

26 November 2014

TE1330191.1000

Mr. Ian Haskell
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P.O. Box 1500
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Dear : Ian,

Re: H-H Dam Break and Tailings Runout Study – Consideration of 24 Mile Lake

In February of 2014, AMEC conducted a dam break study ¹ for the H-H Dam which provides eastern containment for the Highland Tailings Storage Facility (TSF) at the Highland Valley Copper (HVC) mine site. That study was prepared in response to a request from HVC to consider the effects of a hypothetical dam break on the downstream mining operations. Further to that study, this letter describes the rationale for inclusion of the 24 Mile Lake Water Management Facility (WMF) as part of the H-H Dam Break and Tailings Runout Study.

As indicated in the H-H Dam Break Study, the 24 Mile Lake WMF is located at the toe of the H-H Dam and is operated as a water containment and sediment control facility, receiving occasional tailings slurry discharges from the H-H Pumphouse during tailings line maintenance or emergencies. The 24 Mile Lake WMF is located upgradient of the active Valley Pit and has the potential to overtop in the event of a breach of the H-H Dam if the free water volume within the facility is not managed appropriately (AMEC 2014).

The area between 24 Mile Lake and the Valley Open Pit consists of native soil and rock as well as waste rock material. Although not constructed as a dam, this area has been designated by HVC as a “dam” as it provides artificial containment of 24 Mile Lake separating it from the Valley Pit. The distance between the Valley Pit and 24 Mile Lake is approximately 1,700 m. Because this area has been raised over time beyond the natural containment of the lake it now acts as a dam and AMEC was retained by HVC to undertake a detailed geotechnical review of the 24 Mile Lake facility and the area separating it from the Valley Pit ². That study noted that 24 Mile Lake is used for emergency storage purposes and the natural watershed for the lake is very limited. Nonetheless a standard operating procedure for the 24 Mile Lake WMF was developed to maintain water levels sufficiently low as to preclude the potential for an overtopping

¹ AMEC Environment & Infrastructure (AMEC). 2014a. Highland Valley Copper H-H Dam Break and Tailings Runout Study, Highland Valley Copper Mine Near Logan Lake, British Columbia.

² AMEC Environment & Infrastructure (AMEC). 2014b. 24 Mile Lake Data Review Memo, Highland Valley Copper Mine Near Logan Lake, British Columbia.

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event from entering the Valley Pit. The study also considered the effects of hydraulic gradient driven internal erosion and pit wall instability and concluded that these mechanisms were not credible due to the substantial separation between the lake and pit. As demonstrated in the H-H dam break and tailings runout study, the potential tailings runout resulting from the breach of the H-H dam could result in a displacement of the water impounded within 24 Mile Lake towards the Valley Pit if the water level was allowed to rise to full capacity. However, under normal operating conditions an overtopping breach of the adjoining area between 24 Mile Lake and the Valley Pit is considered to be highly improbable as the H-H dam breach scenario was based on a sunny-day earthquake trigger that should not be considered in conjunction with a rainy-day flooding event of the 24 Mile Lake facility.

Nonetheless, it is prudent to consider these types of scenarios in order to inform emergency preparedness planning and serve to illustrate that a credible failure mode exists in the form of miss-operation of the lake water level leading to overtopping. This type of event is not expected to result in a classical breach of the lake containment as typically defined by a dam break study but rather the rising or displaced water would inundate the area towards the Valley Pit which slopes uphill ultimately leading to a discharge into the Pit. Furthermore, the flow path would follow a heavy equipment haul route constructed of well compacted waste rock that is not particularly susceptible to erosion or down cutting during what would be considered as a relatively short duration event. As such, an individual dam break study for 24 Mile Lake was not performed as the associated worst case inundation limits predicted in the combination H-H dam break and 24 mile lake water displacement scenario were considered sufficient to support emergency response planning initiatives for the combined facilities.

This letter was prepared by Michael Cyr, P.Eng. and Andrew Witte, P.Eng. and was reviewed by Andy Small, P.Eng. This letter is for the exclusive use of Teck Resources – Highland Valley Copper Partnership (THVC), for the specific application to the area within this letter. Any use which a third party makes of this letter, or any reliance on or decisions made based on it, are the responsibility of such third parties. AMEC accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. It has been prepared in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

Sincerely,

**AMEC Environment & Infrastructure,
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