BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

INDIAN AND NORTHERN AFFAIRS CANADA

POLARIS MINE ABANDONMENT AND RECLAMATION

REVIEW OF OUTSTANDING ITEMS AND ASSESSMENT OF CROWN'S REMAINING LIABILITY

FINAL

PROJECT NO.: 0131-013-06
DATE: APRIL 17, 2009

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April 17, 2009
Project No. 0131-013-06

Mr. Kevin Buck
Manager, Waters Division
Indian and Northern Affairs Canada
Building 918
PO Box 100
Iqaluit, NU
X0A 0H0

RE: POLARIS MINE - FINAL REPORT REVIEW OF OUTSTANDING ITEMS AND ASSESSMENT OF CROWN'S REMAINING LIABILITY

Dear Kevin:

Please find attached two (2) digital CD's and three (3) signed hard copies of our above referenced report dated April 17,2009 This report has included any comments received from INAC on our earlier draft report dated November 24, 2008.
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

HHH/sf

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LIMITATIONS OF THE REPORT

BGC Engineering Inc. (BGC) prepared this report for the account of Indian and Northern Affairs Canada. 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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1.0 INTRODUCTION

Teck Cominco Metals Ltd. (Teck Cominco) is in the process of reclaiming and abandoning the Polaris Mine site, located on Little Cornwallis Island in Nunavut at about Latitude 75° N and Longitude 97° W. The mine is approximately 140 km by air northwest of Resolute Bay.

Mining operations ceased in 3rd Quarter, 2002 due to lack of ore. A Decommissioning and Reclamation Plan (DRP) was prepared by Teck Cominco and approved by the Nunavut Water Board in April 2002. Decommissioning and reclamation of the mine site was conducted by Teck Cominco and its contractors between 2002 and 2004. Since that time, post-closure monitoring and annual inspections have been carried out as required by the current water licence NWB1POL0311 which expires on December 31, 2011.

BGC Engineering Inc. (BGC) was requested by the Department of Indian Affairs and Northern Development (DIAND) to conduct an audit of past reports to identify any outstanding issues or deficiencies that Teck Cominco may need to address during the post closure monitoring. Based on the 2008 site inspection of the Polaris Mine site (see separate report, BGC, 2008), BGC was also requested by DIAND to provide an ongoing assessment of the Crown's remaining liability for the site based on reclamation work that has been confirmed/verified during the site visit.

2.0 TERMS OF REFERENCE AND OBJECTIVES

This review is part of an overall review of technical information associated with the ongoing Decommissioning and Reclamation work being completed by Teck Cominco for the Polaris Mine. This technical review will facilitate DIAND's interventions to the Nunavut Water Board (NWB) and review of Crown Land Leases. This report will be used by DIAND as part of the ongoing assessment of the Crown's remaining liability for the site based on reclamation work that has been confirmed/verified during the 2008 site inspection reported under separate cover (BGC, 2008).

3.0 AUDIT OF OUTSTANDING ITEMS FROM PREVIOUS REPORTS

3.1 List of Documentation Included in Audit

The following documents, obtained from BGC's files, were reviewed by BGC to check for outstanding items that still need to be addressed by Teck Cominco under the post closure monitoring requirements:

- BGC Engineering Inc., (2008), Polaris Mine Abandonment and Reclamation, Review of Contaminated Soil Remediation Close Out Reports, Draft Report, prepared for Indian and Northern Affairs Canada, October 31, 2008.
- BGC Engineering Inc.,(2008), Polaris Mine Abandonment and Reclamation, August 24, 2008 Site Visit and Inspection, Draft Report, prepared for Indian and Northern Affairs Canada, September 25, 2008.

- BGC Engineering Inc., (2008), Polaris Mine Abandonment and Reclamation, Review of Teck Cominco's 2007 4th Quarter and 2007 Annual Reports, Draft Report, prepared for Indian and Northern Affairs Canada, October 9, 2008.
- BGC Engineering Inc., (2008), Polaris Mine Abandonment and Reclamation, Review of Teck Cominco's 2007 Third Quarterly Report, Draft Report, prepared for Indian and Northern Affairs Canada, October 9, 2008.
- BGC Engineering Inc., (2008), Polaris Mine Abandonment and Reclamation, Review of Teck Cominco's 2007 1st and 2nd Quarterly Reports, Draft Report, prepared for Indian and Northern Affairs Canada, October 9, 2008.
- BGC Engineering Inc., (2008), Polaris Mine Abandonment and Reclamation, Review of 2006 4th Quarter and 2006 Annual Reports, Draft Report, prepared for Indian and Northern Affairs Canada, October 3, 2008.
- BGC Engineering Inc., (2007), Polaris Mine Closure Review- 2006 Quarterly Reports (Q1, Q2 and Q3), Project Memorandum to Mr. Spencer Dewar, Manager Lands Administration, March 28, 2007.
- BGC Engineering Inc., (2006),Polaris Mine, 2006 Site Inspection Report, prepared for Indian and Northern Affairs Canada, August 11, 2006.
- BGC Engineering Inc., (2005), Polaris Mine, 2004 Reports Comments, Project Memorandum to Spencer Dewar, December 20, 2005.
- BGC Engineering Inc., (2005), Polaris Mine Closure- Review of Post-Reclamation Monitoring Program, Project Memorandum to Carl McLean, August 6, 2005.
- BGC Engineering Inc., (2004), Polaris Mine Closure Monitoring, September 9, 2004 Site Visit Report, prepared for Indian and Northern Affairs Canada, November 3, 2004.
- BGC Engineering Inc., (2004), Polaris Mine Closure and Reclamation Project, June 20 to June 22, 2004, Inspection Trip Report, prepared for Indian and Northern Affairs Canada, July 21, 2004.
- BGC Engineering Inc., (2003), Polaris Mine Closure Monitoring, September 8-10, 2003 Site Visit Report, prepared for Indian and Northern Affairs Canada, October 16, 2003.
- BGC Engineering Inc., (2003), Polaris Mine, July 2-3, 2003 Site Inspection Report, prepared for Indian and Northern Affairs Canada, July 17, 2003.
- Nunavut Water Board, (2005), letter to Mr. Bruce Donald of Teck Cominco summarizing outstanding submissions not yet received by NWB or INAC, February 28, 2005.
- Teck Cominco Limited, (2005), Polaris Mine Decommissioning and Reclamation Activities, 2004 Annual Report, submitted to the Nunavut Water Board and to the Department of Indian and Northern Affairs Canada, September 19, 2005.

The above list of documents is not intended to represent a complete listing or audit of all documentation submitted to INAC. Teck Cominco may have submitted additional information not forwarded to BGC for review. For example, BGC has no record of receiving or reviewing the 2005 3rd and 4th Quarterly reports, however BGC has correspondence on file to indicate that the 2005 1st and 2nd Quarterly Reports were reviewed with no comments noted.

It is also important to note that BGC's area of expertise is primarily in the geotechnical field and as such our reviews of the Polaris decommissioning and reclamation activities have focused on issues related to permafrost conditions, earthworks, landfill covers, slope stability, erosion, mining subsidence and general post-closure monitoring. INAC and NWB may wish to review their files to assess the need for auditing outstanding items in other areas such as water quality and biological monitoring. This may include canvassing of other regulatory bodies such as Environment Canada and Fisheries and Oceans to ensure that all their requirements have been met.

3.2 List of Outstanding Items

The time period covered by this partial audit begins in 2003, which is the start of the decommissioning and reclamation work and corresponds with the start of the current water licence (NWB1POL0311) issued March 1, 2003.

The outstanding items have been summarized into the following two main groups:

- Missing documentation or information.
- Outstanding reclamation or field work items that need to be done on site.

In each case it is important to note that the primary reference list for the documentation content that Teck Cominco is required to submit to the Nunavut Water Board (NWB or "Board") is given in the Water Licence. Table 1 presents a summary list of the documentation required to satisfy the water licence conditions. Refer to the Water Licence for actual detailed wording.

Table 2 is a summary list of the outstanding documentation requirements noted in the above reports and their current status, as understood by BGC based on available information. Both INAC and NWB should be satisfied that the information in their files satisfies regulatory requirements.

Table 3 is a summary list of the recommended site reclamation or on-site work activities and their current status based on actual site inspections.

It is important to note that these lists are not a comprehensive summary of all outstanding items. The information contained in the summary is based primarily on the project related documentation on file at BGC. BGC was retained by INAC throughout the decommissioning and reclamation period to provide periodic reviews, as requested, primarily in the areas of geotechnical, permafrost and mine waste management issues. Teck Cominco was responsible for submitting the required information to INAC/NWB. INAC in turn determined which items were sent to BGC for review. There may be other submissions on file with INAC/NWB that were not reviewed by BGC and therefore the current status of any item deemed by BGC to be "Outstanding" in the following tables should be confirmed by a cross-check of INAC/NWB files.

