

General notes: For sections covering physical structures that have appendices; CWP, PWP, etc., please list in the appropriate section where the engineering specifications may be found.

Figures:

A number of figures were included in the submittal but not listed in the Table of Contents: Figures 3.5, 3.6, 3.41, 3.48, 3.49, 4.10, and 4.11. Please include in the Table of Contents.

A number of figures listed in the Table of Contents are missing: Figures 3.23 and 3.24. Please provide these figures.

Figure 1.2, page 6: The permit boundary should be a polygon with corners to make area measurements simpler. Please also include power lines in the permit boundary.

Figure 1.2, page 6: The Virginia Mine is not discussed in the application. It should be discussed or removed from the figure.

Figure 1.3, page 7: This map is very ‘crowded.’ Either make into smaller separate ones or one larger (2 feet x 3 feet, or 3 feet x 5 feet) fold out. Show LAD layouts on separate figures. Please use more defined lines for the permit and disturbance boundaries. The choices of color for the power lines and permit boundary are very close. Please use different colors and make them bolder. Are the yellow lines indicating perimeter roads? Update the legend to indicate all features shown on the figure. The fence and diversion ditches are indicated with the same color. Please change one and use a more bold marking. ARM 17.24.116(4)

Figure 1.3, page 7, Facilities Site Plan: There is discussion about a LAD area throughout the document, but only the underground injection galleries are shown on this primary facility map. Figure 3.38 shows the location of the LAD area used in 2014, but this falls outside of the permit area boundary shown in Figure 1.3. Alternative LAD locations were shown in Appendix O (Figure 4), but those appear outdated and do not correspond with the current application. Please update Figure 1.3 and other pertinent figures to show the surface LAD area, and include those acres in the permit area. 82-4-335(5)(l), MCA

Figure 1.3, page7: The wetlands stop at the Castle Mountain Ranch property boundary. Perhaps the wetlands could be mapped from aerial photographs with a note stating “Wetlands on Castle Mountain Ranch are interpreted from aerial photographs”? AMR 17.24.116(3)(a)

Figure 1.4, page 9, Legend: The CSZ claims are not shown on the map. ARM 17.24.116(4)

Figure 1-4, page 9: The mine permit boundary should include all LAD areas. 82-4-335(5)(e), MCA and ARM 17.24.116(4)

Figure 1.5, page 11, Legend: Please list the geologic units shown on the map. Also, please include the proposed mine permit boundary on this map. 82-4-335(5)(e), MCA and ARM 17.24.116(4)

Figure 1.5, page 11: The geologic map does not include a legend describing the geologic units and symbols shown on the map. Please provide this information.

Figure 1.5, page 11: Please provide a reference for the base layer for this map. Perhaps Figure 4.2 could be used as the base map instead.

Figure 1.6, page 12: The proportions of the intervals between the sulfide zones are considerably different from the left-hand column to the expanded right-hand column. The Middle Sulfide Zone apparently changes from copper-rich (red) on the left to pyrite-rich (yellow) on the right. The small x symbol used for two thinner pyrite intervals in the expanded column is not explained.

The notation; “Lower Newland” near the top of the expanded column should probably read “Upper Newland.”

Figure 1.7, page 13 and Figure 2.6, page 31: Could these two figures be combined to provide one generalized cross section for the sub surface? While these two figures have different orientations and scale, it might be better to have one standard cross section to show the lithology, structure, depth to water (with the wells in which those depths were measured) and the Ramp Access/Decline/Access Ramp (using one consistently). Alternatively a close-up of Figure 4.3 could be used for the Schematic Cross-Section. ARM 17.24.116(4)

- Figure 1.7 there is a light green unit under the overburden and over the dolomite layer. Please provide a name for this unit in the legend. Should this layer also be identified in Figure 3.6?
- Figure 1.7 shows conglomerate under the LSZ and the Johnny Lee Lower Zone. Should this layer also be included in Figure 2.6?
- Please label the Buttress Fault.
- Please pick a color symbol for all major units and be consistent throughout the application.

Figure 2.1, page 22: The figure is hard to read. Please enlarge and place on a separate page.

Figure 2.2, page 27: The figure is too small. Please make the figure larger. See also comments on Figure 1.3. 82-4-335(5)(e), MCA

Figure 2.2, page 27: Please consider including the proposed permit area boundary on this map for project location context. The same comment applies for many of the figures in this document, which have different scales or extents from one figure to the next. Other examples include, but are not limited to: Figure 2.3- Seep and springs, 2.5- Major streams and tributaries, 2.8- 2012 synoptic survey sites, 2.9- Wetland delineation, 2.15- Baseline soils, 2.16- Wildlife habitat, 2.19- Baseline vegetation, 2.21- Baseline ambient noise, 4.1 and 4.2- Hydrologic conceptual model and geology. ARM 17.24.116(4)

Figure 2.3, page 28: The map labels the “Brush Creek Fault” as “inferred.” Why is it inferred, what is the geologic evidence for the existence of this fault? ARM 17.24.116(3)(a)

Figure 2.3, page 28: Is PZ 7A/7B, as referenced on page 262, missing from the figure? Also, please include the proposed mine permit boundary on this map. 82-4-335(5)(e), MCA

Figure 2.5, page 34: Streams are labelled 'Creeks' on the actual topo. Please change the title to reflect this. Also, please include the proposed mine permit boundary on this map. 82-4-335(5)(e), MCA

Figure 2.7, page 41: The gold colored text is difficult to read. Please change to a different color. Also, please include the proposed mine permit boundary on this map. 82-4-335(5)(e), MCA

Figure 2.7, page 41, Figure 3.9, page 143, and Figure 4.6, page 262: Please provide more (and consistent) information on depth to water beneath the major facilities and in the area of the groundwater infiltration gallery. Add a smaller scale map (like Figure 3.9) with details of the depth to water based on the data points identified in Figure 3.9, and incorporate that potentiometric surface into the overall site groundwater maps (Figure 2.7 and Figure 4.6). Given that additional geotechnical boreholes, such as those shown on Figure 3.9, were installed during 2015 and are not included on Figure 2.7, can this figure be updated with new control points to refine the potentiometric surface, particularly in the area of the proposed infiltration galleries and Brush Creek? Can the potentiometric lines be extended beyond the inferred Brush Creek Fault?

Also, include a symbol for the potentiometric surface elevation on the cross sections depicted in the following figures (Figure 3.15, Figure 3.16, Figure 3.17, Figure 3.21, Figure 3.22, Figure 3.24, Figure 3.27, Figure 3.28, Figure 3.31, and Figure 7.3). Include a reference to the closest data point from which this data point was obtained from the borings shown in Figure 3.9, and the date on which that elevation was measured. ARM 17.24.116(3)(a)

Figure 2.7, page 41, Legend: What does WLE stand for?

Figure 2-8, page 51. Please include the proposed mine permit boundary on this map. 82-4-335(5)(e), MCA

Figure 2.9, page 57: The figure is difficult to read. Please make it larger. Also, please project the proposed mine permit boundary and proposed mine facilities on this map. 82-4-335(5)(e), MCA

Figure 2.15 (page 77); 2.16 (page 83) and 2.17 (page 87): Please make these figures larger. Also, please project the proposed mine permit boundary and proposed mine facilities on this map and include the locations of infiltration galleries and LAD areas on the soil map. 82-4-335(5)(e), MCA

Figure 2-16, page 83: Please project the proposed mine permit boundary and proposed mine facilities on this map. 82-4-335(5)(e), MCA

Figure 2-17, page 87: Please project the proposed mine permit boundary on this map. 82-4-335(5)(e), MCA

Figure 2-18, page 88: Please project the proposed mine permit boundary on this map. 82-4-335(5)(e), MCA

Figure 2-19, page 91: Please project the proposed mine permit boundary and proposed mine facilities on this map. 82-4-335(5)(e), MCA

Figure 2.20, page 95: Is 24ME1111 indicating a cultural resource? If so, is it the red line that circles most of the site?

Figure 2.20, page 95: The figure uses the same line color to both delineate cultural resource areas and the proposed permit boundary. Please use different symbols in order to distinguish between the permit area and cultural resources.

