BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT

POLARIS MINE, CLOSURE MONITORING

SEPTEMBER 8-10, 2003 SITE VISIT REPORT

FINAL

PROJECT NO.: 0131-013-01
DATE: OCTOBER 16, 2003

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Project No. 0131-013-01
Date: October 16, 2003

Mr. Carl McLean
Manager, Land Administration Operations
Indian and Northern Affairs Canada
Nunavut District Office
Building 918
Iqaluit, NU
X0A 0H0

Re: Polaris Mine- Closure Monitoring, September 2003 Site Visit Report

Dear Carl:

Please find attached one hard copy and one CD copy of our above referenced report dated October 16, 2003. Patrick Duxbury of the Nunavut Water Board requested a copy of the report. In addition I have forwarded a copy to Dionne Filiatrault as well. I would also suggest sending a copy to John Knapp of Teck Cominco, because of the discussions and unresolved issues mentioned in the report. We would be pleased to make another copy, if you wish, please let me know.

Should you have any questions or comments, please do not hesitate to contact me at the number listed above.

Yours truly,
BGC Engineering Inc.
per:

Holger Hartmaier, M.Eng., P.Eng.
Senior Geotechnical Engineer

cc. Nunavut Water Board- Patrick Duxbury, Cambridge Bay
Dionne Filiatrault, Gjoa Haven

HHH/sf

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LIMITATIONS OF REPORT

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1.0 INTRODUCTION

The Department of Indian Affairs and Northern Development (DIAND) have retained BGC Engineering Inc. (BGC) to ensure that Teck Cominco (TC) meets their obligations for closure and restoration as required by the approved closure plans under the land leases and water licence for the Polaris Mine. Included in BGC's scope of work is the verification of the implementation of all aspects of the approved closure plan. As part of this verification process, two site inspection visits were scheduled in 2003. The first site visit took place July 2-3, 2003. Details of this site visit are summarized in a site visit report (BGC, 2003).

Primary responsibility for technical input on closure operations, design, quality control and quality assurance (QA/QC) rests with TC and their prime reclamation contractor, SNC-Lavalin, in association with Gartner Lee Limited (Gartner Lee). Project management of the decommissioning and reclamation project is the responsibility of Cascade Management Inc..

This memorandum summarizes observations made during the second site inspection visit to the Polaris Mine between September 8 and September 10, 2003. The site visit was arranged by the Department of Indian Affairs and Northern Development (DIAND) and included the following representatives:

- Mr. Carl McLean, DIAND, Manager Land Administration Operations;
- Mr. Jim Noble, DIAND, Resource Management Officer;
- Mr. Patrick Duxbury, Nunavut Water Board, Mine Reclamation Co-ordinator; and
- Mr. Holger Hartmaier, P.Eng., BGC Engineering Inc., Senior Geotechnical Engineer

Mine site staff involved in conducting the tour of the ongoing reclamation activities included the following:

- Mr. John Knapp, Teck Cominco, Site Manager;
- Mr. Ron Matthews, Teck Cominco; and
- Mr. Tony Toombs, Cascade Management Inc.

The purpose of this inspection trip was to review progress of the site reclamation activities since the last inspection trip (July 2-3, 2003), as well as to discuss Teck Cominco's response to the issues raised during the previous visit.

1.1 Itinerary

The inspection team travelled to Polaris by chartered aircraft from Iqaluit on September 8, with stops at Hall Beach and Resolute Bay for re-fuelling. Patrick Duxbury (NWB) was met at Resolute Bay, having travelled up from Cambridge Bay the previous day. The inspection team arrived at Polaris at about 4:15 PM local time and were met by John Knapp.

A brief site tour was conducted by John Knapp to take advantage of the good weather and daylight conditions. Brief stops were made at all areas where surface reclamation activities were underway.

On September 9, the surface reclamation sites were inspected in more detail, followed by a brief tour of some of the underground activities. A meeting was held to discuss Teck Cominco's response to the issues identified in the previous inspection and areas of concern arising from the current inspection.

