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9545-1-1-JER-R

November 14, 2005

Ms. Phyllis Beaulieu
Manager of Licensing
Nunavut Water Board
Box 119,
Gjoa Haven, NU. X0B 1J0

Dear Ms. Beaulieu,

Re: Jericho Project, East Dam & Southeast Dam Design Report and Construction Specifications.

Thank you for providing INAC with an opportunity to review the above-mentioned plan, dated August, 2005, and prepared by EBA Engineering Consultants Ltd. for Benachee Resources Inc. (herein referred to as “Benachee”).

These documents were submitted to the NWB by Benachee on August 30, 2005 as a requirement of Part D, Item 2 of water license NWB1JER0410.

It should be noted that INAC’s review and/or acceptance of this report and construction specifications does not in any way, release Benachee from its obligation to comply with the spirit and intent of the Water Licence condition under which the report was submitted. Benachee is ultimately responsible for correcting any deficiencies in the report and construction specifications and/or any liabilities resulting from these deficiencies, which may arise during the course of the project.

INAC’s scientific and geotechnical engineering advisors have reviewed the documents prepared by EBA Engineering Consultants Ltd. (EBA) and submitted by Benachee. The documents include:

- Jericho Project East and Southeast Dam Design Report.
- Jericho Project East Dam and Southeast Dam Construction Specifications.
- Drawing ED-1 Processed Kimberlite Containment Area Location
- Drawing ED-2 East Dam and Southeast Dam Surficial Geology
- Drawing ED-3 East Dam and Southeast Dam Location Plan
- Drawing ED 4 East Dam and Southeast Dam Typical Cross Sections
- Drawing ED-5 East Dam and Southeast Dam Key Trench Layout Plan
- Drawing ED-6 East Dam and Southeast Dam Liner Layout Plan
- Drawing ED-7 East Dam Profile and Cross Section
- Drawing ED 8 Southeast Dam Profile and Cross Section

The above documents were prepared by EBA Engineering Consultants Ltd., dated

Canada

August 2005. The drawings were all labeled with "Revision 0, Issued for Construction".

In addition, INAC's expert reviewers referred to INAC's Intervention for the Water Licence submission, dated November 30, 2004, for additional context in this review.

In preparation of these comments, INAC's advisors have also reviewed the comments prepared by Acres International for the Nunavut Water Board, dated October 20, 2005. In general, INAC concurs with the review comments and recommendations made by Acres to the NWB, and therefore will not repeat similar comments here.

DESIGN REPORT

The design report describes the design and construction of the PKCA East and Southeast Dams. PKCA operation will be described under separate cover in a PKCA management plan that is currently being prepared.

The following comments are provided in the order of the sections presented in the design report.

1. In Section 2, Design Intent, there is no mention about the design of the main water retention element. Are these dams considered "frozen core" dams with geomembrane liners as a backup, or is the geomembrane liner the main water retention element? Will the structures be raised again in the future or is this the final height?

2. Section 2.2 Foundation Conditions summarizes the foundation conditions at the dam sites. It was noted that two boreholes were drilled at the East Dam and one borehole was drilled at the Southeast Dam. Ice descriptions were not logged during drilling, however, EBA has conservatively assumed that the tills are ice rich in the low lying areas between the bedrock abutments. There should also be some statement regarding the presence or absence of taliks under the dam foundation. It was noted that ground temperatures below 10 metres in September ranged from -5C to -70 C. If taliks are present, they have not been considered in this design.

3. Section 2.3 Lake and Tailings Level Projections should include some more discussion about PKCA pond storage water levels. This issue was raised by INAC in the 2004 Water Licence Intervention (see Section 2.1.2 of the Intervention). The concern raised by INAC previously was that the maximum allowable water level of 523 metres during operation corresponds to the spillway invert level. During a flood, the pond level will rise above this level in order to pass water through the spillway. At the water licence hearing, Tahera's consultants explained that the pond level could rise from elevation 523 metres to 523.7 metres if the spillway was entirely blocked while passing the design flood. The top of the geomembrane liner is set at elevation 523.5 metres on the construction drawings. Note that the elevation of the top of the geomembrane liner has been lowered by 0.5 metres from the elevation provided in the water licence hearing (el. 524.0 metres). During the water licence hearings, Tahera explained that under normal operating conditions, the pond level would be kept below elevation 523 metres, so that, in the event of a flood, pond levels would rise to a maximum elevation of 523.2 metres. The design report also indicates that

during the 2006 freshet, the pond level may rise to elevation 520 metres if the divider dike is blocked by freezing. Further discussion is required regarding how water levels in the eastern portion of the PKCA will be regulated.

