

Former Polaris Mine Decommissioning and Reclamation Summary of Reporting 2003 - 2011



Teck Metals Ltd.
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Appendix A – CD of all NWB and MMER Reports

1 Introduction

Teck Metals Ltd. (Teck), formerly Teck Cominco Ltd. and Cominco Ltd. has prepared this Summary of Reporting (Report) for submission to the Nunavut Water Board (NWB) as part of Teck's application for renewal of water licence 1AR-POL0311 (Licence) for long term monitoring of the former Polaris Mine site (Project).

The purpose of this Report is to summarize the past nine (9) years of quarterly and annual reporting between 2003 and 2011 that has been conducted during the decommissioning, reclamation and post-reclamation of the former Polaris Mine. During this period Teck has prepared and submitted a total of forty (40) reports including twenty seven (27) reports in accordance with the Licence and thirteen (13) reports in accordance with the Metal Mining Effluent Regulations (MMER) documenting on-site activity and monitoring results. It is anticipated that this Report will support reviewers of the water licence renewal application in developing a broad understanding of the Project's background and direct reviewers to the appropriate monitoring report or detailed information where necessary.

This Report includes two main sections: one for NWB reporting and one for MMER reporting. Each section includes: (1) a description of the reporting requirements; (2) a list of the reports submitted outlining who the reports were submitted to and how the reports were submitted; and (3) a summary of the content of the reports submitted on an annual basis.

In addition, electronic copies of all forty (40) reports are provided on a CD appended to this Report for reference as required.

2 Nunavut Water Board Reporting

2.1 Water Licence Reporting Requirements

Teck prepared annual, quarterly and geotechnical inspection reports for submission in accordance with conditions of the Project's Water Licence 1AR-POL0311 (Licence) in Part B, Item 6; Part H, Item 6; and Part H, item 27 of the Licence as follows:

Part B, Item 6 – Annual Reporting Requirement

The Licensee shall file an Annual Report with the Board no later than March 31 of the year following the calendar year reported, which shall include, but not be limited to the following information:

- i. *A list of unauthorized discharges and summary of follow-up actions taken;*
- ii. *A progress report and/or revision of any studies or plans requested by the Board under this licence;*
- iii. *An executive summary in terms understandable to the general public, translated into Inuktitut, of all plans, reports, or studies conducted under this Licence;*
- iv. *A summary of any closure and reclamation work undertaken during the year and an outline of any work anticipated for the next year, including any changes to implementation and scheduling;*
- v. *A summary of the estimate of the total current mine closure cost based upon mine reclamation and monitoring activities carried out during the past year in accordance with Part B, Item 3 or Part G, Item 21;*
- vi. *A public consultation/participation report describing consultation with local organizations and the residents of the nearby communities;*
- vii. *A brief summary of work done to address concerns or deficiencies listed in the inspection reports and/or compliance reports;*
- viii. *A report on the Effluent and Water quality monitoring studies conducted during a calendar year, including but not limited to:*
 - a. *The monthly and annual quantities (in cubic metres) of Water pumped from Frustration Lake for all purposes;*
 - b. *A report summarizing the Effluent monitoring results as required in Part H in the form set out in Schedule 6 of the Metal Mining Effluent Regulations.*
 1. *The monthly and annual quantities of Effluent discharged from the Tailings Impoundment Area at the Final Discharge Point;*
 2. *Results of Acute Lethality Tests and Daphnia Magna Monitoring Tests;*
 3. *Summary cause and remedial measures planned or implemented for non-compliant Effluent discharges and Acute Lethality Test failures.*
 - c. *A report summarizing the results of Effluent characterization, sub-lethal toxicity testing and Water quality monitoring generated under the Part H, (using tabular summaries where applicable) including but not limited to the following:*
 1. *The dates on which each sample was collected for Effluent characterization, sub-lethal toxicity testing and Water quality monitoring;*
 2. *The locations of the Final Discharge Points from which samples were collected for Effluent characterization;*
 3. *The location of the Final Discharge Point from which samples were collected for sub-lethal toxicity testing and the data on which the selection of the final discharge point was made in compliance with Part H, Item 35;*
 4. *The geographical coordinates of sampling areas for Water quality monitoring, in degrees, minutes and seconds, and a description that is sufficient to identify the location of the sampling areas;*

5. The methodologies used to conduct Effluent characterization and Water quality monitoring, and the related method detection limits; and
 6. A description of quality assurance and quality control measures that were implemented and the data related to the implementation of those measures.
- ix. Any other details on water use or waste disposal requested by the Board by November 1st of the year being reported.

