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November 4, 2008

David Abernethy
Regional Coordinator
Water Resources Division
Nunavut Regional Office
Indian and Northern Affairs Canada
Iqaluit, NU XOA 0HO

Dear Mr. Abernethy:

Re: 1AR-NAN0208, Nanisivik Mine – INAC Site Inspection, July 2008

This letter is submitted in response to the comments and recommendations included in your letter of August 1, 2008 to the Nunavut Water Board. Those comments were made following your site visit to Nanisivik with several representatives of INAC and your consultants, along with representatives from the Government on Nunavut. The purpose of the inspection was to observe reclamation and closure activities which were in progress at that time.

First off let me begin by thanking your group for the favourable comments we received during their visit. It was my pleasure to be there during the tour and I would not hesitate to say that we received positive feedback from all the visitors in attendance. There was a very good technical exchange of information between your consultants and ours, and a general agreement that the project was proceeding according to design.

That being said there were a few requests for additional information on several geotechnical items that I believe you captured in your letter. In way of a response I have asked our geotechnical expert to address each of these items and have appended this letter here (BGC Engineering Inc. November 4, 2008).

In the way of a general update since your site visit in July, I can inform you that in accordance with the approved 2004 Reclamation and Closure Plan ("Plan"), the physical aspects of the project have now been completed. As detailed in that Plan this includes the following which were described as "key reclamation measures:

1. A geothermal insulation cover of shale (1.0 m) and a durable cap of sand gravel (0.25 m) were constructed over exposed tailings to ensure that the tailings remain frozen and isolated from the environment even under a worst-case prediction of climate warming.

2. A 1 m water cover remains over subaqueous tailings to prevent oxidation of tailings from affecting water quality.

3. An engineered outflow spillway Has been constructed from the covered tailings area designed to provide environmental protection against an extreme flood (probable maximum flood).

4. Mineralized surface "mine development" rock has been relocated to the underground mine or to open pits where backfilling is required.

5. Open pits have been backfilled and covered with a geothermal insulation cover that is thicker than proposed for the tailings cap (1.95 m shale plus 0.25 m sand and gravel) to ensure that the waste rock and mineralized wall rocks remain frozen and isolated from the environment even under a worst-case prediction of climate warming.

6. A geothermal insulation cover of shale (1.95 m) and a durable cap of sand gravel (0.25 m) was constructed over the landfill facility, in addition to shale which was already in place from mining operations, to ensure that the tailings remain frozen and isolated from the environment even under a worst-case prediction of climate warming.

7. The industrial infrastructure and residential buildings were dismantled or demolished and components of economic value were salvaged for shipment off site or for sale locally.

8. Non-hazardous demolition debris and residual scrap materials were disposed in the underground mine or in open pits where backfilling was required.

9. Contaminated soils were remediated by covering in-place or by excavation and disposal in either the underground mine or in open pits that required backfilling.

10. Additional monitoring instruments were installed to monitor ground temperature and depth of thaw in reclaimed areas.

11. Environmental monitoring of the site has continued throughout the reclamation period and will continue until we can confirm long term stability and success of the reclamation measures.

This outlines the major works which commenced in 2003 and were finalized in September of this year. In general terms, the town and mine site and all associated surface infrastructure (both Nanisivik Mine and Government of Nunavut owned) has been removed or remediated. A "footprint" remains, as it does at every site that man has touched, but the physical presence has been erased.

Former Townsite area.

The only exception to this which would be the tank farm at the dock. This facility remains intact and the property of Nanisivik Mine. As you are aware however, DND has approached Breakwater to acquire the tankfarm and have been conducted a feasibility study to determine if the facility meets their needs as part of the announced "deep water refueling station for the Arctic". As part of the feasibility exercise DND have conducted an Environmental Assessment as well as a Structural Review of the installation. It is anticipated that a decision will be made in the short term, however should this not occur in 2009 or should DND decide not to use the tanks, we will make arrangements to have the location remediated in accordance with the approved Plan.

