Appendix A3

Independent Geotechnical Expert Review Panel 2009 Reports

Report No.2 – February 10, 2009

Report No.3 – June 18, 2009

AEM Response to Report No.3

Report No.4 – August 19, 2009

AEM Response to Report No.4

February 10, 2009

Mr. Dennis Gourde, P.Eng.
General Manager
Agnico – Eagle Meadowbank Division
Baker Lake Office

Email: denis.gourde@agnico-eagle.com

Dear Mr. Gourde,

Re: Meadowbank Dike Review Board (MDRB)
Report No. 2

1.0 INTRODUCTION

The second meeting of the MDRB was convened in Vancouver on January 8-9, 2009. All three Board members were in attendance. The agenda for the meeting is enclosed as Attachment A. The sequence of the meeting followed the agenda closely.

The objectives of the meeting were as follows:

- to review progress with the completion of the East Dike
- to be briefed on water management and the east pool dewatering
- to review the design status of the Bay Goose dike
- to review the design status of the Stormwater and Saddle dikes
- to review the design status of the Central Dike.

To assist the MDRB in the conduct of its work, the following documents were issued either prior or at the meeting:

i) AEM, 2009. Documents for presentation, Meeting No. 2, January 8-9, 2009.
ii) Golder Associates Ltd. 2008. Report on Tailings Storage Facility, Dike Design, Meadowbank Gold Project, December.
iii) Golder Associates Ltd. 200. Bay-Goose Dike and South Camp Designs, Meadowbank Gold Project, Nunavut, December.
iv) Golder Associates Ltd. Control of Suspended Solids at Second and Third Portage Lakes – Construction of East, South Camp and Bay-Goose Dikes, Meadowbank Gold Project, Nunavut, December. (draft)

DESIGN REPORT

Project staff was debriefed by the MDRB in the afternoon of January 9. A draft of this report was submitted for review on February 10, 2009 and the final version was transmitted on March 6, 2009.

The next meeting of the MDRB is planned for June 12 in Vancouver in order to review final design documents. This meeting is to be confirmed by AEM.

2.0 RESPONSE TO REPORTS No. 1 and 1A

AEM have responded effectively to all issues identified in MDRB Reports Nos. 1 and 1A, either by their actions and/or further discussion at this meeting. There are no outstanding issues.

3.0 EAST DIKE

Past involvement in the design and construction of the East Dike by the MDRB is summarized in Report No. 1, submitted on November 26, 2008; Report No. 1A, submitted by Dr. A. Robertson on November 26 and a teleconference discussing grouting procedures with AEM and Golder staff on December 5.

At this time, dewatering is now planned for March, 2009 indicating a slippage of about three months, compared with the plan last fall. March dewatering is the final date that respects the current business plan.

Since December 5 the primary focus has been in advancing the rock grouting. Casing has been systematically installed to tertiary spacing (1.5 m). Three stages of rock grouting are envisaged, followed by Stage 4, contact grouting through a perforated casing. Based on field trials this appears to be the only practical way forward.

Bedrock grouting is advancing in an effective manner. Procedures are well-defined and monitoring is to a high level. Based on records presented to the MDRB, performance appears good. On a matter of detail, Stage 3 procedure needs to be reviewed with respect to P_{max} and recording the pressure when the volume cutoff is reached, in order to aid interpretation. The MDRB is not convinced that the proposed closure grout criterion is any better than simply plotting the flowrate/time relation in a linearized form and judging that outcome. The MDRB is content that bedrock grouting will be effective as planned and its completion is not critical to the schedule.

However, the contact grouting is a critical element and at this stage it relies on an unproven procedure. The MDRB notes that the perforation will be a slot with variable efficiency. Before fixing procedures, trials are needed. Higher pressures than currently being considered may be appropriate. The MDRB also recommends the consideration of thinner mixes for the contact

grouting. Experimental support optimizing the slot characteristics with the grout mix is needed before procedures can be detailed with confidence.

While contact grouting remains a high priority, confidence in the outcome cannot be assured at this time. While the MDRB supports the completion schedule as proposed, it reminds AEM that a residual risk will remain due to potential erodability in the contact zone and the soil bentonite wall. The primary defence in the design is low gradient. The maximum head across the cutoff wall is 7 m. Secondary contact grouting will be as good as practical within the scheduled time available, but it will be based upon unproven procedures.

4.0 EAST POOL DEWATERING

To accommodate a revised mine plan which increases tailings production to 8500 t/day and life of mine storage requirements to 29.3 Mt, AEM have modified mining and construction within the area occupied by the pool contained by the East Dike. The revised construction requirements impose physical and schedule constraints on pool dewatering. Dike design and construction is addressed in Sections 6 and 7 of this report. In this section dewatering, and water and tailings management aspects of East Pool are reviewed.

The pool contained by the East Dike must be dewatered to permit the construction of:

i) the Starter Divider Dike (identified as the Stormwater Dike in permitting documents), which forms the North Cell of the tailings impoundment;

ii) the Starter Central Dike which forms the South Cell of the tailings impoundment; and

iii) mining of Portage Pit.

The total dewatering volume from East Pool is reported to be 15.3 Mm^3. Of this quantity AEM have assumed that 60% (9.2 Mm^3) will meet discharge TSS criteria and can be discharged directly to Portage Lake and that 40% (6.1 Mm^3) will require TSS management. The stage at which dewatering will exceed TSS discharge concentrations depends on the geometry of the lake shorelines that develop, sediments on these shorelines (and their settling characteristics) and the season - with spring breakup, with high surface flow rates, being a period of particular concern. The 60/40 split is understood to be a value obtained from Diavik experience for which the site conditions may not be equivalent to those at East Pool. The Board recommends that the water management plan and schedule consider potential variation from this split and that contingency management be provided.

Stage 1 – Dewatering to 127 masl and Starter Divider Dike Construction Initiation:

The volume of dewatering required to reduce the East Pool elevation from 133.43 masl to the base of Divider Dike at 127 masl is 6.8 Mm^3.

Dewatering is planned to start March 1, 2009, using three pumps with a capacity of 60,000 m^3/day discharging to Third Portage Lake (3PL) and to continue while the outlet to 3PL

is ice blocked. It is anticipated that 5.5 Mm^3 can be discharged in this manner by May 31. The balance of 1.3 Mm^3 will be evacuated after spring breakup and is scheduled for completion by July 13. The Board notes that the dewatering schedule is constrained with regard to pumping capacity. Further, that during and following spring breakup the potential for TSS concentrations in the East Pond will be high due to the potential for sediment erosion from the exposed lake bottom at lake edges. If dewatering is done from only the south of the sill, on which the Divider Dike will be constructed, there will be high erosive flows over this sill, increasing the potential for TSS. Consideration should be given to:

i) increasing pumping capacity to maximize the amount of dewatering that can be achieved prior to the spring breakup after which erosion potential of exposed lake shores and TSS generation is greatly increased;

ii) pumping from both north and south of the sill at rates which would limit the cross sill flow that could increase erosion.

During the first three months of dewatering to 127 masl most of the downstream slope of East Dike will be exposed. During this period the East Dike will be monitored for performance. The Board is in agreement with the dike instrumentation that has been proposed by Golder Associates (GAL) and AEM for general performance monitoring. However, this array of instruments may not be adequate to locate discrete sources of leakage. Monitoring should include:

i) careful maintenance of the most precise measurement of inflow/outflow and change in storage calculations that can reasonably be achieved;

ii) under-ice visual inspection of water in the vicinity of the toe of the dike for turbidity and signs of internal erosion or piping

iii) evaluate heat pulse instrumentation to determine if it can be implemented in time.

iv) once the downstream toe is exposed, direct seepage monitoring, and potentially remediation, becomes practical.

The Board observes that there is significant risk of dike seepage during the approximately three months of dewatering but considers it acceptable to proceed.

Subsequent Stages:

Following on the Stage 1 dewatering, dewatering will continue to 116 masl to allow Portage pit mining. This requires removal of about 6.1 Mm^3. This elevation also exposes the foundation for the Central Dike. It is anticipated that of this 2.3 Mm3 will not require TSS control and the balance will be treated over 133 days in an Optional Treatment plant at 24,900 m^3/day. Additional dewatering (3.1 Mm^3) of the remainder of the East Pool south cell will occur subsequent to that date prior to tailings placement in the South Cell in 2004.

Stage 1 construction of the Starter Divider Dike has total storage capacity of 4.5Mm^3. Stage 2 construction increases capacity and there is some capacity to temporarily store and clarify dewatering water. The potential to increase capacity could be developed to provide a water management clarification pond.

The Board urges AEM/GAL to advance with greater clarity the water management for subsequent stages which is necessary to establish dike design criteria, capacity, scheduling of raises, need for final height.

Board places emphasis on contingency planning by simple means such as ensuring that the Divider Dike is designed for water storage and has an appropriate maximum capacity.

With regard to tailings distribution and discharge management the Board recommends:

i) Careful consideration be given to tailings distribution/winter operation etc.

ii) Access along all tailings lines is required with redundant discharge lines to ensure that contingencies or mitigation measures are available for frozen lines.

iii) Recognize that glaciation and ice accumulation in beaches reduces average tailings densities and adopt a discharge system to minimize ice entrainment.

5.0 BAY-GOOSE AND SOUTH DIKES

To accommodate the revised current mine plan in which the south end of Potage Pit and Goose Island Pits have been modified and to optimize the dike depths and costs, there has been a revision to the alignment of the Bay Zone and Goose Island dikes. However, the minimum setback distance of 70 m from pit crest to toe of dikes has been maintained.

AEM and its consultants are in the process of final design based on additional bathymetric and other information that has been gathered and relies on obtaining yet further geotechnical information along the dike alignment for completion. The Board does not anticipate any substantive changes from this next campaign of investigation and approves of the design as proposed with the following comments for consideration:

a) South Dike – this is a simple structure of acceptable design and winter construction should be maximized to reduce potential of turbidity in adjacent lakes.

b) Bay-Goose Dike

   i) Design criteria are similar to those for East Dike and are therefore accepted

   ii) Minor design changes that have been made from the original layout and design result in improved constructability

   iii) Both SB and cement-bentonite (CB) cut-off walls are being considered and for “Shallow” depths :

- the final choice will be dependent on the East Dike performance observed during dewatering, and
- AEM will proceed to bid on both types with the final decision to made after the East Dike experience and additional geotechnical drill information is evaluated.

iv) For the "Medium" depth cut-off:

- Board agrees that cut-off should be CB (cement-bentonite) or CSB (cement-soil-bentonite)
- Board prefers cut-off taken to rock
- Board recommends GAL evaluate alternative methods for cut-off construction, including:
  - Long stick excavation
  - Bauer DSM (deep soil mixing)

v) The schedule for construction needs evaluation with particular review of the crusher capacity and camp constraints.

vi) The Board agrees that more geotechnical data is needed for optimization and support of contractor bids but is of the opinion that the program, as proposed, can be reduced to fit schedule constraints. It recommends that consideration be given to sonic coring to expedite completion.

vii) The Board was advised of measures proposed by AEM to improve turbidity control practice and suggests that consideration be given to consultation of an additional expert in turbidity control.

viii) Board accepts setback as per GAL analyses but requests AEM summary of implementation of recommendations with respect to mapping monitoring, drainage, depressurization, and TARP

ix) Board is concerned regarding air flush drilling in setting of casing for grouting and the potential for damage to the cut-off wall if air pressures cause breakout to the adjacent high permeability fill. It recommends a change to this practice; or that a test/evaluation program be completed to demonstrate that damage is not occurring.