Part H, Item 6 – Geotechnical Inspection Report Requirement

An inspection of all earthworks, to include but no limited to landfill covers and remaining sections of the Garrow Lake Dam, shall be carried out annually during the summer by a Geotechnical Engineer. The Geotechnical Engineer's report shall be submitted to the Board within sixty (60) days of the inspection, with a covering letter from the Licensee outlining an implementation plan to respond to the Engineer's recommendations.

Part H, Item 27 – Quarterly Report Requirement

The Licensee shall submit to the Board an effluent monitoring report for all tests and monitoring conducted during each calendar quarter not later than 45 days after the end of the quarter (i.e., February 14, May 14, August 14, and November 14). The **Effluent monitoring report** shall include:

- i. The information as required by Part H, Item 18;
- ii. The concentration and monthly mean concentration of each substance set out in Part D, Item 4 that is contained in effluent samples collected under Part H, Item 7 to 9 where applicable;
- iii. The pH of the effluent samples as required by Part H, Item 7 to 9 where applicable;
- iv. Whether a composite or grab sample collection method was used for each effluent sample as required by Part H, Item 7 to 9 where applicable;
- v. The total volume of effluent deposited daily as required by Part H, Item 19 if applicable for each month of the reporting quarter;
- vi. The mass loading of the substances set out in Part D, Item 4 as recorded under Part H, Item 23; and
- vii. The results of the effluent characterization conducted as required by Part H, Item 14(i).

2.2 Reports Submitted

Over the Licence term between 2003 and 2011, twenty seven (27) annual and quarterly reports were submitted to the Nunavut Water Board and Aboriginal Affairs and Northern Development Canada (AANDC) formerly Indian and Northern Affairs Canada (INAC) as listed in Table 1: Summary of Water Licence Reporting to NWB and AANDC. These reports were distributed in hardcopy and electronic format to the Nunavut Water Board, Manager of Licensing at P.O. Box 119, Gjoa Haven, NU, X0B 1J0 and to the Department of Indian Affairs and Northern Development, Manager, Land Administration, Box 100, Iqaluit, NU, X0A 0H0. Typically, following receipt of the quarterly and annual reports, the NWB acknowledged and distributed the reports to interested parties on their Qikiqtani Distribution List for information and review, and posted the report to the NWB public registry/ ftp site.

As shown in Table 1, where appropriate, some reports were combined into one report such as 1st and 2nd quarterly reports or 4th quarter and annual reports. Generally the annual reports summarize the contents of the quarterly reports and do not include much additional information. Geotechnical inspection reports were generally appended to the 3rd quarter reports.

It is further noted that due to correction of reporting deficiencies related to the comprehensive quarterly reporting in 2003, submission of the 2003 Annual Report, which was simply a summary of the content of the quarterly reports was delayed until February 2009. In addition, it is noted that the 2004 annual report was revised and resubmitted in February 2009 to include outstanding data and information.

Upon completion of the majority of decommissioning and reclamation activity in September 2004, subsequent annual activity on site including key annual monitoring requirements were conducted during the 3rd quarter when the site was snow-free. As such the 3rd quarter reports from 2005 onwards contain the majority of the year's data and documentation.

Table 1: Summary of Water Licence Reporting to NWB and AANDC

Year	Report Title	Date Submitted
2003		
1 st Q	Polaris Mine Decommissioning and Reclamation Progress Report, 1 st Quarter 2003 for the Nunavut Water Board and Indian and Northern Affairs Canada	August 1, 2003
2 nd Q	Polaris Mine Decommissioning and Reclamation Progress Report, 2 nd Quarter 2003 for the Nunavut Water Board and Indian and Northern Affairs Canada	August 28, 2003
3 rd Q	Polaris Mine Decommissioning and Reclamation Progress Report, 3 rd Quarter 2003 for the Nunavut Water Board & Indian and Northern Affairs Canada	January 19, 2004
4 th Q	Polaris Mine Decommissioning and Reclamation Activities Quarterly Reporting – 4 th Quarter 2003 Submitted to the Nunavut Water Board and to the Department of Indian and Northern Affairs Canada	March 9, 2004