Table 1: Summary of Documentation Required by Water Licence

Water Licence Reference	Documentation Required	Comments
Part B, Item 3	Quarterly Expenditure Reports of remediation completed to date.	INAC/NWB to confirm that all Quarterly reports are on file.
Part B, Item 5	By November 1, 2003, an approximation of the amount of security to implement corrective measures should Garrow Lake be detrimentally affected by decommissioning and reclamation activities.	Assumed to have been received by NWB. No longer relevant as decommissioning and reclamation work is essentially completed.
Part B, Item 6	An Annual Report by March 31 of the year following the calendar year reported.	MMER component no longer required as site obtained closed site status. INAC/NWB to confirm that all Annual Reports are on file.
Part E, Item 1	Within 30 days of issuance of Licence, a revised Emergency Response Plan.	Requires annual review and changes shall be submitted to the Board. Board should check if update is required to reflect current level of activity on site.
Part F, Item 1	Submit to Board for approval, design drawings prior to construction of any dams, dykes or structures intended to contain, withhold, divert or retain Water or Waste.	This would apply to the cover designs for the Operational and Little Red Dog Quarry Landfills. There are no dams, dykes or water diversion structures on site.
Part F, Item 4	As built plans and drawings of modifications within 90 days of modifications.	The 90 day period has long expired, however the Board should be in possession of all as-built drawing records pertaining to waste disposal facilities left on site.
Part G, Item 3	Modifications to Decommissioning and Reclamation Plan (DRP) to be submitted annually to Board as an addendum.	Actual DRP was never modified as far as BGC is aware. Now a redundant requirement.
Part G, Item 4	By March 31, 2005, a Comprehensive Assessment of Mine Site Remediation in terms of remediation objectives and need for ongoing monitoring and follow-up remediation requirements.	INAC/NWB to confirm if this report was submitted. If not, this item may be covered by recommendations included in annual inspection reports. Assess if still required.
Part H, Item 6	Report of Annual Geotechnical Inspection, within 60 days of the inspection.	INAC/NWB to confirm if all annual geotechnical inspection reports (2003- present) are on file.
Part H, Item 27	Effluent monitoring report for all tests and monitoring conducted during each calendar quarter, not later than 45 days after the end of the quarter.	Open water flow occurs annually in the 3rd quarter only. INAC/NWB to confirm that these records exist for historical record purposes.
Part H, Item 28	Annually, no later than March 31, a report summarizing the Effluent Monitoring results for the previous calendar year.	See above comment.
Part H, Item 39	Submit exact location of water sampling reference areas referred to in Part H, Item 37(i) within 30 days of identifying such areas.	Assume this has been satisfied.
Part H, Item 41	By June 16, 2003, the Biological Monitoring Studies as required by Part 2 of Schedule 5 of the Metal Mining Effluent Regulations.	Confirm that this was submitted as it is necessary to document basis of biological monitoring program carried out to assess impacts of mining.
Part H, Item 42	By June 30, 2003 the Terms of Reference to study: metal concentrations in benthic sediments, representative species in Garrow Lake and Garrow Bay and erosion rates of shorelines of Garrow Lake and Garrow Creek.	As above.
Part H, Item 44	Submit for review the results of the monitoring requirements in Table 1 (of the Licence) in accordance with Part B, Item 6.	Assumed to be part of regular submissions to INAC/NWB.

Table 2: Summary of Outstanding Documentation from Available Reports

Reference Document	Outstanding Items	Current Status and Comments
BGC (2003), July 2-3, 2003 Site Inspection report	Information pertaining to construction of Operational Landfill: thermistor readings, material testing results (moisture content, grain size, density), as-built drawings. Verify that actual properties of cover materials are equivalent to assumptions in thermal analysis and verify final thickness of cover with respect to actual properties.	BGC reviewed the "Issued for Construction " set of drawings in 2003 for INAC/NWB. This set included construction material specifications for the landfill cover. The final as-built set of drawings and associated QA/QC reports verifying that the construction materials met the specifications have not been reviewed by BGC. INAC/NWB to confirm if these have been received.
	An updated estimate of the volume of hydrocarbon and metals contaminated soils placed underground.	A final total was provided by Teck Cominco in the 2004 NWB and INAC Report, dated September 19, 2005. Appendix 11 of this report includes mine level plans showing the locations where contaminated soils were stored up to the time the portals were sealed.
	The results of the metals and hydrocarbon analysis of the meltwater stored underground and a drawing showing the location and extent of the underground meltwater storage area.	INAC/NWB should confirm that these records are on file as it is necessary to document what wastes are encapsulated at the site for historical record purposes.
BGC (2003) September 8-10. 2003 Site Visit Report	Teck Cominco hired EBA to review the subsidence issue and will submit results of their evaluation and proposed plan to INAC/NWB for review. Requested to provide compilation of all instrumentation and survey records showing subsidence data.	This document is still outstanding. BGC understands that Golder Associates was also requested by Teck Cominco to provide an assessment. This is a major issue to be resolved before releasing the site to the Crown. These records should be on file in case of future subsidence issues.
	Metals contaminated soils in bedrock under concentrate storage shed.	See BGC (2008) review of contaminated soil remediation close out reports. A risk assessment was conducted leading to covering the area with clean beach gravel. No outstanding concerns.
	As- built drawings of cover for Operational Landfill.	Still outstanding, BGC has not reviewed. INAC/NWB should have all as-built record drawings on file for historical record purposes.
	As-built engineer signed and stamped drawings showing final slopes and contours for New Quarry and North Pit reclamation.	As above.
BGC (2004) June 20-22, 2004 Inspection Trip Report	Teck Cominco have hired Golder Associates to review the subsidence data.	A report on the assessment of the subsidence issue is still outstanding.
	Teck Cominco planned to excavate some test pits in subsidence area to confirm minimum thickness of cover over the waste.	BGC's September 9, 2004 site visit report indicates that Teck Cominco found less than the minimum of 1.8 m of cover in some areas and additional fill was placed. INAC/NWB should check their files for documentation from Teck Cominco regarding these investigations. This data is useful for the overall assessment of the subsidence zone, as the placement of wastes and backfill may complicate the interpretation of surface movements.
BGC (2004), September 9, 2004 Site Visit Report	As-built drawings for portals.	BGC reviewed the design drawings for the portals in 2003. An as-built set was sent to BGC as part of the 2008 site inspection. A review of this documentation is recommended and may be carried out by BGC under separate cover, pending approval by INAC.
	As-built drawings for LRD Quarry Landfill and cover.	In the 2004 Annual Report, Teck Cominco noted that detailed surveys of the placement of debris, metals contaminated soils, the cover cap and the locations of the thermistors had been done but the final drawings were not yet complete. A plan of the placement of debris within the landfill was included in the 2004 Annual report. INAC/NWB should check if an as-built drawing was submitted. As-built drawings of all structures remaining on site should be on file for historical record purposes.

Reference Document	Outstanding Items	Current Status and Comments
	Report by Golder on subsidence area.	Still outstanding.
	Close out reports and remaining quarterly reports.	BGC reviewed the 2003 and 2004 close out reports (see BGC 2008). INAC/NWB should confirm that they have all quarterly reports on file.
BGC (2006), 2006 Site Inspection Report	Thermistor data from data loggers in Operational Landfill and LRD Quarry Landfill.	Several years of temperature data should be collected to demonstrate that the landfill cover materials are performing according to design assumptions and that the encapsulated waste material remains frozen.
	Subsidence zone assessment by Golder.	Report remains outstanding. Monitoring continues.
	As-built drawings for marine dock and adjacent shoreline reclamation.	INAC/NWB to check if as-built drawings have been submitted. BGC has no record of reviewing these documents. In the 2004 Annual Report, Teck Cominco noted that surveys were completed, but these drawings were still in the draft stage and were not yet ready for submission.
	As-built drawings for Garrow Lake Dam decommissioning.	As above. In the 2004 Annual Report, Teck Cominco noted that surveys were completed but drawings were still in the draft stage and must still be submitted.
	As-built drawings for portal closure seals.	BGC received a copy in 2008 after completion of the 2008 site inspection. A review is recommended and may be done by BGC under separate cover, pending approval by INAC.
	As-built drawings showing locations where metals contaminated soils were placed in LRD Quarry Landfill.	Appendix 9 of the 2004 Annual Report includes drawings showing the location of debris placed into LRD Quarry Landfill, as well as a list of the types and quantities of material disposed of in 2004.
	Annual geotechnical inspection reports for 2004 (by EBA) and 2005.	INAC/NWB to check if reports have been submitted. BGC has no record of reviewing these documents.
Nunavut Water Board Letter of Direction to Teck Cominco, February 28, 2005.	The Board requested Teck Cominco to complete the submissions of the following documents which had not yet been received by NWB or INAC at that time:	
	Annual report for 2003.	Noted to be still outstanding in 2004 Annual Report.
	All quarterly expenditure/remediation updates for 2004	INAC/NWB to check their files and confirm that they have a complete record set.
	Geotechnical inspection reports for 2003 and 2004.	As above.
	All quarterly effluent monitoring reports for 2004.	As above.
	Report providing details on the decommissioning of non-PCB transformers at the mine.	BGC found nothing on file regarding this item in any of the documentation reviewed. INAC/NWB should review what the original requirements for this submission were, check if anything is on file and if outstanding, determine if requirement is still relevant.
	Engineer stamped as-built drawings of Little Red Dog Landfill cover.	Still outstanding. INAC/NWB to check files to confirm.
	Engineer stamped as-built drawings of Operational Landfill cover.	The 2004 Annual Report noted that detailed surveys were completed but the drawings were still in the draft stage and not ready to be submitted. INAC/NWB should confirm if these have been received.
	Report considering closure and cover design and engineer stamped as-built drawings of Subsidence Zone/Reclamation Landfill cover.	Still outstanding. INAC/NWB to check files to confirm.