6.0 STORMWATER (DIVIDER) DIKE

6.1 New Function

At the time of the first meeting, the Board was advised of the possible change in the role of the Stormwater Dike for reasons of schedule and dewatering constraints as outlined above in Section 4. This change is now confirmed and design changes have been required.

Essentially the location remains the same with minor alignment adjustment to suit the recent bathymetrical data.

Whereas the previous design called for an impermeable membrane on the south side to retain tailings water and prevent the contamination of run-off collected in the north basin, the new function requires that tailings be stored, at least initially in the north basin. Consequently, the impermeable element of the dike has been transferred from the south face to the north face.

6.2 Design Criteria

The Stormwater Dike shares the same basic design criteria as the central dike and the saddle dikes. In some respects, this dike can be considered as a temporary structure as it will eventually be buried within the tailings deposit. However, until completion of the Central Dike, it will retain water and tailings which would otherwise enter the Portage pit. For a period of time it will also separate tailings and supernatant water from the water which could be pumped to the lake without chemical treatment.

The Board is of the opinion that the design criteria (other than long term closure aspects) should be consistent with those of the Central Dike. In addition, there is a need to consider the potential ice loading on the thin geomembrane which constitutes the impermeable barrier. This loading is derived from:

- Impact of floating ice sheets;
- Thrust from expanding ice;
- Drag of cover material during changes in the pond elevation (upward or downward).

6.3 Design

The Board concurs with the design as proposed, that is a rockfill embankment with transition zone(s) and an impermeable liner. The upstream slope has been flattened to 1V:3H to facilitate construction of the transition layers and liner placement. However, the Board questions the lack of a fine filter beneath the liner. It is also noted that the specification calls for the rockfill to be placed in 3m layers with only nominal compaction by the hauling equipment.

At the present time, a Coletanche bitumen based liner is proposed. These liners, relatively robust for installation, have more limited extensibility than HDPE or PVC liners and adequate support is essential. Foundation conditions, rockfill selection and placement, need for compaction, gradation of transition zones and prevention of segregation must all be considered prior to making the final selection.

The liner will be keyed into a trench taken to rock at the upstream (north) toe of the embankment. The depth of overburden to be excavated could exceed 8m (thickness at borehole 02GT-07). Additional investigations are proposed and this is appropriate. The rock will be grouted, which poses no major problem in the talik area but permafrost at the abutments will have to be taken into account. For reasons of thermal stability, it may be of interest to explore the possibility of locating the cut-off beneath the embankment rather than at the toe. Tailings deposition strategy and the pond location also merit detailed analysis to:

- Reduce water (and ice) against the liner;
- To improve thermal stability;
- To facilitate access to pipelines and spigot points during winter operation.

It is appreciated that spigotting from the north will increase potential tailings capacity but the other considerations may influence the final strategy.

6.4 Construction Staging

The initial crest elevation, and the timing and height of subsequent raises should be clearly spelled out in the design report and operations manual. Pond capacity for tailings and water management roles has to be considered. A freeboard of 1m above tailings/pond is provided. This may be only just adequate to prevent wave overtopping if water is ponded against the dike in the period immediately prior to dike raising.

7.0 CENTRAL DIKE

While the general location and dike type are unchanged from the version presented at the previous meeting, bathymetric data, geotechnical conditions and the Portage pit geometry have led to design changes. The alignment at the East (left) abutment has moved upstream. A flatter upstream slope is also included for this dike, again for reasons of constructability.

Further exploration is proposed in the vicinity of the toe to optimize the cut-off and liner tie-in to bedrock. A central location is also still under consideration though this may imply the use of a diaphragm wall cut-off.

As for the other structures the potential impact of ice loading should be included in the design criteria.

As this dike is the primary structure for the retention, in perpetuity, of the tailings, it is recommended that the earthquake return period for seismic design be revised to reflect practice elsewhere. A return period of 10,000 yrs has been adopted in other jurisdictions for mine closure and would be considered good practice. In an area of low seismic activity this approach may not imply any significant impact on the design.

To advance the final design, the Board recommends the following actions:

- Clarify the construction staging with respect to the water/tailings containment;
- Review the application of Coletanche liner. As mentioned for the Stormwater dike, the adequate support of the liner is paramount. This will dictate the specifications for foundation acceptance, for the construction materials, thickness of filters, and the degree of compaction. The adverse slope of the foundation from downstream to upstream will lead to the ponding of run-off and seepage water in the embankment. An upstream weighting zone is foreseen to counteract the hydrostatic uplift on the liner but consideration must also be given to the effect of submergence on the supporting rockfill below the liner (particle breakage, increased settlement and fines migration even without water flow).

- The upstream slope of the foundation will also complicate the dewatering required during cut-off trench excavation, foundation preparation, and liner placement, until such time as the weighting zone is placed. There may be a need to provide more space between the toe of the upstream slope and the cut-off trench to position dewatering sumps. The pump operation may be required even after liner installation and a detail should be provided for liner sealing around such sumps and the subsequent grouting of the same.
- The fine filter is specified as having a maximum particle size of 80mm and a fines (<0.08 mm) content of 5-8%. To ensure minimal damage to the liner, the maximum size could be reviewed with possible reduction to 56 mm. The fines content has been selected by analogy with concrete faced rockfill dams (CFRD). The semi-pervious nature of this material would indeed reduce flow and the transport of tailings in the event of liner puncture but consideration should be given to the construction aspects. The upstream slope of a CFRD is usually protected from rainfall erosion prior to construction of the facing. A bituminous emulsion spray or extruded concrete curbs are used for this application.

The Board supports the proposal for additional investigations and studies, and looks forward to the opportunity to review the detailed design at a later date.

8.0 SADDLE DIKES

The saddle dikes (SD-1 to SD-6) are required to complete the enclosure of the tailings storage facility. Their design cross-sections are similar to those of the Stormwater and Central dikes insofar as rockfill embankments are sealed with impermeable membranes anchored into a cut-off trench at the upstream toe. It is planned to take this trench down to rock but grouting will not be feasible due to the frozen ground (permafrost). The presence of water and/or tailings may lead to long term degradation of the frozen barrier and remedial grouting is considered a possibility with drilling through the tailings beach.

Consideration should be given to any benefit that may arise from the location of the cut-off beneath the embankment instead of at the toe and also from the tailings deposition pattern to minimize the period of open water against the dikes.

The issues raised for the Stormwater dike and the Central dike with respect to ice loading on the liner and earthquake criterion for closure are also applicable for these structures.

Boreholes in the vicinity of the Stormwater dike abutments indicate that overburden thicknesses may be small for the saddle dikes but the planned additional investigations are appropriate.

9.0 ADDITIONAL COMMENTS

The Board again wishes to note that the construction activities in 2009 will take place on several fronts and with intensity not less than that of 2008. The need for close supervision of the work which is critical to ensure good performance cannot be overemphasized. Adaptation of designs to the exposed foundation conditions is to be expected and must be accomplished in a timely manner. AEM will be going out to tender for the 2009 work and the requirement for good collaboration with the eventual contractor must be clearly stated and encouraged through the appropriate contractual conditions.

In addition, a few items were noted in the specifications included with the TSF dike design report which may warrant review. These are:

1. The responsibility of the "Owner" for foundation preparation and embankment and the "Contractor" for the filters and liner installation leads one to wonder how responsibility for performance is to be established.
2. The excavation of the cut-off trench and the placing of the concrete mat is the responsibility of the "Contractor". It should be clear that the "Owner" is not responsible for foundation preparation in this instance.
3. The maximum depth for grout hole drilling of 50m is inconsistent with the planned treatment of the Second Portage Fault down to 100m. (It is interesting to note that the use of "air flush" is prohibited by the specification but an air powered down-the-hole hammer was used at the East Dike)
4. The instrumentation section does not include a specification for the piezometer cables though direct burial and water block cable is required for the thermistors.
5. The data acquisition section makes no mention of back-up power nor whether radio communication is required for remote interrogation, reading frequency adjustment and alarm capability.

10. FUTURE MEETINGS

1. Design review meeting in June, according to progress with studies and tender packages. Review of behaviour during dewatering of the East dike also on the agenda. Location - probably Vancouver.
2. Site visit in July (20-24 to be confirmed). It is anticipated that the foundation of the Stormwater dike will be exposed and that work will be underway on the Bay-Goose dikes.

11.0 ACKNOWLEDGEMENTS

The Board again wishes to thank the staff of both AEM and Golder Associates for the informative presentations during the course of the meetings and to all participants for their valuable contribution to the discussions.

Norbert R. Morgenstern, P.Eng

D. Anthony Rattue, P.Eng.

Andrew M. Robertson, P. Eng.

ATTACHMENT A

AGENDA FOR BOARD MEETING NO. 2

JANUARY 8-9, 2009

AGNICO EAGLE

MEADOWBANK

VANCOUVER MEETING

JANUARY 8-9, 2008

Attendance		
Gaston Blanchette	AEM	Dike Engineer
Larry Connell	AEM	Reg. Manager Environment & Govt.
Denis Gourde	AEM	General Manager
Stephane Robert	AEM	Environment Superintendent
Cameron Clayton	Golder	
John Cunning	Golder	Senior Technical Review
Fiona Esford	Golder	
Nicholas Lauzon	Golder	
Ben Wickland	Golder	Dike Design
Norbert Morgenstern	Self	Dike Review Board
Anthony Rattue	SNC Lavalin	Dike Review Board
Andrew Robertson	Robertson Geoconsultants	Dike Review Board

June 18, 2009

Mr. Dennis Gourde, P.Eng.
General Manager
Agnico – Eagle Meadowbank Division
Baker Lake Office

Email: denis.gourde@agnico-eagle.com

Dear Mr. Gourde,

Report No 3
Meadowbank Mine Dike Review Board
Meeting June 12, 2009

1. INTRODUCTION

The dike review meeting was convened, as planned, to discuss the status of the design for the Bay Goose dike and the Tailings Storage Facility. In addition, the remedial grouting of the East Dike, required during the initial dewatering of the west arm of Second Portage Lake, merited attention. The As-Built report of the East Dike construction was also available and a presentation of the subject matter, including the lessons learnt, was made during the course of the meeting.

The discussions on the remedial grouting followed on from a telephone conference call held on May 29th. All three Board members participated in the conference call and were present at the June 12th meeting.

Prior to the meeting, information packages were sent out, either in electronic or hard copy format. The packages included the East Dike As-Built report and drawings, the Bay-Goose design drawings and specifications as released for tender, and the latest progress drawings for the Tailings Storage Facility. Additional hand-outs were supplied during the course of the meeting to include the PowerPoint presentations.

2. RESPONSE TO REPORT No 2

The items raised during previous discussions and included in the MDRB report no 2, have been addressed or are being considered in the ongoing design and construction work. The Board is content with the responses given by Agnico Eagle Mines (AEM) and their Engineering Consultants, Golder Associates Limited (GAL).

3. TECHNICAL COMENTARY

3.1 East dike

On May 19th, during the initial dewatering of the west arm of Second Portage Lake, anomalous piezometer readings were noted at stations 60+450 and 60+490. The drawdown rate for continuous pumping at 60,000 m3/day also dramatically reduced, indicating that significant seepage had initiated through or beneath the dike. There were pre-cursor indications of changed conditions by way of temperature changes in the piezometers (May 17th). In addition this event followed the opening of the outlet of Second Portage Lake, previously controlled by ice cover.

AEM and GAL reacted in a timely manner by immediately setting up a task force to address the issue, and take remedial actions that were appropriate, well executed, and effective. This has permitted drawdown to proceed at a rate consistent with schedule requirements, albeit by employing additional pumping capacity. It should be noted that the onset of the freshet had increased the quantity of water which had to be handled to achieve the drawdown.

