



June 26th, 2015

Al Hoffman,
Chief Inspector of Mines
Ministry of Energy and Mines

Re: Response to Memorandum of February 3, 2015 from Ministry of Energy and Mines

Under cover of this letter, please find condition assessments for the four tailings storage facilities at Highland Valley Copper (HVC), as per the request outlined in the memorandum from the Ministry of Energy and Mines (MEM), dated February 3, 2015. The condition assessments were performed by the Engineer of Record, Neil Singh, P.Eng., of Klohn Crippen Berger (KCB) and the findings have been discussed with HVC's Independent Tailings Review Board.

HVC is committed to ensuring the safe operation of these four tailings storage facilities and all other dam structures. As such, the condition assessments consisted of a thorough review by the Engineer of Record of existing design and as-built information, including close scrutiny and re-evaluation of historical subsurface investigation information in light of the knowledge gained from the Mount Polley failure. The review specifically evaluated the potential failure modes requested by MEM based on the recommendation in the Mount Polley Panel report:

- 1) Risk of undrained shear failure of silt and clay foundations
- 2) Water balance adequacy
- 3) Filter adequacy

The results from the condition assessment, provided in the attached sealed letters, verify that the four facilities are performing according to design, and based on ongoing monitoring, instrumentation, surveillance and investigation activities are considered to be appropriately protected against the above referenced potential failure modes.

The findings of the condition assessments did indicate some gaps in knowledge and monitoring. The ongoing improvement in defining and characterizing foundation conditions and dam performance over time is part of the observational method that we have successfully employed at all of Highland Valley Copper's tailings storage facilities for decades. While we are confident based upon past performance of the non-active facilities that they are more stable now than at any time in the past due to consolidation of the foundation over time, we recognize there is an opportunity to improve the definition of material properties and lateral distribution of materials in the foundations in light of the findings from the Mount Polley investigation. Notwithstanding these opportunities to improve our information, as demonstrated in the 2014 DSI reports, recent Dam Safety Reviews and in the third-party opinion of the Tailings Review Board, no immediate safety or stability concerns have been noted for any of Highland Valley Copper's tailings storage facilities and accompanying dam structures.

We have carefully reviewed and are taking steps to address each potential information gap, according to the recommendations by our Engineer of Record, as summarized in Table 1. Many of the activities noted had already been planned or are underway as part of ongoing work.

At HVC, and across all of Teck, we are focused on meeting the highest standards of safety for communities, employees and the environment. Completing these condition assessments in light of lessons learned regarding tailings dam safety complements the existing comprehensive systems and procedures we have in place for the safe operation and monitoring of our tailings storage facilities. As examples of systems we have in place, HVC has had an Independent Tailings Review Board (ITRB) in place for two years, and has implemented the Towards Sustainable Mining initiative and achieved AAA rating for the Tailings Protocol, as administered by the Mining Association of Canada.

Please do not hesitate to contact me if you have any further questions regarding the operation, maintenance and monitoring of our tailings storage facilities.

Sincerely,



Greg Brouwer
General Manager, Highland Valley Copper

cc: Diane Howe, Ministry of Energy and Mines
Heather Narynski, Ministry of Energy and Mines
Chris Anderson, Teck
Jeff Hanman, Teck

Table 1: Planned Actions

Structure	Potential Gap and Corresponding Planned Action	Timeline for Action
Highland TSF: LL Dam	<p>Defining the extent and material properties of the various glacio-lacustrine layers has been ongoing since 1977 as part of the design, construction and monitoring of the Highland TSF. As per recommendation KCB 2014 DSI-LL-06 (KCB 2014b), and recommendations in our 2010 Design Update Report (KCB, 2010) additional drilling and lab testing is underway for the foundations of in the Valley Buttress Berm (VBB), North Buttress Berm (NBB) and North Abutment. A drilling program is planned for 2015. This is an ongoing task that spans multiple construction seasons; a progress update will be provided in the 2015 Dam Safety Inspection Report (DSI).</p>	Ongoing
	<p>Update stability analyses as new strength data is acquired. This is an ongoing task that is updated annually. This task will be reported in the 2015 Annual Performance Review report.</p>	Ongoing (updated annually)
	<p>It is also necessary to understand the stresses, deformations, and generation of pore pressures in the glacio-lacustrine layers under the loading from current and predicted construction stages. This should be accomplished using a stress-deformation model (such as Settle 2D, or similar) based on updated definitions of material extents and characteristics (from #1, above) and a review of inclinometer performance data as per recommendation KCB 2014 DSI-LL-08 (2014b). Progress update given in the 2015 DSI.</p>	Initiated following the planned 2015 drilling program To be completed by end of 2016
Highland TSF: HH Dam	<p>The deep foundation silt and clay layers are not well characterized; however, these do not represent potential critical slip surfaces even assuming conservative properties and undrained conditions. Nevertheless, a deep inclinometer installation would confirm the stratigraphy and provide monitoring to confirm the design assumptions. This will be installed in 2016. Additional characterization of strength, index, and piezometric levels of the deep foundation silt/clay layers is ongoing per recommendation KCB 2014 DSI-HH-02 (KCB 2014b). This is an ongoing commitment spanning multiple construction seasons and a progress report will be provided in the 2015 DSI.</p>	Ongoing
	<p>There is limited piezometric information upstream and downstream of the H-H Dam core. It has been recommended per KCB 2014 DSI-HH-02 (KCB 2014b) that additional instruments are installed in the tailings beach and downstream shell in order to estimate and monitor the gradient across the core, and alert levels should be updated to include a threshold gradient across the core. This is an ongoing commitment spanning multiple construction seasons; a progress report will be provided in the 2015 DSI.</p>	Ongoing

Structure	Potential Gap and Corresponding Planned Action	Timeline for Action
Highland TSF: 24 Mile Lake	No gaps or recommended actions were identified.	
Bethlehem No 1 TSF: No 1 Dam & Bose Lake Dam	There is limited information on material properties and extent of the clay layer identified at 15 to 17 m depth below Dam No. 1. We recommend a site investigation of (initially) one drill hole to sample and carry out laboratory testing on the layer.	Completed by end of 2016.
	Once the drill hole data is available and the properties of the glacio-lacustrine layer are better understood, the properties should be incorporated into the stability and seismic deformation review per recommendation KCB 2014 DSI-BM-02 (2014). This work has been initiated.	Completed by end of 2016.
	Update instrumentation alert levels at both dams as per recommendation KCB 2014 DSI-BTTF1-04 (2014).	Completed by end of 2016.
Bethlehem No 2 TSF: Trojan Dam	Drill at least one hole to verify presence or absence of a silt or clay layer and collect undisturbed samples for laboratory strength testing.	Completed by end of 2016
	We are currently conducting seismic stability and deformation analyses for the new consequence classification for Trojan Dam per recommendation KCB 2014 DSI-TD-08 (2014). This will later be modified to incorporate information from the proposed drilling (in 2016). These analyses will include a review of whether higher pore water pressures (and undrained conditions) could be induced by seismic loading.	Scheduled for completion in December 2015
	A performance review of instrumentation including updating alert levels at Trojan Dam is ongoing, per recommendations KCB 2014 DSI-TD-05 (2014), scheduled for completion in November 2016, and KCB 2014 DSI-TD-06 (2014), scheduled for completion in December 2015.	Ongoing
	A monitoring point for observations of seepage is being established at the downstream location of the decommissioned culvert, as per recommendation KCB 2014 DSI-TD-12 (2014).	Planned for completion by end of 2016.
Highmont TSF	No gaps or recommended actions were identified.	n/a