Figure 2-21, page 101: Please add the proposed mine permit boundary to this map. Also, the polygon shown on the figure representing the project boundary appears to be lands leased by Tintina rather than the proposed permit boundary. 82-4-335(5)(e), MCA

Figure 2.22, page 103: Highways 89 and 12 should be shown in green not brown. Please make the correction. The figure should label highway 259 (just northwest of White Sulphur Springs) as it connects highways 360 and 89.

Figure 2.22, page 103: The project boundary shown on this figure does not correspond to the permit area boundary shown elsewhere. What does this boundary actually represent? The same comment applies to the outlines shown in Figures 2.23 and 2.24.

Figure 2-23, page 105: The polygon shown on the figure as the project boundary does not represent the proposed mine permit area. Please retitle or replace with the proposed mine permit boundary. 82-4-335(5)(e), MCA

Figure 2.24, page 106: Add label to highway 259 and 294. Please contact the Department of Transportation for proper labelling of highway system for all transportation figures and narrative. Also, the polygon shown on the figure as the project boundary does not represent the proposed mine permit area. Please retitle or replace with the proposed mine permit boundary. 82-4-335(5)(e), MCA

Figure 3.1 (page 111) and 3.2 (page 112): All ventilation raises are shown located on the western side of the project area. Will any be placed on the eastern side?

Figures 3.1 (page 111) and 3.2 (page 112): The figures indicate the locations of four ventilation raises; however, Section 3.2 does not describe their construction or dimensions. Will these shafts be grouted to minimize inflow of groundwater from the higher permeability shallow Ynl-A unit of the Newland Formation? Will any mitigations be applied to minimize oxidation of bedrock in the Upper Sulfide Zone that would be exposed within the raises? Was the influence of these raises on drawdown and inflows included in the groundwater model (no mention of the raises could be found in Appendix M (page 3-20, Section 3.4 Mining Simulations)? Please provide detailed cross sections of the vent raise structures. 82-4-335(5)(k), (l) and (m), MCA and ARM 17.24.116(3)(d)

Figure 3.6, page 127: Outside water feeds are entering from the western side, and yet most outside of the mill facilities, i.e.: paste plant, potable and fresh water tanks and the tailings thickener are located on the eastern side of the mill. Tintina may want to relocate these structures to the western side of the mill or move structures on the west side to the east.

Figure 3.9, page 142: The CTF and PWP are shown in solid lines, which are assumed to be final locations. Are the portal pad and mill sites finals as well? If so, please change the dashed lines to solid lines.

Figure 3.13, page 155: The figure is hard to read. Please enlarge and/or make two separate pages.

Figure 3.15, page 161: Please include station numbers on cross-sections D and E.

Figure 3.16, page 166: Please reference that Figure 2/C7001 is in Appendix K. Where is inset A/-?

Figure 3.17, page 167: The figure is of the Process Water Pond schematic cross-section, not the WRS as the text (page 168, second paragraph) notes.

Figure 3.18, page 170: Please add cross-sections with station numbers.

Figure 3.19, page 171, and Figure 3.21, page 174: The drain pipe locations beneath the Process Water Pond (PWP) as shown on Figure 3.19 do not appear to extend beneath the seepage collection sump. Also, the cross sections provided on Figure 3.21 do not indicate that either the drain pipes or drainage gravel extend beneath the seepage collection sump. Please clarify whether the PWP foundation will be designed such that groundwater will collect beneath the seepage collection sump, or will drain via gravity into the foundation drain collection pond. ARM 17.24.116(3)(d)

Figure 3.20, page 173: Please reference that the cross-sections are located on Figure 3.21.

Figure 3.22, page 176: Please add station numbers to the aerial view of cross-sections E and F.

Figure 3.25, page 181 and 3.26, page 183: Please reference that cross-sections are found in Appendix K.

Figure 3.26, page 183: Please expand the figure to show the foundation drain tie-in to the CTF drainage sump.

Figures 3.26, page 182, and Figure 3.27, page 183: The foundation drain pipe locations beneath the Cemented Tailings Facility (CTF) as shown on Figure 3.26 do not appear to extend beneath the seepage collection sump. Also, the cross sections provided on Figure 3.27 do not indicate that either the drain pipes or drainage gravel extend beneath the seepage collection sump. Please clarify whether the CTF foundation will be designed such that groundwater will collect beneath the seepage collection sump or will drain via gravity into the foundation drain collection pond. ARM 17.24.116(3)(d)

Figure 3.27, page 185: Please add the static groundwater table elevation. 82-4-335(5)(k), MCA

Figure 3.29, 189: The figure references cross-section 1/2009. Where is this referenced cross-section located?

Figure 3.31, page 193: Please include the NCWP grout curtain. 82-4-335(5)(l), MCA

Figure 3.32, page 194: The lower sections of the spillway contain steep sections from -8.84% to -14.5% with a standard trapezoidal configuration. Given the slope, consider using a Rosgen type design. Reference that channel cross profiles are located in Appendix K and add station numbers to the plan view.

Figure 3.33, page 196: Please add the piping for the CTF foundation drain to the CTF collection pond, from Sheep Creek to the NCWP, and the waste rock drain to the CWP. Also, please add the purple line piping from the CWP to the mill to the legend and update the legend to reflect these additions. 82-4-335(5)(l), MCA

Figure 3.34, page 204: Figure 4.10 (page 273) shows a brine flow path from the water treatment plant to the PWP, however Figure 3.34 does not. Please correct.

Figure 3.34, page 204: Is the LAD shown on the figure the same facility as the underground infiltration gallery system, or is it the surface LAD that is located outside the permit boundary?

Figure 3.34, page 204: Similar to the format in Table 3-21, please report the estimated volumes using consistent units, i.e. do not mix gpm with m^3/year in the same schematic. Consider editing the LAD end-point in the diagram to “Underground Infiltration Galleries,” since the majority of treated water will not be applied to the surface LAD. The balance for the CTF shows that only precipitation/runoff leaves the facility (84,000 m^3/year in and out), and all other water is considered void loss. This ignores the discussion of the water which will separate from the paste tailings during deposition and consolidation. Although a smaller volume than precipitation, that source of water would also be pumped to the PWP and should be included in this water balance, as it is also being used in the geochemical modeling.

This figure indicates 181,000 m^3/yr (or 91 gpm) of water going to the PWP from underground dewatering, with the remaining 833,000 m^3/yr (418 gpm) going to the WTP. This is inconsistent with other information provided about the water balance; "This [mine] water will be collected and pumped to surface, where it will be divided between the process water pond as make-up water (210 gpm; 800 Lpm) and the water treatment plant (290 gpm:1097 Lpm) prior to discharge" (page 275, also on page 116). Please explain this difference, and update the corresponding text and figures accordingly. 82-4-335(5)(l), MCA

Figure 3.36, page 215, and Figure 3.37, page 216: Is the LAD shown on the figures the same facility as the underground infiltration gallery system?

Figure 3.38, page 218: The figure is a schematic of the surface LAD system. Please include locations of pivot sprinklers with area sweeps. A schematic is of the 2014 surface LAD system, but this site information is not included on any other facility maps, please update accordingly. The permit area boundary needs to be expanded to include this area, especially if the footprint may expand from 17 acres to 40 acres. The storage tanks used in 2014 are discussed in Section 3.7.4.1 and shown in Figure 3.38. Is this a carry-over from previous draft documents, or will the storage tanks also be retained and used for operations? 82-4-335(5)(l), MCA

Figure 3.38, page 218: Is the LAD shown on the figure the same facility as the underground infiltration gallery system? All LAD areas need to be included in the permit area. Storage tanks shown on the figure must be shown as part of the permitted facility and in the permit boundary. 82-4-335(5)(l), MCA

Figure 3.39, page 225: Please expand on how run-on/off storm water flows are controlled, presumably by sedimentation ponds. Consider using a pull-out map of at least 2 feet x 3 feet. ARM 17.24.116(3)(g)

Figure 3.39, page 225: Some of the run-on diversion ditches are shown in blue on this figure (per the legend), while other ditches which appear to serve the same purpose are shown in green. Some are shown as leading to outfalls, while others do not have identified outfalls. Please clarify the figure as appropriate so that all proposed storm water diversions and outfalls are shown. The figure's legend also lists several features (permit boundary, fence, drainfield extension) which are shown on the map, but for which line colors are not included in the legend.

