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16 December 2016

Amec Foster Wheeler File: NX14001K.2

Nicole Pesonen
Environmental Manager
Nyrstar Myra Falls Ltd.
PO Box 8000
Campbell River, BC V9W 5E2

Dear Ms. Pesonen:

**Re: Myra Falls Lynx TDF Dam Face Closure Cover Design
Schedule of Quantities**

As part of the development of a permit level closure cover design for the outside face of the Lynx tailings disposal facility (TDF) Dam (draft report NX14001K.2, dated 15 December 2016), Nyrstar Myra Falls Ltd. (Nyrstar) requested that Amec Foster Wheeler Environment & Infrastructure (Amec Foster Wheeler) prepare a schedule of quantities for closure cost estimation purposes. The objective of this letter is to present the schedule of quantities and discuss the limitations and exclusions related to the schedule.

Table 1 below presents the estimated quantities based on the design drawings NX14001K.2 series C-1000 dated 15 December 2016, which was based on the June 2015 LiDAR surface provided by Nyrstar and the 2015 construction as-built surveys supplied by Nyrstar on 05 December 2015, referred to as the “existing ground surface”.

This estimate of quantities was prepared to a 30% accuracy level and is not intended for construction purposes. Quantities may change during the detailed design stage and should be re-evaluated at that time. The volumes and surface areas were computed based on the constructed state of the materials delineated by the design lines and grades presented on these drawings. They were not adjusted to account for losses or overlaps inherent to the construction methods and specifications, and were not inflated to include a contingency.

The final ground surface elevation at the ultimate dam toe is uncertain. The Lynx TDF cover is for the outer slope of the dam to its ultimate design crest elevation of 382.5 masl. Before progressive reclamation and construction of the Lynx TDF cover can begin, the base of the Lynx TDF dam must be constructed to its full extent. Existing fills or unsuitable native materials will need to be removed down to acceptable foundation materials within the ultimate dam footprint (i.e., outward to the projection of the outer dam slope on this “foundation” level), which is anticipated to be five to ten metres below the existing ground surface. The “foundation cut” will then be backfilled with compacted waste rock fill to the desired elevation to form the ultimate envelope of the dam

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http://edc01projects.amec.com/sites/p_NX10011/2016 Closure Design/Lynx TDF/PermitDesign/Report/Final/NX14001K.2 Lynx Cover Volume Letter FINAL_2016-12-16.docx

“Zone A”, and to the target “final ground surface” downstream of the dam, which may be higher or lower than the pre-existing ground surface. A small portion of the ultimate dam base north of Super Pond was already completed in 2015 as part of the dam foundation construction, and backfilled with dam fill to pre-existing ground surface levels. This foundation preparation operation does not apply to the dam’s East Arm, which is to be founded on existing waste rock fill and haul roads. The waste rock surface in this area at the time of dam construction may differ from that used for this permit level design.

Because the cover is to be constructed at the intersection of the final ground surface and the dam face, any modification to the final ground surface elevation will affect:

- The location of the cover toe;
- The length of the cover;
- The length and profile of the proposed cover toe infrastructure (drain, ditch and access road); and
- The volume of cut and/or fill required to construct the subgrade geometry of the proposed cover toe infrastructure.

Construction of the dam foundation to the desired elevation and associated regrading of the surrounding ground surface does not pertain to closure and was not included in Amec Foster Wheeler’s scope of work for the Lynx TDF dam face closure cover design. For this reason, cut and/or fill volumes required to form the subgrade of the proposed cover toe infrastructure were not included in this schedule of quantities, assuming that minimal reworking of existing surfaces will be required when the time comes to implement closure designs.

For the reasons discussed above, the following items were omitted from this Schedule of Quantities:

- Toe ditch and drain cut/fill volumes from subgrade up to the specified geometry and profile; and
- Access road cut/fill and re-grading of the existing ground towards the existing or proposed water management infrastructure outside of battery limits where applicable.