Reference Document	Outstanding Items	Current Status and Comments
	Report on sampling results at Frustration Lake.	Results are included in Annual Reports. Past samples have not indicated any turbidity concerns. BGC supports Teck Cominco's request to eliminate this sampling requirement. See BGC 2008 Site Inspection Report for further discussion on this issue.
	Report on sediment/turbidity levels observed at Dock and Foreshore Area.	Now obsolete, but INAC/NWB to check what is on file for this item.
	Report describing the cover placed over the footprint of the former Concentrate Storage shed, as well as engineer stamped as-built drawings of the constructed cover.	In the 2004 Annual Report, this item was noted to be still outstanding.
	Report on the subsidence zone that includes predicted movement, risk management and long term monitoring concerns.	Still outstanding.
	A report that re-evaluates the estimated cost of re-establishing Garrow Dam in the post-reclamation phase.	This item may have been a contingency requirement imposed by INAC/NWB in case effluent from Garrow Lake exceeded regulatory limits during the reclamation period. Post-closure monitoring has confirmed that this is no longer an issue and presumably this requirement is now obsolete.
	Terms of Reference for post-closure site monitoring, including mine components to be monitored, type of monitoring to be undertaken, frequency of monitoring, protocols for remote site monitoring, contingency plans for additional or altered monitoring requirements.	Teck Cominco provided this information as an attachment to a letter dated June 14, 2005 responding to the February 29, 2005 letter from INAC/NWB. See BGC comments on this response below.
	INAC/NWB recommended that the above be submitted as one comprehensive document and requested Teck Cominco provide a date when this report could be expected.	Request now obsolete, as it has been superseded by subsequent reports, although many of the items are still outstanding.
BGC Memo to Carl McLean (INAC), August 6, 2005	BGC asked INAC/NWB if bathymetry of tailings deposition area in Garrow Lake had been submitted.	INAC/NWB to check files to confirm if final bathymetry of Garrow Lake is on file.
	Data and report supporting Teck Cominco's conclusions that the movements in the subsidence zone have slowed and do not present a safety issue. The outstanding geotechnical consultant's review of the subsidence issue was requested.	A summary report on this issue is still outstanding.
	As-built drawings of mine portal plugs.	Received by BGC in September 2008 and will be reviewed under separate cover pending approval by INAC.
	Analysis of wind data from Resolute Bay and ability to react to extreme events to mitigate effects on stability of Garrow Lake halocline.	Request is deemed obsolete. Practically, there is limited ability to react to extreme events due to time delays and site logistics. Garrow Lake is usually ice-covered and to date, high wind events have not resulted in any disturbances to the water column during the brief open water window.
Teck Cominco 2004 Annual Report, September 19, 2005.	Teck Cominco highlighted the items that were still outstanding at that time and reported on others as they were completed. The following items were noted:	
	2003 Annual Report	Was still outstanding as of September 19, 2005.
	As-built drawings for the marine dock and adjacent shoreline.	Surveys were completed, but drawings in draft stage and not yet ready for submission. INAC/NWB should confirm if these drawings have been received.
	As-built drawings for removal of Garrow Lake Dam.	Detailed surveys were completed at the end of construction, but drawings were still in draft stage and not ready for submission. INAC/NWB should confirm if these drawings have been received.

Reference Document	Outstanding Items	Current Status and Comments
	Survey of Garrow Lake Wave-Break structure.	During summer of 2004, the remnants of the wavebreak structure were removed down to native materials in the creek channel. Teck Cominco was going to provide a more detailed survey. In subsequent years, visual inspections have been carried out. The outlet has become naturally blocked by lakebed gravels pushed by lake ice during the winter. These blockages are naturally breached during periods of high flow. INAC/NWB should check what survey data is on file. As a minimum, the final as-constructed grades after removal of the wave break structure should be on file for record purposes. There is no need for any further follow-up surveys.
	As-built drawings of Operational Landfill cover.	Teck Cominco noted that detailed surveys had been completed during construction, including the locations of the thermistors. The drawings were in the draft stage at the time and not yet ready for submission. INAC/NWB should confirm if these drawings have been received.
	As-built drawings of the LRD Quarry Landfill cap.	Teck Cominco noted that surveys were done and that the drawings were still in the draft stage and not ready for submission. INAC/NWB should confirm if these drawings have been received.
	Confirmation of adequacy of remedial efforts to deal with residual metals contamination in the footprint of the concentrate storage area and as-built drawings.	Check files for documentation giving approval for cap and if as-built drawings were submitted. Check for risk assessment study done that was basis for this approach. The 2004 Annual report noted that a technical memorandum on this issue was still outstanding.
	Rationalize legal names between permits, licenses and leases.	INAC/NWB to confirm if this has been done. It will be important to have this step completed when dealing with reclamation security issues.
	Report by Golder Associates on geotechnical review of subsidence zone.	Teck Cominco indicated that they were in the process of reviewing a draft of this report and would forward this upon completion. This report remains outstanding. In August 2004 a detailed survey of the subsidence zone was carried out. Data was compared with 2003 results and showed no significant changes except for extra fill placed to increase cover thickness in some areas. Recent inspections have shown that the conditions in the subsidence area do not pose a hazard to the public or wildlife. BGC recommends that Teck Cominco submit an assessment report on the subsidence zone that summarizes the past history and monitoring data. This record will provide INAC/NWB with confidence that no long term stability concerns are a factor when considering reduction in reclamation security.
	Photographs taken by GLL in August 2004 of Garrow Lake erosion monitoring need to be added to Appendix 13.	Teck Cominco to obtain from GLL. INAC/NWB should confirm that copies are on file for historical documentation purposes.
	Garrow Creek erosion monitoring results.	Data was collected but not prepared in report format. To be included in Appendix 14 of 2004 Annual Report. INAC/NWB should confirm that this record is on file for historical documentation purposes.
	Marine Dock and Foreshore Erosion Monitoring.	Data was collected by GLL but not finalized into report. Appendix 15 of 2004 Annual Report contained sea bed imaging of intertidal and sub tidal dock and foreshore area. Appendix 20 contained 3 DVD's with SIMS imagery and a SCUBA survey. INAC/NWB should confirm that this record is on file for historical documentation purposes.
	2004 Annual Geotechnical Inspection Report by EBA Engineering.	Report was not included in 2004 Annual Report (Appendix 5). INAC/NWB should confirm that a copy is on file for record purposes.