ARM 17.24.116(3)(g)

Figure 3.40, page 227: Where possible, use the Rosgen type channel design to more mimic a natural channel.

Figure 3.41, page 228: Instead of concrete basin blocks, consider using large sized rip rap to mimic a more natural rock dissipation area, or a large shallow depression using rocks of different sizes for energy dissipation.

Figures 3.42, page 232 and 3.43, page 233: Both figures are labeled 'Typical BMPS' and sheet 1 of 2 and 2 of 2. As they are labeled 1 of 2 and 2 of 2, consider just using one figure number. Sheet 2 of 2 shows water discharge filter bags yet there is no other reference to them or their use. Will these be used, and where? If not, please remove from the figure. ARM 17.24.116(3)(g)

Figure 4.2, page 254: Please label the faults. ARM 17.24.1116(3)(a)

Figure 4.3, page 255: Please correct the alphanumeric characters. Instead of text, there are rectangles.

Figure 4.3, page 255: The text values will need to changed, which did not convert/translate to the figure (e.g. letters P, W, V, Z) this includes text on the location map, the cross sections and associated axes, and the text in the legend.

Figure 4.5, page 260: The blue text box shading makes the text somewhat difficult to read. Please use a 'white' background shading.

Figure 4.8, page 269: The text on page 267, Section 4.1.6.2 references Figure 4.8 in years, yet Figure 4.8 labeling is in layers, i.e.: Layer 1, Layer 3 and so on. Please label the layers on Figure 4.8 in years.

Figure 4.8, page 269: Maps of simulated drawdown during Project Year 4 are provided. Please also provide cross sections depicting the simulated drawdown at several time steps from baseline conditions through post-closure water level recovery. Include geology and the locations of proposed mine workings. Suggested cross section locations include (1) a west-east section beginning west of the proposed mining zones, crossing through the proposed ventilation raise located near Well PW-2, and extending through the location of Well PW-7, ending to the east of the Volcano Valley Fault trace; (2) a southwest-northeast section extending from near the Black Butte Fault trace northeastward through the proposed ventilation raise located near well MW-2B and extending to the northeast through the location of Well PW-7, ending to the northeast of the Volcano Valley Fault trace; and (3) a south-north cross-section beginning south of the Black

Butte Fault and extending through well PW-9 to the Volcano Valley Fault trace. 82-4-335(5)(l), MCA

Figure 4.9, page 271: The drawdown for MW-2B is not shown on the graph, even though a red line is shown for that well in the legend. Is it completely overlapped by other well data or was the line omitted?

Figure 4.10, page 273: Please indicate the growing season for the surface land application system in the schematic as well. ARM 17.24.1116(3)(a)

Please list the volumes of brine from the WTP, volumes to and from the mill, the volumes in the drains, and volumes to and from the CTF in the schematic. ARM 17.24.116(3)(k)

Figures 4.10, page 273 and Figure 4.11, page 274: The underground LAD is shown as part of the water balance. Is this the same facility as the underground infiltration gallery or does this refer to the LAD outside the permit boundary?

Figure 4.10, page 273: Please include estimates for the flows that are not shown between some facilities, e.g. CTF to the PWP, PWP to and from Mill, PWP to and from WTP, estimates from all drains that are shown.

Figure 4.11, page 274: Please add the groundwater flow to the aquifers in the figure. Please show predicted seepage from the reclaimed CTF. ARM 17.24.116(3)(k)

Figure 4.11, page 274: The figure shows all water lines closed at closure with the exception of the CTP foundation drain. Will this drain be left open post closure? ARM 17.24.115(1)(f)

Figure 4.11, page 274: The figure indicates that there will be no flow across the facility at year 20. Will there be any inputs from the drains that are shown (CTF, PWP, CWP), and how would that water quality compare to background conditions? (Refer to discussion about not plugging drains at closure) What is the flow indicated by "Groundwater < __ gpm?"

Figure 6.1, page 283: In the legend, new surface monitoring locations are shown in purple and are referenced as 'MW's.' New monitoring wells are listed as 'P' and new piezometers are listed as 'SW.' Please label surface water monitoring locations as 'SW,' groundwater monitoring wells as 'MW,' and piezometers as 'P.' Please review the figure, and revise as necessary. Please update the legend symbols/colors to correspond to the correct monitoring point categories shown on the map.

Figure 7.1, page 292: Please add the reference that cross-section 1/8002 is found in Figure 7.3, and in Appendix K.

Figure 7.1, page 292: The figure is titled “Site Plan Map of Post Closure Topography.” Some mine features (plant site, portal pad, contact water pond) are shown as outlines with original topography shown. DEQ presumes these features will be removed and restored to original topography. Other features (ROM stockpile, Process Water Pond) are shown with a pattern identified in the legend as “reclaimed area” but no topography is shown. Are these features intended to also be restored to original topography during reclamation? Please revise the figure to indicate reclaimed topography in these areas. Also, no topography is shown on the surface of the reclaimed Cemented Tailings Facility. Does Tintina propose to mound this feature to promote runoff and minimize infiltration? Please revise the figure accordingly.

Figure 7.1, page 292, Note #5: The note states that the NCWR (non-contact water reservoir) would be returned to approximate original contour upon reclamation. However, elsewhere in the document it is stated that the dam would be retained, but reduced to a smaller size. Please show the actual proposed topography for the post-closure NCWR. Note the placement of any fill re-located when the height of the dam is reduced, design and location of a replacement spillway at the lower elevation, any other modifications necessary at closure. 82-4-336(12), MCA

Figure 7.2, page 294, general comment: Please update this map to show the other facilities, ponds or infiltration areas, and pipelines that will remain at the site…even those that are buried at closure (e.g. PWP cemented waste and liner, PWP foundation drain, underground infiltration galleries, etc.).

<u>Tables:</u>
A number of tables were found but not listed in the Table of Contents: Tables 2-12, 2-35, 3-3, 3-4, 3-23, 3-24, 3-34, 3-35, 3-36, 3-37, 7-1 and 7-2. Please correct the Table of Contents.

Table 2-3, page 23: The table indicates that the potential evaporation is less than precipitation at the site as listed in Table 2-2. In Section 2.2.1, the site is characterized as a site that receives annual precipitation below potential evapotranspiration. Please clarify this discrepancy. This will have significant bearing on all water balances. ARM 17.24.116(3)(a)

Table 2-8, page 35, Monitoring parameter list: Please check the surface water and groundwater monitoring results, as well as the humidity cells test data, to ensure that all parameters for which there has been a water quality exceedance are included in the monitoring parameter list.

Table 2-8, page 36: Please include units for the detection limits for each parameter (e.g. U and Zn, presumably mg/L).

Table 2-10, page 42: The table uses feet, while Figure 3.27 uses meters. Please be consistent in the use of metric or standard units of measurement.