Materials related to the following Lynx TDF closure components were also omitted since their designs were outside of the battery limits:

- The concrete headwall or pipe drop structure at the confluence of the South and West Arm Ditches, and associated pipeline or channel for the clean and contact water options;
- The extension of the Lynx Springs Drain, hydraulic structure and pipelines;
- The extension of Lynx TDF dam foundation under drain into the existing shotcrete ditch;
- The contact water collection ditch along the East Arm Ditch at the toe of Waste Dump 1; and
- The Lynx TDF closure and interim spillways.

Table 1: Schedule of Quantities for the Lynx TDF Dam Face Closure Cover Design

Item #	Description	Quantity	Units
1	DAM CLOSURE COVER		
1.1	Select Quarry Run	34,300	m ³
1.2	Compacted Till	53,000	m ³
1.3	Growth Medium	22,300	m ³
1.4	Revegetated Surface	7.62	ha
2	WEST ARM DITCH (LENGTH 447 m)		
2.1	<u>Toe Ditch Fill and Liner Installation</u>		
2.1.1	Compacted Till	1,200	m ³
2.1.2	Textured 2 mm HDPE Liner	4,200	m ²
2.1.3	Heavyweight Geotextile Liner	4,200	m ²
2.1.4	Class 50 Riprap	1,600	m ³
2.1.5	Class 10 Riprap	400	m ³
2.1.6	Geotextile Below Class 10 Riprap	2,100	m ²
2.2	<u>West Arm Toe Drain</u>		
2.2.1	Liner Bedding Material	1,200	m ³
2.2.2	Textured 2 mm HDPE Liner	3,900	m ²
2.2.3	Clean Coarse Filter	2,600	m ³
2.2.4	Clean Drain Rock	700	m ³
2.2.5	Select Quarry Run	700	m ³
3	EAST ARM DITCH (LENGTH 267 m)		
3.1	<u>Toe Ditch Fill and Liner Installation</u>		
3.1.1	Compacted Till	700	m ³
3.1.2	Textured 2 mm HDPE Liner	2,500	m ²
3.1.3	Heavyweight Geotextile Liner	2,500	m ²
3.1.4	Class 50 Riprap	900	m ³
3.1.5	Class 10 Riprap	240	m ³
3.1.6	Geotextile Below Class 10 Riprap	1,300	m ²
3.2	<u>East Arm Toe Drain</u>		
3.2.1	Liner Bedding Material	700	m ³
3.2.2	Textured 2 mm HDPE Liner	2300	m ²
3.2.3	Clean Coarse Filter	1600	m ³
3.2.4	Clean Drain Rock	450	m ³
3.2.5	Select Quarry Run	400	m ³

Table 2: Schedule of Quantities for the Lynx TDF Dam Face Closure Cover Design (Cont'd)

Item #	Description	Quantity	Units
4	SOUTH ARM DITCH (LENGTH 264 m)		
4.1	<u>Toe Ditch Fill and Liner Installation</u>		
4.1.1	Compacted Till	700	m ³
4.1.2	Textured 2 mm HDPE Liner	2,500	m ²
4.1.3	Heavyweight Geotextile Liner	2,500	m ²
4.1.4	Class 50 Riprap	900	m ³
4.1.5	Class 10 Riprap	240	m ³
4.1.6	Geotextile Below Class 10 Riprap	1,300	m ²
4.2	<u>South Arm Toe Drain</u>		
4.2.1	Liner Bedding Material	900	m ³
4.2.2	Textured 2 mm HDPE Liner	2,900	m ²
4.2.3	Clean Coarse Filter	2,100	m ³
4.2.4	Clean Drain Rock	1,100	m ³
4.2.5	Select Quarry Run	600	m ³
5	ACCESS ROAD FILL		
5.1	Compacted Crushed Gravel (Rolling Surface)	1,900	m ³

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Yours truly,

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