Annual	Polaris Mine Decommissioning and Reclamation Progress Report 2003 Annual Report – Submitted February 25, 2009 for the Nunavut Water Board & Indian and Northern Affairs Canada	February 25, 2009
2004		
Combined	Polaris Mine Decommissioning and Reclamation Activities 2004 <u>Revised</u> Combined Quarterly and Annual Reports	February 11, 2009
2005		
1 st Q and 2 nd Q	Polaris Mine Water Licence NWB1POL0311 – 2005 1 st and 2 nd Quarter Water Licence Report (Letter Report)	August 11, 2005
3 rd Q	Polaris Mine Post Reclamation Monitoring Report 3 rd Quarter 2005 for the Nunavut Water Board & Indian and Northern Affairs Canada	December 31, 2005
4 th Q and Annual	Polaris Mine 2005 4 th Quarter & 2005 Annual Report for the Nunavut Water Board and Indian and Northern Affairs Canada.	February 15, 2006
2006		
1 st and 2 nd Q	Polaris Mine Water Licence NWB1POL0311 – 2006 1st and 2nd Quarter Water Licence Report (Letter Report)	August 8, 2006
3 rd Q	Polaris Mine Post-Reclamation Monitoring Report 3 rd Quarter 2006 for the Nunavut Water Board and Indian and Northern Affairs Canada	January 8, 2007
4 th Q and Annual	Polaris Mine 4 th Quarter & 2006 Annual Report for the Nunavut Water Board and Indian and Northern Affairs Canada	October 2, 2007
2007		
1 st and 2 nd Q	Polaris Mine 2007 1 st and 2 nd Quarter Decommissioning and Reclamation Report for the Nunavut Water Board and Indian and Northern Affairs Canada	October 15, 2007
3 rd Q	Polaris Mine Post-Reclamation Monitoring Report 3 rd Quarter 2007 for the Nunavut Water Board & Indian and Northern Affairs Canada	November 20, 2007
4 th Q and Annual	Polaris Mine 2007 4 th Quarter & 2007 Annual Report for the Nunavut Water Board and Indian and Northern Affairs Canada	February 26, 2008
2008		
1 st and 2 nd Q	Polaris Mine 2008 1 st and 2 nd Quarter Decommissioning and Reclamation Report for the Nunavut Water Board and Indian and Northern Affairs Canada	July 22, 2008

3 rd Q	Polaris Mine Post-Reclamation Monitoring Report 3 rd Quarter 2008 for the Nunavut Water Board & Indian and Northern Affairs Canada	November 26, 2008
4 th Q and Annual	Polaris Mine Post-Reclamation Monitoring Report 2008 4 th Quarter and 2008 Annual Report for the Nunavut Water Board & Indian and Northern Affairs Canada	February 12, 2009
2009		
1 st and 2 nd Q	Polaris Mine 2009 1 st and 2 nd Quarter Decommissioning and Reclamation Report for the Nunavut Water Board and Indian and Northern Affairs Canada	September 23, 2009
3 rd Q	Polaris Mine Post Reclamation Monitoring Report 3 rd Quarter 2009 for the Nunavut Water Board and Indian and Northern Affairs Canada	January 12, 2010
4 th Q and Annual	Polaris Mine Post-Reclamation Monitoring Report 2009 4 th Quarter and 2009 Annual Report for the Nunavut Water Board and Indian and Northern Affairs Canada	March 14, 2010
2010		
1 st and 2 nd Q	Polaris Mine 2010 1 st and 2 nd Quarter Decommissioning and Reclamation Report for the Nunavut Water Board and Indian and Northern Affairs Canada	January 15, 2011
3 rd Q	Polaris Mine Post Reclamation Monitoring Report 3 rd Quarter 2010 for the Nunavut Water Board and Indian and Northern Affairs Canada	January 17, 2011
4 th Q and Annual	Polaris Mine Post Reclamation Monitoring Report 2010 4 th Quarter and 2010 Annual Report for the Nunavut Water Board and Indian and Northern Affairs Canada	March 13, 2011
2011		
1 st and 2 nd Q	Polaris Mine – 2011 1st and 2nd Decommissioning and Reclamation Monitoring Report (Water Licence #NWB1POL0311) (Letter Report)	September 12, 2011
3 rd Q	Polaris Mine Post Reclamation Monitoring Report 3 rd Quarter 2011 for the Nunavut Water Board and Indian and Northern Affairs Canada	December 28, 2011
4 th Q and Annual	Expected Submission date April 2013.	