Environmental monitoring of the site has been continuous throughout both the operation and reclamation periods (more than 30 years). Post- closure monitoring will now commence and will continue until it can be demonstrated that the site has achieved its long term objectives of posing no adverse effects on human or ecological receptors. Regular reporting of these results will occur throughout the closure monitoring period.

Breakwater is proud of the work that has been accomplished at Nanisivik. The mine operated successfully for 27 years, pioneering the way for many of the mining projects which came after it. Now, as it enters this final stage, we are completing the story of that success. We will continue to diligently monitor the results of our efforts, ensure that our obligations are met and that the legacy of the project remains a positive one. In short, we maintain our commitment to "do the right thing".

As always should you have any questions or comments on this matter you can contact me directly by telephone at (416) 363-4798 or by email at bcarreau.breakwater.ca.

Best regards,

***Robert Carreau**, Vice President, CSR and Sustainability*

BREAKWATER RESOURCES LTD.

cc. Nunavut Water Board

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November 4, 2008
Project No.: 0255-017-04

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Attention: Mr. Bob Carreau

RE: RESPONSE TO REVIEW COMMENTS IN INAC AUGUST 1, 2008 LETTER

Dear Bob:

In response to your request, BGC Engineering Inc. (BGC) has developed a number of responses to review comments provided in the INAC letter dated August 1, 2008. The review comments provided by INAC were developed following a site inspection of the Nanisivik Mine reclamation works by INAC and their consultants undertaken on July 14, 2008. The original review comments along with the developed responses to each review comment are provided below.

1.0 REVIEW COMMENTS AND RESPONSES

1. *Original Review Comment: Freeze-back of tailings within the West Twin Disposal Area Surface Cell is taking place and permafrost conditions will eventually prevail from the original lake bottom to the active layer. Elevated pore pressure has been observed in the tailings and the potential consequences of freezing (i.e. pingo formation and heaving) have been addressed in the BGC Engineering Inc. 2004 Assessment of Surface Cell and Test Cell Taliks. BGC Engineering Inc. has suggested that the Surface Cell is a closed system. If this were the case, movement would result from the expansion of frozen water. Movement within the Surface Cell was not observed, leading to speculation that the Surface Cell may actually be an open system with an unfrozen conduit extending under the dam and up through the subaqueous tailings into the remaining portion of West Twin Lake. Ongoing freezing conditions could drive a plume of cryo-concentrated pore water into the lake. Potential impacts to the water quality of West Twin Lake do not appear to have been addressed in the BGC Engineering Inc. 2004 report.*

Response:

The instrumented monitoring of permafrost at the Nanisivik site has been on-going for 20 years (the first thermistors were installed in 1988). Since that time more than 70 instruments have been installed comprising several hundred temperature nodes. Additionally, physical evidence of local permafrost behaviour has been observed during the construction and throughout the continued operations of the site for more than 40 years. As a result of this site specific information and experience, a very good understanding of the geothermal conditions at the site has been developed by CanZinco Ltd. (CanZinco) and BGC.

The Geothermal monitoring data collected from the West Twin Disposal Area (WTDA) , as well as vibrating wire piezometers which show increasing pore pressures in the Surface Cell talik as freeze-back continues, supports the understanding that the talik is a closed system. The geothermal monitoring data collected to-date suggest that there is no thawed conduit between the Surface Cell and the Reservoir. Additionally, if the system were open, pore pressures would likely increase at a much reduced rate, as observed in the Test Cell talik which is an open system. Nonetheless, as a conservative measure, the Surface Cell and Test Cell taliks were both considered to be open systems (hydraulically connected to the Reservoir) during the development of long term water quality projections. This task was completed by Gartner Lee Ltd. and the results and methodology are documented in Section 6.7 of the West Twin Disposal Area Closure Plan report (BGC et al. 2004) (submitted to the NWB in 2004 and available on the Public Registry). The results of that modelling projected water quality from the WTDA would continue to meet water quality requirements throughout the post closure monitoring period.