Table 2-12, page 47: This table indicates that the underground infiltration galleries will have hydraulic conductivities in the range of 1,000 to 10,000 feet per day. Please clarify whether this conductivity range pertains to the gravel layer in the constructed drain system or to the surrounding bedrock, and provide data supporting the hydraulic conductivity values used for design of the infiltration galleries. Elsewhere in the permit application, many other values for hydraulic conductivity of shallow bedrock are given, all of which are much lower. Page 46 (bottom) states that Table 2-12 refers to highly fractured shallow bedrock, but provides a lower range of hydraulic conductivities (a few hundred to a few thousand feet per day) for the material. Also on Page 46 (paragraph 1, sentence 3), the text states that the bedrock unit with the highest hydraulic conductivity is the Ynl-A which ranges between 1 and 5 feet per day. Section 2.5.3.1 (Hydraulic Properties of Soil and Shallow Bedrock, Page 81, paragraph 2, 6th sentence) states that soil and underlying bedrock have similar hydraulic conductivities, approximately 10.3 feet/day. Section 3.7.4.2 (Page 221, Underground Infiltration Galleries, paragraph 2, sentence 5) states that the highly fractured bedrock in which the galleries will be constructed will have infiltration rates averaging 32 feet per day, but no testing data are cited to support this value. Table 4-1 (Section 4.1.2, Page 257) indicates that the geometric mean of hydraulic conductivity values for the shallow lower Newland formation (Ynl-A) is 1.5 feet per day, and Section 4.1.6.1 (Page 266, paragraph 3, 3rd sentence) states that Layer 1 of the groundwater model is 16 feet thick and represents highly weathered shallow bedrock. Appendix M, Page 2-14, Table 3-4 indicates that the calibrated hydraulic conductivity value for Layer 1 (shallow Ynl-A) is 1.3 feet per day. Appendix K, Page 5, Section 2.4 states that 12 tests were completed in weathered bedrock, and those 12 tests indicated an average hydraulic conductivity of 0.255 feet per day with a range between 0.017 feet per day and 5.6 feet per day. The only monitoring well completed in the shallow Ynl-A is MW-4B, which is screened starting 10 feet below the overlying Sheep Creek Alluvium and yielded a hydraulic conductivity of approximately 7 feet per day from a slug test (Appendix B, Page 3-2, Table 7). In summary, no data could be found within the application to support either the very high hydraulic conductivities stated for shallow weathered bedrock (1000s of feet per day) in Table 2-12, or even the more moderate average value of 32 feet per day stated in Section 3.7.4.2, Underground Infiltration Galleries. DEQ recommends that the sizing of infiltration galleries be reconsidered using hydraulic conductivity values measured on site, such as the values from the Knight Piesold report (Appendix K) which average 0.255 feet per day. ARM 17.24.116(3)(a)

Table 2-20, page 64, Granodiorite row: Please provide an estimate of the volume of construction rock required to evaluate construction rock needs. ARM 17.24.116(3)(i)

Table 2-21, page 64: Please provide the results of the ongoing testing before the application can be called complete and compliant. 82-4-335(5)(k), MCA

Table 3-2 page 110, and Table 3-11, page 133: The LAD areas would be considered as disturbed areas and therefore the acreages should be included. ARM 17.24.116(3)(a)

Table 3-2, page 110: Does this show the life of mine surface disturbance? Please provide the surface disturbance in 5 year increments. The new power lines should be included in the permit boundary and surface disturbance boundary. All the wells, piezometers, and vent raises should also be included in the permit boundary and surface disturbance boundary.

Table 3-4, page 118: Column for copper-enriched rock (tonnes) indicates that 10,368 tonnes will be produced in year 2. This is inconsistent with paragraph 1 on page 117: “After 2.5 years of development mining, Tintina mining crews will start mining copper-enriched rock from upper Johnny Lee deposit production drifts.” Please clarify. If copper-enriched rock is produced prior to the 2.5 year mark, would it be stockpiled and segregated on the WRS pad or in a separate location? This would be before the 2.0 acre/ 82,600 ton mill feed storage pad is constructed. ARM 17.24.116(3)(i)

Table 3-11, page 135: Please include the wells and piezometers and the surface LAD area in the disturbance acreage. 82-4-335(5)(e), MCA

Table 3-14, page 144: Please correct the table’s title. “Hazard” is spelled incorrectly.

Table 3-21, page 201: The Tailings Solids Content (74%) is slightly less than the description given on page 145 (3.5.4 Tailings Characteristics) that reports 79% solids. Please clarify. Although a 5% difference seems small, the volume of water associated with that difference would be significant over the life of operation, both in terms of water balance and management and the designed rheology of the paste. Please update the text, table, and model input assumptions accordingly. How do the results of the model change in response?

Table 3-21, page 201: Please report volume estimates with consistent and comparable units. Gallons per minute is used throughout the application text and for the underground dewatering rate in the table, but m^3/yr is used for other model inputs.

Table 7-1 page 301: Please reconcile Table 3-2 (page 110) which shows 284.96 acres of surface disturbance, with Table 3-11 (page 135) which shows 259.05 acres of surface disturbance, and

Table 7-1, page 301: The table shows 205.7 acres of disturbance, as well as the required soil volumes to reclaim those 205.7 acres. ARM 17.24.116(3)(b)

Table 7-2, page 303: There are tree species listed in the table, but no discussion of tree planting in the text (e.g. target locations, sources for trees, method of planting, etc.). Please update and clarify the text accordingly. 82-4-336(8), MCA

<u>Appendices:</u>
Appendix A, Climate and Meteorology: Page 9 of 10, Appendix A-1, Section 6, Summary and Conclusions, third paragraph: The analysis uses the water deficit of 98 mm to be conservative in terms of water availability. However the site may have overall net precipitation. The analysis in this section should be used for water availability but using a net precipitation analysis for the area to design water treatment and discharge needs. A range of values could be used to provide more realistic estimates for the site. Please discuss in the text of the application document and not in the appendix. ARM 17.24.116(3)(a)

Contents for Appendix C. The figure should show both wetlands by category and location of proposed facilities. ARM 17.24.116(4)

Appendix C, Wetland Delineation and Water Body Survey Maps (Map 1, 3 sheets, electronic only): Please show an overlay of the proposed permit area and the mine facility locations on the wetland and waterbody survey map. Also, provide maps in "D" size paper so that details can be determined.

Appendix D, page 5, Section 1.2, fourth paragraph, fourth bullet: The citation for Environmin, 2015b could not be located in Section 6, References. Please correct.

Appendix D, page 7, Section 1.3, first paragraph, second sentence: Please include a reference for Mogk D. 2015 in Section 6, References.

Appendix D, page 13, first paragraph, first sentence: Please add parenthesis (H202)(Miller et al, 1997).

Appendix D, page 25, third paragraph, first sentence: Change MMA to MLA.

Appendix D, page 62, Section 4.3, second paragraph, first sentence: Please clarify the ranking of samples for acid and sulfate production. Should the second reference to 4% with ROM be changed to 4% without ROM?

Appendix D, page 58, Section 4.1.1.1, first paragraph, first sentence: Reference is made to ASTM Standard C1308. This standard for diffusion testing includes a computer model for diffusive fractional leaching. The summary of this standard includes the following: "Results of this test method address an intrinsic property of a material and should not be presumed to represent releases in specific disposal environments. Tests can be conducted under conditions that represent a specific disposal environment (for example, by using a representative groundwater) to determine an effective diffusion coefficient for those conditions." http://www.astm.org/Standards/C1308.htm. If ASTM 1308 is to be used to model groundwater quality in the underground workings during operations and closure, then please explain how the requirement for testing using representative groundwater will be met.

Appendix E, page 12, Section 4.2, fourth paragraph, Arsenic: Reference is made to a MDEQ statewide action threshold of 40 milligrams per kilogram. The cited action threshold for arsenic has been superseded by more recent guidance on threshold background values: http://deq.mt.gov/Portals/112/Land/StateSuperfund/Documents/InorganicBackground/BkgdInorganicsReport.pdf. Table 4-4 of this document calculates a statewide background threshold value for arsenic of 22.5 mg/kg. Samples 47-01 (As 8.3 mg/kg) and 47-02 (As 11.3 mg/kg) collected from Meagher County were used in the calculation of this statewide threshold value.

Appendix E, page 12, Section 4.2: The potential mine area is not a residential site so residential thresholds for arsenic, copper, lead, and other elements do not apply. DEQ reviewed the data and has suggested some additional soil salvage as listed below:

Appendix E, page 14, Section 4.3, Adel soil section: Adel soils are salvageable to up to 32 inches in depth. Topsoil would be salvageable up to 15 inches in depth and subsoil from 16-32 inches in depth. Coarse fragments contents are only 60%. Arsenic concentrations are in a range that should be acceptable for subsoils. ARM 17.24.115(1)(b), and 116(3)(b)

Appendix E, page 14, Cheadle soils: Cheadle soils are salvageable up to 8 inches in depth. ARM 17.24.115(1)(b), and 116(3)(b)

Appendix E, page 15, Houlihan soils: Second lift salvage of soil should be from 12 to 30 inches in depth. ARM 17.24.115(1)(b), and 116(3)(b)

Libeg soils: Please note that coarse fragment content is not listed as a limiting factor for these soils in Appendix E, page 8, Table 1. Please correct.