2.3 Summary of Report Contents

2.3.1 Quarterly and Annual Reports 2003

The quarterly reports submitted for 2003 generally included the same contents including: executive summaries in Inuktitut; introductions; status of authorizations and/or approvals; unauthorized discharges and summaries of follow-up action; progress report of studies/plans requested; decommissioning and reclamation progress report; update of decommissioning and reclamation schedule; update of estimated mine decommissioning, reclamation, and monitoring costs; public consultation/ participation; summary of work done in response to inspection/compliance reports; freshwater use; physical monitoring of the site including placement of demolition debris into landfills, placement of metals/hydrocarbon contaminated wastes underground in the mine, and thermistors data; Garrow Lake stratigraphic monitoring; summary of effluent monitoring and effluent characterization; and other details related to water use or waste disposal requested.

The 3rd and 4th quarter reports included additional content regarding erosion monitoring, summary of Environmental Effects Monitoring (EEM) and summary of Garrow Lake Department of Fisheries and Oceans (DFO) study program progress. The 3rd Quarter Report included additional information regarding the geotechnical inspection and bathymetric monitoring of Garrow Lake.

The 2003 Annual Report generally included the same content as the quarterly reports except for omission of the section on status of authorizations and/or approvals; and physical monitoring of the site. The 2003 Annual Report also included a section summarizing the Garrow Lake DFO study program progress.

In summary, there were no unauthorized discharges of water or effluent during 2003. On March 20, 2003 there was a spill of approximately 2000 litres of diesel fuel which was reported to the Nunavut Spill Report Line. The spill occurred during a routine transfer of fuel from the tank farm to the surface accommodation building through a pin-hole leak in a metal line. See the 2003 1st Quarter Report for more details.

Decommissioning and reclamation work reported included:

- Building Demotion of the Mill, Offices, Warehouse facilities, Barge, Concentrate Storage Shed, Thickener Building, Cemented Rock Fill Plant, Fuel Tank Farm, Accommodation building;
- Earthworks including Marine Dock and adjacent shoreline, Garrow Lake Dam, Operational Landfill, Little Red Dog Quarry Landfill, Back 40 Area, Exploration Waste Rock Dump, Temporary Dock, and roadways; and
- Contaminated Soil Remediation at the Concentrate Storage Shed and area, Cemented Rock Fill Plant area; former Quonset Huts fuel storage area; Tailings Thickener Building and area; former

Fuel Bladder storage area, former Crusher area, Main Snow Dump, North Portal Ore Stockpile, Exploration Waste Dump/ Stockpile area and Shoreline North of Dock, 2002 Oil Spill Area, Marine Dock and adjacent Foreshore area, and Barge area.

2.3.2 Combined Quarterly and Annual Report 2004

Decommissioning and reclamation activity was greatest during 2004 leading up to the completion of work in September. As such the 2004 Combined Quarterly and Annual Report is a comprehensive report over 1000 pages in length. The Report includes an executive summary in Inuktitut; introduction; unauthorized discharges and summary of follow-up actions; status of authorizations and/or approvals; decommissioning and reclamation progress report; project cost estimate update; reclamation security requirements; public consultation/participation; freshwater use; physical monitoring of the site including summary of work done in response to inspection/compliance reports, disposal of demolition debris and contaminated soils, thermistor data, erosion monitoring, annual geotechnical inspection, and subsidence monitoring program; Garrow Lake stratigraphic monitoring; water licence effluent monitoring including correspondence regarding application of Metal Mining Effluent Regulations (MMER), and summary of effluent monitoring and characterization; Garrow Lake limnology and ecology study; and status of the site as of December 31, 2004.

