NWB Tools

Richard Dwyer <richard.dwyer@nwb-oen.ca>

Agnico Eagle Meliadine Waste Rock Storage Facility 1 Design Report and Drawings

Sara Savoie <sara.savoie@agnicoeagle.com> Fri, Jan 3, 2020 at 12:24 PM
To: "sergey.kuflevskiy@nwb-oen.ca" <sergey.kuflevskiy@nwb-oen.ca>
Cc: "karen.kharatyan@nwb-oen.ca" <karen.kharatyan@nwb-oen.ca>, licensing <licensing@nwb-oen.ca>, Meliadine Environment Supervisors <meli.environment.supervisors@agnicoeagle.com>

Good afternoon Sergey,

I hope you've had a pleasant holiday season and I take this opportunity to wish you and NWB colleagues all the best for 2020.

You will find below Agnico Eagle's answers to the NWB/CIRNAC/KvIA questions on the WRSF1 design report and drawings. We remain available should any additional questions/clarification be needed.

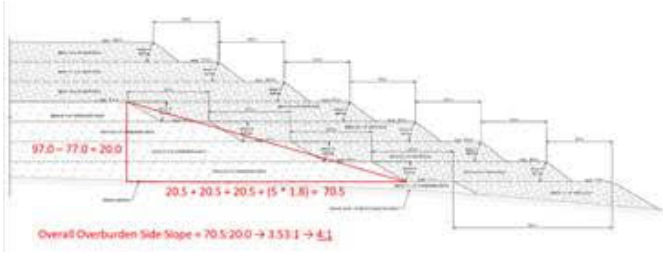
NWB

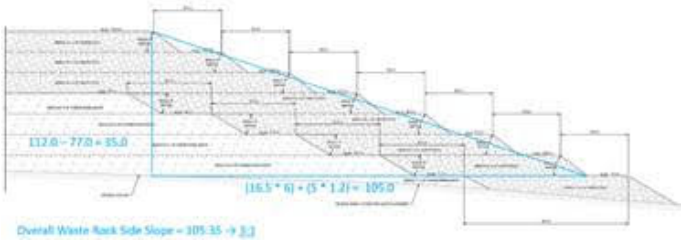
1. *Section 4.1.1 states that the overall footprint of the WRSF1 has reduced and, therefore, the total capacity has decreased from 9.4 Mm3 to 5.56 Mm3. However, it is unclear where the difference will be stored. Does this mean that the balance of the waste rock will be incorporated into the WRSF2 and WRSF3, or other measures will be implemented?*

Optimization of WRSF2 and WRSF3 configurations will occur during the detailed design stages of these facilities. AEM is confident that this optimization process will account for the balance of waste rock material from the diminished capacity of WRSF1 and no other measures are currently under consideration.

2. *Table 4 shows that the slopes for overburden and waste rock will be at 4:1 and 3:1, respectively. However, Section 5.2 provides different side slopes of 1.8:1 for overburden and 1.2:1 for the waste rock. Are these the dimensions before the modifications implemented to maximize the storage?*

As shown in the design drawings, WRSF1 will be built in a series of "benches", with each bench generally representing one "lift" of material of maximum 5.0 m height. Table 4 provides the overall multiple-bench side slopes for the overburden and waste rock within the WRSF (crest of top bench to toe of bottom bench) as shown below. Section 5.2 however, provides the assumed side slopes for the different material types for each individual "bench" or "lift" and are indicated on the design drawings as "angle of repose". The angle of repose values quoted in Section 5.2 reflect the angle of repose or friction angle values used in the stability analysis.





3. *Section 6 states that the "overburden benches to 77.0m and 82.0m will be placed to a maximum height of 2.5m", but the drawings still show these benches at a 5m thickness, and the 77 vs. 82 elevations are still 5 m apart. Is this just a typo and this statement was referring to 2.5m lifts that will be placed one on top of each other to ensure better freeze-back?*

As reflected in the design drawings, the stability and thermal analysis assumed that each bench will be placed to a maximum height of 5.0 m (one lift). After the analysis was conducted however, the Design Engineer (Tetra Tech) further recommended that overburden lifts be reduced to 2.5 m maximum height as an additional measure to promote freeze-back and enhance stability. Therefore, overburden benches 77.0 m and 82.0 will each be placed in two lifts of 2.5 m height, placed one on top of each other (no set-back).