2. *Original Review Comment: It is understood that L.A. Abrasion tests were performed on select samples of shale prior to their use as a cover material on tailings and open pits. For the most part this shale was frozen when quarried and is now subject to repeated freezing and thawing cycles. If not already completed, it is recommended that CanZinco Ltd. perform a long term freeze-thaw durability assessment on quarried shale to evaluate how shale cover material will break down when subjected to repeated freeze-thaw cycles. It is understood that shale has broken down into 'pea gravel' sized pieces within the thermal cover test-pits. There is a possibility that this weathering will continue in the future, resulting in silt sized particles that retain water, forming a soft surface that restricts vehicle access in the summer months (for monitoring) or may create an unstable surface beneath cover armour on slopes resulting in solifluction movements (i.e. gradual movement of cover material down slopes). However, the breakdown of shale cover material may be advantageous because fine grained materials would have a lower thermal conductivity, resulting in a thinner active layer and more effective thermal cover. As long as this material remains frozen, long term durability will not be an area of concern, stability would only be affected in the thawing season.*

Response:

Test pitting investigations were conducted in the test covers constructed over tailings at the WTDA and at the cover constructed over waste rock at Area 14 in July 2004. The results are documented in the QA/QC Plan report (BGC 2004b). The test covers were constructed over tailings in the Test Cell in 1991 and 1992 and the cover over waste rock at Area 14 was constructed in 1988. The grain size distribution of the samples collected from the test covers in 2004 were similar to the grain size distribution of samples collected during construction as documented in Terratech (1993). The shale fill in both locations was observed to consist primarily of gravel and cobble sized particles (62% to 95% by mass) with lesser amounts of sand and silt sized particles. These results suggest that degradation of the shale fill due to freeze thaw cycles over a 10 to 15 year period was minimal.

Freeze thaw tests were conducted on samples of shale during initial material assessment work documented by Golder (1999). The results suggested that the percent loss after 25 cycles was minimal, 6.1 to 2.3%. No additional freeze thaw durability testing has been completed on the shale material.

The results of the lab testing combined with the visual observations from the test covers suggest that physical breakdown of the shale fill due to freeze thaw cycles will be very slow. As such, it is unlikely to affect the trafficability or stability of the covers. In the event that some breakdown does occur over a shorter time frame, it is likely to be beneficial to the thermal performance of the cover systems, as suggested in the original review comment.

3. *Original Review Comment: Reclamation work consisting of a 2.2 m cover over unsaturated material (waste rock, pit walls, landfill) and a 1.25 m cover over saturated material (tailings) has been completed in many areas. In order to verify that the covers have been constructed to the required thickness, it is recommended that CanZinco Ltd. provide:*
   - *A. Plan view drawings showing the pre and post cover topography. Ideally this would be complimented with isopach drawings of the cover thickness; and,*
   - *B. Construction records to show the volumes of material moved as a check on the isopach volumes. These records could be the contractor's progress billings or production summary or even survey estimates of the volume removed from the quarries.*

Response:

A. Plan and section view drawings for each surface reclamation cover have been included in the as-built report for the surface reclamation covers (BGC 2008a). Isopachs are not included on these drawings. Profile view drawings include an original ground profile. Additionally, plan view drawings of the Surface Cell and Test Cell cover include an outline of areas of significantly increased cover thickness (>2 m). In these areas, the "poured" tailings surface topography necessitated the increased cover thickness to permit the construction of

the desired surface grades. For all other covers including the waste rock piles and open pits, the surface of the backfill was constructed (as opposed to poured) thus the covers were generally built to the design thickness and excess fill was not generally required to meet the designed surface grades. As such, the cover thickness is essentially consistent (i.e. total cover thickness is generally 2.35 m throughout) and isopach contours would be of minimal value.

B. Due to the use of multiple quarries to provide the required construction volumes and the sharing of quarries for road construction, the contractor's records do not provide sufficient accuracy to approximate cover volumes. All cover volumes provided in the as built reports were developed using the pre- and post-construction survey information and are believed to be accurate.