Reference Document	Outstanding Items	Current Status and Comments
BGC Memo to Spencer Dewar, December 20, 2005, Re: 2004 Annual Report Comments	This memorandum reviewed the 2004 Annual Report submitted by Teck Cominco on September 19, 2005, the Annual MMER Report dated September 2005 and the 3 CD's of seabed imaging.	The outstanding items identified by Teck Cominco in the 2004 Annual report were highlighted by BGC for follow-up. Status of these items is given in previous section of this table, above.
BGC Memo to Spencer Dewar, March 28, 2007, Re: Review of 2006 Q1, Q2 and Q3 Reports	In the Q2 Report, TCL indicated that it would be requesting a reduction in the number and frequency of samples required to monitor the stability of the Garrow Lake water column.	BGC recommended that INAC water quality specialists review the available monitoring data and the study of the Garrow Lake limnology included in the 2004 Annual report to assess Teck Cominco's request and determine what modifications could be made.
	In the Q3 Report, TCL presented the results of the annual survey over the subsidence area. There was no mention that their consultants report would be forthcoming.	BGC recommended that Teck Cominco confirm if a report on the subsidence area is still forthcoming and the expected completion date. Alternatively, BGC recommended that Teck Cominco prepare a report that summarizes the history of the subsidence zone, including the data that demonstrates 4(+) years of relatively stable conditions. In the 2008 geotechnical inspection report, BGC noted that Teck Cominco had indicated that no consultant report would be forthcoming.
	Assessment of wind speed measured at weather station in Resolute Bay and effects on stability of Garrow Lake water column.	BGC requested that Teck Cominco include for reference the wind speed criteria given in the DRP to allow comparison with the data collected from the weather station. The data should be presented in a format that clearly shows that the actual energy being applied to the lake surface does not exceed the thresholds that would cause mixing or instability of the water column.
	Thermistor data in landfill covers.	Data loggers have now been installed and will provide confirmation that the covers are meeting their objectives. BGC requested that the thermistor data be correlated with site air temperatures to fairly judge their performance. This may not be possible if there are no thermistor beads located at the ground surface. Alternatively, the data from Resolute Bay could be used for a rough comparison.
BGC Review of 2006 4th Quarter and 2004 Annual Reports, October 3, 2008	Limited data set concerning temperatures in the two landfill covers.	Limited data shows that the waste material is frozen and the seasonal active zone remains within the cover. However further monitoring is required to show that a stable temperature regime has been achieved. The installation of dataloggers and continuous monitoring for the rest of the post-closure period should satisfy that requirement.
	Visual monitoring of erosion areas around New Quarry that have been mitigated.	In 2006, Teck Cominco placed riprap along several gulley areas around New Quarry. This work appears to have stopped further erosion, however visual monitoring will continue for the remainder of the post-closure period.
	Simplified water quality monitoring program.	Teck Cominco has consulted with Environment Canada and submitted a simplified plan for consideration by INAC and NWB. Check current status of this request.
BGC Review of 2007 Third Quarterly Report	Indications of toxicity in the reported Daphnia magna tests.	The Water Licence requires Teck Cominco to report only the results of the tests. It is unclear what obligations Teck Cominco has with respect to identifying the causes of and the elimination of the toxicity now that the site has received closed mine status and is no longer required to meet MMER. This requires further review by INAC and NWB, perhaps in conjunction with EC.

Reference Document	Outstanding Items	Current Status and Comments
BGC Review of 2007 4th Quarter and 2007 Annual Reports	Completion of outstanding studies and as-built drawings listed in 2004 Annual Report (dated September 19, 2005).	Teck Cominco indicated that the missing reports were scheduled for completion in the first Quarter of 2008. Copies of the 2008 1st and 2nd Quarter reports were received by BGC from INAC. No outstanding reports or as-builts were included, so these still remain outstanding. BGC requested that Teck Cominco provide a list of the outstanding documents they are referring to so they can be cross-checked with the 2004 Annual report.
	Rationalization of water quality monitoring program to reduce annual costs.	This issue is in the hands of the regulatory bodies to resolve.
BGC 2008 Site Visit and Inspection Report	Report on subsidence zone.	Teck Cominco indicated that its consultant has not responded to their request to prepare an assessment of the subsidence zone. BGC recommended that Teck Cominco summarize and submit all their supporting documentation and data to INAC with their 2008 3rd Quarter or 2008 Annual Report. BGC is prepared to undertake this review on behalf of INAC to assess the long terms risks and potential implications on the reclamation security.

Table 3: Summary of Outstanding Items Related to On-Site Reclamation Activities

Reference Document	Outstanding Items	Current Status and Comments
BGC (2003) July 2-3, 2003 Site Inspection Report	Clean up insulation blowing around tailings thickener area and site in general. Conduct confirmatory soil sampling of soil when fill pad under tailings thickener removed.	Site cleanup of loose debris is ongoing when personnel are on site. See BGC (2008) for review of 2003 and 2004 soil remediation close out reports. No outstanding concerns.
	Disposal of ice-rich material from the breaching of Garrow Lake Dam.	In the DRP, this material was to be placed into LRD Quarry. During reclamation, Teck Cominco requested a revision to dispose of this material into the tailings thickener overflow lagoon due to its proximity to the Dam. This was denied by INAC/NWB. A further modification request was submitted by Teck Cominco on October 15, 2004 to place this material into the excavation for the removal of the process barge. This received regulatory approval on March 5, 2004.
	Frustration Lake access road erosion due to meltwater runoff.	Teck Cominco has improved the cross-drainage ditches and placed erosion protection. Visual monitoring is done on an annual basis. See BGC 2008 for recent inspection recommendations.
BGC (2004), September 9, 2004 Site Visit Report	Removal and re-contouring of piles of ice-rich soils along upstream side of Garrow Lake Dam.	Based on past site inspections, this area is no longer a concern. No further action is recommended.
	Analysis of rusty coloured soil on exposed lake bed sediments along shoreline of Garrow Lake	Subsequent test results showed that metals did not exceed site specific remediation requirements and no further remedial action is required. INAC/NWB should confirm that they have a copy of the analytical test results on file for record purposes.
	Monitoring of Garrow Lake outlet channel at wave break structure.	Letter of Approval for Decommissioning of Garrow Lake wavebreak structure was issued on July 8, 2004. The letter requires visual observations during low flows at end of summer to confirm that the channel is not obstructed. These are ongoing while personnel are on site. See BGC 2008 site inspection report for current status. No further action required.
	Equip thermistors installed in Operational Landfill with dataloggers.	This was done in 2006. No further outstanding concerns.
	Flatten slopes in vicinity of tank farm and incinerator.	Done by Teck Cominco, no further concerns.
	Re-grade area of additional excavation where cover materials were removed in New Quarry.	In the 2004 Annual Report, Teck Cominco noted that this work would be carried out in 2006 when equipment operators are again mobilized to the site. Both the BGC 2006 and GLL geotechnical inspections did not comment on this area. This area should be checked again during the 2009 geotechnical inspections.
	Monitor performance of restored marine shoreline area.	Ongoing visual monitoring confirms a natural stable beach has developed. No further outstanding issues or concerns.
	Exploration portal backfill looks too steep for the fine material used. At Main Portal, the upper crest of the slope should be bladed down. Some steel bars sticking out of the ground were to be removed for aesthetic and safety purposes	Upper crest of Main Portal was subsequently bladed down. In 2008 a slump was noted by BGC in the Main Portal backfill that will be repaired by Teck Cominco in 2009. Steel bars were removed. Teck Cominco has ongoing program of picking up scrap metal around the site when personnel are present seasonally. A final check in 2009 is recommended.
BGC (2006), 2006 Site Inspection Report	Erosion along Frustration Lake access road.	Teck Cominco have armoured the drainage channels and constructed deflection berms. Monitoring will be required to check that channels remain stable and no new erosion develops.

Reference Document	Outstanding Items	Current Status and Comments
	Gulley erosion in slopes around New Quarry.	Armoured swales were constructed by Teck Cominco in these areas. No new erosion areas have developed. Monitoring is required to check that these remain stable and no new erosion develops.
	Scrap metal stockpile in LRD Quarry.	Pieces of scrap metal collected by Teck Cominco from the site have been stockpiled on the surface of the LRD Landfill cover. This material should be buried in the LRD landfill before the site is permanently abandoned.
	Fleet of construction equipment left on site.	Teck Cominco indicated that the remaining equipment is beginning to suffer more frequent breakdowns and as a result the capability of undertaking any further significant reclamation work is limited. INAC/NWB should be aware from a reclamation security perspective that if significant site works become necessary, a new fleet of equipment may need to be mobilized to site, in addition to demobilizing the old equipment and ultimately the replacement equipment as well.
BGC Review of 2007 Third Quarterly Report	Water sampling of Loon Lake Drainage	This requirement under the Water Licence has not been reported in this or other previous Quarterly reports. INAC/NWB to check if this is still a requirement or find documentation approving that sampling was no longer required.
	Sampling of seepage (if any) from toe of Operational Landfill.	Seepage was noted by GLL in the 2007 geotechnical inspection report and should be sampled in 2009. In addition, the white precipitate noted by GLL in the same area should be sampled and analyzed to determine its composition.
BGC 2008 Site Inspection Report	Additional erosion caused by quad traffic along Frustration Lake access road.	Quad traffic frequently detours around snow filled drainage swales along the decommissioned access road. This has resulted in damage to the tundra surface adjacent to the reclaimed roadway and the potential for further erosion and degradation. BGC recommended that quads stay on the reclaimed roadway to prevent further damage. BGC also recommended that INAC/NWB consider discontinuing the need to collect water quality samples in Frustration Lake, as to date they have all shown no signs of turbidity associated with the slow erosion of the causeway and it is the only reason that quads need to travel on this road.
	Erosion gullies around New Quarry.	Continue monitoring for remainder of licence period. Minor repairs to riprap may be required if flow regime in drainage course is increased by intense rainfall event of rapid snowmelt.
	Slump in backfill of Main Portal.	A small landslide has displaced the backfill placed in front of the Main Portal. Teck Cominco has verbally agreed to repair this in 2009.
	Stockpile of metal debris in LRD Quarry.	This stockpile of metal debris collected by Teck Cominco from around the mine site should be buried within the LRD Quarry Landfill in 2009, before removing equipment from the site.

