DEQ
Montana Department
of Environmental Quality

March 16, 2018

Jerry Zieg, Vice President of Exploration
Tintina Montana, Inc.
PO Box 431
White Sulphur Springs MT 59645

RE: Notice of Deficiency for Montana Pollutant Discharge Elimination System permit application for permit number, MT0031909

Dear Mr. Zieg:

On February 15, 2018, the Montana Department of Environmental Quality (DEQ) received an updated Montana Pollutant Discharge Elimination System (MPDES) permit application (Forms 1, 2D, and 2F) for the Black Butte Copper Project. The updated application forms were submitted in response to DEQ's January 10, 2018, Notice of Deficiency.

DEQ reviewed the updated application materials and noted that the following new narrative language was added to explain why Coon Creek will not be the nearest surface water affected by the proposed discharge from Outfall 001:

...Restoring the flow to the natural channel will result in Coon Creek being above the groundwater table as it enters the alluvial valley. This in combination with the effect of drawdown from mine dewatering on the groundwater flow path...will prevent water discharged to Outfall 001 from discharging to Coon Creek.

Given the reliance on the *Sheep Creek Alluvial Flow Model Report* in Appendix F to support this statement, DEQ Water Quality Division staff conducted a more thorough review of the model and determined additional information is needed. Please address the following:

- Both the mine dewatering model (submitted as part of the Mine Operating Permit (MOP) and the Sheep Creek alluvial model used the current diverted location of Coon Creek. But, the permit application indicates that the applicant is working to divert Coon Creek back into its original channel which is up to 10 feet higher than the diverted channel. If Coon Creek is moved back to the original channel, the model results submitted may not accurately predict the conditions during mine operation. Please address how moving Coon Creek would affect the modeled predictions on groundwater elevations, flow directions and streamflow in Coon Creek and Sheep Creek. It is possible two scenarios need to be conducted depending if Coon Creek will be diverted back to its natural channel.
- Table 1 of Appendix B in the MOP indicates that the wells/piezometers in the Sheep Creek valley have been monitored quarterly for several years. Please submit at least one representative potentiometric contour map of the Sheep Creek valley for each quarter so that

the range of hydrologic conditions under which Outfall 001 will discharge can be reviewed. These maps should also include Coon Creek and Sheep Creek stage elevation data where available.

- Figure 3.3 of the MPDES application shows both piezometers and surface water stage monitoring locations as "groundwater monitoring points"; this figure should be corrected to identify stream elevation stations. Also, please clarify what date(s) the groundwater and surface water elevations were collected for each monitoring point on the map.
- Figure 3.3 of the MPDES application appears to treat the stream elevations as equal to the adjacent groundwater elevation, which makes it difficult to determine which portions of Coon and Sheep creeks may be gaining or losing to groundwater. Please submit this map with the groundwater elevation contours based only on groundwater elevation measurements, but include the stream stage elevations on the map for use in determining gaining and losing stream sections.
- The application did not address the impacts to streamflow under mine operating conditions with both dewatering and Outfall 001 discharges occurring. Pursuant to ARM 17.30.715(1)(a) of the nondegradation rules, activities that increase or decrease the mean monthly flow of a surface water by less than 15 percent or the seven-day ten-year flow by less than 10 percent are nonsignificant degradation. Changes above those levels would require additional review. The results of the Sheep Creek valley numerical model and the mine dewatering model should be used to determine streamflow changes in Coon Creek and Sheep Creek under low flow and high flow conditions. Note that according to Appendix M of the MOP (section 5.2) Coon Creek is predicted to have its baseflow reduced by 70% which would likely exceed the nondegradation criteria.
- The impacts to Coon Creek described in the previous comment may also be evident in Figure 5-3 of Appendix M of the MOP which shows the 10 foot drawdown contour line in layer 1 of the model following Coon Creek for approximately 1,000 feet. This may indicate that Coon Creek is acting as significant recharge source for the dewatering operation. Please confirm that the dewatering model is not withdrawing more water from Coon Creek than is actually available.
- The numerical model of the Sheep Creek valley and the Outfall 001 discharge was conducted for relatively low flow conditions using fourth quarter data. To determine the range of conditions with regards to where Outfall 001 discharges will enter surface water and the range of conditions on streamflows in both Coon Creek and Sheep Creek another scenario should be run for high flow conditions. The scenarios can be run at steady-state conditions, but should reflect the higher flow and lower flow conditions.
- The MPDES permit application states several times that Sheep Creek is gaining from groundwater, which is the basis for the 3,500 feet long mixing zone in Sheep Creek in Appendix D of the MPDES application. However, Figure 3.3 of the MPDES application