The remedial actions consisted of grouting the upper part of the bedrock and also the cut-off/bedrock contact between stations 60+448 and 60+520. The grout holes were drilled immediately upstream of the cut-off with a final average spacing of 3.0 m. The grouting work was carried out by the original sub-contractor (TCG) who was able to re-mobilize the equipment and team at short notice, and was directed by GAL personnel.

Type 30 and micro-fine cement, together with superplastifier, thixotropic and anti-washout additives, were employed for the grouting.

As mentioned above, the work was apparently effective as dewatering has continued; however, a number of questions remain. It is noted that a reduction in the piezometric levels was recorded after the start of drilling but before the first grout injection; which implies a movement of material during drilling to block the main conductor and reduce flow. Little reduction of piezometric levels was observed during grouting. Therefore, it cannot be concluded that the grouting blocked or sealed the flow path.

As yet, there is no definitive explanation for the leak which may be the result of either inadequate prior grouting or the erosion of joint filling which was not groutable. Current data suggests that rock grouting is performing as intended but, the contact grouting performance is difficult to evaluate and we await direct seepage measurements following drawdown. The Board recommends implementation of a seepage measurement system at the downstream toe of the dike to locate the source of residual leakage and to enable monitoring of evolution of the flow rates. The Board looks forward to inspecting the downstream area below the East Dike in July.

The potential for further leaks should be recognized and therefore, the Board recommends development of a ‘contingency leak management plan’ to be incorporated in the OMS – Dike Manual (equipment, supplies, procedures, people ….)

The Board was pleased to learn that, at least in the short term, grouting equipment for on-going construction work will remain on site; but there should be an evaluation of long-term needs.

There is a need to understand AEM's capacity for long term seepage management in the search for cost effective solutions for not only the East Dike but in the selection of foundation treatment for the other water retaining structures.

3.2 East dike; As-Built report and drawings

The Board notes that very through documentation of the construction activities has been prepared which will be of value for evaluating the performance of the dike and also for refining the design and construction of the future structures. However, a number of additional details could be added to the final version including, for example, the dynamic compaction grid pattern and number of drops, which are not described.. This information will be of value in the comparison of the techniques to be proposed by the contractor for the next stage of construction.

3.3 Bay – Goose Dike Design

The Board was pleasantly surprised to learn of the large amount of investigation work that was accomplished over the winter period and concludes that adequate information is now available for the final design of the North Side. Additional investigation is proposed for the South side and the Board concurs with this need due to the extra depth to bedrock and the apparent presence of soft deposits. The exploration work, with a preponderance of percussion drilling, has yielded valuable data on rock levels but little information on the overburden characteristics.

Interpretation of the results indicates 5 m of lake bed sediments on axis B-B' in the north sector, which establishes a need for more detailed information before start-up (if practical) and a management plan (stability issues, mud wave issues, turbidity issues). It is planned that the cut-off be taken to bedrock in the north sector so design of the cut-off in this area will not be affected. However, in order to complete the design in the south sector, where a partial cut-off is an option being considered, additional characterisation is required. The Board wishes to emphasise that the adoption of a partial cut-off is a significant departure from the design concepts being adopted elsewhere in the dike designs. In order to justify this proposal it is essential that continuous coring, to the degree practical, be obtained over the interval from the base of the proposed cut-off to the bedrock. The identification of local conductive layers, such as gravel seams is important.

The Board notes that rock hydraulic conductivity appears to be greater than at the East Dike and may make grouting more of a challenge.

For both sectors of the dike, a cement-soil-bentonite slurry cut-off wall is proposed for all sections where the bedrock surface is more than 8 m below the lake level (i.e. below elevation 125 m). The concept is to place the CSB up to elevation 127 m followed by soil-bentonite (SB) to the top of the cut-off wall. The Board seeks clarification of procedures to achieve a clean CSB/SB interface, following discussions between AEM and the contractor.

GAL is aware of the increased depths of fill requiring dynamic compaction as compared to depths at the East Dike, and the Board seeks clarification as to the planned methods of execution and in-situ validation of effective densification to full depth.

In view of the greater depths, and in light of the possibility of leaks developing despite diligent foundation treatment work, the Board recommends consideration of a downstream filter blanket beneath rockfill in deep sections as an additional line of defence against piping.

Furthermore, the Board suggests review of the alignment detail on the north side of Goose Island that currently incorporates an abutment location which would necessitate dealing with frozen ground.

Further discussion on design details is anticipated for the July site visit.

The Board is content with staging of the Bay-Goose construction and the interface with the mine plan

3.4 Bay-Goose Dike; Drawings and Specs

It is understood that negotiations are already underway with the selected Contractor, Fernand Gilbert Ltd (FGL), but it is suggested that a few items in the specifications be reviewed prior to final contract signing as some technical and/or contractual issues may require clarification. These relate to the division of responsibilities between the Owner and the Contractor, and also to the requirements for cut-off backfill materials, grouting and instrumentation. Tony Rattue submitted a marked-up pdf version of the specifications containing a number of observations for consideration.

3.5 TSF Stormwater Dike

As for the Bay-Goose dike, a considerable number of extra soundings were performed over the winter from the ice surface. It is now considered that there is adequate site investigation for final design & construction. Ice rich soils were encountered on the abutments but the maximum thickness should allow removal of the same to produce an acceptable foundation. The Board requests confirmation of this issue at the next meeting.

There have been a few cases of unsatisfactory performance of the Coletanche membrane when installed in winter conditions and with less than ideal choices for bedding material. The Board questions the use of Coletanche in this location, primarily due to its limited extensibility and the consequent risk of rupture under load, and recommends that alternative solutions be evaluated (durability is not a concern; costs of other membranes are similar or even less, and have greater extensibility).

3.6 Saddle Dam No.1

This is a permanent closure structure, situated near the lake, and hence is sensitive for environmental concerns. As for the other structures, the 2009 winter exploration program, using primarily percussion drilling, indicated the presence of frozen till/ice rich soil to depths reaching 10 m. The actual ice content is not known and no evaluation of potential thaw settlement can be made. If this material were not completely excavated, what options are being studied taking into account potential deformations during both operation and closure? The thermal considerations will have potential influence on

seepage and dam deformation. A design memo on this subject is anticipated by the GDRB prior to the July meeting.

3.7 Other Issues

It is understood that AEM will act as contractor for the construction of the Saddle Dam No1, in addition to carrying out the embankment placement for the Bay-Goose dike in 2009. The designer of record will be GAL and AEM needs to be held to the same specifications and QC/QA protocols as is normal for a third party contractor. It will be in the interest of both parties to clearly define applicable roles and responsibilities.

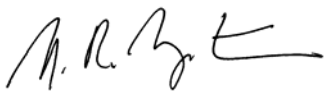
4. NEXT MEETING

A site visit is scheduled for the week of July 20th. Norbert Morgenstern and Andy Robertson will make their own travel arrangements to reach Baker Lake in the afternoon of July 20th. Anthony Rattue will use the charter flight from Montreal to site on July 20th, and it is assumed that AEM will make these arrangements.

5. ACKNOWLEDGEMENTS

The Board wishes to thank the personnel of AEM and GAL for their participation in the conference call and the meeting, and for the excellent documentation and presentations made by GAL which contributed to the efficiency and effectiveness of the proceedings.

Signed:



Norbert R. Morgenstern, P.Eng

D. Anthony Rattue, P.Eng.

Andrew M. Robertson, P. Eng.

ATTACHMENT A

AGENDA FOR BOARD MEETING NO. 3

June 12, 2009

AGNICO-EAGLE MINES - MEADOWBANK DIVISION

MEADOWBANK DIKE REVIEW BOARD

Meeting #4 - June 12th, 2009

5th Floor Main Boardroom, Golder Associates Office
500-4260 Still Creek Drive, Burnaby

AGENDA

8:00 **Welcome** (Continental Breakfast served)

8:15 **East Dike** (Golder and AEM)

Status Update
- Contingency Grouting
- Dewatering

As-Built Conditions
- Construction Activities
- QA/QC Activities
- Design Modifications
- Lessons Learned

10:45 *Coffee Break*

11:00 **Bay-Goose Dike – Part 1** (Golder)

General Concept
Drawings and Specifications

12:00 *Lunch (working)*

12:15 **Bay-Goose Dike – Part 2** (Golder and AEM)

Drawings and Specifications continued
Tendering Update
Construction schedule

13:30 **TSF Stormwater Dike & Saddle Dam 1 - Part 1** (Golder)

General Concept
Design Alternatives

14:30 Coffee Break

14:45 **TSF Stormwater Dike & Saddle Dam 1 – Part 2** (Golder and AEM)

Construction drawings and specifications
Construction Schedule

16:00 **Deliberation by the Board Members**

17:00 **Preliminary report by the Board Members**

17:30 **Closure**

19:00 Supper (TBC based on travel schedules)

AGNICO EAGLE

MEADOWBANK

VANCOUVER MEETING

June 12, 2008
Held in the offices of Golder Associates, Burnaby, B.C.

Attendance		
Gaston Blanchette	AEM	Dike Superintendant
Stephane Robert	AEM	Environment Superintendent
Dan Walker	Golder Associates	Project Manager
Michel Julien	Golder Associates	
Grant Bonin	Golder Associates	Grouting Specialist
Fiona Esford	Golder Associates	
Paul Bedell	Golder Associates	
Norbert Morgenstern	Self	Dike Review Board
Anthony Rattue	SNC Lavalin	Dike Review Board
Andrew Robertson	Robertson Geoconsultants	Dike Review Board

July 20, 2009

Project No. 08-1428-0028/1100
Doc. No. 919 Ver. 0

Mr. Stéphane Robert
Environment Superintendent
Agnico-Eagle Mines Limited
Meadowbank Division
P.O. Box 540
Baker Lake, Nunavut
X0C 0A0

RESPONSE TO REPORT NO. 3 MEADOWBANK MINE DIKE REVIEW BOARD, JUNE 12, 2009
SUBJECT: REVIEW COMMENTS

Dear Mr. Robert,

On June 12, 2009, the third meeting was held between the Meadowbank Dike Review Board (MDRB), Agnico Eagle Mines (AEM), and Golder Associates Ltd. (Golder). The meeting was convened to discuss the status of the design for the Bay Goose Dike and Tailings Storage Facility. In addition, the as-built report for the East Dike construction was presented along with the results of the remedial grouting undertaken at the East Dike. On June 18, 2009, the MDRB provided a letter with their comments from this meeting. This letter provides Golder's response to MDRB questions and comments which is being submitted on behalf of AEM.

1.0 EAST DIKE

Comment: *Explanation of the mechanism which led to the leak in the East Dike;*

Response: The mechanism which led to the leak at the East Dike still remains a matter of debate and speculation at this stage. Upon review of the most likely causes, we are of the opinion that it was probably linked to the presence of a zone in which adequate closure may not have been achieved. It is believed that during dewatering, localized washout started to occur and accelerated as the gradient increased. The evolution of thermal regime appears to have been the best indicator of activity in this area and demonstrated the value of detailed instrumentation. This event also allowed a contingency leak management plan to be developed.

Comment: *Recommendation that a downstream seepage measurement system be implemented following dewatering;*

Response: A system to monitor seepage within the seepage collection ditches will be implemented by AEM.

