

May 2, 2013

City of Nanaimo
455 Wallace Street
Nanaimo, BC
V9R 5J6

Bill Sims, ASCT
Manager, Water Resources

Dear Mr. Sims:

Middle and Lower Colliery Dams
Conceptual Costing of Rehabilitation or Replacement Options
Clarifications in Response to Hatch Peer Review

Klohn Crippen Berger (KCB) has reviewed the “Colliery Dams Rehabilitation/Renewal - Cost Estimate Peer Review Final Report”, Hatch Ltd., May 1, 2013, which comments on our report “Middle and Lower Colliery Dams, Conceptual Costing of Rehabilitation or Replacement Options”, KCB, dated April 30, 2013. As previously discussed, this letter provides some clarifications on points raised in Hatch’s report.

We are pleased to note that Hatch are in general agreement with KCB’s estimates and conclusions. Hatch’s comments on some generalizations and lack of detail in our report relate mainly to the conceptual nature and timeline for this assignment, and to issues which would need to be investigated further as part of design of dam rehabilitation and replacement options.

Hatch Section 4.4

Embankment Material Properties:

KCB based their seismic analysis and buttress fill design on a gravel material with a friction angle of 42°.

Spillway Energy Dissipation:

For the Roller Compacted Concrete (RCC) replacement dams, it is assumed that excavation will expose bedrock over much of the dam footprints. If concrete elements, such as a stilling basin or flip bucket are required, the concrete work required lies well within the contingency allowances.

For the spillway expansions, significant energy dissipation can be provided by an intentionally rough rock excavation surface.

130502 KCB Clarifications.docx

River Diversion and Lake Dewatering

The proposed temporary river diversion scheme, for dam removal during the summer, is a low-disturbance coffer dam upstream of the Middle Lake (e.g. sand-filled supersacs and geomembrane) with a 900 mm surface, gravity pipeline (HDPE or PVC), approximately 700 m long, discharging to Harewood Creek near the Lower Dam. A coffer dam crest, route and route profile for this diversion pipeline has been identified which provides a flow capacity of 1.4 m³/s. This pipeline will convey normal summer Chase River flows past the two lakes (construction area) to the lower Chase River.

Once the diversion pipeline is in place, the lakes will probably be dewatered using siphon pipes over the spillways.

RCC volume vs Conventional Concrete volume:

The relative estimated quantities of conventional concrete vs RCC (not including walkways) are detailed in Table 9 of our report. Estimated conventional concrete volume is 14% and 10% of the overall dam volume for the Middle and Lower dams respectively.

Hatch Section 6.2

Costing Methodology:

We acknowledge that more discussion of the basis for unit rates and assumptions would have been appropriate. As Hatch observes elsewhere in their report, KCB used a mixture of pricing derived directly from similar projects in the region (including cost data received from the City) and engineering judgment based on the particular logistics, volumes, and construction conditions of this project. In some cases, such as jet grouting and footbridge costing, we discussed the requirements and design with knowledgeable contractors and suppliers.

We trust that this additional information is useful. Please do not hesitate to contact the undersigned if you have any questions or comments on these topics.

Yours truly,
KLOHN CRIPPEN BERGER LTD.



Robin J. FitzGerald, P.Eng.
Principal, Water Resources

RJF/