shows that even under current conditions Sheep Creek is losing near SC-4 and PZ-2, and downgradient of that point there is insufficient information to determine if Sheep Creek is gaining or losing. More importantly, under the mine operating conditions Figure 3.4 of the MPDES application shows that Sheep Creek is losing to groundwater from the most upstream UIG to at least as far downstream as SC-6, and may not begin gaining groundwater until near the confluence with Coon Creek. Coon Creek may also be gaining groundwater directly above the confluence with Sheep Creek. Please submit an analysis and map showing how each river cell that represents Coon Creek and Sheep Creek is interacting with groundwater (including volumetric rates into or out of the creeks) under mine operating conditions for both low flow conditions (which is the scenario already submitted) and high flow conditions. This information will be used in determining the correct mixing zone location in Coon Creek and/or Sheep Creek over the range of annual conditions that will occur. It can also be used to determine changes in streamflow due to mine operations.

- There is a discrepancy between the mine dewatering model in the MOP and the Sheep Creek valley model in the MPDES permit application with regards to the interaction between groundwater in the Sheep Creek alluvium and groundwater in the bedrock. The MOP model assumes hydraulic connection between those units as it creates significant drawdown in the Sheep Creek alluvial due to bedrock dewatering. However, the Sheep Creek valley model assumes the bedrock is a no flow boundary. Please explain this discrepancy and how it impacts the predictions of Outfall 001 discharge migration and how it impacts the predictions of streamflow changes in Coon Creek and Sheep Creek.
- Page 3-4 in Appendix F of the MPDES application states: "*The river conductance was set arbitrarily high for Sheep Creek to assure it does not limit the interaction between the river and the groundwater. This was done as it is assumed that Sheep Creek is the dominant boundary of the groundwater system*". Setting the riverbed conductance arbitrarily high would bias the model results and overestimate the amount of groundwater entering or water discharging from Sheep Creek, particularly as compared to Coon Creek. Please explain how this parameterization doesn't bias the model results, or if it does bias the model results then the model should be run using realistic riverbed conductance values as were used in Little Sheep Creek and Coon Creek.
- Table 4.1 in Appendix F of the MPDES application shows that all three creeks are losing to groundwater, but the text states that the table shows groundwater discharging (gaining) to all three creeks. Please clarify.
- Table 4.1 in Appendix F of the MPDES application shows the observed discharge of water from Coon Creek to groundwater as 45 gpm. Please clarify how and when that value was measured.
- Appendix M of the MOP shows the effects of mine dewatering will take several years to stabilize. After the first year of dewatering Figure 5-3 shows less drawdown in the Sheep Creek valley than after 4 years (Figure 5-4). The Sheep Creek valley model was run using

the predicted dewatering drawdown after 4 years. Therefore, the predicted impacts from Outfall 001 may not be accurate for the first several years. Please address the transient impacts from the mine dewatering (particularly during the early stages of mine development) and to what extent impacts to surface waters from Outfall 001 will be different in that time frame as opposed to the long-term steady state results submitted.

- The groundwater mounding created by Outfall 001 as shown in Figure 5-1 of Appendix F of the MPDES application does not seem to be reflected in the groundwater potentiometric contours in Figure 5-2, which appear linear despite the mounds created by the Outfall 001 discharge. Please confirm that Figure 5-2 represents the combined effects of both mine dewatering and mounding from the Outfall 001 discharges.

Please provide the additional information requested above by April 16, 2018.

Thank you for your patience and cooperation during the permit process. If you have any questions or concerns, please contact me at (406) 444-5326 or at jmay@mt.gov.

Sincerely,

Jeff May
Water Protection Bureau
Montana Department of Environmental Quality

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