February 10, 2015

Mr. Tom Livers, Director
Montana Department of Environmental Quality
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Mr. Chris Savage,
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Dear Director Livers and Forest Supervisor Savage,

I am writing with respect to the tailings dam at the proposed Montanore Mine. Given the recent investigation into the catastrophic failure of the tailings dam at the Mount Polley mine in British Columbia, we urge the agencies to reassess the safety, construction and design of the Montanore tailings dam and to appoint an independent panel to review the proposed tailings dam design prior to the release of the Final Environmental Impact Statement and Record Of Decision.

In January, a panel of experts released its findings from its investigation of the Mount Polley tailings dam, a modern impoundment that breached on August 2014 and released 25 million cubic meters of tailings into the Fraser River watershed in British Columbia.[1] The panel concluded that the dam failed because of a faulty design that didn't account for the instability of the glacial till on which it was constructed. The B.C. Minister of Mines has called for an immediate investigation of all 123 tailings dams within the province and

[1] Independent Expert Engineering and Review Panel, Report on Mount Polley Tailings Storage Facility Breach, January 30, 2015. Available at: https://www.mountpolleyreviewpanel.ca/sites/default/files/report/ReportonMountPolleyTailingsStorageFacilityBreach.pdf

it executed a search warrant at the engineering firms involved in the tailings dam design and management, including AMEC.

The results of the Mount Polley investigation are important to the proposed Montanore Mine for a number of reasons:

1) Like the Mount Polley tailings dam, the Poorman tailings dam (the preferred alternative) will be located on unstable glacial fill.

> Surficial geology at both the Little Cherry Creek and Poorman tailings impoundment sites is dominated by Quaternary glacial deposits (Figure 64). Detailed geology and cross sections of the tailings impoundment are provided in Figure 65. As much as 300 feet of unconsolidated silt, sand, and gravel overlie the Wallace Formation in both tailings impoundment areas. Fine-grained glacial lake (glaciolacustrine) materials dominate the center and eastern portion of tailings impoundment sites and interfinger with intermixed silt, sand, and gravel glaciofluvial materials on the western portion of the site. Section 3.9.2.2.2 SDEIS.

2) AMEC, one of the engineering firms involved with the construction and management of the Mount Polley tailings dam,[2] has also been involved with design issues at the Montanore Mine tailings dam.[3] AMEC Geomatrix developed a three-dimensional numerical groundwater flow model of the Poorman Tailings Impoundment area.

3) The long term safety and stability of the tailings dam is a crucial public safety issue, and yet the Supplementary Draft Environmental Impact Statement analysis of the proposed Montanore tailings dam did not include the final design or geotechnical analysis of the Poorman tailings dam (the preferred alternative), merely a conceptual design. There was no analysis to show that the tailings dam was even feasible, let alone stable in the short or long term.

> According to the SDEIS, "The design developed from the Poorman site is conceptual only and is based on limited geotechnical investigations." (p. 47 SDEIS)
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> "Using thickened tailings may affect the ability to use the impoundment as a reservoir to maintain a water balance. In final design, MMC would reevaluate the water balance and the tailings deposition plan. One option would use the drainage in the northern end of the impoundment area as a dedicated water storage area and readjust the dam alignment and deposition plan." (p. 49 SDEIS)

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[2]http://www.vancouversun.com/news/More+search+warrants+executed+Mount+Polley+mine+failure/10791264/story.html

[3]Technical Memorandum, AMEC Geomatrix to Klepfer Mining Services, Poorman Tailings Impoundment Capture Analysis, Montanore Project, November 2010.

4) There are two major tailings dam safety problems as outlined by Dr. Chambers' technical review (see attached). The choice of the earthquake event corresponding to the Maximum Credible Earthquake (MCE) was not the most conservative choice for the MCE, as reflected in the data presented in the technical reports. The random local earthquake M 6.5, cited under the minesite at a depth of 5 km, should be used as the Maximum Credible Earthquake (MCE) for calculation of peak acceleration, rather than a M 7.0 earthquake on the Bull Lake Fault.

Even based on the choice of the MCE as a M 7.0 earthquake on the Bull Lake Fault by the designers of the tailings dams, the design horizontal acceleration due to the MCE of 0.22 g was not used as the design seismic event for dam stability analysis. It appears that a value of 0.11g, or only half the horizontal acceleration of the MCE event, was utilized for seismic safety analysis.

We've seen from the instability issues at the Troy mine that earthquakes in the area can cause unanticipated consequences. The underground tunnels at Troy have collapsed, causing worker safety problems, surface subsidence and the unanticipated closure of mine operations.

5) The SDEIS states that the Montanore tailings dam will not be required to secure a high hazard dam permit. According to the SDEIS, "DNRC will not be issuing a high hazard dam permit for the tailings impoundment because management and operation of the impoundment would be addressed under an MMRA operating permit during operations."

The panel of experts that reviewed the Mount Polley tailings dam failure identified critical risk factors, and made a number of key recommendations that we urge DEQ and the Forest Service to implement at the proposed Montanore mine. These include:

- Appointing an independent tailings review board (ITRB) to evaluate the tailings dam design.

- Using Best Available Technology (BAT), which includes:
  - eliminating surface water from the impoundment,
  - promoting unsaturated conditions in the tailings with drainage provisions, and
  - achieving dilatant conditions throughout the tailings deposit by compaction.

- Evaluating tailings dam designs for these potential failure modes:
  - undrained shear failure for dams with silt and clay foundation soils.
  - water balance adequacy, including provisions and contingencies for wet years.
  - filter adequacy, especially for dams containing broadly graded soils or mine waste.

- Applying design, construction and safety standards developed specifically for tailings dams, rather than adapting those used for water retention dams. For example, using the appropriate factor of safety. Hence, the factor of safety of 1.5 for Montanore needs to be recalculated based on the results of the glacial deposit analysis.

We urge DEQ and the Forest Service to re reassess the safety, construction and design of the Montanore tailings dam and to appoint an independent panel to review the tailings dam prior to the release of the Final Environmental Impact Statement and Record Of Decision. The failure of the Mount Polley tailings dam highlights the risk of building a dam on glacial fill, and raises questions about AMEC's involvement in design issues at Montanore. Furthermore, the failure of the SDEIS to include a design and geotechnical analysis of the Poorman tailings dam alternative, and the DEIS's improper use of the maximum credible earthquake data, raise considerable uncertainty about the stability of this facility. Given that tailings dams must store mine waste in perpetuity, these facilities warrant the most rigorous review and the stringent standards. We urge the agencies to review the recommendations from the Mount Polley tailings dam review panel, and apply those to the proposed Montanore Mine.

We look forward to a response from the agencies, and welcome the opportunity for a more detailed discussion on these matters.

Sincerely,

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