A follow-up meeting was held on the morning of September 10 to review information presented by Teck Cominco with respect to the ongoing subsidence above the underground workings. Mr. Martin Van Rooy, P.Eng., Inspector of Mines for NWT and Nunavut (Workers` Compensation Board) was asked to participate in this meeting.

The inspection team left Polaris at about 12:30 PM September 10, returning by charter to Iqaluit, via Resolute Bay and Hall Beach.

Weather during the site inspection period was favourable, with temperatures in the range of 5° C to –5° C. September 8th was sunny, with scattered clouds, September 9th was cloudy and windy, with high winds and snow overnight September 9th -10th. The high winds persisted through the morning of September 10th, resulting in delayed flight departures from the site. The ground was bare of snow in all areas at the time of inspection. Snow cover was present at higher elevations outside the general mine area. Approximately 30 cm of snow fall had occurred in the week prior to the site visit.

2.0 OVERVIEW

Significant progress has been made in all areas of reclamation since the last site visit. Major milestones included the following:

- Demolition and removal of the majority of the barge.
- Demolition and removal of the concentrate storage shed.
- Dock and foreshore remediation underway.
- Drawdown of Garrow Lake to within 0.4 m of original lake level.
- New Quarry decommissioning and stockpiles of cover material.
- Operational Landfill lower cover layer placed.
- Re-contouring of North Pit area.
- Remediation of fuel bladder spill area.

Ongoing activities at the time of inspection included the following:

- Cutting and removal of remaining portions of the barge hull.
- Removal of contaminated soils in the marine foreshore area.
- Disposal of demolition debris into Little Red Dog (LRD) quarry.
- Disposal of metals and hydrocarbon contaminated soils into the underground mine workings.
- Removal of tailings overflow lagoon and tailings thickener foundation pad.

Details with respect to observations at these, and other areas, are provided in the following sections.

Prior to this site visit, BGC received a copy of the drawings and specifications for the following items of work:

- Removal of Garrow Lake Dam;
- The Operational Landfill cover; and
- Dock and Marine Foreshore remediation.

Teck Cominco submitted these documents under the terms of the water licence to NWB and DIAND for review and comment. BGC`s comments were sent to NWB and DIAND about one to two weeks before the site visit. Although NWB and DIAND have not yet provided Teck Cominco with a written response to these submittals, they were discussed on-site with John Knapp.

Selected photographs taken during the site inspection are presented in Appendix I and are referred to by photo number in the text.

3.0 SITE INSPECTION OBSERVATIONS

3.1 Garrow Lake

3.1.1 Garrow Lake Dam (Photos 12-16)

Over the summer, the level of Garrow Lake was slowly lowered by siphoning water over the dam. At the time of inspection, the level of Garrow Lake had been lowered to about 0.4 m above its original lake level. Teck Cominco expects that the water levels would be down to original lake level by early October, when the siphon pipes will likely stop working due to freeze-up. Currently, siphoning is being done with 17 (out of 18) pipes of varying diameter. TC has collected water quality samples at the designated "Final Discharge Point", during the period of flow, as required by the Metal Mining Effluent Regulations (MMER) and Water Licence. Test results are expected to be included in the 3rd quarter report being prepared by Teck Cominco. During the site visit, DIAND representatives also obtained water quality samples from the discharge point. These test results should be compared with the test results obtained by TC for the same period.

Breaching and removal of Garrow Lake dam is scheduled to commence in March 2004 and is expected to take about one month. Teck Cominco has allowed two months in their schedule to complete this work. Some preliminary work will be carried out this fall to remove the insulation within the crest of the dam before the ground freezes. Carrying out this preliminary work while the ground is unfrozen will hopefully allow easier removal of the insulating panels, without breakage. Teck Cominco initiated this procedure after their experience last winter in other areas of reclamation, such as the tailings thickener pad.

Teck Cominco will use pre-packaged explosives rather than the ANFO (used for mining), to blast the fill in the embankment. This will ensure that no residual ammonium nitrate or diesel fuel will be present within the materials left on site or utilized elsewhere.