Twenty two (22) appendices were attached to the 2004 Report including the following:

- APPENDIX 1 Executive Summary of 2004 Decommissioning and Reclamation Report in Inuktitut
- APPENDIX 2 Unauthorized Discharges or Spills and Summary of Follow-up Action
- APPENDIX 3 Decommissioning and Reclamation Progress Photographs
- APPENDIX 4 Project As-Built Drawings
- APPENDIX 5 Contaminated Soil Remediation 2004 Close Out Reports
- APPENDIX 6 Verification of Lack of PCB's in Light Ballasts
- APPENDIX 7 Project Cost Report
- APPENDIX 8 Annual Subsidence Survey
- APPENDIX 9 Clarification of Remediation of Contaminated Soil at the Concentrate Storage Shed
- APPENDIX 10 Record of Debris Placed into Little Red Dog Quarry Landfill
- APPENDIX 11 Record of Contaminated Soils Excavated and Locations of Disposal In the Mine
- APPENDIX 12 Rock Temperatures Surrounding Mine Workings
- APPENDIX 13 Garrow Lake Erosion Monitoring
- APPENDIX 14 Garrow Creek Erosion Monitoring
- APPENDIX 15 Marine Foreshore Monitoring
- APPENDIX 16 Intertidal and Subtidal Photographic Survey – Former Dock Area
- APPENDIX 17 Miscellaneous Water and Soils Samples Collected From the Site
- APPENDIX 18 Garrow Lake Stratigraphy Monitoring

- APPENDIX 19 Correspondence Between Teck Cominco and Environment Canada Regarding the Application of the Metal Mining Effluent Regulations
- APPENDIX 20 Garrow Lake Effluent Discharge Monitoring Data
- APPENDIX 21 Limnology and Ecology of Garrow Lake
- APPENDIX 22 Report in Electronic form (.pdf) on CD

One unauthorized discharge from Garrow Lake was reported. A single grab sample of effluent taken on July 7th, 2004 from the Final Discharge Point of Garrow Lake had a Total Suspended Solids (TSS) level of 117 mg/L which exceeded the TSS limits of both the water Licence and the MMER. Concurrent with taking this sample, the monthly characterization which includes an acute lethality sample were also collected. There was no acute toxicity of either the Rainbow Trout or the Daphnia Magna (i.e. LC50s in both cases were > 100% effluent). All of the metals concentrations were within water Licence and MMER limits. It is apparent that the TSS was the result of high flows in the newly re-established Garrow Creek channel and not a reflection of the water quality within Garrow Lake itself. All subsequent water samples from the Final Discharge Point were compliant for the remainder of the discharge season. A copy of the letter submitted to Environment Canada and their response are included in Appendix 2 of the Report.

Three (3) hydrocarbon spills were reported including (1) an encounter of liquid petroleum during planned clean-up of known hydrocarbon contaminated soils under Foldaway #1; (2) identification of a punctured 205 L oil drum; and (3) a fuel line leak in the area of the Accommodation Complex Utilidor.

Decommissioning and reclamation work reported included:

- Building demolition of the Mill/Offices/Warehouse Facilities/ Barge, Cat Generator Building, Concentrate Storage Shed, Accommodations Complex, Fuel Tank Farm, Incinerator Building, Foldaway Buildings, Fire Hall, fresh water system, mine portals, and Temporary Dock;
- Earthworks including Marine Dock and adjacent shoreline, Barge and adjacent areas, Garrow Lake Dam, Garrow Lake Wavebreak Structure, Operational Landfill, Little Red Dog Quarry Landfill, Back 40 area, and roadways;
- Contaminated Soil Remediation at the Concentrate Storage Shed and area, Cemented Rock Fill Plant area, former Quonset Huts fuel storage area, Tailings Thickener Building and area, former Fuel Bladder Storage area, former Crusher Area, Main Snow Dump, North Portal Ore Stockpile, Exploration Waste Dump/ Stockpile area and Shoreline North of Dock, 2002 Oil Spill area, Marine Dock and adjacent Foreshore Area, Barge area, Accommodations area, Foldaway Buildings, Fuel Tank Farm and Lube Storage areas, Tailings Pipelines, Loon Lake Snow Dump, Fire Hall area, and other areas;
- Disposal of Hazardous Materials/ Special Wastes including waste hydrocarbon incineration, confirmation that fluorescent light ballasts free from PCB's, and shipping of chemical and hazardous waste materials.

It was reported that as of September 7th, 2004 all of the work identified in the Decommissioning and Reclamation Plan (DRP) had been completed with a few minor exceptions that were completed over the next few summer seasons. Work undertaken was in keeping with the approved DRP or in accordance

with approved changes to the DRP. While the volumes of contaminated materials greatly exceeded original estimates, the project was completed on schedule. A small exploration style shelter was left on site, along with supplies and some heavy equipment to facilitate implementing the monitoring program and to address the minor re-sloping of a few areas on site.