Sebud soils: Second lift salvage should be up to 20 inches in depth. ARM 17.24.115(1)(b), and 116(3)(b)

Wineglass soils: Second lift salvage should be up to 22 inches in depth. ARM 17.24.115(1)(b), and 116(3)(b)

Woodhall soils: Second lift salvage should be up to 10 inches in depth. ARM 17.24.115(1)(b), and 116(3)(b)

Woodhurst soils: Salvage of up to 12 inches in depth for topsoil, and up to 12 inches for subsoil. ARM 17.24.115(1)(b), and 116(3)(b)

Appendix E, page 21, Appendix A, Data Tables, Table A-1: Please revise the salvage depth tables based on the comments above. ARM 17.24.115(1)(b), and 116(3)(b)

Appendix E, Figure 2: The Baseline Soil Survey Map should be reproduced at a larger size (D size). Outlines of the proposed permit boundary and projected facilities should be superimposed on the map to clarify which soil units will be impacted by the project. ARM 17.24.116(3)(b)

Appendix F, page 28, Section 3.11, first paragraph: The statement is made that no amphibians were recorded during the study. Please note Appendix G Morrison-Maierle, Baseline Aquatic Survey, page 24, Section 3.7, where the Columbia Spotted Frog was documented in Sheep Creek. Please correct.

Appendix F, Sheet 1 of 1, Wildlife Habitat Map: The map should be reproduced at a larger size (D size) to make the map symbols more readable. Outlines of the proposed permit boundary and projected facilities should be superimposed on the map to clarify the habitat types that will be most impacted by the project. ARM 17.24.116(4)

Appendix G, Baseline Aquatic Survey and Assessment of Streams in the Tintina Black Butte Mine Area of Meagher County, MT: The report is marked as ‘draft.’ Please finalize the report.

Appendix G, page 17, Section 3.3, line 15: Change “were” to “where.”

Appendix H, Plate 1, Vegetation Type Map: The map is missing and should be produced in “D” size.

Appendix H, Plate 2, Ecological Site Map: The map is missing and should be produced in “D” size.

Appendix K: Executive Summary, first paragraph: The distance is given in metric units but the size of the project is measured in acres. Please be consistent by using either the metric or standard system.

Appendix K: Executive Summary, first paragraph, third sentence: Please add ‘copper’ after ‘high-grade.’

Appendix K: Executive Summary, second paragraph, third sentence: Please add ‘the’ after ‘stored on.

Executive Summary, fourth paragraph, fourth sentence: Please add ‘meteoric’ after ‘bleed water.’

Appendix K, page I of II, Executive summary, second paragraph, second sentence: Please describe the source and chemical nature of the slag that is to be used for the binder to thicken the tailings. ARM 17.24.116(3)(k)

Appendix K, page 1 of 53, Section 1.1: Distance is measured in kilometers and land in acres. Please be consistent with using either the metric or standard system.

Appendix K, page 1 of 53, Section 1.3, Scope of Report: The scope of the report does not include the design for the Contact Water Pond. The facility is shown on Drawing C1001 but is not included in the design drawing or cross sections. ARM 17.24.116(3)(g)

Appendix K, page 3 of 53, Figure 2.1: This poor quality figure should be replaced by the map prepared for Appendix C, Wetland Survey and Waterbody Inventory.
Note: The wetlands map is currently missing from Appendix C, but it is listed in the Table of Contents. ARM 17.24.116(4)

Appendix K, page 8 of 53, Section 3.2.4: Where on the site would the cement plant be located? ARM 17.24.116(4)

Appendix K, page 9 of 53, Section 3.3, first paragraph, third sentence: Please identify on a figure the 0.17 hectares of category III wetlands and 200 meters of streams that will be backfilled during construction. ARM 17.24.116(4)

Appendix K, page 13 of 53, Section 4.5, Paragraph 1: Change "Core" to Corp and also on page 51 of 53, Section 14, references. United States Army Corp of Engineers.

Appendix K, page 16 of 53. Section 5.5, Drawing C2004: If there were a small leak from the underdrain and given the CTF foundation drains are in excavated trenches (see C2600 below), if a leak occurred within the base of the impoundment would the drain system intercept it? 84-4-335(5)(l), MCA

Appendix K, page 16 of 53, Section 5.5, Drawing C2004: Except for the one cutslope drain located at the southern end; all feed is from a single 4 inch drain pipe. Why are there two drain pipes for this section?

Appendix K, page 16 of 53, Section 5.5, Drawing C2004: As these two 8 inch pipes can handle the entire outflow of the foundation drain system, if the drain system was full, could the final leg 10 inch diameter pipe to the catchment basin handle the total flow?

Appendix K, page 19 of 53, Section 5.10, last sentence: Per the Drawing List C0001, there is no print titled C6110. Please correct.

Appendix K, page 20 of 53, sec 5.11.3, last sentence: The text references Drawing C2008, CTF Waste Rock Co-Disposal Platform Plan. On C2008, there is a reference to cross-section 1/C2009. Per the Drawing Sheet C0001, there is no C2009. Please correct.

Appendix K, page 21 of 53, Section 6.3: Reference PWP Drawing C3004 and the questions on the CTF foundation drain concerning small underdrain (red arrow) leakage and downstream foundation piping.

Appendix K, page 22 of 53, Section 6.5: How will the PWP liner be protected from ice damage during the winter freeze-ups?

Appendix K, page 22 of 53, Section 6.6, second paragraph: The text references that the intake for the reclaim system includes a 30 hp centrifugal pump located on a pad on the crest of the PWP embankment, at the NE corner. Drawing C6250 shows a 50 hp vertical turbine submersible pump. What type of reclaim system water pump will be used? 82-4-335(5)(l), MCA

Appendix K, page 24 of 53, Section 7.3: Given some of the slope angles proposed for the NCWP spillway, is it possible to design/install a more natural Rosgen design?

Appendix K, page 25 of 53, Section 7.4, second paragraph, second sentence: The text notes that, 'A pump will be located on a pad on the crest of the NCWP…'. Per drawings C6430 and C66440, the NCWP pump is a floating unit. Please clarify where the pump would be located. 82-4-335(5)(l), MCA

Appendix K, page 25 of 53, Section 7.5, first paragraph: The text notes that runoff into the NCWR basin would be diverted around the facility. If the purpose of the NCWR is for recharge of Sheep Creek, why not channel storm water run-off into the NCWP?

Appendix K, page 29 of 53, Figure 8.3: Is the black line going through the foundation shales on the upstream side the grout curtain? If so, please identify. 82-4-335(5)(l), MCA

Appendix K, page 32 of 53, Section 9.0, fourth paragraph, second sentence: The Contact Water Pond is mentioned in this Section and is shown on the site plan C1001. However, there are no design drawings, typical sections, or details provided for the Contact Water Pond. ARM 17.24.116(3)(g)

Appendix K, page 33 of 53, Section 9.3, third paragraph: The text notes that: "It is anticipated that the CTF and the PWP cuts will extend into the groundwater table." Please show the anticipated groundwater elevations on Drawings C2003 and C3003. 82-4-335(5)(l), MCA and what is the estimated depth into groundwater the cuts are anticipated to make?

What are the estimated outflows from these cuts? As the foundation preparation for the CTF and PWP is anticipated to be in the groundwater table, how will any cut slope outflows be handled until such time the foundation drains are installed and fully operational? 82-4-335(5)(k) and (l), MCA and ARM 17.24.116(3)(g)

Note: If these ponds are actually within the groundwater table this would raise serious concerns that would have to be addressed in the next deficiency review.

Appendix K, page 33 of 53, Section 9.4, second paragraph, first sentence: Please change to address both the PWP and the CTF.