Decommissioning of the dam will also include the access roads to the dam and the upstream wave break structure.

3.1.2 Wave Break Structure (Photos 17-25)

One of the items of work associated with the decommissioning of the Garrow Lake Dam is the assessment of the need to remove the wave break structure. The wave break structure is a low rockfill dike constructed across the original outlet of Garrow Lake, about 500 m upstream of the dam. The structure was built well after Garrow Lake Dam was constructed, to reduce the potential for wave action and erosion along the upstream face of the dam.

While Garrow Lake was operated as a tailings disposal facility, the wave break structure was submerged below lake level. The original lake level was raised by about 2.5 m to ensure that the surface water quality was not impaired during tailings deposition. Now that the lake level has been lowered, the structure has become visible, and an assessment of its condition is possible. At the time of the site visit, water was flowing freely over the wave break structure at a low section, located in the vicinity of the original lake outlet. The depth of water was estimated to be at least 0.4 m at its deepest point over the crest of the wave break structure. Teck Cominco will monitor lake levels until drawdown reaches the original lake level of elev. 1005.6 m (mine datum). If the wave break structure impedes flow above this level, Teck Cominco will clear more material, as required to maintain flow.

As long as flow out of Garrow Lake is not impeded, Teck Cominco proposes to leave the wave break structure in place, for the following reasons:

- Removal of the rockfill will create more sedimentation within Garrow Lake, thereby compromising the water quality being discharged through the siphons.
- The shoreline area is soft and will become damaged by equipment traffic, leading to more sedimentation and erosion later.
- The structure is not detrimental to the long term hydrological regime of the lake.

In short, Teck Cominco feels that there will be more environmental damage associated with the removal of the structure than will result by leaving it in place.

In discussion with Teck Cominco, the inspection team expressed the concern that the original creek channel should be re-established as a minimum. The existing crest of the structure, even at its lowest point is above the grade of the natural creek bed and would therefore be impeding flow, even if the crest was below the original lake level elevation. As an exposed embankment above lake level, the existing structure would be subjected to ice, wind and wave erosion that may impede flow through the present low point, which at best will act as a weir, not a channel. Over time, the potential exists that the rockfill may freeze-up and prevent flow.

Teck Cominco will make a formal submission to DIAND/NWB regarding their proposed decommissioning plan for the wave break structure. In addition to the technical issues discussed above, the TC proposal should confirm that the rockfill in the wave break structure is clean. Acid-base accounting (ABA) and metals leaching tests should be carried out if this fill is to be left in place.

3.2 Ongoing Subsidence (Photo 26)

The subsidence zone, located above the underground mine workings, was identified as an area to be remediated under the Polaris Decommissioning and Reclamation Plan (the Plan). Since last year, this area has been used to dispose of decommissioned mining equipment and has been covered with shale rockfill. According to Teck Cominco, subsidence is still ongoing. The remediation program in the Plan required that the subsidence area be covered with a surcharge of backfill to form a positive relief feature that would shed runoff and prevent ponding. Teck Cominco is now expressing some concern about this approach:

- Continuing to surcharge the subsidence zone with more fill would increase the tendency to subside due to the increased weight of the fill, rather than providing a stable, long-term solution.
- The rate and magnitude of subsidence could increase due to the additional load and may exceed the depth of fill placed, ultimately resulting in a surface depression.
- There is a potential danger to personnel and equipment working above the subsidence zone due to the unknown subsurface conditions associated with the subsidence.
- Since mine closure, many of the survey points used to monitor subsidence have been covered or destroyed so there is no way to assess the effects of fill placement on ground movements and hence, assess safety.

Teck Cominco are recommending that instead of surcharging, the area be allowed to subside and form a depression that will collect water. Teck Cominco argues that if subsidence leads to surface cracks, water will fill the cracks and freeze, ultimately sealing the base of the subsidence zone and perhaps improving overall stability.