2.3.3 Quarterly and Annual Reports 2005

The combined 2005 1st and 2nd Quarter Report was submitted in a letter report format including a summary of 1st quarter 2005 activity, summary of 2nd quarter 2005 activity, Garrow Lake water quality and stratigraphic monitoring, and water quality and Environmental Effects Monitoring (EEM) program. During this period the Polaris Mine site remained un-occupied due to winter weather conditions. As there was no effluent discharge from Garrow Lake, the only monitoring undertaken was the spring sampling of Garrow Lake.

The 2005 3rd Quarter Report included an executive summary in Inuktitut; introduction; water quality monitoring including Garrow Lake effluent discharge monitoring, Garrow Lake water column, other surface waters including Little Red Dog Quarry Landfill, and Frustration Lake; physical stability of the site including subsidence survey, annual geotechnical inspection, and Garrow Lake elevations; and other site monitoring including Resolute Bay wind monitoring, landfill thermistor monitoring, and former Concentrate Storage Building soil samples.

The 2005 combined 4th Quarter and Annual Report included an introduction; 2005 4th quarter report reclamation activities; 2005 4th quarter site monitoring including site conditions inspections, water quality monitoring, and EEM; unauthorized discharges; progress report of studies and plans; executive summary of report translated into Inuktitut; summary of closure and/or reclamation work undertaken; update of reclamation and monitoring costs; public consultation/participation; work conducted in response to inspection or compliance reports; effluent and water quality studies conducted including quantities of freshwater pumped from Frustration Lake, Garrow Lake water column monitoring, and Garrow Lake effluent and receiving waters monitoring.

The EEM Program Interpretive Report required under the Metal Mining Effluent Regulations (MMER) was also appended to the 4th Quarter and Annual Report including a discussion of the application of the MMER to the Polaris Mine in Section 2.3.

No unauthorized discharges or spills were reported in 2005 and no freshwater was pumped. Closure and reclamation activity was conducted during June, July and early August. A small crew of 3 to 4 people was stationed on site to conduct maintenance to the temporary site camp and remaining equipment after being used by the reclamation contractor from 2002 to 2004. In addition to carrying out site monitoring activities, crews were assigned to clean up litter around the site.

2.3.4 Quarterly and Annual Reports 2006

The combined 2006 1st and 2nd Quarter Report was submitted in a letter report format including a summary of 1st quarter 2006 activity, summary of 2nd quarter 2006 activity, Garrow Lake water quality and stratigraphic monitoring, notification of intent to initiate planned discharge of effluent from the Tailings Impoundment Area, water quality and environmental effects monitoring program, and Garrow Lake elevation. During this period the Polaris Mine site remained un-occupied due to winter weather conditions. As there was no effluent discharge from Garrow Lake, the only monitoring undertaken was the spring sampling of Garrow Lake.

The 2006 3rd Quarter Report included an executive summary in Inuktitut; introduction; water quality monitoring including Garrow Lake effluent discharge monitoring, Garrow Lake water column, other surface waters including Little Red Dog Quarry landfill, and Frustration Lake; physical stability of the site including subsidence survey, annual geotechnical inspection, Garrow Lake wave break survey, and Garrow Lake elevations; and other site monitoring including Resolute Bay wind monitoring, landfill thermistor monitoring, and former Concentrate Storage Building soil samples.

During the 3rd Quarter of 2006, the key annual monitoring requirements for the Polaris Mine were undertaken as the site was essentially snow free during July and August. A small staff consisting of the environmental consultant's representative (to conduct water quality monitoring), two (2) equipment operators/mechanics (to complete outstanding earth work) and two (2) local Inuit assistants were on-site for most of July. In addition, near the end of July, a Teck Cominco representative and a geotechnical engineer from Gartner Lee Limited conducted a detailed site inspection including the annual geotechnical inspection. On July 27th crews demobilized from site for the season. Subsequent to the site being vacated, water quality monitoring was continued by personnel who flew to site for site monitoring events from Resolute Bay, and a Gartner Lee representative returned to site in August to conduct the Garrow Lake sampling event. By mid-September the site was snow covered and Garrow Creek was frozen ending the water sampling for the year. The comprehensive site monitoring was conducted as required by the water Licence and the Decommissioning and Reclamation Plan (DRP) requirements.