Comment: *Recommendation that a 'contingency leak management plan' be incorporated in the OMS – Dike Manual (equipment, supplies, procedures, people) in recognition that further leaks could occur;*

Response: An East Dike OMS Manual has been prepared and is currently under the control of AEM. At the request of AEM, Golder can assist with incorporating the recent 'contingency leak management plan' developed as a result of the anomalous East Dike instrument readings into the overall OMS plan for the dike. The plan should include a list of required equipment, supplies, personnel and procedures.

Comment: *Evaluate the long-term needs for grouting equipment to be located at Meadowbank;*

Response: The required length of time for grouting equipment to be located at site will be assessed in consultation with AEM during development of OMS manuals for the remaining Meadowbank dikes.

Comment: *Assess AEM's capacity for long term seepage management for the East Dike and other structures that will be constructed;*

Response: AEM is planning to provide the future open pits with sufficient pumping capacity to allow safe dewatering during storm events and should large water inflows be experienced. Details of the pumping capacity is to be provided by AEM.

Comment: *Additional information could be incorporated into the final version of the East Dike As-Built Report, including: dynamic compaction grid pattern and number of drops;*

Response: Additional details concerning the dynamic compaction process will be included in the final version of the East Dike As-Built Report.

2.0 BAY GOOSE DIKE DESIGN

Comment: *Interpretation of the results indicates 5 m of lake bed sediments on axis B-B' in the north sector, which establishes a need for more detailed information before start-up (if practical) and a management plan (stability issues, mud wave issues, turbidity issues);*

Response: Unfortunately current site conditions (*i.e.,* limited ice thickness) do not permit gathering of additional information regarding the area identified as potentially having a thicker zone of lake bed sediments.

The presence of a thicker zone of lake bed sediments has been inferred from drilling pressures, which we were unable to confirm with sample collection methods available during the most recent investigation program.

Therefore the presence or potential presence of thicker, softer lake bed sediments along the Bay-Goose Dike alignment was discussed with AEM and the selected contractor during a construction kick-off meeting held on June 18, 2009 in Montreal. During dike construction in these areas, rockfill placement will initially proceed along the dike centerline, followed by placement of rockfill laterally to displace outward as much of the softer sediments as possible. The rate of rockfill placement will be monitored and adjusted, if necessary. Stability of the rockfill embankment will also be monitored and adjusted, if necessary during construction. Stability of the downstream toe of the rockfill embankment will be monitored following dewatering.

The stability of rockfill placement will be observed and placement methods modified in other areas, if necessary.

Comment: *In order to complete the design in the south sector, where a partial cut-off is an option being considered, additional characterisation is required. The adoption of a partial cut-off is a significant departure from the design concepts being adopted elsewhere in the dike designs. In order to justify this proposal it is essential that continuous coring, to the degree practical, be obtained over the interval from the base of the proposed cut-off to the bedrock. The identification of local conductive layers, such as gravel seams is important;*

Response: Golder, on behalf and at the request of AEM, is reviewing potential geotechnical investigation methods and equipment that could provide continuous samples which would in turn permit a better assessment and characterization of the lakebed soils. Preparation for the winter 2009 – 2010 program is underway to facilitate the potential mobilization of selected investigation equipment to site during the 2009 barge season. It is understood that the applicability of the partial cutoff wall concept is dependant on the characteristics of the material that may be left in place and upon the ability to demonstrate the continuity of the material and its low hydraulic properties.

Comment: *Rock hydraulic conductivity appears to be greater than at the East Dike and may make grouting more of a challenge;*

Response: Packer test results from the 2009 geotechnical investigation program will be further analyzed to assess the potential implications to grouting. Additional packer testing will be conducted as part of the winter 2009 – 2010 program. Adjustments to the grouting program will be made, as required.

Comment: *For both of the dike, a cement-soil-bentontie slurry cut-off wall is proposed for all sections where the bedrock surface is more than 8 m below the lake level (i.e., below elevation 125 m). .... Clarify procedures to achieve a clean CSB/SB interface, following discussions between AEM and the contractor;*

Response: Preliminary discussions were held between AEM, Golder, and the contractor on June 18, 2009 regarding the construction procedures to be used for this part of the work. It was clarified that the maximum time permitted between placement of the CSB and SB is 1 day and that the time between placement of the two materials should be minimized in order to limit the formation of a cold contact. It is understood that the CSB will be placed using a large diameter tremmied pipe to the base of the excavation. The contractor plans to use excavators and a crane supplied by AEM for this operation. The contractor is to provide a detailed work plan that will provide additional information.

Comment: *Clarify the planned methods of execution and in-situ validation of effective densification to full depth of the core backfill material;*

Response: The compaction contractor plans to use the same equipment and general methods for compaction of the core backfill for the Bay-Goose Dike as were employed for construction of the East Dike. It is understood that the contractor plans to modify the grid pattern for compaction, number of drops, and number of passes, in order to achieve sufficient compaction to depth in the deeper portions of the Bay-Goose Dike. The contractor is confident that the material can be adequately compacted to the depths anticipated in the northern sector of the dike based on experience elsewhere. As part of the quality assurance program, for the deeper portion of the dike, Golder is proposing to perform large penetration tests (LPTs) prior to and following compaction. The testing is proposed to occur along the centerline of the cutoff wall. The results will be used to infer the relative change in density as a result of compaction. Testing is proposed to occur below a specified depth (*e.g.,* 3 m) at a regular interval of about 1.5 m to the depth of the backfill.

Comment: *In view of the greater depths, and in light of the possibility of leaks developing despite diligent foundation treatment work, the Board recommends consideration of a downstream filter blanket beneath rockfill in deep sections as an additional line of defence against piping;*

Response: At this time, Golder is of the opinion that a downstream filter blanket beneath the rockfill in the deeper portions of the Bay-Goose dike is not required and the added cost for this item is not justified. The interface between the rockfill and the lakebed soils is expected to be gradual and varied, due to the mixture of the materials, and variability in the properties of the lakebed soils. Seepage gradients along the interface are not anticipated to be sufficiently high enough to result in a large degree of piping.

Comment: *Review of the alignment detail on the north side of Goose Island that currently incorporates an abutment location which would necessitate dealing with frozen ground;*

Response: Based on the results of the 2009 geotechnical investigation program it is anticipated that frozen ground is present on the abutments and in shallow water (up to a water depth of 1.5 m). Construction of the entire dike on unfrozen ground is not feasible, therefore a contingency grouting program will be in place that will permit grouting of additional areas (*i.e.,* abutments or shallow areas) if thawing occurs and results in an increase in seepage. The head of water acting across the cutoff wall in these areas is low and therefore it is expected that mitigative grouting can be successfully performed, if required. In order to avoid the presence of frozen ground near Goose Island, the cutoff wall would need to be moved into deeper water and this would necessitate a larger volume of fill materials (rockfill, coarse filter, core backfill). Golder and AEM recognize the potential risks of constructing the cutoff on frozen ground and are prepared to manage these risks.

Comment: *Comments from Mr. Tony Rattue regarding the specifications;*

Response: The comments on the specifications provided by Mr. Rattue are appreciated and are currently under review.

3.0 TSF STORMWATER DIKE AND SADDLE DAM NO. 1

Comment: *Confirmation of removal of ice-rich soils in the abutment areas of the Stormwater Dike was requested;*

Response: The ice-rich soils within the footprint of the Stormwater Dike, determined to be only in the areas of the abutments, will be removed prior to fill placement. The construction drawings and specifications are being revised to incorporate this item.

Comment: *The geomembrane material selection was questioned with regards to the potential for settlement due to the thawing of ice-rich foundation soils;*

Response: The geomembrane material for both the Stormwater Dike and Saddle Dam 1 were re-evaluated in light of the discussion with the Board. A technical memorandum discussing the geomembranes of the structures has been prepared and will be discussed with the Board during the next meeting. The document also discusses the foundation preparation activities for the structures.

4.0 OTHER ISSUES

Comment: *It is understood that AEM will act as contractor for the construction of the Saddle Dam 1, in addition to carrying out the embankment placement for the Bay-Goose dike in 2009. The designer of record will be GAL and AEM needs to be held to the same specifications and QC/QA protocols as is normal for a third party contractor. It will be in the interest of both parties to clearly define applicable roles and responsibilities;*

Response: AEM and Golder thank the Board for their insight on this matter, and recognize the importance of achieving the design requirements for these structures and of demonstrating appropriate and thorough QC/QA.

5.0 CLOSURE

We hope the above information provides the required clarification. If additional information is required, please do not hesitate to contact us.

Yours very truly,

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED

Fiona Esford, M.Sc., P.Eng. (BC, Yukon)
Geotechnical Engineer

ORIGINAL SIGNED

Michel Julien, Ph.D., P.Eng. (QC)
Principal, Project Director

ORIGINAL SIGNED

Paul M. Bedell, M.E.Sc., P.Eng. (NT/NU)
Associate, Senior Geotechnical Engineer

ORIGINAL SIGNED

Dan Walker, Ph.D., P.Eng. (NT/NU)
Associate, Project Manager

KD/FCE/MJ/PMB/DRW/lw/rs/lw

CC: Eric Lamontagne and Gaston Blanchette (AEM)

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August 19, 2009

Mr. Dennis Gourde, P.Eng.
General Manager
Agnico – Eagle Meadowbank Division
Baker Lake Office

Email: denis.gourde@agnico-eagle.com

Dear Mr. Gourde,

Report No 4
Meadowbank Mine Dike Review Board
Meeting July 20-23, 2009

1. INTRODUCTION

The dike review meeting was held, as planned, at site. The objective of the meeting was to learn of responses to past reports from the Board, to review the design of various water and tailings retention structures, to inspect site conditions, and to assess the way forward.

The sequence of activities was adjusted according to ongoing site work, and followed the agenda as presented in Attachment A.

All three Board members participated in visits and meetings. A list of the persons participating in the discussions is presented in attachment B.

Prior to and during the meeting, information packages were sent out in electronic format. The documents were also made available in hard copy during the meeting. The packages included:

- Stormwater Dike and Saddle Dam 1 Geomembranes, Tailings Storage Facility, Meadowbank Gold Project, Memo.
- TSF IFC drawings
- Bay-Goose IFC drawings and Specs
- East Dike Grouting Contingency Memo
- Response to MDRB Report #3

Electronic copies of the PowerPoint presentations made during the meeting were also made available.

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

2. RESPONSES TO RECOMMENDATIONS FROM REPORT No 3

There has been a comprehensive assessment by Golder Associates Limited (GAL) of the Board recommendations made during the previous meetings, and they have been responsive to all input. Some recommended changes to the specifications have been incorporated already. The implementation of other technical aspects is still under consideration as is mentioned in the succeeding sections of the report.

The management of seepage flows beneath the East Dike will be undertaken by Agnico-Eagles Mines (AEM) as part of the overall pit dewatering procedures. However, the Board notes that AEM have been slow to formulate a definitive plan that includes estimates of seepage, toe drain and sump details, pumping station design, and contingencies for adaptation to possible increased flow rates.

3 PROJECT STATUS

All plant buildings were closed in over the winter and major items of equipment were installed, which facilitates the remaining mechanical and electrical work. The work is on schedule for a mill start-up in 6 months.

The camp capacity is stressed with 470 staff on site and additional accommodation for 180 is required.

Three dikes are to be built this year namely:

- Bay–Goose North;
- Stormwater dike;
- Saddle Dyke No 1.

It is to be noted that the latter two structures are essential for 2010 start-up, whereas the first is required to ensure continuity in production in 2011.

The Board is pleased to be informed that the same contractor, Fernand Gilbert (FGL), and the same sub-contractors have been awarded the contract to build the Bay-Goose and Saddle Dike No1. This will ensure continuity and a shorter learning curve which is good for the project.