Following the site inspection tour, a meeting was held with Teck Cominco on September 10 to review some of their site information in order to give the inspection team better insight into the problem. Present at the meeting from Teck Cominco was John Knapp and Ron Matthews. In addition to the inspection team members, Mr. Martin Van Rooy, Mines Inspector for NWT and Nunavut, was requested to participate by John Knapp.

John presented mine plans and cross-sections showing the underground workings, as well as subsidence measurements, which ended in October 2000. The following notes summarize the conditions related to the subsidence zone, based on the information presented by TC:

- Current zone of subsidence covers an area with a diameter of about 300 m at the surface.
- Estimated maximum opening height in the underground stopes is about 30 m.
- The total width (span) of unsupported stopes underground is about 600 m.
- Subsidence commenced during mining operations. Failure of the roof of the stope prevented the placement of backfill to the full height of the stope.
- Subsidence measurements to October 2000 show up to 2.5 m of maximum settlement.
- There may be another set of readings taken in 2002, but these were not available at the time of the meeting. Teck Cominco will search for additional subsidence monitoring records in their minesite files.
- The thickness of rock cover over the unsupported stopes is about 100 m, with about 5-10m of overburden.
- The unsupported roof is within the Thumb Mountain Formation (shales), close to the contact with the overlying Irene Bay Formation (limestone).
- The Irene Bay Formation is about 50 m thick and is overlain by another 50 m of rock comprising the Cape Phillips Formation (shales).
- The strata have a slight dip to the east.
- The permafrost temperature in the rock around the mine opening is about –12° C.
- Teck Cominco have reported seeing surface cracks of up to 30 cm in width associated with the subsidence zone in the past.
- During the site visit no surface cracks were noted (or pointed out by Teck Cominco). A small pond had formed at the centre of the depression area, and was freezing over.

Based on the brief review of the instrumentation data presented by Teck Cominco, BGC's assessment is that the zone of subsidence may still be expanding in diameter in response to underground deformations. For example, the plot of settlement versus time presented by TC for the instrument showing the greatest subsidence appeared to have leveled off by October 2000, however, similar plots for points located to the west of the deepest point seemed to be just beginning to move, some indicating a steep (rapid rate) of subsidence. This would seem to indicate that the zone of subsidence is still increasing in area and could continue for some time. Teck Cominco feels confident that despite the underground voids present in the stopes, the records of stope dimension and amount of backfill placed would yield a conservative (but

unlikely) estimate of the maximum amount of settlement in the order of 30 m. According to TC, compensating for this by placing 30 m of backfill on the surface is not a feasible option. Realistically, the actual amount of total subsidence is expected to be significantly less than 30 m due to the bulking of caving material as it fills the voids in the stopes. In effect, Teck Cominco expects the subsidence to be a self-healing process. Once equilibrium is reached between the volumes of the void openings and the caved material filling them, subsidence should gradually diminish in magnitude and rate.

Assuming subsidence takes place over wide area, TC expects the resulting surface depression to collect water from runoff and precipitation forming a small pond or lake. Freezing of any water as it enters cracks in the permafrost is expected to prevent seepage into the underground workings.

Teck Cominco has hired EBA Engineering Consultants to review the subsidence issue and will be submitting the results of their evaluation and proposed plan to DIAND/NWB for review.

The subsidence problem has significant long-term implications for closure. TC, as yet do not appear to have a good understanding of the mechanism of failure causing the subsidence. There are several major technical issues that need to be addressed before a decision can be made with regards to the surface reclamation options that need to be carried out. The EBA report should address these in its evaluation:

- A description of the mechanism of subsidence, (rock failure, pillar collapse, permafrost degradation, ice lenses in the roof, etc.).
- Thermal regime and ice conditions in the overburden.
- Thermal regime and need for installation of thermistors to monitor permafrost temperatures from the surface, around the underground opening.
- Impact of surface water pond on thermal regime and permafrost stability.
- Impact of placing fill on the rate and amount of subsidence and the permafrost regime.
- Estimate of maximum extent and depth of subsidence zone.
- Assessment of physical stability and protection required.
- Recommendations for ongoing assessment and monitoring.