The 2006 combined 4th Quarter and Annual Report included an introduction; 2006 4th quarter report reclamation activities; 2006 4th quarter site monitoring including site conditions inspections, water quality monitoring, and environmental effects monitoring; unauthorized discharges; progress report of studies and plans; executive summary of report translated into Inuktitut; summary of closure and/or reclamation work undertaken; update of reclamation and monitoring costs; public consultation/participation; work conducted in response to inspection or compliance reports; effluent and water quality studies conducted including quantities of freshwater pumped from Frustration Lake, Garrow Lake water column monitoring, and Garrow Lake effluent monitoring; and request for simplified monitoring program.

The following activity was reported in the 2006 combined 4th Quarter and Annual Report:

- No unauthorized discharges or spills were reported in 2006 and no freshwater was pumped.

- During July a small crew consisting of five (5) people was stationed on site to conduct complete re-sloping of a small area in the New Quarry, the former Tank Farm, and Incinerator Pad as identified in the September 2004 site inspection report. After completion of this work, these areas were inspected at the end of July 2006 by INAC during their annual site inspection;
- Clean-up of site litter continued throughout the month of July;
- Areas of erosion identified in the 2005 annual geotechnical inspection were repaired;
- Other areas with new erosion features were repaired;
- In July the final two missing thermistors were installed in the Operational Landfill; and
- All thermistor installations were upgraded to make the data more accurate and installation more bear proof and data loggers were installed so that temperature data in both landfills could be collected all year around.

The 2006 combined 4th Quarter and Annual Report noted that the mine was a Recognized Closed Mine under the Metal Mining Effluent Regulations (MMER). It further reported that that on July 27th, 2006 Teck received a letter from Environment Canada confirming that the Polaris Mine had no further obligations under the MMER. This letter was attached as Appendix 2 to the Report.

The 2006 combined 4th Quarter and Annual Report also notes that during 2006, Teck commissioned Azimuth Consulting Group Inc. (Azimuth) to conduct a review of data related to Garrow Lake limnology and chemistry. This review confirmed that the Lake continued to be very stable and highly stratified and that the metals concentrations in the Lake continue to gradually decline since active deposition of tailings had ceased for the past four (4) years. Teck and Azimuth presented this data to Environment Canada to request their support in simplifying the on-going water quality monitoring requirements at the site. In a letter dated December 12th, 2006 Environment Canada stated that it was in support of simplifying the water quality monitoring program. This letter was attached as Appendix 6 to the Report.

2.3.5 Quarterly and Annual Reports 2007

The combined 2007 1st and 2nd Quarter Report included an introduction, summary of 1st quarter 2007 activity, summary of 2nd quarter 2007 activity, Garrow Lake water quality and stratigraphic monitoring, notification of intent to initiate planned discharge of effluent from the Tailings Impoundment Area, water quality and Environmental Effects Monitoring (EEM) program, and landfill temperature monitoring. During this period the Polaris Mine site remained un-occupied due to winter weather conditions. As there was no effluent discharge from Garrow Lake, the only monitoring undertaken was the spring sampling of Garrow Lake.

The 2007 3rd Quarter Report included an executive summary in Inuktitut; introduction; water quality monitoring including Garrow Lake effluent discharge, Garrow Lake water column, Little Red Dog Quarry Landfill surface water, and Frustration Lake; physical stability of the site including subsidence survey, geotechnical inspection and Garrow Lake elevations; and other site monitoring including Resolute Bay

wind monitoring, landfill thermistor monitoring (installations and data), and former Concentrate Storage Shed soil samples.

During the 3rd Quarter of 2007, the key annual monitoring requirements for the Polaris Mine were undertaken as the site was snow free during July and August. Between July 26th and August 1st, a small group of people (4 – 5) were on site to conduct the geotechnical inspection, surveying, retrieving thermistor data and collecting other miscellaneous samples. On August 1st, crews demobilized from site for the season. Subsequent to the site being vacated, water quality monitoring was continued weekly by trained local residents who flew in from Resolute Bay and by a Gartner Lee representative who returned to site in August to conduct the Garrow Lake minimum ice thickness sampling event. By mid-September the site was snow covered and Garrow Creek was frozen ending the water sampling for the year.

