AECOM
99 Commerce Drive
Winnipeg, MB, Canada R3P 0Y7
www.aecom.com

204 477 5381 tel
204 284 2040 fax

Memorandum

To	Patricia Randell, Justin Stockwell	Page	1
CC	Tom Wingrove		
Subject	Tailings Relocation		
From	Kendall Thiessen		
Date	July 4, 2011	Project Number	60159089 (402.12)

The following memorandum discusses the methods of relocating tailings, as a supplement to the "Geotechnical Assessment and Costing of the Mt. Nansen Mine Closure Alternatives" document prepared for the Government of Yukon(AECOM 2010). The following discussion applies to the Closure Options where the tailings are to be re-located, specifically:

- Option 3: Tailings Backfilled into Pit with High Infiltration Cover, Waste Rock in Place
- Option 4: Tailings and Waste Rock Backfilled into Pit with Low Infiltration Cover

A more detailed description of the Options is included in AECOM (2010). A key performance criteria for Option 3, is that the tailings placed above the water table must meet a specified maximum hydraulic conductivity to support tension saturation. To accomplish this, it has been determined that the coarse and fine tailings must be blended to achieve the required volume of material that meets the specified performance criteria. For Option 3 AECOM (2010) suggested that blending and transporting of the tailings may be done by dredging the tailings with multiple dredges, and mixing of the slurried tailings would occur in-pipe en-route to the pit for placement. The AECOM (2010) geotechnical assessment notes that there may be other methods of blending and transporting the tailings, and gives an example that would involve blending tailings through a series of hoppers and conveyors. The required blending of tailings could probably not be achieved by transporting and placing (partially) frozen tailings by truck. For Option 4, AECOM noted that because the tailings did not require blending, that it may be preferable to transport the tailings by truck during winter, when heavy equipment can move on the frozen crust of the tailings. Slurrying the tailings for Option 4 is not advised, as it would add water to the tailings which are to be stored in a relatively dry condition.

The concept and pricing for excavating, blending, transporting, and placing the tailings for Option 3 and Option 4 were done in consultation with an experienced environmental services contractor who has extensive experience handling tailings, including dredging tailings and transporting tailings in winter via load and haul with trucks.

The volumes of water required for the dredging operation were discussed with the contractor, and it was determined that Dome Creek would be able to supply sufficient water if the water was recycled, and if additional water was collected and stored prior to and during dredging operations. The pit lake

is also an existing source of surface water. The existing tailings pond, with some re-grading and active management may be a suitable short-term reservoir. There are various dredging technologies available and likely a suction type dredge would be used. The contractor may determine that a land based dredging setup would be most suitable, in which case boats or barges would not be required on the tailings pond. A water cover would still be required over the tailings as a water source for the dredging and slurrying.

The costs for relocating the tailings through dredging (Option 3) and load and haul (Option 4) methods were both developed through discussions with an experienced contractor, and therefore can be reasonably compared to each other. The total relocation costs for the two methods are similar.

The water treatment costs for Options 3 and 4 have been assumed to be the same. The greatest cost associated with water treatment is the capital expenditure on the treatment equipment (estimated at approximately $2 million). Comparatively, the operating costs are relatively minor, and differences in short term operating costs are not significant. If the tailings are to be relocated in a slurry, as proposed for Option 3, then the excess water will be recycled, and would not require treatment until the completion of the relocation, when the water would then be treated and released. For both Option 3 and Option 4, there would be a period of water treatment after the placement of the tailings to treat the porewater released during consolidation.

Establishing a performance based specification that establishes a criteria for the final in-situ condition of the tailings may lead to cost savings by allowing the contractor to determine the most effective method of tailings blending, transport and placement. The purpose of the discussions with a contractor was to determine the feasibility of blending the tailings, and the best method of blending, transporting and placing the tailings. At the conceptual design stage, the costs of only one relocation method for each option were investigated.

Please contact the undersigned with comments or questions.

AECOM Canada Ltd.

Prepared by:

PROFESSIONAL ENGINEER
YUKON TERRITORY
KENDALL THIESSEN
04/07/11

Kendall Thiessen Ph.D. P.Eng.
Geotechnical Engineer

Reviewed by:

Tom Wingrove P.Eng.
Deputy Operations Director
North America Environment

/dh

REFERENCES

AECOM 2010
Geotechnical Assessment and Costing of the Mt. Nansen Mine Closure Alternatives, November 2010.