While all reasonable efforts will be made to control TSS, the Regulator has been advised that construction of the dikes will not be stopped should construction activities result in TSS exceeding permitted limits.

The Board notes that there is no margin for error in reaching the goal for completion of the required work for this year and believes that inadequate planning has been done in order to meet the start-up deadline.

The responsibilities for tailings management during mill operation will fall on the Mill Superintendant and the Environmental Manager. This facet of the work should not be underestimated given the added complexities of working in an extreme northern climate. Consequently, the Board would like to be provided with a copy of the detailed organization chart at the next meeting.

Furthermore, the Board was advised of a potential increase in ore reserves, which places additional emphasis on the need for good advance planning of tailings facilities with regards to capacity and management for the anticipated future production. It is expected that this item will be the subject of discussion at future meetings.

4. SITE INSPECTION

The Board inspected the site on several occasions during the course of the meetings and notes the following:

i) Silt curtain

Silt curtain mobilization for Bay-Goose is underway. The anchors, in the form of selected blocks of rock, are being set by means of a helicopter (See photo #1). Given that no large barge is available, this is an efficient and apparently cost effective way of carrying out this component of the work. In parallel, the assembly of sections of curtain on land will accelerate the installation. It is noted that the curtains will be full depth to lake bed as compared to the open bottomed installation used last year. This should be more effective with respect to the lateral translation of the sediment plume but the curtain will need to resist current forces.

The Board considers that all practical efforts to make effective use of silt curtains are being implemented.

ii) Material sources

a) A stockpile of 0-20 mm material has been built near the abutment from which the Bay-Goose embankment will be launched. Some segregation was noted as shown in photo #2. Although material with a maximum size such as 20 mm is not particularly prone to segregation, care is still required when handling the material in a dry state. Lifts in the pile should not exceed 2 m in height. The pile should be stepped and material should not be allowed to spill down the full length of side slopes.

b) The unfrozen till deposits, which have been exposed along the shore of arm the 2nd Portage Lake by the dewatering, appear to offer a promising source of construction material. Exploitation of the deposit has begun and a stockpile is being built up adjacent to the east abutment of the Stormwater dike. From a visual appreciation, the material is of good quality and not excessively moist; though some sand pockets were observed. It is considered that the extent of the deposit around the Tailings Storage Facility (TSF) basin should be adequate for current design needs.

iii) South Camp Dike

The Board made a brief inspection of this completed structure. Construction was carried out in winter which permitted the excavation of a 4.5 m deep cut-off trench in the dry, due to permafrost and grounded lake ice, which removed the need for a cofferdam. Maintenance of frozen conditions was desirable given the 25 m depth of till below the dike foundation. The foundation conditions are monitored by two sets of thermistors that can be seen in photo # 3.

iv) East Dike

This was the first visit since completion of the dike. The final configuration with an increased width of haul road was noted. An inspection was made of the area at the toe downstream of the remedial grouting work carried out in March of this year. Seepage emanates from the toe in the area between Stn. 6+450 and 6+490 but the precise location of the source has yet to be determined due in part to the presence of fill material from a ramp used to install the dewatering pumps. The ramp was being excavated at the time of the visit. Consequently, the water turbidity was at least in part due to this disturbance. The seepage exited from the east side of the fill (photo # 4) until a channel was excavated on the west side. The majority of the flow is now seen to originate on the west side (photos # 5 and 6). Monitoring by way of weirs or flow pipes is required at both locations, and visual description of changes in suspended fines is necessary.

The lake elevation was at 133.1 m and the small impounded pond at the toe of the dike was at 126.75 m. The discharge rate was not known but estimated to be about 30–40 l/s.

Inspection along the shore revealed a number of smaller discharges; some of which may be from ice thaw. It is likely that several small flows distributed around the perimeter of the basin contribute to the total inflow which, since pumping has been stopped, amounts to something of the order of 75 l/s. The 75 l/s includes the flow from the upper pond so this number also includes thaw water inflows from the upper basin.

The sediments exposed on the lakebed are sandy silt at the surface to more plastic silts at depth. Characterisation of these materials is yet to be done.

The dewatering of the north arm of 2nd Portage Lake has permitted an appreciation of the extent of the boulder fields (photo # 7) which ring the lake shore and surround the islands. The boulders, derived from the till from which the fines have been winnowed away by wave action, are moved around by the ice sheet to form what appears almost as man made fill. The presence of these deposits is of interest in the design of the near shore portions of the dikes built in water.

A second visit was made to the dike on the morning of July 22nd to inspect the sinkhole which had been detected in the afternoon of July 21st. This sinkhole occurred at St 6+472 (+/-), located 1 to 2 m upstream of the cut-off wall (see photos #8 and 9), in the base of a trench excavated recently to make a repair to an instrument cable. An excavation was conducted at the opposite end of the trench to investigate whether an apparent depression was a manifestation of another sinkhole but this was not the case. The general area has been the site of significant settlement since construction, as shown by the punching of the rigid drill casings through the surface cap (photo #10). Further studies are to be conducted in the field and office as noted in the discussion below. It is important to note that there was neither a perceptible increase nor a change in turbidity of nearby seepage resulting from the July 21st sinkhole.

v) Stormwater Dike

A walkover inspection of the Stormwater Dike foundation was carried out from east to west. The variable foundation conditions from soft lakebed to extensive boulder fields to bedrock outcrops were noted (photos # 11 to 13). The boulder fields, similar to those described for the East dike, are to be addressed in the detailed directives to be formulated to cover foundation preparation. Requirements will vary according to the location across the dike section. Foundation stripping had just started on the East abutment. This will be carried out in stages until the ice rich material is removed.

vi) Saddle Dam No 1

The proximity of this structure to the lease boundary and the adjacent 3rd Portage Lake was noted. This is of significance for the management of any seepage in both short and long term.

The visit included a walkover along the dike centerline. The steep rock abutments on the right flank transitioning to ice rich frozen soils in the valley bottom were noted (photo # 14).

5. TECHNICAL COMENTARY

5.1 East dike

The 3rd meeting of the Board was held shortly after the completion of the remedial grouting and a diagnostic of the source of increased seepage had not been made. There is still some doubt as to the precise location of the seepage window through or under the wall, despite the fact that the grouting exercise was apparently successful.

The Board has the following concerns which were aggravated by the sinkhole discovery:

(i) There is an immediate need to monitor D/S seepage flow rates by whatever means are practical;

(ii) There is also a need for prompt response, including contingency grouting plans, should there be a recurrence of the leak;

(iii) The detailed design (including collection system and pump station) for long-term seepage management should be tied to levels of leakage rate. In this regard it would be useful to document
- what is the design seepage scenario?
- how will it be handled?
- what is the demand capacity ratio for the collection system and how robust is the logic?
- how does this relate to the AEM emergency measures and evacuation plan for the pit?
- is there an Emergency Response Plan (ERP) to define responsibilities, lines of communication and actions to cover abnormal instrument readings, inspector observations etc.?;

It is to be noted that the behaviour during drawdown has been highly non-linear with a rapid increase from almost zero seepage to something of the order of 600 l/s. This inflow was sufficient to negate the influence of the dewatering pumps installed at that time. It is therefore important to establish the design basis and it is recommended that a

series of alert levels be established (for example green, orange, and red alert levels) through which the type and rapidity of response can be better assured.

All of these points require prompt action. It should be accepted by all concerned that the mine cannot operate without such a systematic approach to the seepage and other indicators of dike performance.

The appearance of a sinkhole reveals that not only was there loss of water but also the migration of solids which is a more serious issue. Likely the sinkhole is a result of leakage prior to the remedial grouting program but this requires confirmation. The situation requires immediate attention to confirm that:

i) leakage is not increasing with time
ii) the integrity of slurry wall has not been compromised.

A way forward on this issue was discussed in detail with GAL & AEM and the action items and schedule are shown in Attachment C.

The Board requested that a teleconference be held in the week of August 10 for an update on the findings and recommendations for advancing this component of the work. This meeting was held on August 11, prior to completion of this report. A record of this teleconference is to be provided by GAL.

5.2 Bay-Goose Dike North

The Bay-Goose dike will be constructed over two seasons. The characterisation of the foundation conditions permits the work to proceed on the northern sector but additional site investigation work is required to finalise the design of the southern sector.

The Board agrees with the alignment and the cross-section as currently proposed for the northern sector but noted, from discussions held after the meeting, that input should be sought from the Contractor to confirm the constructability of the slurry trench at the points of deflection in the dike axis.

The Board notes that inadequate attention may have been paid to the influence of freeze/thaw effects on the soil/bentonite slurry wall conductivity and recommends a test program tied to thermal modeling and cyclic freeze thaw effects. If the results indicate that this may be a significant factor, then additional thermal insulation may be needed.

Outside the lakebed, the foundation is affected by permafrost and the timing of abutment construction to minimize thaw needs to be addressed.

Although the onus is on the slurry wall contractor to determine if the densification of the central zone of the embankment is adequate to ensure trench stability, the Board agrees with the use of the Large Penetration Test (LPT) to guide future work and identify any current flaws. This may lead to more rigorous requirements in future specifications for the treatment of deeper fills.

Based on the sinkhole experience, and despite the fact that the root cause has yet to be identified, the Board is of the opinion that continuity of the downstream filter and possible extension into a blanket beneath the shoulder would contribute to control of piping. Discussions held after the formal meeting identified avenues to be further studied by GAL, particularly related to the geometry of the coarse filter which, in fact, may not be necessary at the bedrock contact.

In all areas where the foundation rock level dips below elevation 125 m, the soil-bentonite (SB) is to be replaced by a cement-soil-bentonite (CSB) material in order to achieve greater resistance to erosion. The interface between CSB/SB merits attention. The Board holds the view that this contact is essentially little different from the rock/SB interface except that it will not be grouted. However, the upstream and downstream zones of 0-20 mm material and the filter cake of bentonite formed on the trench faces will provide protection. Nevertheless, precaution is warranted and the following points are raised:

I. The Contractors construction methods should be reviewed to ensure continuity in the placement of the CSB as there is concern about the possibility of cold joints within the CSB.

II. The Board prefers ensuring no shearing of CSB interface and hence a minimum set time should be adopted prior to placing the SB material. However, there should also be a control of the maximum time before SB placement to minimize the accumulation of sand settling out of the bentonite slurry.

With respect to grouting, the Board notes with favour a number of potential improvements that have or are to be added to the specifications but, given the experience on the East dike, the Board questions whether there is more that can be done to improve the completeness of treatment and the reduction of the possibility of a repetition of the incident of high seepage and the coarse particle erosion that appears to have occurred.

The Board expresses a preference for the Tube à Manchette method but understands that it is likely that 'perforated' casing will be used. This merits additional evaluations.

The grout holes will be located immediately upstream of the cut-off wall which permits more flexibility in drilling and grouting methods and in hole orientation. For example inclined holes may be used, if required, to better intercept the principal rock joints. It has also been proposed that more systematic flushing of in-filled joints be carried out. To this end a modification to the specification permits, under the direction of the Engineer, the drilling of adjacent secondary and tertiary holes prior to the grouting of primaries. In the same vein, it is suggested that drilling parameters may assist in the identification of joint openings, as may televiewer images. Side discharge bits may improve the effectiveness of hole washing. The need for further investigation, after construction of the initial rockfill embankment, should be considered. There is a need for GAL to advise on the best available technology to optimise the grouting effort in order to avoid sinkholes in the future.

