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"Technical Support for Grassroots Public Interest Groups"

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Attn: East Boulder Mine Amendment 004 EIS
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https://www.fs.usda.gov/project/?project=61385

Re: Scoping comments – Lewis Gulch Tailings Storage Facility and the Dry Fork Waste Rock Storage Area

1. Filtered/Dry Tailings

In the judgement of the Mount Polley Expert Panel (2015), filtered tailings are considered to be a best practice. This is a technology that is rapidly developing. The filtering approach and technology being used at Stillwater and East Boulder is probably decades old, and there are no technical assessments available to evaluate the viability and cost effectiveness of using a more modern approach to the use of filtered/dry tailings at Stillwater and East Boulder.

There are several aspects of filtered/dry tailings that should be investigated as a part of the proposed Lewis Gulch tailings facility. The present backfill operation utilizes only the sand fraction of the tailings. If filtered whole tailings were used for backfill instead of only the sand fraction of the tailings, more of the tailings would be available for backfill, and it would also be feasible to use filtered/dry tailings disposal on the surface.

The amount of tailings disposal space available at the East Boulder minesite will essentially be exhausted when the Lewis Gulch TSF is full. The platinum-palladium mineral resource will not be exhausted for decades beyond the point where the Lewis Gulch TSF is full. When the Lewis Gulch TSF is full, where will additional tailings go?

In addition to lack of space for tailings disposal at the minesite, the East Boulder River Valley is very steep, and its susceptibility to flooding will only be increased by the presence of tailings facilities that are being built close to the river. Would it make more sense from a safety perspective to move to tailings disposal site now, instead of waiting until the Lewis Gulch TSF is full?

Because filtered/dry tailings could have multiple benefits at East Boulder, it should be given consideration as a fully developed option in the EIS. These potential benefits include:

a) Filtered and compacted tailings would occupy significantly less volume than the slime portion of the tailings now being deposited in the impoundment at East Boulder. This could extend the life of the Lewis Gulch TSF by several years. The Lewis Gulch TSF would allow an additional 12 years of tailings disposal. If this same Lewis Gulch area were used for filtered tailings disposal, an additional 10 years of tailings disposal could be added because of the increased density of the filtered tailings

b) At some point in the life of the East Boulder Mine, mine access workings will become available for backfill.

c) Dry tailings on the surface would also allow more potential tailings disposal sites near to the mine to become available.

Filtered/Dry tailings need to be thoroughly evaluated in the EIS.

2. Seismic Hazard Assessment

A seismic hazard assessment is used to establish the size of the earthquakes that could occur in the project area, most importantly the horizontal acceleration that would affect large structures like the tailings impoundment embankments, as well as the waste rock facilities. If these structures were to fail catastrophically, they could have a major impact on the East Boulder River, and as far as the Yellowstone River itself.

It appears that the probabilistic seismic assessment being used to determine the design earthquake events for the proposed Lewis Gulch expansion, including the Dry For Waste Rock Storage Area, comes from a study completed by Knight Piesold in 2016 (KP 2019). The USGS data used for this study comes from the 2014 USGS geologic hazard assessment. The 2014 USGS hazard assessment was revised in 2018. Another revision of the USGS hazard assessment is due to be released in 2023.

The data used to establish the seismic events for the existing calculations is out of date. A new probabilistic, and deterministic, seismic hazard report should be conducted in order to correctly model the seismic stability of the Lewis Gulch TSF and the Dry Fork Waste Rock Dump.

3. Design Earthquake for Dry Fork Waste Rock Storage Area

The design seismic event for the tailings dam is the 1 in 10,000-year earthquake, or maximum credible earthquake. This is the appropriate choice for the design seismic event for a facility that must continue to function indefinitely. However, the design earthquake for the waste rock dump which is only 1 in 2,500-years. Catastrophic failure of the waste rock dump during a large earthquake would also have serious effects on the East Boulder River.

The decision to use a design earthquake for the Dry Fork Waste Rock Area of lower magnitude than for the Lewis Gulch tailings embankments is not clear. Failure of either facility could lead to large amounts of waste being deposited in the East Boulder River, since both facilities are about the same distance from the river.

The use of a less than maximum credible earthquake might be explained because all seismic events with a return period of 1,000 years or more would fall under the Failure Modes and Effects Analysis (FMEA) definition of “very unlikely” (KP 2022), so the 1-in-2,500 year earthquake would have received the same hazard classification as the 1-in-10,000 year earthquake in the Dry Ford Waste Rock Area FMEA analysis.

Right now there is a significant discrepancy between the seismic events used for the design of the Lewis Gulch tailings dam and Dry Creek Waste Rock Storage Area. Both contain mine waste that could damage the East Boulder River if a catastrophic failure were to occur. Both should be using the same design parameters to mitigate the long-term risks of a catastrophic failure to the East Boulder River.