4. *Original Review Comment: Fine grained material was observed in the West Twin Disposal Area spillway channel, originating from the side slopes. CanZinco Ltd. should consider armouring the spillway side slopes, along with the placement of rip rap in the channel's bottom to trap fines during periods of flow. Although the spillway was cut into rock, channel bottom rip rap should be installed to slow the design flow and minimize the transport of fines into West Twin Lake (a review of Golder Associates Ltd. 2004 Detailed Design of West Twin Dyke Spillway report prepared for CanZinco Ltd. mentions a 600 mm thick layer of D_{50} = 300 mm boulders to be positioned in the spillway base).*

Response:

The West Twin Dike Spillway is a channel excavated at the south end of the West Twin Disposal Area to passively transfer water from the Surface Cell to the Reservoir. The channel is designed to convey the Probable Maximum Precipitation (PMP) event and was excavated through permafrost soils and bedrock. Details regarding the as built construction details are summarized in BGC (2008b).

The reviewers observations are correct, a minor amount of sediment has been deposited into the base of the spillway. The sediment has both washed down from, and out of, the upper portions of the side slopes. This deposition of a minor amount of sediment is not considered to impact the effectiveness of the spillway in achieving its design and operational objectives. It should be noted that the spillway side slopes are armoured within, and above, the design flow depth (0.52 m in the upper flatter portion of the spillway to 0.31 m in the lower steeper portion of the spillway to). Sediment transport is considered to be a short term effect as the spillway area physically and thermally stabilizes. Having said this, no excursions from the water quality objectives of 15 mg/L for suspended solids have been observed in the WTDA discharge to date. As such, no additional armouring of the spillway side slopes is currently planned.

With respect to rip rapping the channel bottom, the upper portion of the spillway (the area between the access ramp and the spillway inlet) was excavated into competent bedrock. Any addition of armour in this area would be redundant and may impede drainage resulting in excessive backing up of water on the Surface Cell cover during the design flood event. This is not desired. The lower portion of the spillway (from the access ramp to the spillway outlet) was over excavated during construction, due to difficult ground conditions, and subsequently backfilled with 2 to 3 m of rockfill (D_{50} = 300 mm rockfill overlying D_{50} = 100 mm rockfill). This is considered to meet the design objectives and no additional rip rap placement is currently planned.

5. *Original Review Comment: A small pond was observed on the West Twin Disposal Area surface cover in close proximity to the spillway inlet. This should be drained or filled with additional cover material.*

Response:

The pond at the spillway inlet is of limited extent (less than 0.5 hectare) and of minimal depth (less than 0.3 m deep). The water from the Surface Cell and surrounding water shed (127 hectares) is directed to this area, by design, by a series of low gradient (0.5%) surficial drainage swales. Due to the coarse grained nature of the cover materials, water flow is generally subsurface. The water flows into the West Twin Dike spillway and subsequently into the Reservoir. The visible water flowing through this area is not considered to be standing water. Whether the water is exposed at surface or not, the same volume of water will be present at this location. Backfilling (covering) the area would provide saturated voids within the rockfill and the thermal effects are expected be the same. As such, no modifications to the Surface Cell cover adjacent to the inlet of the spillway are currently planned.

6. *Original Review Comment: A number of areas have been developed as shale quarries to provide reclamation cover material. The disturbance of these areas will result in permafrost thawing and the occurrence of ponded water that will exacerbate the thawing. Numerous depressions were observed in those quarries that were visited. CanZinco Ltd. should recontour or fill all of these areas to minimize ponded water and future permafrost distress, with associated ground surface settlement. A new state of thermal equilibrium will eventually be achieved in these shale quarries but this will take several years, longer if there is any ponding of water.*

Response:

General contouring and regrading of the site was one of the final tasks of the reclamation process and therefore occurred after the date of this inspection. As part of this process, the quarries developed during the reclamation construction process have been regraded such that they were free draining and ponding was not occurring. However, it should be noted that there is a fine balance when mechanically contouring surface soils in a permafrost regime. The very act

of redistributing surface soils can lead to thermokarsting in areas which were previously stable. As part of the post-closure monitoring program, CanZinco is committed to continue monitoring surface deformations at the quarry sites as well as all areas of the reclamation footprint and will address these as required.

