

December 19th, 2012

Mr. Dominique Girard, P. Eng.
General Manager
Agnico – Eagle Mines, Meadowbank Division
Baker Lake Office

Email: dominique.girard@agnico-eagle.com

Dear Mr. Girard,

**Report No 13
Meadowbank Mine Dike Review Board
Telephone/Webex Conference December 19, 2012**

1.0 INTRODUCTION

The conference call with the Dike Review Board was held on December 19th. The Board is now comprised of three members, Mr. D. W. Hayley, Dr. N. R. Morgenstern and Mr. D. A. Rattue. All three members participated in the call.

The objectives were to review the progress of the detailed design for the Vault Dike. This structure is on a fast track with construction set to begin in February 2013. The activities covered those outlined in the agenda which is included as Attachment A. The list of participants is given in Attachment B.

In the report which follows, the Board's recommendations are underlined.

2.0 PRESENTATIONS

Presentations, assisted by Webex transmission of the PowerPoint images, were made by personnel from Agnico-Eagle Mines (AEM) and SNC-Lavalin Inc. (SLI). These included an overview of the project, the design criteria, the site investigations for the Vault Dike and the results of studies and design for the dike.

The site investigations were conducted in November and December of 2012, and consisted of percussion soundings with a primary objective of establishing the bedrock profile. Three thermistor strings were installed, one on the left abutment and two in the stream bed.

The analytical work included thermal analyses and slope stability analyses.

3.0 COMMENTS BY THE MEADOWBANK DIKE REVIEW BOARD

3.1 Design parameters

The dike classification and the design parameters are appropriate for the type and scale of structure as well as for the limited planned life cycle.

3.2 Site investigations

The investigations were limited in scope, insofar as type of equipment was concerned, with little sampling of the overburden material being possible given the use of percussion drills. Some difficulty was apparently experienced during the installation of the thermistors, perhaps as a result of hole caving which is not uncommon in non-cohesive soils when air powered drill rigs are used. Nevertheless, the primary objectives of the programme were realized. As will be mentioned later, the Board sees a need to perform additional instrument installations immediately prior to the start of construction.

3.3 Stability analyses

Not surprisingly, given the low height and wide footprint, the analyses showed that static and pseudo-static minimum Factors of Safety were achieved for all the cases presented. The Board has no further comments in this regard.

3.4 Thermal analyses

The Board is of the opinion that the thermal analyses were well performed and pertinent to the work in hand. The results not only contributed to the interpretation of the measurements made by the thermistor strings but also permitted ideas to be advanced concerning the construction phases and eventual dike performance. The limited duration of temperature readings since the installations in December do not, by themselves, permit an understanding of the annual cycle of temperatures in the foundation, and particularly in the streambed. The TEMP/W simulations have made a significant contribution in this regard.

The analyses indicate that by constructing the dike in winter and by opening the cut-off trench as early as possible, frozen conditions should be sufficiently well established in the base of the dike to ensure seepage control.

3.5 Dike cross-section

The dike cross-section is conventional and follows precedent gained from other structures at the Meadowbank mine site.

A comparison of thermosyphon freezing and bituminous geomembrane for the creation of the impervious barrier demonstrated a preference for the latter.

Foundation preparation will consist of the removal of ice and snow followed by the excavation, aided by blasting, of a cut-off trench to bedrock.

The Board finds this to be a satisfactory approach for winter work but suggests that well graded, dense, ice poor till as has been encountered elsewhere at the site could also constitute an acceptable foundation. Beneath the extent of the geomembrane, any extensive ground ice should be removed even beyond the nominal width of the key trench. The Board recommends that additional thermistors be installed in advance of construction to assist with decision making process on the required depth of excavation, and to corroborate the simulation of the ground temperature regime.

If no suitable source of till is available, the Board concurs with the use of the bentonite amended 0-20 mm crushed stone as a material in which to anchor the geomembrane. AEM has experience with the use of such material. The Board suggests that the full width of the key trench at the base be backfilled with this material rather than attempting to place several different materials, given the anticipated difficult winter working conditions.

Given the low head, the Board concurs with the idea to place the geomembrane in horizontal bands rather than vertical as would normally be the placing configuration. The quality control for the first (lower) welded joint should be more stringent than subsequent joints which will be located in the freeboard area.

The Board is of the opinion that the pump well shown on the drawing may not be the most appropriate means to control seepage. It is inevitable that the bottom of the dike will become saturated and freezing may be inhibited if warmer water is drawn into the base of the fill by the pump. It is suggested that seepage be controlled at the downstream toe as a first measure with bedrock grouting as a contingency. However, it is believed that seepage quantities will be manageable and that freeze-back will occur in short order.

3.6 Construction management

The organigram presented shows that AEM will take the lead on construction management with various QC and QA services supplied by Inspec-Sol and SLI respectively. This follows the practice established for the central dike construction. Foundation acceptance and field design modifications will be made jointly by AEM and SLI. The Board is in agreement with this approach.

4.0 CONCLUSIONS

The Board is satisfied that the detailed design has advanced to a stage that permits specifications and construction drawings to be prepared, and construction to begin as scheduled. The construction will not be the first to have been carried out in winter conditions at Meadowbank but the Board would like to reiterate that greater diligence is required to ensure that the spirit and the letter of the specifications will be met and that any field design modifications are accomplished in a timely manner.

5.0 ACKNOWLEDGMENTS

The Board wishes to thank the personnel of AEM and SLI for their presentations. The Webex format permitted an efficient sharing of information.

Signed:



Norbert R. Morgenstern, P.Eng.



Don W. Hayley, P.Eng.



D. Anthony Rattue, P.Eng.

ATTACHMENT A

AGENDA FOR BOARD MEETING NO. 13

December 19th, 2012

Agnico-Eagle Mines-Meadowbank Division

Meadowbank Dike Review Board

Meeting # 13 – December 19, 2012

Webex conference call

AGENDA

Wednesday, November 19

Webex conference call, start at 8:00 am Central Time

8h00	Connections to Webex
8h05	Welcome and Review of the Agenda - AEM
8h15	Vault project Update - AEM
8h30	Vault dike investigation - SNC
9h00	Vault dike design - SNC
9h45	Vault dike – QA/QC and construction schedule - AEM
10h15	Comments from the board
11h00	Closure

ATTACHMENT B

PARTICIPATION AT DECEMBER 2012 CONFERENCE CALL

Participants		
Thomas Lepine	AEM	
Erica Voyer	AEM	
Simon Grenier	SNC-Lavalin Inc	
Yohan Jalbert	SNC-Lavalin Inc	
Jean-Francois St-Laurent	SNC-Lavalin Inc	
Don Hayley	EBA	Dike Review Board
Norbert Morgenstern	Self	Dike Review Board
Anthony Rattue	SNC Lavalin	Dike Review Board