Appendix K, page 34 of 53, Section 9.7, first paragraph, first sentence: The text notes that excess excavation quantities will be placed on the Stage 2 embankment footprint. Please show where these materials will be stockpiled on one of the plans. Also, please address how would this volume of soil material be placed and stored pending use for Stage 2 construction? Would materials be compacted, graded, or vegetated during the interim period? 82-4-335(5)(l0, MCA and ARM 17.24.116(3)(g) and (b)

Appendix K, page 34 of 53, section 9.6: Please use as much salvaged soils as possible in the construction of berms and other 'dirt' structures. This will reduce the footprint of both the top and subsoil piles.

Appendix K, page 39 of 53, third paragraph, first sentence: Please consider instead of the standard trapezoidal design, using more of a Rosgen design.

Appendix K, page 41 of 53, second bullet: Will filter bags be used, and where?

Appendix K, page 41 of 53: Please provide the Dam Breach Inundation study when completed. 82-4-335(5)(l), MCA

Appendix K, page 42 of 53, Section 11.2.2, second paragraph, single sentence: Please state that Appendix E being referenced is a subsection of Appendix K.

Appendix K, page 45 of 53, Section 12.1, first bullet, last sentence: If sediment is found in the bottom of the PWP at closure, would the sediment be left in place and mixed with cement, or disposed in the CTF? 82-4-335(5)(l), MCA

Appendix K, page 46 of 53, Section 12.1, last paragraph: If the foundation drains are to be cut and capped at closure, this raises a concern if they producing water. Would this not increase pore pressure under the structures (CTF & PWP)? If pore pressures rise, could this not create a situation where there is uncontrolled outflow from under these structures, destabilizing these structural foundations? 82-4-335(5)(l), MCA

Appendix K, sub-appendix E: The Tailings Pipeline Feasibility Study is marked “draft.” Please resubmit with the final study.

Appendix K, sub-appendix E, page E-1 of 16, Section 1.0: The text notes that KP retained MG Engineering to develop a pumping system to deliver excess tailings to the surface tailings facility. As approximately 45% of the tailings generated will be pumped underground for backfill and structural support, was the underground piping included in the study and design?

Appendix K, sub-appendix, page E3 of 16, Note: The note is a recommendation from MG Engineering not to install a double-walled system due to possible issues specified in the note. Given this recommendation, is a double-walled piping system still the best option?

Appendix K, sub-appendix E, page E-3 0f 16, Section 4.0, Double-walled Containment: The text notes that TRI has requested double-walled containment and is assumed to only be on those sections of pipe between the plant and CTF. Would the entire run be double-walled or just segments? ARM 17.24.116(3)(d)

Appendix K, sub-appendix E, page E-4 of 16, corrosion, first paragraph, fourth and fifth sentences: The fourth sentence notes that HDPE cannot handle the operating pressures required to pump cemented tailings paste and the fifth sentence notes that stainless steel pipelines are too expensive. What type of material will the piping be made out of? ARM 17.24.116(3)(d)

Appendix K, sub-appendix E P E-4 or 16, Corrosion, third paragraph, first sentence: The text notes that there is no information available on the Black Butte tailings or process water. These data gaps will need to be filled in and may additional comments. Additionally, is there information that can be presented on cycling cemented tailing mixtures at anticipated operating pressures? ARM 17.24.116(3)(j)

Appendix K, sub-appendix E, page E-4 of 16, Flushing, third paragraph: The text notes that due to the duration of idle time for the CTF piping, flushing will be needed. How many gallons of water would be required on average to flush the line? As the flushing will start soon after tailings deposition, once this water is sprayed into the impoundment, will this additional water have any effect on the setting/hardening characteristics of the cement mix?

Appendix K, sub-appendix E, page E-5 of 16, Drainage: After flushing, how and where will the system be drained? AMR 17.24.116(3)(d

Appendix K, sub-appendix E, page E-5 of 16, Cold Weather: Several options are presented to prevent freeze-up. How will the tailings piping be protected from freeze-up? ARM 17.24.116(3)(d)

Appendix K, sub-appendix E, page E-6 of 16, Leakage, last sentence: Please finalize the design and location for the tailings pipe. ARM 17.24.116(3)(d)

Appendix K, sub-appendix E, page E-6 of 16, Summary: The proposal is based on numerous possibilities regarding pipe material, pipe route, surface installation, and drainage profile. Please commit to one final design and submit engineering documents and specifications for review. The submittal can acknowledge that minor changes may be necessary during construction. ARM 17.24.116(3)(d)

Appendix K, sub-appendix E, page E-7 of 16, Section 5, Route options: Three separate routes are proposed for the pipe corridor from the plant to the CTF. All have stated advantages and disadvantages. Please choose one for final review and approval. Submit but not limited to the following: pipe specifications, pump specifications, pipe corridor, elevation maps, cross-sectionals of the pipe/ground interface, and sections that may be cased. If there is a leak, where would the leaking tailings report to for clean-up? ARM 17.24.116(3)(d)

Appendix K, sub-appendix E, page E-10 of 16, sec 6.0, Rheology-based Preliminary Sizing, first paragraph, first and second sentences: The text notes that there is no information available on the rheology of the cemented paste. All calculations used to determine pipe size, velocity flows, and yield stress are based on other sites and literature. Please supply site paste rheology data to the engineering company so a final tailings pipe line may be designed. ARM 17.24.116(3)(d)

Appendix K, sub-appendix E, page E-13 of 16, sec 7.0, Pressure–Based Sizing: Based on the three options several piping sizes are presented, along with several cost estimates. Please submit rheology data along with a final pipe corridor to the engineering firm so a final proposal may be drafted and submitted for review. ARM 17.24.116(3)(d)

Appendix L, Figure 2: The water balance schematic does not account for seepage from the CTF and PWP foundation drains as a source of water. Please include these items. ARM 17.24.116(3)(l)

Appendix L. Figure 2: The schematic does not appear to account for brine from the water treatment plant. How does brine influence water balance? ARM 17.24.116(3)(d) and (k)

Appendix M, page 2-30, first paragraph, second sentence: The hydraulic conductivity assigned to the paste backfill is given as 2.85 x 10^{-4} ft/day, and this is reiterated on page 3-24. However, this is drastically different than the value of 10^{-9} ft/day, provided in the application document (Table 2-12 as well). Please clarify.

Appendix M, page 3-20, Section 3.4, first paragraph in section: Dewatering of the decline and access ramps was simulated using the drain package. Were the ventilation raises also included in the model? 82-4-335(5)(k), MCA

Appendix M, Page 5-6, Section 5.1.1, first paragraph: Simulation of discharge to the primary infiltration gallery resulted in excessive mounding. Please verify that this was simulated by adding recharge to Layer 1 of the model at the location of the proposed infiltration gallery, and state what hydraulic conductivity was used for Layer 1 in this simulation. 82-4-335(5)(k), MCA

Appendix M, page 5-6, first paragraph, general comment: The primary infiltration gallery area resulted in excessive mounding during initial modeling. Therefore, an alternative infiltration gallery area was used, with a smaller sub-area used in the model (all areas indicated in Figure 5-2). However, the alternate infiltration gallery location used in the model does not correspond to any of the proposed locations found in the application document (Figure 1.3 in that text). In contrast, the primary area which resulted in mounding is one of the proposed locations. Updated modeling should be performed for the primary area, as well as for the other infiltration gallery shown in Figure 1.3 (west of the CTF). This would provide a more realistic model of waste water infiltration and would determine if those locations are sufficient, or if alternate discharge methods are needed. 82-4-335(5)(k), MCA

Appendix M, Page 5-14, Section 5.2, second paragraph, last sentence: The groundwater model predicts that flow in Sheep Creek would be reduced by 202 gpm, "…near the estimated consumptive use of the project (210 gpm), indicating that all of the water that is discharged to the underground infiltration gallery returns to the ground and offsets any depletion from mine dewatering above the consumptive use rate." This sentence is confusing. Rather than stating that all water discharged into the ground "returns to the ground," should it not instead state that all the water enters Sheep Creek? 82-4-335(5)(k), MCA