3.3 Recommendations Concerning Outstanding Items

3.3.1 Outstanding Documentation Requests

The above list indicates that there are still a substantial number of outstanding document submissions based on the information available to BGC. It is recommended that INAC/NWB conduct their own internal audit of their files using the above tables as a guide to confirm which items have in fact been received and which are still outstanding. Since Teck Cominco has requested a reduction in the reclamation security in recognition of the completion of the site reclamation work activities, it is reasonable to expect that the regulators should be in possession of all the required documentation necessary to assess if the work completed to date meets the original design requirements and poses no long term concern with regard to physical, chemical and thermal stability and that the site will remain safe for the public and wildlife.

Since the ultimate objective is to return the mine site back to the Crown, regulators should be in possession of all documentation that contains information regarding as-built site conditions for the public record and their own due diligence as landowners. This includes the location of landfills and waste disposal sites and inventories of the materials contained within them. At some future date, the site may become reactivated by mining or other enterprise and the historical records on file with the regulators will be relied on to determine existing site conditions and potential development restrictions.

In assessing the need to gather any of the outstanding documentation, BGC recommends that the following material from Teck Cominco should, as a minimum, be on file for public historical record purposes and to demonstrate due diligence on behalf of the regulators in eventually accepting the reclaimed site:

- All as-built drawings for any facility or reclamation work completed on site. This would include, but not be limited to the following:
    - Underground mine plans showing final extent of workings at the time of mine closure.
    - Garrow Lake Dam breach and associated Garrow Creek channel stabilization.
    - Garrow Lake wave-break structure, final surveys of structure footprint.
    - Operational Landfill, including final cover details, thermistor locations and thermistor bead depths.
    - Little Red Dog Quarry Landfill, including final cover details, thermistor locations and thermistor bead depths.
    - Reclamation area landfill cover details.
    - Dock and marine foreshore final grades.
    - Former concentrate storage area cover.
    - Portal seals (for all portals on site).
    - Final slopes and contours for New Quarry, North Pit and Little Red Dog Quarry.

- Associated quality control and quality assurance documentation for the above items (i.e. grain size curves, field moisture contents, compaction tests, laboratory tests, etc.)
- Any supporting design documents for the above items.
- Monitoring data used to confirm long term performance and stability, including:
    - Temperature measurements from thermistors installed in Operational Landfill and LRD Quarry Landfill.
    - Underground mine rock temperature data obtained just prior to and during reclamation activities.
    - Topographic data over subsidence zone.
    - Garrow Lake water column analytical results.
    - Wind speed data from Resolute Bay weather station.
    - Erosion monitoring data, including any measurements and visual observations, such as the Garrow Lake shoreline, marine foreshore and dock area, Frustration Lake access road and New Quarry slopes.
    - Water quality and toxicity.
- Inventory of types and quantities of wastes contained in on-site landfills. Includes as-built drawings showing location of waste materials within each on-site landfill, including:
    - Operational Landfill.
    - Little Red Dog Quarry Landfill.
    - Reclamation Landfill.
    - Metals and hydrocarbon contaminated soil and meltwater disposed in underground mine workings.
    - Photographic records showing various materials in place prior to encapsulation by cover materials.
- Close out reports for remediation of areas of metals and hydrocarbon contaminated soils, including supporting analytical results.
- Reports and associated correspondence documenting any specific studies, reviews or assessments carried out to obtain regulatory approval for specific reclamation activity or deviation from approved DRP, such as:
    - Risk assessment and design of cover for residual metals contaminated soil in footprint of former concentrate storage shed.
    - Disposal of meltwater in underground workings.
    - Disposal of metals contaminated soils into Little Red Dog Quarry.
- Reports, studies or related documentation concerning assessment of any issue affecting long term stability of the site, such as the long term stability of the subsidence zone.
- A complete set of the quarterly and annual reports covering the term of the current water licence.
- A complete set of the annual geotechnical inspections carried out by Teck Cominco during the term of the current water licence.

- Photographic records of final as-built conditions in all areas where reclamation activities have taken place as a baseline to judge changes in the future.
- Quarterly and annual reclamation expenditure reports to document the level of effort expended during the decommissioning and reclamation phase.

BGC also recommends that INAC/NWB appoint a single individual who would be responsible for auditing their respective internal files and identifying any missing information. Each item of missing information should be assessed on a case by case basis to determine if the outstanding information is still forthcoming from Teck Cominco or not. There may be cases where documentation has become lost or is no longer obtainable from the site. INAC/NWB would then have to assess the impact on the overall database and if the lack of information raises any concerns regarding the release or reduction of the security bond requested by Teck Cominco.

3.3.2 Outstanding Site Reclamation Activities

Since reclamation was completed in 2004, the site has remained relatively stable. Teck Cominco has maintained a fleet of construction equipment on site and a small exploration camp to house field staff for a few weeks each year during the summer to conduct minor repairs. In 2009, Teck Cominco will undertake the final follow-up repairs identified in previous site inspections, as noted in Table 3. This work is expected to include:

- Repairing and flattening the overall slope and landslide of the backfill at the Main Portal.
- Burying the stockpile of accumulated scrap metal collected from around the site in the Little Red Dog Quarry Landfill.
- Re-grading the area of additional excavation where cover materials were removed in New Quarry (if still required).
- Repairs to gulley erosion around New Quarry and Frustration Lake access road, if required.

The on-site fleet of construction equipment has limited capability to undertake further significant reclamation work. It is anticipated that the remaining work can be carried out using this equipment, supplemented by hand labour as required. The 2009 inspection should confirm that no long term stability issues remain at the site. Teck Cominco have tentatively planned to demobilize from the site in 2010, with the current water licence expiring on December 31, 2011. As such, there are three years of post-closure monitoring left to confirm long term site stability.

The following section discusses the implications of the above outstanding items on the current assessment of the Crown's remaining liability.

4.0 ASSESSMENT OF CROWN'S REMAINING LIABILITY

4.1 Decommissioning and Reclamation Plan

The Decommissioning and Reclamation Plan (DRP) prepared by Gartner Lee Limited (GLL), dated March 2001 is the approved reclamation plan for the Polaris Mine site. The DRP was prepared to satisfy the requirements of the Polaris Mine Water License, held by Teck Cominco Limited (Teck Cominco) under the authority of the Nunavut Water Board (NWB) and for the surface leases held under the authority of the Government of Canada Territorial Lands Act and the Territorial Lands Regulations. The DRP was jointly approved by INAC and NWB on April 15, 2002.

The DRP superseded the "Closure and Reclamation Plan" submitted to the Northwest Territories Water Board in May 1996 and also the "Restoration Plan" for the surface leases submitted to DIAND in 1984 and approved by DIAND in 1985 (GLL, 2001).

At the time the DRP was prepared, Polaris Mine was operating under Water License N4L2-0262, granted by the Northwest Territories Water Board under the Northwest Territories Water Act. The Nunavut Water Board assumed responsibility for existing Water Licenses in Nunavut in 1996 under the mandate of the Nunavut Land Claims Agreement Act. The proposed Nunavut Water Act has not yet been promulgated. The old License expired December 31, 2002. The current Water License NWB1POL0311 came into effect March 1, 2003 and expires December 31, 2011.

There are five surface leases at the Polaris site that all expire on April 30, 2011:

- Lease 3472; with an area of 328 hectares incorporates most of the former mine facilities, including: the barge; concentrate storage building; accommodation building; landfill sites; backfill quarries; mine openings; the Frustration Lake pumphouse and the tailings thickener.
- Lease 68 H/8-1-3; with an area of 14.29 ha, covers a portion of the bed of Crozier Strait and includes the docking infrastructure.
- Lease 68 H/8-3-3; with an area of 67.49 ha, covers the airstrip and some roads and pipelines.
- Lease 68 H/8-8-2; with an area of 403 ha covers the bed of Garrow Lake, which is designated as the tailings deposition area in the lease.
- Lease 68 H/8-9-2; with an area of 148.91 ha, provides a buffer zone around Garrow Lake, the Garrow Lake Dam and Garrow creek to the ocean.

Teck Cominco holds three mining leases under the Territorial Lands Act through the Canada Mining Regulations, Lease Numbers 2346, 3799 and 3800 (GLL, 2001).