5.3 Bay-Goose Dike South

The Board is of the view that the base case design should be a cut-off to rock and this design should advance. However, the Board is open to a demonstration by detailed site investigation that a partial cut-off is an acceptable optimization. A site investigation is needed in any case to evaluate the presence of boulders, granular zones etc. in the till for a constructability assessment of the cut-off. In these conditions, the Sonic core is the preferred tool, as good recovery is paramount.

The above comments relating to the provision of a downstream filter take on additional pertinence for the partial cut-off and the Board is of the view that a filter beneath the rockfill shell is an integral part of design. As mentioned in section 3, all shorelines and lakebed where water is less than the depth of annual ice formation are characterised by

relatively thick deposits of boulders, in some areas overlain by cobbles and gravel. This material, unless removed, precludes the placing of crushed stone directly on the lakebed to achieve a protection against internal erosion. Underwater video may be required to locate areas of boulder accumulation that may affect the detail design.

With respect to specifications for both segments of the Bay-Goose Dike, there is now additional clarity concerning responsibilities, testing frequencies, and QC/QA for fill materials

5.4 TSF Stormwater Dike

The basic layout, as currently proposed, optimises fill volumes by incorporating the mid-lake ridge and the rock outcrops on the west bank. However, further adjustment to the alignment may be required to improve the cut-off location.

The cross-section and foundation treatment are acceptable as proposed, with the possible exception of the location of the cut-off trench which currently sits inside the upstream toe. The benefits from a thermal insulation point of view will be minor but the construction sequence and duration may be severely handicapped by the need to complete the cut-off trench and the membrane placement before placing the body of the embankment. The cut-off trench should be moved upstream out from under the dam to facilitate construction. Furthermore, there is a need for clarification of the specifications covering the backfill materials and its placement in the trench. It is noted that the dewatering was stopped on July 10th for reasons related to water quality at an elevation of 127.8 m. Cofferdams may be required for construction but this should not be a reason to eliminate the possibility of the change of the cut-off alignment.

It is understood that the Coletanche liner material is in shipment to the site and the Board accepts its use but insists on meticulous inspection of bedding and coarse filter zone. The drawings currently show a rockfill cover to protect the Coletanche membrane against ice. The Board is concerned that this solution may in fact lead to damage to the liner due to downward drag of loose placed material. Moreover, the presence of a rockfill cover would preclude ready access to perform repair work. Thus it is questioned whether protection could not be adequately provided by relying on tailings beaches, pond control, or a Linear Low Density Polyethylene (LLDPE) rub sheet.

The Board expresses the wish to review the specifications, when issued.

Construction Plan:

The Board is disturbed to note that planning is not more advanced given the critical path nature of this structure in overall mine start-up. The Board was re-assured by project staff that planning is in progress and adequate equipment will be available. Nevertheless, the Board wishes to receive a copy of the planning so that it can participate in tracking the effective sequencing. The Board notes that design changes are taking place simultaneously with construction planning and consequently, close cooperation between GAL and AEM is essential and particular care should be taken to ensure that all design changes are documented.

There is a particularly urgent need for investigation of the till/ rock conditions along the cut-off trench alignment. The presence of jointed and frost jacked rock (photo #12) indicates a requirement for an adequate filter between fine grained materials and the

rock wherever the hydraulic gradient could lead to piping. It is to be recalled that no rock grouting is planned for this structure due to its temporary nature.

5.5 Saddle Dam No.1

As mentioned in report No 3, this is a permanent closure structure, situated near the lake, and hence is sensitive for environmental concerns. This structure, and the other saddle dams, merit their own Design base Memorandum (DBM) and Design Report. The design criteria and hypotheses for operation and closure should be clearly laid out and approved by AEM.

As with the Stormwater Dike, the Board suggests that a simplified key trench detail be adopted to move this element upstream so as to facilitate construction. However, before this decision can be made there is a need to review the anticipated performance of the dike and its foundation. There may be a need for further seepage and thermal modelling to determine the potential for thaw of the foundation, the impact on dike integrity, and requirements for a seepage collection and a pump-back system at the downstream toe. Subsequent to this work, the location of the cut-off trench can be optimised and the potential need for such control measures as thermosyphons evaluated.

The Board notes that filters have been added downstream of the cut-off trench but the extent is to be confirmed.

Direction is needed from AEM in relation to the design for closure as a function of the management of cyanide and other contaminants. Reliance on frozen ground for primary seepage control may be applicable in the short term for operations but a design is required that can be relied upon despite the long term potential for thawing resulting from current predictions of global warming.

It should be noted that future degradation may be uncontrolled and may lead to the need for perpetual care.

6 NEXT MEETING

A telephone conference call was planned for the week of August 10 and was held on August 11th.

The next meeting, to review the 2009 construction work, is proposed for December 17-18 either in Vancouver or Montreal at AEMs discretion. However, the Board members reiterate their interest in being kept up to date with the planning and design progress during the intervening period.

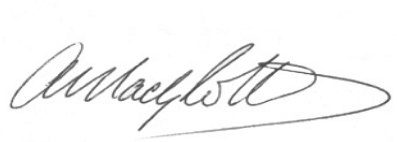
7 ACKNOWLEDGEMENTS

The Board once again wishes to thank the personnel of AEM and GAL for their participation in the site visit and the meetings, and for the excellent documentation and presentations made by AEM and GAL which contributed to the efficiency and effectiveness of the proceedings.

Signed:

Norbert R. Morgenstern, P.Eng

D. Anthony Rattue, P.Eng.



Andrew M. Robertson, P. Eng.

ATTACHMENT A

AGENDA FOR BOARD MEETING NO. 4

July 20-23, 2009

AGNICO-EAGLE MINES - MEADOWBANK DIVISION

MEADOWBANK DIKE REVIEW BOARD

Meeting #5 - July 20 to 23, 2009

Meadowbank Mine Site, Nunavut

AGENDA

Monday July 20

Dr. Morgenstern, Dr. Robertson and Mr. Bonin arrive in Baker Lake at approximately 14:30 pm local time. AEM to provide transport from Baker Lake to site (~ 2 hrs).

Mr. Rattue, Mr. Julien, Ms. Beaulieu and Ms. Esford arrive on site in early afternoon from Montreal on AEM Charter. Mr. Bedell is already on site.

17:30 *Check-in, room assignments and site H&S orientation (AEM to provide)*

18:30 **Welcome** (AEM to confirm meeting room)

Dinner (site cafeteria)

Tuesday July 21 – Morning Session (Office & Field)

6:30 *Breakfast (site cafeteria)*

7:30 **Review of the Agenda**

7:45 **MDRB Report #3**

Review and Respond to MDRB Report #3

- East Dike
- Bay-Goose Dike
- TSF Structures (Stormwater Dike and Saddle Dam 1)
- Other

8:15 **East Dike**

- Instrumentation data update
- Grouting contingency planning update

8:45 *Coffee Break*

9h00 **Field Visit**

- **Bay-Goose Dike Field Visit**
  - General site area
  -
  - Turbidity Barriers Anchors Installation
- **East Dike Field Visit**
  - As-built conditions
  - Downstream toe inspection
  - Instrumentation location
- **South Camp Dike**

11h00 Bay Goose Dike

- IFC Drawings and Specifications
- Construction Plan and schedule

12h30 Lunch (Site Cafeteria)

Tuesday July 21 – Afternoon Session (Field & Office)

13:30 Field Visit

- **East Dike Field Visit** (second downstream toe inspection)
- **Borrow Pit**
- **TSF Field Visit**
  - Stormwater Dike
  - Saddle Dam 1
  - Dewatering progress

16h00 Bay Goose Dike (Cont'd)

- 2009-2010 Geotechnical Investigation
- QC/QA Roles and Responsibilities

18:30 Dinner (Site Cafeteria)

Wednesday July 22 – Morning Session (Field and Office)

6:30 Breakfast (site cafeteria)

7:30 Field Visit – East Dike sink hole

8:30 East Dike sink hole discussion

9:30 Coffee Break

10:00 TSF Stormwater Dike & Saddle Dam 1

- IFC Drawings and Specifications
- Liner Options
- Construction Plan and schedule
- QA Program

12:30 Lunch (Site Cafeteria)

Wednesday July 22 – Afternoon Session (Office)

13:30 **Deliberation by the Board Members**

18:30 *Dinner (site cafeteria)*

19:30 **Preliminary report by the Board Members**

20:30 **Closure**

Thursday July 23 – Morning (Meadowbank/Baker Lake)

Dr. Morgenstern, Dr. Robertson and Mr. Bonin to depart for Baker Lake no later than 8:30 am local time. AEM to provide transport from site to Baker Lake (~ 2 hrs).

Mr. Rattue, Mr. Bedell, Ms. Beaulieu and Ms. Esford depart site in early afternoon for Montreal on AEM Charter. Mr. Julien will remain on site.

ATTACHMENT B

ATTENDANCE AT JULY 2009 MEETING
Held at the Meadowbank Mine site, NU

Attendance		
Gaston Blanchette	AEM	Dike Superintendant
Denis Gourde	AEM	General Manager
Eric Lamontagne	AEM	Mine manager
Sebastien Tolyesi	AEM	Mining Superintendant
Paul Henri ???????	AEM	Regional Manager
Michel Julien	Golder Associates	Project Manager
Annie Beaulieu	Golder Associates	
Paul Bedell	Golder Associates	
Grant Bonin	Golder Associates	Grouting Specialist
Fiona Esford	Golder Associates	
Norbert Morgenstern	Self	Dike Review Board
Anthony Rattue	SNC Lavalin	Dike Review Board
Andrew Robertson	Robertson Geoconsultants	Dike Review Board

ATTACHMENT C

Activity Planning for East Dike

AGNICO-EAGLE MINES - MEADOWBANK DIVISION

MEADOWBANK DIKE REVIEW BOARD
Meeting #4 - July 20 to 23, 2009
Meadowbank Mine Site, Nunavut

East Dike Sink Hole Plan of Action

Facts (Tuesday July 21st, evening):

- Sinkhole at 472 + Water inflow estimated to be increasing + turbidity downstream.
- Dimensions (~1.2m deep x 1.7m wide and 2 m long)
- Thermistor 485 shows unexpected temperature increase
- Inclinometers maybe showing some displacement

Plan of Action:

Monitoring & Investigation

- Water flow to monitor
- Use of Tracer (Contact Stéphane for appropriate/acceptable tracer on an environmental point of view
- Review of latest pond elevation & Air temperature data
- Get supplies on site to intervene
    - Cement HE type 3 or G/U
    - Rheomac (+2 drums)
- Film identification – Bentonite? (XRay diffraction) NOTE: this could be from recently installed instruments.
- Investigate the wall, primarily to prove the wall is or isn't intact (paramount) and secondarily to identify what/where material has been displaced:
    - Airtrack under thermal cap (airtrack drilling through the frozen cap)
    - Cone testing with skilled operator (6m, 3m, 1.5m → STA 464.5 to 497.5)
- Proceed with mass balance
- Investigate settlements within wall (Plate + pipe to monitor)

Schedule

1. Weir + Sediment Trap (July 22-23)
2. Sampling of water (July 22-23) + sample to leave site with Fiona & Paul on 23rd.
3. Airtrack drilling through frozen core + access for CPT and plastic casing + videocamera (Week of July 27th)
4. Tracer test (Prepare this week (contact Stéphane) and proceed Week of July 27th)
5. CPT testing (organization week of 27, mob end of week of 27th, pushing: 1 week (August 3 to August 7)
6. Review data (pond elevation and temperature)
7. Review of data & Recommendations
8. Memo to address the integrity of the wall & Conf call with MDRB at the end of the week.
9. Memo includes: review of data (water elevation & temperature) data from grouting & mass balance, results from analysis(bentonite content in water), settlement and flow measurements, and will conclude with recommendations for path forward

by August 15:

A memo will be completed and discussions with MDRB will have happened

In parallel, proceed with procurement (initiate 23-24 and get the material on site during the week of 27-28)

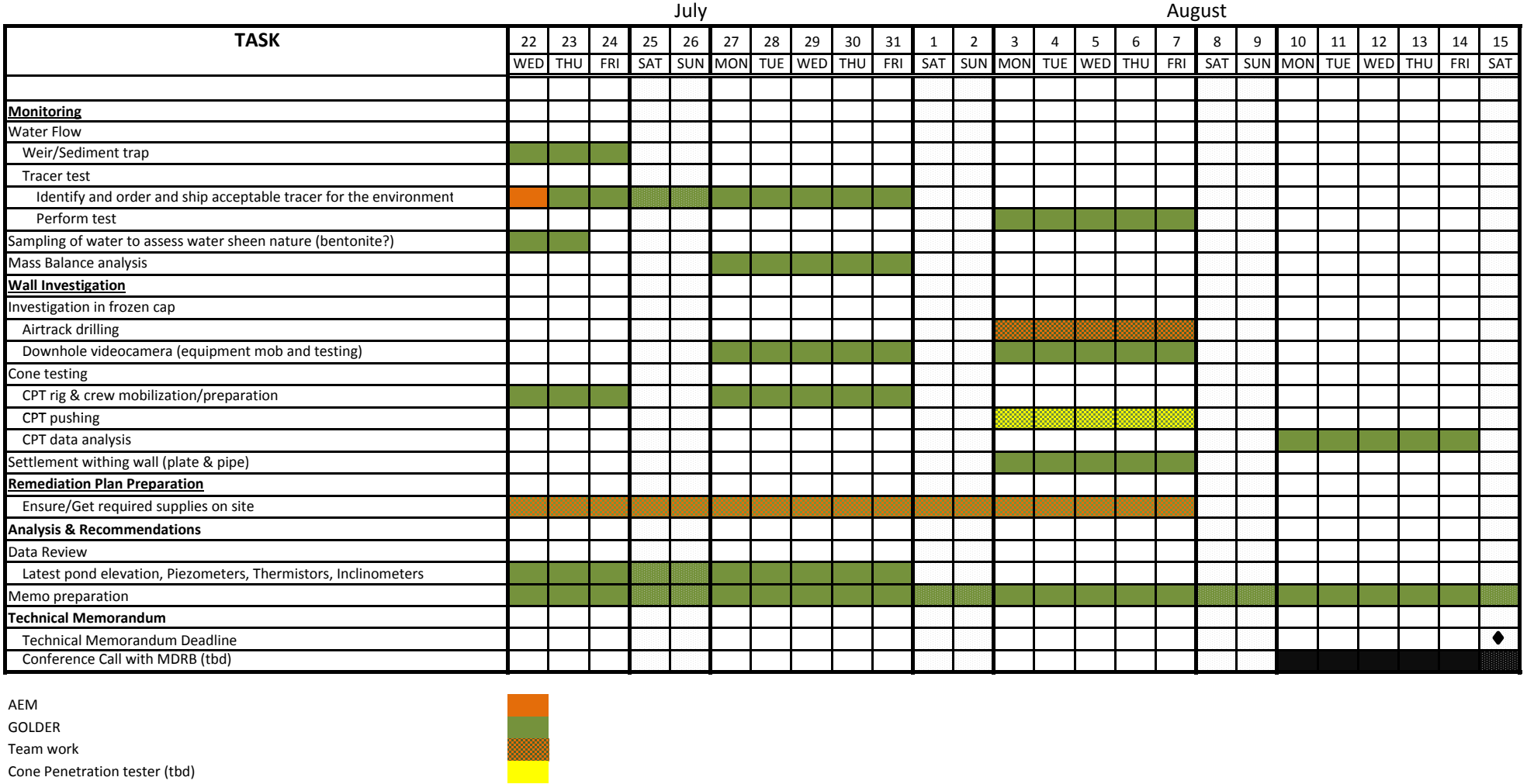
AGNICO-EAGLE MINES - MEADOWBANK DIVISION

MEADOWBANK DIKE REVIEW BOARD

Meeting #4 - July 20 to 23, 2009

Meadowbank Mine Site, Nunavut

East Dike Sink Hole and Seepage Plan of Action Schedule



ATTACHMENT D

Photographs

Photo # 1 Silt curtain anchor placement

Photo # 2 Stockpile of 0-20 mm material

Photo # 3 South Camp dike, upstream toe

Photo # 4 East Dike, seepage to east of ramp

Photo # 5 East Dike, pool at toe to west of ramp

Photo # 6 East Dike, seepage to west of ramp, note slightly cloudy

Photo # 7 East Dike, boulder field along downstream toe of dike

Photo # 8 East Dike, sinkhole at stn. 6+472

Photo # 9 East Dike,
Trench in which sinkhole
was located

Photo # 10, East Dike
Punching of crest by
drill casings

Photo # 11 Stormwater Dike, variation of foundation conditions

Photo # 12 Stormwater Dike, open joint in rock foundation

Photo # 13 Stormwater Dike, boulder accumulation along shoreline

Photo # 14 Saddle dike No1, view from south to north abutment

December 2, 2009

Project No. 09-1428-5007
Doc. No. 968 Ver. 0

Dr. Eric Lamontagne
Agnico-Eagle Mines Limited Meadowbank Division
P.O. Box 540
Baker Lake, Nunavut
X0C 0A0

RESPONSE TO REPORT NO.4 MEADOWBANK DIKE REVIEW BOARD, DATED AUGUST 19, 2009
SUBJECT: REVIEW COMMENTS

Dear Dr. Lamontagne,

On July 20 to 23, 2009, the fourth meeting was held between Meadowbank Dike Review Board (MDRB), Agnico-Eagle Mines Limited (AEM), and Golder Associates Ltd. (Golder). The meeting was held on the Meadowbank site so that the East Dike could be inspected and the construction preparation work at the Bay-Goose Dike and Tailings Storage Facility (TSF) could be observed. The East Dike instrumentation and grouting contingency planning update were also discussed. In addition, the technical specifications, construction work plans and construction schedules for the Bay-Goose Dike and TSF structures were presented along with the quality assurance (QA) and quality control (QC) program.

On August 19, 2009, the MDRB provided a letter with their comments from this meeting. This letter provides Golder's response to the MDRB questions and comments which is being submitted on behalf of AEM.

1.0 PROJECT STATUS

Comment: *The responsibilities for tailings management during mill operation will fall on the Mill Superintendant and the Environmental Manager. This facet of the work should not be underestimated given the added complexities of working in an extreme northern climate. Consequently, the Board would like to be provided with a copy of the detailed organization chart at the next meeting.*

Response: Agreed. A copy of the OMS Manual for the TSF structures will be provided to the Board once it is finalized by AEM.

Comment: *The Board was advised of a potential increase in ore reserves, which places additional emphasis on the need for good advance planning of tailings facilities with regards to the capacity and management for the anticipated future production. It is expected that this item will be the subject of discussion at future meetings.*

Response: AEM and Golder acknowledge this statement and confirm that TSF development is considering the eventual need for greater capacity than currently anticipated. The tailings deposition planning, currently done in parallel with the dike construction work, is taking the mine expansion into account. Design and specifications for the future TSF dikes, such as Central Dike and other Saddle Dams, will be presented to the MDRB in future meetings.

2.0 SITE INSPECTION

Comment: *A stockpile of 0-20 mm material has been built near the abutment from which the Bay-Goose embankment will be launched. Some segregation was noted as shown in photo #2. Although material with a maximum size such as 20 mm is not particularly prone to segregation, care is still required when handling the material in a dry state. Lifts in the pile should not exceed 2 m in height. The pile should be stepped and material should not be allowed to spill down the full length of side slopes.*

Response: Agreed. Stockpiling procedures and supervision are part of the QA/QC program.

Comment: *Seepage emanates from the* [East Dike] *toe in the area between Stn. 6+450 and 6+490…The seepage exited from the east side of the fill (photo # 4) until a channel was excavated on the west side. The majority of the flow is now seen to originate on the west side (photos # 5 and 6). Monitoring by way of weirs or flow pipes is required at both locations, and visual description of changes in suspended fines is necessary.*

Response: Following the site inspection, a rectangular weir was designed and installed to measure the flow through a channel excavated on the south side of the dewatering pipe ramp downstream of the East Dike (at about Sta.60+490) where most of the flow was found to occur.

The weir was monitored in July and August and seepage has been estimated at about 15 L/s on average, considering an additional 20% that did not report to the weir based on visual evaluation. The water flow rate appeared somewhat stable and the water was clear.

The weir became submerged in early September due to rising downstream water levels.

East Dike visual inspection and piezometer monitoring remain part of the QA/QC program.

Comment: *A walkover inspection of the Stormwater Dike foundation was carried out from east to west. The variable foundation conditions from soft lakebed to extensive boulder fields to bedrock outcrops were noted (photos # 11 to 13). The boulder fields… are to be addressed in the detailed directives to be formulated to cover foundation preparation.*

Response: AEM and Golder acknowledge this statement and confirm that TSF dike construction Technical Specifications require that a rough grading of the foundation surface be performed to remove boulders protruding more than 300 mm above the ground and scalp tops of hummocks to form a smooth surface. A copy of the TSF IFC Specifications will be provided to the MDRB prior to the next meeting.

QA/QC activities included the monitoring of the foundation preparation work specified.

3.0 TECHNICAL COMENTARY

3.1 East Dike

Comment: *There is an immediate need to monitor D/S seepage flow rates by whatever means are practical.*

Response: As described above, monitoring of seepage observed by the MDRB was performed between July 24 and September 6, 2009.

Comment: *There is also a need for prompt response, including contingency grouting plans, should there be a recurrence of the leak.*

Response: Discussions on an emergency/remedial action plan are ongoing between AEM and Golder. An initial grouting response plan was prepared during the original seepage event (May 2009). A draft remedial action plan was prepared in August which included a list of supplies and equipment required for emergency grouting. A copy of this action plan will be issued to the MDRB prior to the next meeting. The supplies included in this plan have been purchased by AEM and are now on site as is the required equipment. Personnel to carry out the emergency measures would be mobilized, if required.

The remediation action plan will be implemented in a phased approach and will be reviewed and updated as the work progresses.

Comment: *The detailed design (including collection system and pump station) for long-term seepage management should be tied to levels of leakage rate. In this regard, it would be useful to document: What is the design seepage scenario, how it will be handled, what is the demand capacity ratio for the collection system and how robust is the logic, how does this relate to the AEM emergency measures and evacuation plan for the pit, is there an Emergency Response Plan (ERP) to define responsibilities, lines of communication and actions to cover abnormal instrument readings, inspector observations, etc?*

Response: A detailed seepage management plan is currently in preparation. It will be presented to the MDRB at the next meeting of the Board.

Comment: *It is to be noted that the behaviour during drawdown has been highly non-linear with a rapid increase from almost zero seepage to something of the order of 600 l/s. This inflow was sufficient to negate the influence of the dewatering pumps installed at that time. It is therefore important to establish the design basis and it is recommended that a series of alert levels be established (for example green, orange and red alert levels) through which the type and rapidity of response can be better assured.*

Response: An East Dike OMS Manual has been prepared and is currently under review. The manual includes an emergency preparedness plan based on the CDA Dam Safety Guidelines. Updates to the OMS manual will include trigger or alert levels for monitoring.