4. *Section 7 has a reference to Channel 6 that will stream run-off from WRSF1 into the CP5. However, the NWB has no record of receiving the construction design and drawings for this item to date. When will this information be provided to the Board?*

Currently run-off from WRSF1 is directed to the CP5 catchment area via Channel5 only, with no design or construction having been completed for Channel6. However, AEM is currently reviewing water management requirements to support the associated infrastructure for the Tiriganiaq open pits. Detailed design reports and drawings for any additional water management structures, including the potential Channel6, will be submitted for approval 30-days prior to construction activities as per regulatory requirements.

CIRNAC

1. *CIRNAC recommends that AEM provides clarification on the rationale for not considering the expected freeze back in the waste material for the purpose of slope stability analysis.*

The stability analysis conducted by Tetra Tech shows that the calculated deterministic Factor of Safety (FoS) for all loading scenarios considered exceed industry standards given the assumption of unfrozen overburden and waste rock materials. This is considered a conservative approach, as freeze-back within these materials will increase the strength parameters, particularly cohesion, and increase the stability of the facility. As the waste rock facilities are categorized by AEM as “high risk” infrastructure, due to the proximity of operational facilities during the life of mine and the permanent nature of the structures, this more conservative design is believed appropriate.

2. *Section 4.3 states “the thermal model will be verified and refined on a periodic basis throughout the life span of the WRSF, as ground/waste temperature monitoring data and as-built information becomes available.” CIRNAC recommends the frequency the thermal model is verified and refined by AEM is specified.*

Rather than provide a set and rigid frequency for refinement of the thermal model, AEM will assume an adaptive management approach to thermal conditions and update the model if and when required by observed behavior and measurements. For example, as discussed in the thermal analysis memorandum provided in Appendix B of the submission, the thermal analysis will be updated if the placement plan for the overburden waste for benches 77.0 m and 82.0 m differs significantly from the plan simulated in the

analysis. Verification of the thermal model, by monitoring and analysis of the ground temperatures, will occur monthly during the first year after installation of a thermistor, then on a quarterly basis. It is expected that any considerable deviation of the expected temperatures within the waste materials and underlying ground, particularly in the layer of ice-rich silt within the foundation materials, will trigger an evaluation of the actual thermal performance and re-calibration of the model.

3. *It is unclear to CIRNAC what sections of the design criteria and corresponding assumptions will be reviewed during the quality control. CIRNAC recommends that AEM provides a QA/QC template, indicating the design parameters to be verified, for future clarification.*

As discussed in Section 5.3, the quality control plan will be developed and included as part of the Operation, Maintenance and Surveillance (OMS) manual for the WRSF, and will include regular monitoring of ground/waste temperatures and ARD/ML testing. Other parameters that are expected to be assessed as part of the QA/QC plan include pore water salinity of the waste materials, in addition to assessments of specific design criteria such as adequate snow removal prior to placement, bench set-back distances and overall slope angles. The OMS manual is anticipated to be completed in early 2020, after a risk assessment for the facility has been conducted.

KvIA

1. *The KvIA would recommend that AEM moves towards an Adaptive Management Plan (AMP) for WRSF1. The AMP should put in place specific mitigation measures and associated management actions to be taken when specific thresholds are exceeded for the stability, deformation, seepage and permafrost degradation.*

As discussed above, AEM is currently developing the OMS for the waste rock facilities, with this manual expected to be completed in early 2020. The OMS is a risk-based management document based on and will incorporate specific thresholds and associated mitigations. Adaptative management strategies will be included in the OMS.

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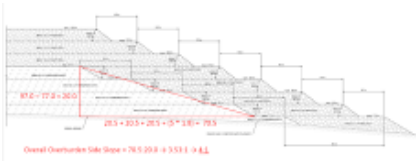
2 attachments



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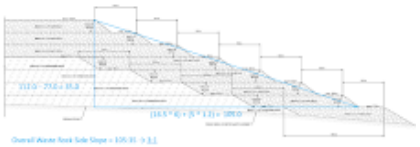

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