The DRP follows the "Guidelines for Abandonment and Restoration Planning for Mines in the Northwest Territories", issued by the Northwest Territories Water Board in September 1990. Teck Cominco's own closure objectives and approach to closure planning follow those outlined in the document "Mine Reclamation in Northwest Territories and Yukon", Northern Water Resource Studies, Indian and Northern Affairs Canada, April 1992. The DRP was prepared on the assumption that all facilities and installations that comprised the Polaris operations would be decommissioned, removed or reclaimed under the terms of the land leases. The general objectives of the DRP are:

- To ensure that the site returns to a condition such that public health and safety, and the environment are protected.
- To provide a working document that addresses the concerns and requirements of all stakeholders during the consultation and implementation stages.
- To eliminate or minimize the requirements for long term care and maintenance.
- To identify those activities required to return the site to an aesthetically acceptable condition.

During the reclamation period, INAC published the document "Mine Site Reclamation Policy for Nunavut" (INAC, 2002). This Policy was intended to cover existing mining operations. Since Polaris Mine shut down in the 3rd Quarter of 2002, it fell under the transition rules for existing mines in which "...certain aspects of this Policy will have to take into account the specific situation and issues of individual mines on a case-by-case basis." No specific changes had to be made to the DRP as a result of the implementation of this Policy.

Part G, Item 3 of the current Water License requires that Teck Cominco review the DRP annually and modify the Plan as necessary to "...reflect directions from the Board, changes in operations and technology, and results from restoration research and other studies." Although no formal revisions were made to the DRP during the course of the decommissioning and reclamation period some restrictions and conditions were applied in the approval process.

- The joint approval of the DRP on April 15, 2002 by INAC/NWB excluded the decommissioning and reclamation of Garrow Lake, Frustration Lake and the dock and marine foreshore area. Those areas were subject to Fisheries Act authorizations by Fisheries and Oceans Canada ("DFO"). In support of their application for Fisheries Act authorization, Teck Cominco prepared the "Polaris Fish Habitat Restoration Plan" (Teck Cominco, 2002). The authorizations were granted and are subject to conditions set by DFO. On July 4, 2003, INAC and NWB issued a joint approval of the DRP for the components related to Garrow Lake, Frustration Lake and the Dock and Marine Foreshore area, provided that DFO's mitigation measures for the protection of fish habitat were addressed and that the conditions required by DFO under the Fisheries Act Authorization were met.

- The Joint Approval issued July 4, 2003 provided lists of specific conditions that applied to the decommissioning and reclamation work undertaken at Garrow Lake, Frustration Lake and the dock and marine foreshore area, which were in addition to the measures proposed in the DRP.
- With respect to the Frustration Lake jetty, DFO suggested that monitoring of the jetty for erosion should be included in the post-closure monitoring plan. Appropriate contingency measures to prevent elevated sedimentation adjacent to the jetty are reflected in the terms and conditions of the current Water Licence.
- On June 6, 2002, the new Metal Mining Effluent Regulations (MMER) promulgated under the Fisheries Act came into effect. Since Polaris Mine was still operating at the time, the new standards were applied in the Water License. The new MMER further enhanced the requirements of previous regulations by adding limits for cyanide, including an upper limit on pH, lowering the limit for Total Suspended Solids (TSS), requiring Environmental Effects Monitoring (EEM) and requiring production of non-acutely lethal effluent. Teck Cominco complied with MMER monitoring requirements until July 27, 2006, when the mine achieved closed mine status. However, the Water License imposes equally stringent requirements and Teck Cominco has consulted with Environment Canada (EC) to develop a simplified monitoring plan for consideration by NWB and INAC.
- Under Part G, Item 4 of the Water License, Teck Cominco was required to prepare a "Comprehensive Assessment of Mine Site Remediation" in terms of remediation objectives and the need for ongoing monitoring and long term monitoring and follow-up remediation measures. A detailed post-reclamation monitoring program was submitted by Teck Cominco to INAC and NWB on June 14, 2005. The monitoring requirements identified items that were obsolete as well as recommending revised monitoring.
- Regulatory approvals were obtained by Teck Cominco for individual activities carried out under the DRP. Each of these approvals included a set of specific terms and conditions required by INAC/NWB.

4.2 Overview of Decommissioning, Reclamation and Restoration Work Carried Out

The following is a summary of the decommissioning and reclamation work carried out at each of the major mine components:

- Mine workings:
    - All underground equipment and machinery was either shipped off site for re-use or left in place in the mine.
    - Equipment not removed from the mine was cleaned and drained of potentially hazardous waste materials such as fuel, lubricants and batteries. Waste oils were burned in the on-site incinerator or shipped off-site with other hazardous materials.

  - Hydrocarbon and metals contaminated soils excavated as part of the site remediation efforts were disposed of in the underground mine workings in accordance with regulatory approvals.
  - All portals and raises were sealed by means of secure plugs and caps. The openings were subsequently backfilled and graded to conform to the contours of the surrounding area.
  - Surface subsidence has occurred over the area now called the Reclamation Landfill. The surface depression was used to dispose of mostly old equipment and scrap metal and was capped with a rockfill cover to promote surface runoff and eliminate safety hazards. Monitoring of this area is being done by surveying the topography on an annual basis using a differential GPS survey system.
  - Known areas of ore stockpiling were investigated and cleaned up by either processing the material through the mill, or sealing the material in the underground mine.
- Garrow Lake Tailing Facility:
  - The physical structures such as the pipelines were flushed, removed and disposed in the LRD Quarry.
  - The pipeline right-of-way was re-contoured to restore natural drainage patterns and prevent ponding of surface runoff.
  - The water level in Garrow Lake was lowered back to its original water level.
  - The Garrow Lake Dam was breached and the Garrow Creek channel through the dam base was re-instated.
  - The Garrow Lake wave break structure was removed and the outlet of the lake was restored back to natural grade.
- Buildings:
  - Demolition and disposal of the process barge on site was carried out, with demolition materials disposed in the LRD Quarry.
  - Saleable equipment was recovered. Chemicals and other hazardous materials were removed.
  - Hydrocarbon and metals contaminated soils around the process barge were excavated and disposed in the underground mine workings in accordance with regulatory approvals.
  - Other buildings on site were demolished, including the concentrate storage building, the Bent-Horn fuel conditioning building, the cemented rock-fill (CRF) plant, the accommodation complex and the tailing thickener building. Demolition debris from these buildings was disposed in the LRD Quarry.
  - The footprint occupied by these buildings was backfilled and graded to a stable slope.
  - Equipment, furniture and other useable materials from the buildings were recycled to nearby communities or disposed on site.
  - Chemicals and hazardous materials including fuels were prepared for shipping off-site for recycling or disposal.

- Fuel Storage and Handling Areas and Distribution Lines:
  - Fuel remaining in the diesel tanks at mine closure were transferred to one of the main tanks in the tank farm for use during the reclamation work.
  - Unused fuel was either removed from site by oil tanker or burned in the incinerator.
  - Sludges remaining in the tank were removed and burned.
  - The tanks were purged of vapours prior to dismantling and cleaning, then disposed of in the LRD Quarry.
  - The impermeable liner from the tank farm was disposed in the underground workings.
  - The berms around the tank farm were graded to prevent diversion or ponding of surface runoff.
  - The associated pipelines were drained and purged of vapours, cleaned and sectioned for disposal in LRD Quarry.
  - The pipeline right-of-ways and culverts under roadways were graded and re-sloped to prevent ponding of surface run-off.
- Concentrate Load-Out Conveyors:
  - The load-out support structures, conveyors and ancillary equipment were removed and dismantled.
  - Steel or equipment not required elsewhere was cut up and disposed into LRD Quarry.
- Miscellaneous Outbuildings:
  - Other buildings were dismantled, removed from site or disposed into the LRD Quarry. These included the firehall, equipment storage sheds and satellite receiving dishes.
- Dock Site:
  - The dock structure was decommissioned by removal of the ship loading tower, conveyor ways, surface pipes and electrical utilities.
  - The sheet piles were cut off below the low water level.
  - The material within the cells was excavated.
- Airstrip:
  - The airstrip was left largely intact.
  - The related equipment including the radio beacon, runway lights and signs were removed.
  - Two small survival shacks were left on the runway for the post-closure monitoring work.
- Freshwater Line and Pumphouse:
  - The pumphouse on the Frustration Lake jetty was dismantled and the equipment removed.
  - The jetty extending into the lake was left in place to avoid impacts on the aquatic environment associated with removal.