Appendix M, page 5-14, second paragraph, last sentence: This indicates that water discharged into the shallow infiltration galleries would have an eventual connection to surface water, and "…offset any depletion from mine dewatering," which requires the appropriate discharge permit. This statement also seems out of date with the proposed plan to mitigate stream depletion through use of the NCWR instead. ARM 17.24.116(3)(k)

Appendix M, Page 5-16, Section 5.3, first paragraph: The groundwater model predicts that water levels will recover more slowly in lower layers of the model (i.e. near the Lower Copper Zone). This is counter-intuitive. Does the model assume that the decline accessing the Lower Copper Zone, and the ventilation raises, would be hydraulically plugged to prevent water from draining from the upper portions of the mine, thus flooding the lower zone first? If these conduits are not plugged at closure, then one would expect dewatering to continue in the upper model layers until the lower elevation mine workings have flooded. What volume of open underground workings in the lower zone was assumed in the model? According to Section 7.2.3.2, the access ramps in the lower sulfide zone may be backfilled with cemented tailings, if the lower ore zone is mined out prior to the upper ore zone. Was this scenario also modeled, and what impact would it have on water level recovery rates? Also, please provide the conductivity for each layer used in the model. 82-4-335(5)(k), MCA

Appendix M, Page 5-19, Figure 5-8: The simulated pre-mine and post-mine potentiometric surfaces are presented only at a basin-wide scale, with contour intervals of 250 feet. Please provide larger scale potentiometric maps focused on the project area (similar to the scale presented in Figures 5-5 and 5-6) with a smaller contour interval. Page 5-16 (Section 5.3) indicates that the "post mine potentiometric surface" shown on Figure 5-8 represents projected conditions 100 years after mining is completed. Please also provide a simulated potentiometric surface map representing conditions at a shorter time frame (e.g. 10 years) following completion of mining. Please explain why the potentiometric contours on this pre-mine map in Appendix M do not match those on Figure 4.5 (Page 260) in the permit application? 82-4-335(5)(k), MCA

Appendix O: The Weed Mitigation and Management Plan is noted as being revised at this time to reflect scope of activities proposed in permit application. The final plan will need to be submitted. 82-4-336(8), MCA

Appendix O, Figure 4: Please update to reflect the current scope of activity proposed.

Appendix P, Emergency Response Plan: The plan is being revised to reflect current scope of activities proposed in permit application. Please submit the plan when it is final. ARM 17.24.116(3)(g)

Appendix P, Emergency Response Plan: Please submit a formal emergency response plan. 82-4-335(5)(l), MCA

Appendix P, page 1, Section 1.0, third paragraph, third sentence: The text notes that a 'Life Flight accessible helicopter landing pad will be established at the mine site. Where will this landing pad be and how will it be marked? It is recommended to contact the FAA on specific requirements for construction, location and operation of helicopter landing pads. ARM 17.24.116(3)(d)

Appendix P, page 3, Section 2.1, fifth bullet: The sentence states, 'Non-life threatening, first-aid requiring injury.' Should the sentence state, 'Non-life threatening injury requiring first aid'?

Appendix P, page 6, Section 2.2.3, Directions to Hospitals: The hospital in Helena should also be listed as it is only 75 miles from the site, compared to Billings at 150 miles, and winter travel to a hospital may be safer than travelling on highway 89 through Monarch and Neihart to Great Falls.

Appendix P, page 7, Section 2.4, first sentence: The text notes that evacuation procedures and routes and rallying points are described in Section 2.2. These issues are discussed in Section 2.3. Please correct.

Appendix P, page 10, Section 3.2, fourth bullet: Please consider obtaining prior arragements/authorizations from private land owners for access in the event of a spill that may cross property boundaries.

Appendix P, page 12, Section 3.4: This section should be removed as it is no longer being proposed.

Appendix P, page 13, Section 3.4.1, third paragraph, first sentence: Please ensure the liner for the tank secondary containment is rated for all materials/liquids to be stored as well as UV resistant.

Appendix P, page 14, Mid-scale Site Plan Map: The map shows NAG and PAG waste rock dumps, and is not representative of the current proposal. Please update map accordingly.

Appendix P, page16, Section 3.4.2, 2nd paragraph, last sentence: Figure 4 is missing. Please provide the figure.

Appendix P, page 16, Section, 3.4.2, third paragraph, first sentence: Figure 5 is missing. Please provide figure 5.

Appendix P, page 16, Section 3.4.2, fifth paragraph, first sentence: The text notes that there will be two 545 kW on site generator units. On page 159, Section 3.6.1.6, first paragraph the text notes that the power requirements are between 9 and 12 MW. Page 159, Section 3.6.1.6, last paragraph of the application notes that there will be (2) 1 MW generators onsite. Please clarify the size and number of generators that will be onsite.

Appendix P, page 16, Section 3.4.2, fourth paragraph, first sentence: Please correct the notation of, 'Error! Reference source not found.'

Appendix P, page 17, Section 3.4.2, fifth paragraph, first sentence: Please correct the notation of, 'WPDSL on Error! Reference source not found).

Appendix P, page 17, Section 3.4.2, fifth paragraph, third sentence: Please correct the notation of, 'Error! Reference source not found.'

Appendix P, page 17, Section 3.4.2, fifth paragraph, sixth and seventh sentence: The text notes that the sediment trap overflows to a hydrocarbon skimming and settling sump and from this sump would report to a 'gray' water sump that would be pumped to a wash pad recycle system. Please provide design details on this collection system. ARM 17.24.116(3)(g)

Appendix P, page 17, Section 3.4.2, fifth paragraph, ninth sentence: The text notes that the fuel/lube storage area would report to a hydrocarbon containment sump. Where will this sump be located? How will it be constructed? ARM 17.24.116(3)(g) and (4)

Appendix P, page 17, Section 3.4.2, seventh paragraph, second sentence. Figure 4 is missing. Please provide the figure.

Appendix P, page 20, Section 4.1, sixth paragraph, first sentence: The text indicates Figure 4 of the amendment document for the exploration decline. Please correct to note that the application is for an operating permit.

Appendix P, page 22, Section 5.2, second paragraph, third sentence: The text noted that in the event of an offsite fire, Tintina has mutual agreements with the Forest Service and DNRC. Page 10, Section 3.2, fourth bullet states if a spill goes offsite, Tintina must get permission of the landowner for a clean-up. Does Tintina need prior written permission form the landowner to access their property in the event of fire?

Appendix P, page 22, Section 5.2, second paragraph, sixth bullet: The text notes that a 475 hp generator will operate the water wells with a second same-sized generator acting as back up. What is the wattage of the generator? Show on the prints where these generators will be located. Will line power be run to these wells in the future or will only on site generators be used? ARM 17.24.116(3)(p)

Appendix P, page 22, Section 5.2, second paragraph, eighth bullet: According to the submitted operating plan, the NAG seepage collection pond will no longer be installed. Please remove all references to the NAG pond.

Appendix Q, Alternatives Analysis for Siting of Major Facilities: The alternative analysis is noted as pending. Please provide when finalized. The location of power poles should be shown on a map. ARM 17.24.116(3)(p)

Glossary of Terms:
gossan: Gossan is an oxide not a sulfide mineral deposit. Please correct.
hectare: Please add the word “to” after “…measure equal”
indicated resource: Please strike the “s” in occurrences, add a comma after: “grade” and change “have” to “has.”
laminations: Please strike the words “…or laminae”
mining claim: Please strike the word “…that” and replace with “on which.”
stratigraphically: Please change to stratigraphic.
tonne: Please add that this is equal to 2200 pounds.
raise, silification, shale, stratigraphy, stratigraphically, subaqueous, TLC, TDS, TKN, ion, tonne (repeated): Please strike out these terms.
vent biota: Suggest changing “volcanic vents” to hydrothermal.
Please add the terms ‘reverse fault.’

Acronyms:
PMP: Please change “probably” to “probable.”
TCLP: Please capitalize all of the words.
TKN: Please remove the period.