3.3 Concentrate Storage Shed (Photos 4,5, 27-31)

The concentrate storage shed was demolished over the summer. The foundations and lower stubs of the columns remain around the floor perimeter. Remediation involved the removal of lead and zinc contaminated soils that formed the floor. Gartner Lee is responsible for taking confirmatory soil samples to determine if remediation criteria have been met. Teck Cominco had expected that the depth of metals contamination would be limited to the upper soil layers. Confirmatory testing of the soils is carried out on a 25 m grid, with 5 samples taken within each 25 x 25 m square area. The testing protocol requires that each sample be screened to extract the –2 mm size fraction, which is then checked for lead/zinc content. In most cases, the –2 mm

size fraction contains a high percentage of concentrate. Since the remediation criteria is based strictly on the lead and zinc content of the –2 mm fraction, regardless of the overall sample size, even minor amounts of concentrate in the soil will register exceedances of clean-up criteria, resulting in a requirement to remove more soil. As a result, a significantly greater volume of soil than originally estimated, has been removed and placed into the underground mine openings used to dispose of metals contaminated soils.

Teck Cominco has reached bedrock over much of the concentrate storage footprint. In some cases, rock has been excavated to depths of about 20 cm. A thin veneer of soil remains over much of the undulating bedrock surface.

John Knapp presented a plan of the concentrate storage area footprint which showed that most of the central and west (shoreline side) of the footprint has been excavated to "clean" material. The remaining metals contaminated soils overlie bedrock along the north, east and south sides of the footprint.

Teck Cominco is proposing to leave the remaining veneer of soil in place. The footprint of the concentrate storage shed will be covered by up to 3 m of cover as part of the marine foreshore re-grading and contouring. Options for collecting the remaining soils off the bedrock surface are limited:

- Onset of winter conditions will result in frozen soil that is more difficult to remove.
- Use of pneumatic blow guns to sweep up the remaining soils risks spreading metals contaminated dust into areas that have already been remediated.
- Satisfying the clean-up standard will be increasingly more difficult if the clean, broken rock is included.
- Leaving the site exposed until next spring risks creating more potentially contaminated runoff water that must be disposed of underground.

Teck Cominco will make formal submittal to DIAND/NWB with their proposed remediation plan for review.

3.4 Operational Landfill (Photos 1, 32-39)

The Operational Landfill is now closed. The lower 1.2 m of shale cover has been placed. Another 0.6 m of crushed limestone cover remains to be placed. Drawings and specifications for the Operational Landfill cover were reviewed by BGC just prior to the site visit. The as-built details of the landfill cover need to be shown on a drawing by Teck-Cominco as modifications were made during construction, specifically as follows:

- The slope above the landfill was re-graded and re-contoured.
- The area between the up-slope toe of the landfill cover and the slope was backfilled with material to be level with the top of the shale cover on the landfill.

The "as-built" drawing showing the above and other changes carried out by Teck Cominco during construction should be reviewed and signed off by a Professional Engineer registered in Nunavut. File copies of the final Operational Landfill cover drawings should be forwarded to DIAND/NWB once the final cover has been placed.

The domestic garbage from the accommodation complex is being burned in a sea container located on top of the hill just north of the Operational Landfill (Photo 69). The burnt residual ash material is being placed into the LRD Quarry. Regulators should confirm if this practice is permissible under the existing permits.

A collection of old, but operational mine equipment is parked on the hill slope adjacent to the Operational Landfill. This equipment will likely be placed underground, if no buyers are found over the next year. All equipment being placed underground will be drained of lubricants and fluids and cleaned.

3.5 Frustration Lake Water Intake (Photos 40-41)

The intake is still being used for domestic water supply to the camp. The pump building was damaged during the spring breakup when a pan of wind driven ice piled up on the rockfill jetty and broke in one side of the building.

Teck Cominco has repaired the road to the water intake that was washed out during the July 2003 site visit.