  - The water storage tank was dismantled and removed, along with the associated electrical equipment.
  - The base of the water storage tank was graded to a stable slope.
  - The associated water lines were dismantled and disposed in the LRD Quarry.
  - The pipeline routes were re-contoured where required to prevent ponding of surface water and to restore natural drainage routes.
- Access Roads and Ramps:
  - Approximately 40 km of access roads exist at site.
  - There were no stream crossings except at the outlet to Loon Lake.
  - All culverts were removed to re-establish natural drainage patterns.
  - Re-contouring was carried out where graded slopes would otherwise be expected to become unstable in the long term.
- Sewage System:
  - Sewage pumps, storage tanks and pipelines were flushed, removed and disposed into the LRD Quarry.
- Heating (Glycol) Distribution Lines:
  - The glycol was drained and collected in drums and either incinerated on site or shipped for disposal off-site.
  - The pipes and tanks associated with the heating systems were cleaned and disposed in the LRD Quarry.
- Electrical and Communications:
  - All electrical and communications cables throughout the site were removed.
  - Cables worth recovering or for re-sale were shipped off-site.
  - Other cables were cut into manageable lengths and disposed in the LRD Quarry.
- Solid Waste Management:
  - The Construction Landfill, containing non-hazardous solid waste produced during the initial construction of the mine site was relocated into the Operational Landfill.
  - An engineered cover for closure was placed over the consolidated landfill to ensure that the waste materials remain frozen within the permafrost layer and that surface contours facilitate drainage.
  - The Reclamation Landfill is located in the subsidence area above the old mine workings and contains decommissioned heavy equipment and other non-hazardous materials.
  - Teck Cominco prepared records of all materials placed into the Reclamation Landfill.
  - The LRD Quarry was used to dispose of demolition debris. No hazardous materials were placed in the quarry.
  - An engineered cover was placed at closure to promote surface runoff, prevent ponding of water and ensure that the waste materials remain frozen within the permafrost layer.

- Chemicals:
  - The inventory of chemicals remaining at closure were kept in their original containers and either returned to the chemical supplier, sold to another user of the product, used at another Teck Cominco facility, or shipped to a licensed disposal facility.
- Hazardous Materials:
  - Hazardous materials were classified and labelled by Teck Cominco as a registered generator of hazardous waste in Nunavut.
  - Waste manifests were prepared by Teck Cominco. Shipments were transported off-site by a registered hazardous waste carrier and received by a registered receiver.
- Contaminated Soils:
  - A human health and ecological risk assessment was undertaken by Cantox Environmental Inc.
  - Soil quality remedial objectives of 10,000 ppm for zinc and 2,000 ppm for lead were set based on historic land use activities at the site and Inuit children as the most sensitive receptor.
  - The Yukon Territory Contaminated Sites Regulation for hydrocarbon contaminated soils of 1,000 µg/g LEPH (light or heavy extractable petroleum hydrocarbons) was adopted for the Polaris closure plan.
  - Metals and hydrocarbon contaminated soils were excavated and disposed in the underground mine workings in accordance with regulatory approvals.
  - Close-out reports for remediation of contaminated soils were prepared by GLL in 2003 and 2004 documenting the locations and volumes of material removed in each area. (See BGC, 2008 Review of Close-Out Reports).

4.3 Outstanding Post-Closure Items Affecting Crown's Remaining Liability

4.3.1 Current Site Security

Teck Cominco's original cost estimate for the decommissioning and reclamation work at the Polaris Mine Site was $47 million. To date, Teck Cominco has incurred approximately $68 million in reclamation and post-closure monitoring costs. The security currently held by the Crown is $18 million.

On June 24, 2008 Teck Cominco submitted a request for a bonding reduction in the amount of $16 million in recognition of the reclamation work already completed, leaving a security of $2 million to cover the remaining outstanding items.

INAC has developed a cost estimating model for determining the decommissioning and reclamation costs for mines that is used in setting security requirements. The RECLAIM model includes various line items for typical mining operations and is designed as generic checklist with conservative unit rates based on northern mining projects. With respect to the Polaris Mine site, the use of the RECLAIM model may be superseded by using the actual cost data provided by Teck Cominco in their quarterly and annual reports. In addition, there are only 3 years remaining in the post- closure monitoring period, so a reasonably accurate projection can be made of the remaining costs based on Teck Cominco's own figures. It is normal practice for the Crown to assess the outstanding liability by assuming that an independent third party contractor has to be hired to complete the work that is currently being carried out by the mining company. Since Teck Cominco has already sub-contracted most of the on-site work, the costs summarized in the reclamation cost reports may be assumed to be a fair estimate of the remaining outstanding liabilities as well.

In general, reclamation of the Polaris Mine site has established physical and chemical stability in most areas, as assessed on the basis of visual and measured monitoring data. However, should Teck Cominco be unable to fulfil its remaining obligations under the DRP and Water Licence, there are several areas that represent a potential cost liability, which would have to be assumed by the Crown. Table 4 is a summary of the potential cost liability associated with various outstanding items. The basis for each of these estimates is discussed in the following sections.

4.3.2 Cost Estimate Basis for Outstanding Items

4.3.2.1 Outstanding Documentation

The status of the outstanding documentation detailed in Section 3 needs to be confirmed by INAC and NWB. As noted in Section 3.3.1, certain types of documentation should be on file as historical record copies, particularly if the Crown will become the eventual custodian of the site. This information, if lost would be impossible to recover from other sources. Regeneration of some types of information may be possible from construction records, but would involve significant expenditure in terms of additional time and cost.

Assessing the potential liability that these missing records may represent is difficult to quantify at this time and will depend on what records are confirmed to be outstanding by INAC and NWB. The recommended approach is to withhold a portion of the security until all of this documentation is received to the satisfaction of all regulatory bodies. The amount of security to be withheld should be large enough to provide an incentive for Teck Cominco to submit their documentation as soon as possible. BGC recommends that INAC/NWB consider setting this amount at $1 million.

4.3.2.2 Demobilization of Remaining Camp and On-Site Equipment

Teck Cominco has indicated that the construction equipment on site requires more repairs and has limited capability of undertaking any more significant reclamation work on site. The Crown would be forced to either upgrade the existing equipment on site or bring in new equipment. In either case, the existing equipment would eventually have to be demobilized from site.

Teck Cominco's plan is to skid the camp and remaining equipment across the ice to Resolute Bay during the winter. The camp and equipment would then be decommissioned or sold to a local contractor. For the purposes of assessing the potential liability associated with this demobilization, BGC assumed that the on-site equipment is inoperable. Therefore, a third-party contractor would have to mobilize new equipment to the site to complete the remaining remedial work, then back-haul the derelict equipment and temporary camp as part of the final demobilization from site.

It was assumed that a third-party contractor based in Resolute Bay would be able to provide the necessary equipment. The existing Teck Cominco camp on site is functional and well maintained and could be used by a third party contractor. However, to provide a more conservative basis for this estimate, it was assumed that the contractor would also bring in a new portable camp that is compatible with his needs. The additional new equipment mobilized to the site to complete the outstanding work was assumed to include:

- A Cat 235 or equivalent excavator.
- A Cat D8 or equivalent bulldozer.
- A tandem axle dump truck.
- Fuel, lubricants and maintenance items for above.
- 3 ATV's for site transportation.
- Skid-mounted sea canisters for storage of equipment and supplies.
- Skids for transporting Teck Cominco's existing equipment from the mine site.

It is important to note that under this scenario, mobilization and demobilization was assumed to occur over the ice during the winter period. Should the Crown have to exercise this option, the equipment would be mobilized to site during one winter season, then demobilized in the following winter season assuming all the site work was completed during the intervening summer period. The cost estimate includes a standby rate for the equipment based on one-half the normal charge-out rate during the period of storage on site.

The timing of the demobilization may extend the period of liability from 2011 to 2012 if the Crown were to assume responsibility for the site after 2010. The option of mobilizing and/or demobilizing by sea-lift (using lightering barges at Polaris Mine site) was not considered as it doesn't offer any significant advantages over the winter ice route. The sea lift has to wait until the open water season to mobilize, leaving a shortened window to complete any on-site work. Demobilization would likely have to wait until the next open water season, unless all work could be completed in the first season.

Based on the above scenario and assumptions discussed, the following costs were estimated to cover this potential liability:

- Mobilization- $835,000, which includes a significant cost component to cover on-site storage.
- Demobilization- $40,000, (Includes the demobilization of Teck Cominco's existing equipment and camp facilities along with the demobilization of the Crown's third-party contractor.)

4.3.3 Ongoing Post-Closure Monitoring Program

The Crown would be required to fulfil the Water License requirements for the remainder of the post-closure monitoring program in 2011. Teck Cominco has requested a reduction in the monitoring requirements based on post-closure monitoring data collected to date. Based on Teck Cominco's cost projections included in the 2007 cost report, this amounts to $731,500 for the years 2009, 2010 and 2011.