4. Freeboard should be discussed more thoroughly. The actual difference in elevation between the top of the geomembrane liner and the maximum allowable water level is 0.5 metres. The 1.0 meters referred to in Section 2.3 is to the top of the dam. Is this 0.5 metres enough for wind wave setup and run up? Is there an allowance for dam settlement included?

5. Section 2.3 indicated that the Divider Dike A would be constructed in the summer and fall of 2005. Please advise on the current status of construction of the divider dike.

6. Section 3 Design Cross Sections indicates that the geomembrane liner will be keyed into the foundation materials with sufficient cover over the key trench to maintain the base of the liner in a frozen condition. As noted above, it is not clear if the remainder of the dam is intended to be constructed as a frozen core or not. No thermal analysis was presented to demonstrate that the key trench would remain in a frozen condition. No seepage analysis was presented to demonstrate the effectiveness of the key trench or to assess seepage through the structure. Seepage has an influence on the temperature distribution within the dam. Note that the geomembrane liner does not extend over the full length of the structure and the till used in the upstream shell is pervious.

7. Section 3 also indicates that the upstream shell will contain till mined from the open pit overburden under winter conditions. No data was presented regarding the geotechnical properties of this till that can be used to assess how this material may behave under frozen conditions. The design report implies that the till will behave like a granular material, once it is placed on the dam. There is no discussion presented on the in situ nature of the till with respect to permafrost conditions and ice content and how it will be excavated and treated prior to placement.

8. With respect to the coarse processed kimberlite that will be placed over the till, Tahera must provide assurance with respect to the durability of this material, as recommended in Section 2.1.3 of the Intervention. Once coarse PK is available, Tahera should develop a test program to demonstrate the slake durability and freeze-thaw durability of this material.

9. Section 4.1 Slope Stability- Analysis Methodology should include copies of the analyzed cross sections for each of the conditions given in Table 1. In addition, the global stability of the dam and the impounded tailings and water should be included as a design case. More detailed discussion is required regarding the analysis of each of the analyzed loading cases.

10. In Section 4.2 there is no data on the till used in the dams. The ice-rich and ice-poor till values in Table 2 are for the foundation only.

11. In Section 4.4 Seismicity, the NBCC criterion for a peak ground acceleration of 0.06g should be checked with NRCAN, as the NBCC does not apply to dams as far as INAC is aware. The seismic safety of a dam should be based on a site-specific seismic hazard evaluation. Does the NRCAN seismic hazard analysis for Contwoyto Lake give the same values for the 2,475 year return period earthquake as the NBCC (2005)?

12. In Section 5 Settlement, the intent is to keep the foundation frozen, thereby preventing settlement, however, the absence of a talik under the dam has not been proven with the information presented in the design report. There is only 0.5 metres of freeboard between the top of the geomembrane and the maximum allowable water level, with no obvious allowance for settlement. According to the design assumption made in Section 2.2, the till in the dam foundation is assumed to be ice-rich. In order to minimize settlement, how much material is Tahera expecting to remove from the foundation?

13. Section 7 Material Properties should mention the need to conduct durability tests on the coarse PK as well as to confirm that the materials are not susceptible to Acid Rock Drainage (ARD) and metal leaching (ML). There is no discussion on how the frozen till will be mined and handled in the open pit borrow excavation.

14. Section 8.3 Schedule, is this schedule still current?

15. Section 8.4 Foundation Preparation does not mention the possibility of encountering a talik. If there is no talik present, then this information should be presented in the design report.