3.6 Little Red Dog Quarry (Photos 9,10, 42-45)

Most of the material being placed at the time of the visit was barge hull sections, which were cut up by the demolition contractor using a plasma torch. The barge sections consisted of an interior and exterior hull, connected by steel crossbracing. To minimize voids in the landfill, these sections were placed on-end, in an orderly fashion, so that soil would be filled into the hull sections. The previous lift of demolition debris has been covered with shale cover material. No evidence of voids or settlement was noted in this cover material. The floor of the pit was dry except for a small area, which was not yet backfilled in the northwest corner.

The amount of barge hull remaining to be disposed of in the LRD quarry is minor. Most of the remaining demolition debris to be placed into LRD quarry will come from the Accommodation complex next fall.

3.7 Mill Barge Demolition (Photos 6, 46)

Demolition of the mill barge is largely completed. Only a small section of barge hull remained to be removed. Workers were cutting up the steel plate using a plasma torch. Excavation of the soil under the barge complex was underway. Contaminated soils were being removed and disposed in the underground storage sites as verified by Gartner Lee staff.

3.8 Dock Cells (Photos 7,8, 47-50)

During the summer, Teck Cominco started to remove the cellular sheet pile dock structures by excavating the soil backfill inside the cells. Divers were used to start cutting the steel piles underwater, but the work had to be suspended due to drifting ice pans that continued to endanger the divers working adjacent to the dock cells. Teck Cominco intends to postpone the removal of the steel piles until this winter. The revised plan is to wait until the winter ice has formed a stable cover adjacent to the cells. The divers will return and work under the ice to complete the cutting process. The sheet piles will then be extracted by cutting away the ice around the structure and pulling out the piles, in effect, reversing the original construction process.

At the time of the site visit, workers were exposing the glycol freeze pipes buried within the backfill. These pipes are emptied and flushed before removal and disposal into LRD Quarry. The glycol in the pipes is incinerated in the on-site incinerator.

Drifting pans of ice had bent some of the exposed sheet piles due to lack of internal backfill support after they were excavated below the water line,.

3.9 Marine Foreshore Area (Photos 2-6, 11, 51-57)

The area between the dock cells and the foldaway buildings is being excavated to remove metals and hydrocarbon contaminated soils and establish the final grades for the foreshore beach. A small berm of soil was left along the shoreline to serve as a buffer between the reclamation work area and the ocean. Gartner Lee staff are monitoring the clean-up progress with confirmatory soil sampling.

3.10 Tailings Thickener Area (Photos 58-59)

Work was underway to remove the containment dike around the tailings thickener overflow pond. The frozen pad foundation under the tailings thickener is slowly being excavated as the ground thaws. The loose insulation debris that was present during the previous visit has been cleaned up. Gartner Lee will check the sediments in the pond for metals and confirm that all contaminated soils have been removed.

3.11 New Quarry Reclamation (Photos 60-62)

New Quarry is the source of the shale material used for general backfill of remediated areas and as cover for the Operational Landfill and the LRD quarry. Teck Cominco has stockpiled sufficient quantities of blasted shale in the quarry to satisfy the remaining requirements for site reclamation. The side slopes of the pit have been flattened and re-contoured. Local shale backfill was used to fill depressions and gullies No further production from New Quarry is anticipated. An-as-built drawing showing the final slopes and contours, signed and stamped by a Professional Engineer registered in Nunavut should be requested from TC.

3.12 North Pit (Photo 63)

Reclamation work in the North Pit area is completed. The rock slopes surrounding the former surface orebody have been completely re-graded and re-contoured. TC should provide the final as-built drawings, signed and stamped by a Professional Engineer registered in Nunavut.

3.13 North Portal Area (Photos 64-65)

Work remains to be done to complete the re-grading of the area. Surface stockpiles of rock and soil, some of which cover backfilled raisebore holes, still need to be removed. The metals contaminated soils around the North Portal have been removed and placed underground. Verification of clean-up was done by Gartner Lee.