4.3.4 Remediation of Areas Identified During Site Inspections

In 2009, Teck Cominco plans to complete remediation in several areas identified during previous site inspections. In addition, the 2009 inspection will check that the previously remediated areas have achieved long term stability. The areas currently identified for repairs in 2009 include:

- Re-grading and contouring of Main Portal backfill to repair slide.
- Burying the stockpile of accumulated scrap metal collected from around the site in the Little Red Dog Quarry Landfill.
- Re-grading the area of additional excavation where cover materials were removed in New Quarry (inspectors to check if still required).
- Repairs to gulley erosion around New Quarry and Frustration Lake access road, if required.
- Final clean-up and re-grading of the camp area during demobilization.

The cost estimate for completing this work was based on the following key assumptions:

- Work would all be completed over a 4 week window. This would include sufficient allowance for delays related to inclement weather or equipment breakdown, repair and maintenance.
- Crew would consist of 3 equipment operators, two labourers and one supervisor.
- Work would be done on a single 12 hour shift basis.

The estimated cost for this potential liability is $250,000.

4.3.5 Stability of Subsidence Zone

Teck Cominco has undertaken monitoring of the subsidence zone during the post-closure period. The data has indicated that surface settlements have reduced significantly since mining operations have ceased and the area was covered by the Reclamation Landfill. Visual inspections confirm that at surface, the subsidence zone poses no potential hazard to the public or wildlife. Although some significant surface cracks are present, there are no concerns regarding potential for erosion or instability.

Teck Cominco was requested by INAC to prepare a report that assesses the conditions in the subsidence zone and potential for any long term instability and this report remains outstanding. The potential for long term surface disturbance within the subsidence zone is the most significant outstanding potential concern that should be resolved before the Crown accepts responsibility for the Polaris Mine site.

It is not possible to provide an estimate of the potential costs associated with any remediation should unacceptable subsidence occur in the future. The report to be prepared by Teck Cominco should include a risk assessment to provide regulators with further confidence that the long term risks do not impose an unacceptable liability.

BGC recommends that in the interim, a $1 million outstanding liability be apportioned to this item to encourage Teck Cominco to complete the required stability and risk assessment of the subsidence zone.

Table 4: Summary of Estimated Crown's Remaining Liability

Item	Estimated Outstanding Potential Liability to Crown	Comments
Outstanding Documentation to be submitted in accordance to Water Licence requirements.	$1,000,000	Suggested hold back of existing security until documents are received.
Mobilization of new equipment to site from Resolute Bay.	$835,000	Assumes mobilization from Resolute Bay of third-party contractor with new equipment in April to bring skids to site to load derelict equipment and transport back to Resolute Bay. Includes 10 months of on-site storage costs until following April assuming a standby rate.
Demobilization of existing camp and removal of old and new equipment after completion of outstanding site reclamation.	$40,000	Assumes third-party contractor loads all old equipment for back-haul to Resolute Bay over ice during the winter after remaining site remediation work is completed.
Remediation of outstanding areas identified during inspections	$250,000	Assumes 4 weeks of work on site during summer season to complete remediation.
Ongoing Post-Closure Monitoring for 2009 to end of 2011.	$731,500	Based on Teck Cominco's projected costs in 2007 annual report.
Assessment of long-term stability of subsidence zone.	$1,000,000	Suggested hold back of existing security until documents are received.
TOTAL OUTSTANDING LIABILITY	**$3,856,500**	

5.0 SUMMARY AND CONCLUSIONS

Table 4 summarizes the potential outstanding liability for the Polaris Mine site based on the assessment presented above. BGC expects that most of this cost liability will be resolved by the end of 2009 when Teck Cominco completes the required site remediation and submits the outstanding documentation. Based on this assessment, the Crown's potential outstanding liability is about $3.9 million, comprising about $1.9 million in on-site contractor related costs and $2 million in recommended hold-back of security to cover outstanding documentation. Based on this assessment, Teck Cominco's request to reduce the bonding to $2 million seems reasonable to cover the remaining site work, provided that INAC/NWB can also be assured that the outstanding documentation is provided as soon as possible.

Both INAC and NWB are requested to undertake their own internal audit of the documentation on file to confirm which items remain truly outstanding. As noted in the above discussions, the regulators are also obligated to provide Teck Cominco with responses to several requests concerning reduction in on-site monitoring requirements for the remainder of the post-closure period. This will affect the potential cost liability associated with those activities.

6.0 CLOSURE

We trust this report meets your requirements at this time. Should you have any questions, or require additional information, please do not hesitate to contact the undersigned, at your convenience.

BGC ENGINEERING INC.
Per:

Reviewed by:

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REFERENCES

BGC Engineering Inc., (2008), Polaris Mine Abandonment and Reclamation, Review of Contaminated Soil Remediation Close Out Reports, Draft Report, prepared for Indian and Northern Affairs Canada, October 31, 2008.

BGC Engineering Inc.,(2008), Polaris Mine Abandonment and Reclamation, August 24, 2008 Site Visit and Inspection, Draft Report, prepared for Indian and Northern Affairs Canada, September 25, 2008.

BGC Engineering Inc., (2008), Polaris Mine Abandonment and Reclamation, Review of Teck Cominco's 2007 4th Quarter and 2007 Annual Reports, Draft Report, prepared for Indian and Northern Affairs Canada, October 9, 2008.

BGC Engineering Inc., (2008), Polaris Mine Abandonment and Reclamation, Review of Teck Cominco's 2007 Third Quarterly Report, Draft Report, prepared for Indian and Northern Affairs Canada, October 9, 2008.

BGC Engineering Inc., (2008), Polaris Mine Abandonment and Reclamation, Review of Teck Cominco's 2007 1st and 2nd Quarterly Reports, Draft Report, prepared for Indian and Northern Affairs Canada, October 9, 2008.

BGC Engineering Inc., (2008), Polaris Mine Abandonment and Reclamation, Review of 2006 4th Quarter and 2006 Annual Reports, Draft Report, prepared for Indian and Northern Affairs Canada, October 3, 2008.

BGC Engineering Inc., (2007), Polaris Mine Closure Review- 2006 Quarterly Reports (Q1, Q2 and Q3), Project Memorandum to Mr. Spencer Dewar, Manager Lands Administration, March 28, 2007.

BGC Engineering Inc., (2006),Polaris Mine, 2006 Site Inspection Report, prepared for Indian and Northern Affairs Canada, August 11, 2006.

BGC Engineering Inc., (2005), Polaris Mine, 2004 Reports Comments, Project Memorandum to Spencer Dewar, December 20, 2005.

BGC Engineering Inc., (2005), Polaris Mine Closure- Review of Post-Reclamation Monitoring Program, Project Memorandum to Carl McLean, August 6, 2005.

BGC Engineering Inc., (2004), Polaris Mine Closure Monitoring, September 9, 2004 Site Visit Report, prepared for Indian and Northern Affairs Canada, November 3, 2004.

BGC Engineering Inc., (2004), Polaris Mine Closure and Reclamation Project, June 20 to June 22, 2004, Inspection Trip Report, prepared for Indian and Northern Affairs Canada, July 21, 2004.

BGC Engineering Inc., (2003), Polaris Mine Closure Monitoring, September 8-10, 2003 Site Visit Report, prepared for Indian and Northern Affairs Canada, October 16, 2003.

BGC Engineering Inc., (2003), Polaris Mine, July 2-3, 2003 Site Inspection Report, prepared for Indian and Northern Affairs Canada, July 17, 2003.

Gartner Lee limited, (2001), Polaris Mine Decommissioning and Reclamation Plan, prepared for Cominco Ltd., Volumes 1-4, March 2001.

Indian and Northern Affairs Canada, (2002), Mine Site Reclamation Policy for Nunavut, Minister of Public Works and Government Services, Canada.

Northwest Territories Water Board, (1990), Guidelines for Abandonment and Restoration Planning for Mines in the Northwest Territories, prepared by the Northwest Territories Water Board and Northwest Territories Region, Northern Affairs Program, Department of Indian Affairs and Northern Development, September, 1990.

Nunavut Water Board, (2005), letter to Mr. Bruce Donald of Teck Cominco summarizing outstanding submissions not yet received by NWB or INAC, February 28, 2005.

Teck Cominco Limited, (2005), Polaris Mine Decommissioning and Reclamation Activities, 2004 Annual Report, submitted to the Nunavut Water Board and to the Department of Indian and Northern Affairs Canada, September 19, 2005.

Teck Cominco Limited, (2002), Polaris Fish Habitat Restoration Plan, submitted to Department of Fisheries and Oceans, in support of the Application for Authorization for Works or Undertakings Affecting Fish Habitat, May 24, 2002.