16. Section 8.6.2 Liner System, how is the integrity of the liner checked after it is covered?

17. Section 8.7 Quality Assurance. If the liner is the primary water retention element, there needs to be more details provided here as to how to ensure the integrity of the liner is maintained during placement and backfilling and how this is verified after it is covered. There is nothing in the design document that mentions seepage through the dam. This relates to the design intent. If parts of the dam have to be kept frozen, then what effect does a less than 100% effective liner have on the performance of the dam?

18. Section 9.0 Long Term Monitoring. Section 9.1 indicates that monitoring of the thermal regime of the dams will be carried out. Section 9.2 describes the thermal monitoring, which includes only the key trench. It is not clear from this section what the objectives of the thermal monitoring are. Further details should be presented regarding the design intent of the dams with regard to the internal thermal regime.

19. Section 9.3 Survey Monitoring. Settlement may be a concern with these structures due to the potential presence of ice-rich tills. The proposed system of wooden stakes driven 300 mm into the 20 mm material or Hilti bolts installed into boulders are not considered acceptable for long term monitoring of settlements. Although precision surveys are not required for this monitoring, the installations should provide

repeatable measurements. It is recommended that survey pins be anchored at least below the depth of the seasonal active zone, which is expected to be at least 1.5 to 2.0 m. This means that the survey pins have to be located on the downstream crest, to avoid piercing through the geomembrane liner.

CONSTRUCTION SPECIFICATIONS

1. In Section 1005, Item 2, Material Sources, the specifications should require that all materials used for dam construction be tested to confirm they are free of constituents that result in ARD and metal leaching. Either BRI warrants this to the Contractor by virtue of having done their own testing as part of the borrow area management plan, or makes the Contractor responsible for testing prior to construction. Due to the lead time involved in obtaining results, BRI should have this information provided to the Contractor as part of the construction documentation.

2. In Section 1005, Item 3, Material Specifications, the following words should be included in the material specifications for all the dam construction materials "…be free of roots, topsoil or deleterious material…"

3. In Section 1005 there are no specifications regarding the mining of the till in the borrow area. Since the till will be in a frozen state when it is excavated from the open pit area, some processing will be required. The specifications for till in Item 3.4 say nothing about the quality of the till that should come from the pit except for maximum particle size and that particles must be "hard, durable and angular".

4. Section 1006 describes fill placement. As noted above in the comments on the design report, it is not clear if the dam is to be constructed as a frozen dam or not. Section 1006, Item 2 describes placement of bedding material in the key trench and is clearly meant to be a frozen material. Item 3 describes placement of bedding material in the superstructure part of the dam and it is not clear if it has to be frozen. The specifications read like those for an unfrozen structure.

5. The specifications in Section 1006 Items 2 and 3 do not provide specific details on how the Contractor should check the integrity of the liner after placement of the fill. This relates back to the design report, where the purpose of the liner needs to be defined more clearly. Further details could be provided in Section 1007.

6. Section 1006, Item 3.1 should be changed to read; *"The bedding material placed in the superstructure must be placed in lifts no thicker than 0.3 metres."*

7. In Section 1007 Benachee should discuss what methods will be used to detect liner damage, if any, after fill placement.

DRAWINGS

Drawing ED-2 East Southeast Dam Surficial Geology

- The surficial geology terrain boundaries seem to be shifted with respect to the terrain features seen on the photographic base. For instance, under the Southeast Dam, part of the north abutment is mapped as "colluvium", where it appears that bedrock is exposed.

- The level of detail of the terrain mapping is insufficient for the scale of the structures being proposed. For example, the areas of boulder fields (felsenmeer) have not been identified, but are lumped under the "Colluvium" unit.

- Areas of organic terrain within the dike footprints have not been identified as such, although this is one of the terrain units in the legend.

These details affect the interpreted foundation conditions to be encountered within the footprint of the dams, which results in invalid conclusions regarding the conditions expected during construction. The presence of surface water and organics across the footprint of the Southeast Dam for instance, indicates the potential for a deeper thawed zone or talik, which does not appear to have been investigated by drilling nor monitored for temperature. Removal of the saturated organics will require a larger excavation to construct a key trench if a thawed zone exists in this area. Additional excavation may be required under the upstream and downstream shells of the dam to remove organic materials.