3.14 Disposal of Hydrocarbon and Metals Contaminated Soils (Photos 66-67)

The open raisebore holes are used to dump metals and hydrocarbon contaminated soils into the underground mine workings. Dump trucks bring the soils from areas that are being reclaimed to the surface stockpile areas located in the former CRF Plant area. The soils are then pushed into the open raisebore holes with a front-end loader. Underground, the soils are transferred from the base of the raisebore holes into the prepared abandoned mine drifts with a scoop tram. The soils are pushed into drifts that were sprayed with water to seal the surface cracks and fissures of the surrounding rock mass. The entire width and height of the drift is filled with contaminated soils. The quantity of contaminated soils placed underground has exceeded the original estimates. At the time of the site visit, TC was in the process of reconciling the total amount of contaminated soils placed underground to date, the estimated amount of soils remaining to be placed and the amount of underground space available.

3.15 Underground Disposal of Meltwater (Photo 68)

The underground drift being used to store the meltwater runoff from the site is now full. Additional water was diverted into the drift since the last site visit. The water level in the drift is now close to the elevation of the main portal underground access road. Adding any further water would result in overflow into the portion of the mine that is still being used and this should be avoided.

Since the underground storage capacity for meltwater runoff has been used up, it is critical that Teck Cominco complete all surface reclamation activities to remove contamination sources that could affect runoff next spring.

4.0 RECOMMENDATIONS

As a result of this inspection, three major issues were identified that will require further follow-up work by Teck Cominco and review by regulatory authorities to be resolved:

- Assessment of removal of the wave break structure in Garrow Lake.
- Assessment of ongoing subsidence over the underground mine workings.
- Assessment of relict metals contaminated soils within the footprint of the concentrate storage shed.

TC will be preparing formal proposals to regulators on these items in the near future.

With respect to the clean-up of contaminated soils, it is understood that TC will be providing the confirmatory soils testing reports prepared by Gartner Lee in their quarterly reports to regulators. Since most of the soils remediation took place between June and September, these reports are expected to be included in the forthcoming 3rd quarter report.

TC should be requested to provide the following information with respect to the ongoing site reclamation and decommissioning activities:

- Compilation of all site instrumentation and survey records showing subsidence data.
- As-built details showing the amount of fill placed to-date into the subsidence area.
- Any engineering reports prepared by TC or their consultants with respect to the underground thermal regime and underground stability, with particular reference to the subsidence zone.
- As-built drawings signed by a Professional Engineer registered in Nunavut for the Operational Landfill cover and New Quarry and North Pit reclamation.
- Reconciled volumes of contaminated soils placed underground and expected volumes remaining to be placed, versus the amount of underground space available for disposal.

5.0 CLOSURE

This report summarizes observations made during the September 8-10, 2003 site visit to Polaris Mine. We wish to thank Polaris mine staff for providing their time, expertise, logistical support and hospitality while the inspection team was on site. In general, the elements of the overall mine decommissioning and reclamation are progressing according to plan. As a result of finding additional areas of contaminated soils, more storage area is required underground and additional reclamation costs have been incurred. Several issues require further follow-up work by Teck Cominco, as outlined above. Teck Cominco will prepare submissions regarding these issues in the near future.

We trust that the above report meets with your requirements at this time. If you have any questions or require further information, please do not hesitate to contact me.

BGC Engineering Inc.
Per:

REGISTERED PROFESSIONAL ENGINEER
H. H. HARTMAIER
LICENSEE
Oct. 16, 2003
N.W.T.

Holger Hartmaier, M.Eng., P.Eng.
Senior Geotechnical Engineer

Reviewed by:

James W. Cassie, M.Sc., P.Eng.
Specialist Geotechnical Engineer

PERMIT TO PRACTICE
BGC ENGINEERING INC.
Signature
Date 03-OCT-16
PERMIT NUMBER: P 285
The Association of Professional Engineers, Geologists and Geophysicists of the Northwest Territories

APPENDIX I - Photographs