From a design perspective, and quite frankly from a risk perspective, there is a significant difference between a 1-in-2,500 year earthquake and a maximum credible earthquake. The use of the maximum credible earthquake as the design event for the Dry Ford Waste Rock Area should be carefully reconsidered in the EIS.

4. Geological and Geotechnical Site Conditions

From reviewing the existing report on geological and geotechnical site conditions (KP 2019), it is not apparent that sufficient drill data has been collected to conclusively determine whether glaciolacustrine deposits are present under the proposed Lewis Gulch TSF. From the drillhole locations plotted in Figure 2.1of KP 2019, it appears that additional drill information may be warranted along the northeast and northwest sides of the proposed Lewis Gulch TSF.

Lacking conclusive data about these deposits could mean that the modeling used to predict the stability of the TSF embankments does not accurately represent the actual geology beneath the TSF embankments.

5. Geochemistry

A detailed discussion of the geochemical characterization of the mine waste, both tailings and waste rock, is required. In the Water Management Plan it is noted:

> "*The average (June 2002 through November 2020) nitrate+nitrite concentration of the East Boulder TSF supernatant pond is 61 milligrams per liter (mg/L) and the average sulfate concentration of the pond is 310 mg/L*." (SMC 2022)

While there does not appear to be any indication of acid mine drainage, the level is sulfate in the tailings pond (310 mg/l) is significantly elevated, and suggests sulfide decomposition could be occurring. Acid-base accounting, metals and sulfur analyses, and humidity cell testing has presumably been done on both the tailings and waste rock. A summary of this information needs to be presented in the EIS, and the supporting technical reports should be included in the EIS technical documentation.

6. Climate Change

Existing analysis by Knight-Piesold has determined that the effect of increased temperatures and the frequency and intensity of rainstorms in Montana will be offset by smaller winter snowpack depths (KP 2022). This is an obvious over simplification of the potential long-term effects of climate change. The tailings facilities at the East Boulder Mine are situated very close to the East Boulder River, and in a very narrow canyon. These tailings facilities must be protected from a storm event large enough to erode the tailings dam. A release of tailings into the East Boulder River would probably be impossible to clean up. A thorough analysis of the potential effects of climate change, especially for maximum storm events, is required for an EIS.

There is no mention of climate change in the Water Management Plan (SMC 2022). In the Water management Plan it is stated:

> "*Unless noted, all stormwater channels will be designed to pass the peak flows resulting from the 1-in-100 year, 24-hour storm event*." (SMC 2022)

Peak flow design using the 100-year storm event is generally the minimum required. Today many mines are using the 1 in 200-year storm event as the design event for stormwater facilities to account for the uncertainty related to climate change. While this is only a surrogate for a detailed climate analysis, it is at least an acknowledgement that climate change is a factor that must be recognized in mine design, especially for water management.

The potential effects of climate change must be incorporated into the EIS.

7. Temporary and Permanent Closure Plans

Like most metal markets, the demand for platinum and palladium can change rapidly. In general, over the life of any mine a temporary halt in operations is not uncommon. During a temporary shutdown mine facilities must be maintained, and critical processes like water treatment must be continued. The EIS should consider the temporary closure plan for the mine, and should analyze the adequacy of that plan.

8. Financial Assurance for Monitoring and Long-Term Water Treatment

The EIS should analyze the reclamation and closure plan for its adequacy, with special attention to the financial assurance associated with reclamation and closure. Financial assurance typically is in the tens to hundreds of millions of dollars, and if this is not correctly calculated can become a significant financial liability to the public. The public ultimately either bears the direct environmental and socioeconomic impacts of the failure to reclaim a bankrupt mine, or assumes the direct costs of reclamation and closure that are paid for by government. These cost estimates should be analyzed as a part of the EIS process.

The Post-Closure phase has been assumed to last for 15 years for the tailings facilities and 5 years for the waste rock storage areas. At the present time nitrate is the primary contaminant of concern. Nitrate is a notoriously long lasting contaminant, and to assume it will be an issue for more than 5 years post-closure is a very optimistic prediction. From a post-closure monitoring and water treatment standpoint, assuming a short period before the cessation of water treatment, and monitoring, could lead to a significant shortfall in post-closure funding. In order to protect the public from the risk of assuming the costs of long-term water treatment, a more conservative approach to calculating long-term water treatment and monitoring funding should be taken, unless it can be demonstrated through existing monitoring data that it is not possible that nitrate or other contaminants to be present at levels of concern.

9. Land Application at the Boe Ranch

Water with elevated levels of nitrate is being land-applied at the Boe Ranch. One of weaknesses of land-application is that a contaminant may saturate the ability of the land to absorb the contaminant. The inability of a soil to use or retain a contaminant, sometimes referred to as breakthrough, can be modelled, and requires monitoring to both verify the modelling and to avoid breakthrough.

Since the amount of water being land-applied at the Boe Ranch will gradually increase as the mine increases in size, a thorough discussion of both the modelling and monitoring strategy should be discussed in the EIS.

Thank you for the opportunity to submit these comments.

Sincerely;

David M Chambers

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References

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