Drawing ED-4, East Dam and Southeast Dam Typical Cross- Sections

- The key trench details indicate a 1:1 excavation slope. This configuration is satisfactory if the ground is frozen during construction. As noted above, potential talik conditions under the Southeast Dam would require flatter slopes, as well as drainage and water control during construction.

- The depth of the key trench is shown as "1.0 metres in Till, 2.0 metres in Rock". No depth of excavation is given for colluvium or organics, which should be removed from the entire dam footprint.

- The depth of the key trench in rock was based on BH-03-10 (SRK, 2003), located near the centre of the East Dam alignment. The bedrock in this hole was encountered at a depth of 23 metres and indicated a zone of broken rock 2 metres thick, overlying competent rock. Recognizing that the active zone in exposed bedrock may be much deeper, potentially up to 5 metres, there is a possibility that the key trench depth may have to be increased to reach competent foundation conditions (ice saturated permafrost soil or rock as per Section 8.4 of the Design Report) where the dams cross areas of exposed bedrock or bedrock with shallow overburden cover.

- No removal of organics is shown under the upstream and downstream shells. The drawing shows only "Removal of Boulders and Rock Fragments" As noted above,

based on the air photo data, provisions should be made in the design to allow for some excavation under the shells to remove organic materials, particularly for the Southeast Dam.

Drawing ED-6, East and Southeast Dam Liner Layout Plan

- Since the proposed liner follows the key trench excavation, more bedding material may be required to backfill any areas of over-excavation that were carried out to remove unsuitable materials, in order to avoid changing the liner configuration and the quantity of liner required.

- If the key trench needed to be deepened, then, presumably, the bottom of the core trench would have to be backfilled with the Zone D Bedding material to bring the bottom of the key trench back up to liner grade, rather than extending the liner deeper.

CONCLUSIONS AND RECOMMENDATIONS

The East Dam and Southeast Dam retain water and processed kimberlite deposited in the PKCA. The design, specifications and construction drawings for these structures were reviewed by INAC's geotechnical advisors to identify any outstanding issues and information requirements and to recommend appropriate measures to satisfy water licence requirements and mitigate potential environmental impacts. As a result of this review, INAC's expert advisors have identified the following major issues that need to be addressed by BRI and EBA:

1. Re-assess the geological conditions along the proposed dam footprint with respect to the location, depth and width of the key trench and the amount of foundation stripping and foundation preparation required under the upstream and downstream dam shells.

2. Clearly state the intended design type of dam in terms of the water retention/seepage control elements, particularly frozen vs. unfrozen design philosophy and the role of the geomembrane liner.

3. Provide a thermal analysis to prove that the key trench will remain frozen.

4. Provide a seepage analysis to assess the effectiveness of the key trench and seepage through the structure and its effect on the thermal regime and overall stability.

5. Provide a slope stability analysis to demonstrate the stability under the design conditions, including global stability of the structure with tailings impounded.

6. Verify pond operating levels and freeboard.

7. Conduct durability testing of the coarse PK once the material is available from the processing plant.

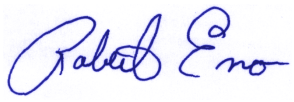
8. Verify that all construction materials are free of materials that have the potential for acid rock drainage and metal leaching.

9. Provide data on the quality of the till material and processing required from the borrow pit.

10. Revise specifications in accordance with above designs and the deficiencies noted above.

Given the extensive list of critiques and questions with respect to this particular report, I would like to suggest, in the interest of facilitating a quick resolution of the technical issues identified by INAC, that a teleconference be set up between Benachee, EBA and INAC. The outcome of this teleconference would be communicated to the NWB for their own information and for distribution to interested parties. I will await the NWB's approval before proceeding any further with this idea.

Should the NWB or Benachee have any questions or comments, please do not hesitate to contact the undersigned.



Robert Eno
Water Resources Coordinator

c. Greg Missal - Tahera Diamond Corporation