Acronyms used in the application but not included in the list of acronyms:
BBC – Black Butte Copper Project
BBF- Black Butte Fault
CWP – contact water pond
EDGM – earthquake design ground motion
ENDMTL – estimated non-degradation maximum treatment level
EMT – emergency medical technician
EPM – equivalent porous media
HFB – hydraulic flow barrier
HSU – hydro-stratigraphic unit
IDF – inflow design flood
K – hydraulic conductivity
MDEQ – Montana Department of Environmental Quality
MDE – maximum design earthquake
MLA – mineral liberation analysis
MSL – mean sea level
MOP – mine operating permit
m – meter
msal – meters above sea level
MSDS – material safety data sheets
NOI – notice of intent to discharge stormwater
NAD – North American datum
OBE – operating base earthquake
OS – copper enriched rock storage
PGA – peak ground acceleration
PEA – preliminary economic assessment
POC – parameters of concern
PWP – process water pond
ROM – run of mine
RPW – relatively permanent waters
tpd – tons per day (tonnes per day)
TNW – traditional navigable water
TRI – Tintina Resources Inc.
UTM – universal transverse Mercator
VVF - Volcano Valley Fault
WRS – waste rock storage
WPDSL – wash pad fuel/oil storage
WUS – waters of United States

Abbreviations:
cu ft: Please remove the space in front of “cubic.”

cu yds: Please remove the space in front of “cubic.”
DO: Please change to” dissolved.”
Pb: Please change to ‘lead.”
SC: Please change to specific conductivity.
TDS: Please change to; total dissolved solids.
TSS: Please change to total suspended solids.
Please strike TI, Sb, Sc, and SO_4.

Complete and Compliant Section:
Please address the following**:**
<u>Section 82-4-336(2), MCA.</u>
Section 82-4-336(2), MCA, requires the reclamation plan to provide that reclamation activities, particularly those relating to the control of erosion, be conducted simultaneously with the operation and in any case be initiated promptly after completion or abandonment of the operation on those portions of the complex that will not be subject to further disturbance. Please address these requirements.

<u>Section 82-4-336(3), MCA.</u>
Section 82-4-336(3), MCA, requires the reclamation plan to provide that reclamation activities be completed not more than two years after completion or abandonment of the operation on that portion of the complex unless DEQ provides a longer period. Please address these requirements.

<u>Section 82-4-336(4), MCA.</u>
Section 82-4-336(4), MCA, requires the reclamation plan to provide that the operator may not depart from an approved plan without previously obtaining from DEQ written approval for the proposed change in the absence of emergency or suddenly threatening or existing catastrophe. Please address these requirements.

<u>Section 82-4-336(5), MCA.</u>
Section 82-4-336(5), MCA, requires the reclamation plan to avoid accumulation of stagnant water in the development area to the extent that it serves as a host or breeding ground for mosquitoes or other disease-bearing or noxious insect life. Please address these requirements.

<u>Section 82-4-336(6), MCA.</u>
Section 82-4-336(7), MCA, requires the reclamation plan to require all final grading to be made with nonnoxious, nonflammable, noncombustible solids unless DEQ grants approval for a supervised sanitary fill. Please address these requirements.

<u>Section 82-4-336(8), MCA.</u>
Section 82-4-336(8), MCA, requires a reclamation plan to provide for vegetative cover if appropriate to the future use of the land specified in the reclamation plan. The reestablished vegetation cover must meet county standards for noxious weed control. Please address these requirements.

<u>Section 82-4-336(9)(a), MCA.</u>

With regard to disturbed land other than open pits or rock faces, Section 82-4-336(9)(a), MCA, requires the reclamation plan to return all disturbed areas to comparable utility and stability as that of adjacent areas. If the reclamation plan provides that mine-related facilities will not be removed or that the disturbed land associated with the facilities will not be reclaimed by the permittee, the post-mining land use must be approved by DEQ. Please address these requirements.

Section 82-4-336(10), MCA.
Section 82-4-336(10), MCA, requires the reclamation plan to provide sufficient measures to ensure public safety and to prevent the pollution of air or water and the degradation of adjacent lands. Please address these requirements.

Section 82-4-336(12), MCA.
Section 82-4-336(12), MCA, requires a reclamation plan to provide for permanent landscaping and contouring to minimize the amount of precipitation that infiltrates into disturbed areas that are to be graded, covered, or vegetated, including but not limited to tailings impoundments and waste rock dumps. The plan must also provide measures to prevent objectionable postmining ground water discharges. Please address these requirements.

Other:
Hard Rock Mining Impact Board: Please provide documentation that this has occurred or when it is expected to occur. 82-4-335(6), MCA

Appendix N: The Geochemical modeling appendix is pending and will need to be submitted. 82-4-335(5)(k), MCA

Appendix O: The weed plan appendix is being updated, and will need to be submitted. 82-4-336(8), MCA

Appendix P: The emergency response plan is being updated, and will need to be submitted. ARM 17.24.116(3)(g)

Appendix Q: Alternative analysis for siting major facilities is pending, and will need to be submitted. ARM 17.24.116(3)(p)

Please provide a plan for temporary cessation of operations. 82-4-335(5)(l), MCA

Please provide a plan for dust control on the CWT during the first few years of mine closure. ARM 17.24.116(3)(c)

The application must address the following:
Names and address of owners of record and any purchasers under contracts for deed of the surface of the land within the permit area and the owners of record and any purchasers under contracts for deed of all surface area within one-half mile of any part of the permit area. 82-4-335(5)(f), MCA

The names and addresses of the present owners of record and any purchasers under contracts for deed of all minerals in the land within the permit area. 82-4-335(5)(g), MCA

The source of the applicant's legal right to mine the mineral on the land affected by the permit. 82-4-335(5)(h), MCA

Bonding (82-4-338, MCA):
In order to facilitate the calculation of a reclamation bond please respond to the following:

Please indicate what type and length of ventilation ducting that would have to be removed at closure. Also, how many electrical substations and mounted transformers would there be? Would there be any underground air compressors, motors for ventilation or other needs?

The disposal of brine will need to be discussed during temporary closure and at the end of mine life. A containment pond may be needed at closure (as well for temporary closure) for brine when the cement backfill operation has ceased. Alternatively, some other method of brine disposal can be proposed.

Please provide the volume of waste rock that may be left on the surface during unexpected closure (year 2 or 3) and which the application states would be placed underground. A waste rock repository should be considered to eliminate having to place waste rock underground. A reclamation plan would be required for this alternative.

Closure of the mine may require water treatment from pumpback wells until water standards can be met. Please provide an estimate of the time needed for water treatment based on geochemical analysis and background water quality.

Please provide an estimate of how long water emanating from beneath the CTF and potentially mixing with seepage from the CTF will need to be treated to meet standards based on baseline water quality and mixing of the two sources of water.

Vent raises: The vent raises should have a horizontal component at the surface to allow final backfilling during reclamation. Otherwise, a long-term bond may be needed to ensure that the covering material is competent.

To mitigate for potential oxidation of sulfide bedrock overlying the Upper Johnny Lee deposit, please consider relocating the proposed infiltration galleries above the ore deposit to provide enhanced recharge and prevent or minimize the long-term (15 years or so) dewatering and oxidation of the Upper Sulfide Zone.

Please provide a detailed cost estimate to construct, operate, and maintain the water treatment plant during the construction and operational phase.

Please proved a detailed costs estimate to construct the hydraulic plug in the decline.

Please proved a detailed cost estimate to close the four ventilation raises.

Please proved a detailed cost estimate to construct a cemented rock backfill for the first 25 feet of the underground workings.

Summary of Major Concerns:
The lower elevations of several impoundments are proposed to be below the water table. This may allow interaction with solutions within the impoundments and groundwater. This concern needs to be fully addressed,

The water table in the areas of the wetlands appears to show a drop of two feet. This potential impact will need to be clarified, or more thoroughly addressed in the application.

A MPDES permit will likely need to be obtained if there is interaction of LAD waters and surface water in the wetlands and/or nearby creeks.

The LAD drainfields may require a UIC permit.

The appendices will need to be submitted in hard copy.

All missing appendices will need to be submitted to allow for a complete review.