7. *Original Review Comment: Although the East Open Pit and East Trench appear to have been backfilled satisfactorily, the surface was observed to be smoothly compacted with fine grained material. Erosion rills can develop in this smooth surface following a severe rain storm or annual snowmelt, eventually forming gullies thaw wash away pit backfill. Although there is an upslope surface water diversion ditch, diversion/flow retarding berms or a layer of coarse armouring should be constructed to create sheet flow rather than concentrated flow of precipitation runoff.*

Response:

Based on quality control testing completed prior to, and during, construction of the covers, the armour materials utilized in the East Open Pit and the East Trench surface reclamation covers meet the requirements for armour materials outlined in the Engineering Design of Surface Reclamation Covers report (BGC 2004a). The armour materials at the East Open Pit and East Trench contain a significant coarse-grained fraction of dolostone and quartzite boulders in a fine-grained matrix of weathered shale. Although these armour materials meet the grain size distribution requirements, it is acknowledged that the armour materials exhibit an increased percentage of fine-grained (sand and silt sized) particles compared to the armour materials derived from the Twin Lakes delta. As a conservative design measure, the armour layer thickness, in areas where alternative armour materials were used, was increased to a minimum construction thickness of 0.35 m. This increased thickness provides a contingency against the loss of a minor amount of the fine grained matrix without compromising the minimum design thickness. Due to the coarse-grained particles entrained within the armour layer, it is considered very unlikely that significant gully erosion, to the extent where the shale portion of the cover would be exposed, would develop on the cover. It should also be noted that the surface of these covers were designed and constructed to encourage sheet flow and discourage concentrated surface flow. Additionally, a surface water deflection berm was constructed upslope of the western side of the East Open Pit cover to limit the potential for erosion of the cover materials. Considering the measures that have already been implemented, no additional contouring of the surface of the East Open Pit or East Trench covers is planned at this time. It should also be noted that no significant erosion of surface cover material has been observed in the three years since completion of the surface reclamation covers. Nonetheless, monitoring of the surface of all of the reclamation covers will continue as part of the annual geotechnical inspection of the reclamation works.

8. *Original Review Comment: INAC was recently informed that the Nanisivik Lead-Zinc mine is located in an active seismic zone (peak ground acceleration of 0.120 g for 2% exceedance in 50 years, Natural Resources Canada – Seismic Hazard Value per 2005 National Building Code). Although this has not been brought to the attention of CanZinco to date, and is not a requirement of the 2004 Reclamation and Closure Plan, it is felt that it would be prudent for you company to assess the stability of various dump and pit shells for the design earthquake during the worst case seasonal thaw conditions., This worst case scenario might consist of a coarse granular shell sliding over a weathered shale surface or layer of ice at the base of the active layer. The stability of the dumps or tailings area may be compromised if the loss of a slope cover section were to occur.*

Response:

Stability analyses were completed for both the West Twin Dike and the sloping portions of the surface reclamation covers. The results of these stability analyses are documented in BGC et al. (2004). The analyses included pseudo-static analyses using a peak horizontal ground acceleration of 0.10 g for 5% exceedance in 50 years (1:1000 year probability). This value was provided specifically for Nanisivik by the Geologic Survey of Canada in 2000. The results of the stability analyses indicated that both the dike and covers remained stable under both static and pseudo-static conditions that were analyzed. As such, no additional stability analyses are planned to be undertaken at this time.

2.0 LIMITATIONS OF REPORT

BGC Engineering Inc. (BGC) prepared this report for the account of Breakwater Resources Ltd. (Breakwater). The material in it reflects the judgment of BGC staff in light of the information available to BGC at the time of report preparation. Any use which a third party makes of this report, or any reliance on decisions to be based on it are the responsibility of such third parties. BGC accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

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3.0 CLOSURE

We trust that this letter report meets your needs at this current time. Should you have any questions or comments concerning the information provided within this letter report, please contact the undersigned at your convenience.

Yours truly,

BGC Engineering Inc.
per:

[Original Signed By]

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Geological Engineer

Reviewed by:

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Specialist Geotechnical Engineer

GKC/sf

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