Comment: *The appearance of a sinkhole reveals that not only was there loss of water but also the migration of solids which is a more serious issue. Likely the sinkhole is a result of leakage prior to the remedial grouting program but this requires confirmation. The situation requires immediate attention to confirm that leakage is not increasing with time and the integrity of slurry wall has not been compromised.*

Response: As a part of the remedial action plan described above, a series of investigation measures have been identified and are being conducted with the objective to assess the slurry wall integrity.

A cone penetration testing (CPT) program has been performed and results are being documented. This document will be provided to the MDRB prior to the next meeting of the Board.

A drilling and monitoring program, including packer testing in the immediate vicinity of the sinkhole has been completed. A geophysical program, including the use of a borehole televiewer in the diamond drilled holes, near the sinkhole and surface geophysics using ground penetrating radar (GPR) over the crest of the dike was conducted in parallel with the drilling and monitoring program.

Results of the drilling investigation and geophysics program will be discussed during the MDRB meeting currently planned for December 2009.

In parallel with the investigation program, the water level and instrumentation data collected on site are being reviewed on a regular basis.

Comment: *The Board requested that a teleconference be held in the week of August 10 for an update on the findings and recommendations for advancing this component of the work. This meeting was held on August 11, prior to completion of this report. A record of this teleconference is to be provided by GAL.*

Response: The minutes of the teleconference meeting were issued on September 21, 2009.

3.2 Bay-Goose Dike – North portion

Comment: *The Board agrees with the alignment and the cross-section as currently proposed for the northern sector but noted…that input should be sought from the Contractor to confirm the constructability of the slurry trench at the points of deflection in the dike axis.*

Response: Discussions were held between Golder, AEM, and the contractor prior to slurry wall construction. Turning points in the cutoff wall were successfully constructed by creating a small overlap in the two axes. The photograph below shows one such turning point in the cutoff wall alignment. The alignment was also slightly modified during the construction process near Goose Island.

Comment: *The Board notes that inadequate attention may have been paid to the influence of freeze/thaw effects on the soil/bentonite slurry wall conductivity and recommends a test program tied to thermal modeling and cyclic freeze-thaw effects.*

Response: Samples have been taken during the construction and a program for freeze-thaw modeling and seepage-thermal analysis is scheduled to commence in November. The results of this program will be provided to the Board once finalized.

Comment: *Although the onus is on the slurry wall contractor to determine if the densification of the central zone of the embankment is adequate to ensure trench stability, the Board agrees with the use of the Large Penetration Test (LPT) to guide future work and identify any current flaws.*

Response: An LPT program was conducted in September, 2009. A technical memorandum summarizing the results of this program will be issued to the MDRB prior to the next meeting of the Board.

Comment: *Based on the sinkhole experience, and despite the fact that the root cause has yet to be identified, the Board is of the opinion that continuity of the downstream filter and possible extension into a blanket beneath the shoulder would contribute to control of piping.*

Response: AEM and Golder acknowledged this statement from the MDRB and discussed its feasibility. Given the very tight construction schedule and the granular material availability, the decision was taken to replace the lower portion of coarse filter with core backfill and the width of the excavation on the downstream side of the cutoff wall was increased. This increased width of excavation means the length of core backfill (filter) material in contact with the bedrock has increased. Drawings were revised and construction was carried out in accordance with the revised design. (These updated documents will be forwarded to the MDRB prior to the next meeting). Golder is reviewing the need for any further design modifications for the southern portion of the dike alignment and whether any other filters (*i.e.* vertical downstream chimney filter) may be necessary for the northern portion of the dike.

Comment: *The Contractors constructing methods should be reviewed to ensure continuity in the placement of the CSB as there is a concern about the possibility of cold joints within the CSB. The Board prefers ensuring no shearing of CSB interface and hence a minimum set time should be adopted prior to placing SB material. However, there should also be a control of the maximum time before SB placement to minimize the accumulation of sand settling out of the bentonite slurry.*

Response: CSB placement occurred primarily in the deeper portion of the cutoff wall alignment during the 2009 Bay-Goose Dike construction. CSB placement was discussed in detail with the Contractor on site. Due to schedule and equipment constraints, CSB placement was done using the same construction methodology as was used for SB rather than the tremmie method outlined in the specifications.

Placement of CSB material began above the existing SB material already in the trench prior to reaching the deeper portion of the cutoff wall. Placement occurred continuously until the cutoff wall depth decreased to 6.5 m or less. Placement of SB material then resumed. As a result of the placement methodology used, the CSB material extended up to the surface of the trench. The CSB mix was reduced to 6% from the 8% specified based on Contractor lab results.

A second zone of CSB was placed at the end of the 2009 cutoff wall. The width of the cutoff wall in this portion was increased to 3 m over approximately a 10 m length. The CSB mix design was modified as well to include 2% cement, rather than 6%. The overlap portion of CSB over SB at this area will also need to be addressed in the 2010 construction season.

Comment:

With respect to grouting, the Board notes with favour a number of potential improvements that have or are to be added to the specifications but, given the

experience on the East dike, the Board questions whether there is more that can be done to improve completeness of treatment and the reduction of the possibility of a repetition of the incident of high seepage and the coarse particle erosion that appears to have occurred.

Response:

AEM, Golder and the Contractor are assessing the grouting technique and methodology for the Bay-Goose Dike. Grouting at Bay-Goose Dike is not scheduled to commence until March or April 2010.

The change in the design involving replacing the lower portion of coarse filter with core backfill, and increasing the amount of core backfill material in contact with the bedrock surface downstream of the cutoff wall, as described above, was advanced based on learnings from the East Dike.

An LPT program has been performed in order to gain further knowledge on the relative core backfill compaction efficiency. The results of this program are being documented in a technical memorandum that will be provided to the MDRB prior to the next meeting of the Board. Monitoring during excavation of the cutoff wall indicated that the trench remained open to the full depth of the excavation.

During the 2009 construction of the northern portion of the Bay-Goose Dike, an accumulation of silt at the base of the initial excavation was observed. The source of the silt may be from fines within the core backfill and coarse filter material being placed within the excavation, and/or from lakebed materials. A review of the gradation of in situ core backfill materials collected during the LPT program is currently underway in an attempt to further clarify the potential source of this material. The results of this analysis will be presented to the MDRB at the next meeting of the Board.

The thickness of the silt varied depending on:

- proximity to the face of the trench where backfill material was being placed;
- shape of the bedrock surface; and
- length of time the excavation was left open.

Following discovery of the silt accumulation, subsequent portions of the excavation were cleaned continuously in front of the backfilling operation to minimize the presence of silt at the base of the excavation between the bedrock surface and the core backfill. In addition, the cutoff wall excavation was continuously monitored to ensure that the base of the excavation was extended to bedrock and to an elevation below the base of the initial trench excavation. This helped to ensure that no silt material remained at the base of the cutoff wall.

Comment: *It is suggested that drilling parameters may assist in the identification of joint openings, as may televiewer images. Side discharge bits may improve the effectiveness of hole washing. The need for further investigation, after construction of the initial rockfill embankment, should be considered. There is a need for* [Golder] *to advise on the best technology to optimize the grouting effort in order to avoid sinkholes in the future.*

Response: A geotechnical investigation program for the southern portion of the Bay-Goose Dike is in preparation. This program may include collection of additional data related to the quality of bedrock and fracture structure beneath the Bay-Goose Dike. Details of the program will presented to the Board prior to initiation of the program currently planned for February 2010. Information obtained from the East Dike investigation program, including televiewer and detailed rock core logging will be considered for the Bay-Goose Dike as well.

3.3 Bay-Goose Dike – South portion

Comment: *The Board is of the view that the base case design should be a cut-off to rock and this design should advance. However, the Board is open to a demonstration by detailed site investigation that a partial cut-off is an acceptable optimization.*

Response: Golder and AEM are reviewing the potential design options for the southern portion of the Bay-Goose Dike. If AEM decides to pursue the “partial cutoff wall design option” it is recognized that an extensive investigation program with detailed collection and logging of lakebed soils will be required, and that information obtained from such

investigation, may or may not support this design. This item is intended to be discussed further during the next MDRB meeting.

Comment: *The Board is of the view that a filter beneath the rockfill shell is an integral part of the design.*

Response: Review of the south portion of the Bay-Goose Dike is currently underway and will be based on additional knowledge acquired during the 2009 construction period, the East Dike investigation program, and the 2010 geotechnical investigation program.

3.4 TSF – Stormwater Dike

Comment: *The cut-off trench should be moved upstream out from under the dam to facilitate construction. Furthermore, there is a need for clarification of the specifications covering the backfill materials and its placement in the trench.*

Response: Stormwater Dike design was reviewed prior to the construction. The alignment was reviewed and revised in the field based on the pond water level and field conditions and the cut-off trench was constructed at the upstream toe of the dike.

Comment: *The Board accepts the use of the Coletanche but insists on meticulous inspection of bedding and coarse filter. Thus it is questioned whether protection could not be adequately provided by relying on tailings beaches, pond control, or a Linear Low Density Polyethylene (LLDPE) rub sheet.*

Response: Coletanche is being used in the construction of the Stormwater Dike. Observations on the liner bedding and coarse filter were discussed with AEM and documented in daily and weekly reports.

Comment: *The Board expresses the wish to review the specifications, when issued.*

Response: TSF Technical Specifications were issued for construction in October and will be provided to the MDRB prior to the next meeting.

Comment: *The Board wishes to receive a copy of the* [construction] *planning so it can participate in tracking the effective sequencing.*

Response: The initial planning for the construction of Stormwater Dike was prepared by AEM and discussed with Golder. Additional information was communicated during the daily construction meetings and during the additional planning meetings held prior to the resumption of work at Stormwater Dike following completion of the earthworks component for Saddle Dam 1 Stage 1 construction. Schedule changes have occurred throughout the construction due to material and equipment availability, and overall priorities.

Comment: *There is a particular urgent need for investigation of the till/rock conditions along the cut-off trench alignment. The presence of jointed and frost jacked rock (photo #12) indicates a requirement for an adequate filter between fine grained materials and the rock wherever the hydraulic gradient could lead to piping.*

Response: Several test pits were advanced along the cut-off trench alignment. The conditions observed in the test pits, and those during cut-off trench excavation and embankment foundation preparation were used to determine the actual cut-off trench alignment. The cut-off trench was aligned to tie-in with more massive bedrock, where practical, and the placement of graded fill materials was performed to provide an appropriate filter system.

This construction approach was developed in consultation with AEM and satisfactorily manages the risk of tailings migration and/or seepage through the Stormwater Dike. It shall be recalled that this structure is internal to the TSF and, as such, any tailings migration and/or seepage through the structure will not report to the surrounding environment; any tailings and/or seepage will report to the South Cell of the TSF.

3.5 TSF – Saddle Dam No.1

Comment: [Saddle Dam 1]*, and the other saddle dams merit their own Design base Memorandum (DBM) and Design Report.*

Response: The decision to have both TSF dikes under the same technical specifications was based on a construction efficiency point of view as both Stormwater and Saddle Dam 1 structures were to be built during the same period and by the same contractor. Nonetheless, care has been made on clearly describing the requirements for both structures. Both structures also have their own drawings sets.

Comment: *As with the Stormwater Dike, the Board suggests that a simplified key trench detail be adopted to move this element upstream so as to facilitate construction. However, before this decision can be made there is a need to review the anticipated performance of the dike and its foundation.*

Response: The Saddle Dam 1 design has been revised. The key trench, as constructed, is located at the upstream toe of the structure.

4.0 CLOSURE

We hope the above information provides the required clarification. If additional information is required, please do not hesitate to contact us.

Yours very truly,

GOLDER ASSOCIATES LTD.

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