The combined 2007 4th Quarter and Annual Report included an introduction; 2007 4th quarter report reclamation activities; 2007 4th quarter site monitoring including site conditions inspections and water quality monitoring; unauthorized discharges; progress report of studies and plans; executive summary of report translated into Inuktitut; summary of closure and/or reclamation work undertaken; update of reclamation and monitoring costs; public consultation/participation; work conducted in response to inspection or compliance reports; effluent and water quality studies conducted including quantities of freshwater pumped from Frustration Lake, Garrow Lake water column monitoring, and Garrow Lake effluent monitoring.

The following activity was reported in the 2007 4th Quarter and Annual Report:

- No unauthorized discharges or spills were reported in 2007 and no freshwater was pumped;
- On July 26th a small crew of five (5) people re-opened the camp and a minimum of four (4) people remained on site until August 1st to complete the annual site inspection;
- Clean- up of site litter continued while crews were on site;
- The subsidence survey was not completed due to equipment failure although this area was visually inspected as part of the annual geotechnical inspection;
- The annual geotechnical inspection was completed by an independent professional geotechnical engineer;
- The annual survey of the elevation of Garrow Lake was completed; and
- During the open water period on Garrow Lake, when no personnel were on site, the wind speeds were monitored at Resolute Bay. A high wind event was noted in Resolute on July 21st to 23rd. Detailed sampling was routinely performed on Garrow Lake Aug. 25th.

2.3.6 Quarterly and Annual Reports 2008

The combined 2008 1st and 2nd Quarter report included an introduction, summary of 1st quarter 2008 activity, summary of 2nd quarter 2008 activity, Garrow Lake water quality and stratigraphic monitoring, notification of intent to initiate planned discharge of effluent from the Tailings Impoundment Area,

water quality and environmental effects monitoring program, and landfill temperature monitoring. During this period the Polaris Mine site remained un-occupied due to winter weather conditions. As there was no effluent discharge from Garrow Lake, the only monitoring undertaken was the spring sampling of Garrow Lake.

The 2008 3rd Quarter Report included an executive summary in Inuktitut; introduction; water quality monitoring including Garrow Lake effluent discharge monitoring, Garrow Lake water column, other surface waters including Little Red Dog Quarry Landfill, and Frustration Lake; physical stability of the site including subsidence survey, marine foreshore survey, annual geotechnical inspection and Garrow Lake elevations; and other site monitoring including Resolute Bay wind monitoring, landfill thermistor monitoring, and former Concentrate Storage Building soil samples.

During the 3rd quarter of 2008, the key annual monitoring requirements for the Polaris Mine were undertaken as the site was snow free during July and August. From July 13th to 19th, five (5) to six (6) people were on site to conduct the geotechnical inspection, surveying, retrieving thermistor data and collecting other miscellaneous samples. On July 19th, crews demobilized from site for the season. On August 24th a site inspection was conducted by an Indian and Northern Affairs Canada (INAC) lands inspector, an INAC geotechnical engineering consultant, and a Teck Cominco representative. Subsequent to the site being vacated, water quality monitoring was continued weekly by trained local residents who flew in from Resolute Bay and by an AECOM Canada Ltd. (formerly Gartner Lee Ltd.) representative returned to site on August 29th to conduct the Garrow Lake minimum ice thickness sampling event. By mid-September the site was snow covered and Garrow Creek was frozen ending the water sampling for the year.

The combined 2008 4th Quarter and Annual report included an introduction; 2008 4th quarter reclamation activities; 2008 4th quarter site monitoring; 2008 financial reporting including updated financial report and request for adjustment; unauthorized discharges; progress report of studies and plans; executive summary of report translated into Inuktitut; summary of closure and/or reclamation work undertaken; estimate of total mine closure cost; public consultation/participation; work conducted in response to inspection or compliance reports; effluent and water quality studies conducted including Garrow Lake water column monitoring, and Garrow Lake effluent monitoring.

The following activity was reported in the 2008 4th Quarter and Annual Report:

- No unauthorized discharges or spills were reported in 2008 and no freshwater was pumped;
- On July 13th a small crew of five (5) to six (6) people re-opened the camp and a minimum of five (5) people remained on site until July 19 to complete the annual site inspection;
- Clean-up of site litter continued while crews were on site;
- The subsidence survey was completed and the results showed no identifiable movement from previous years;
- During the open water period on Garrow Lake, when no personnel were on site, the wind speeds were monitored at Resolute Bay. Two high wind events were noted in Resolute on Aug.

5-6 and Aug. 28-29. Detailed sampling was routinely performed on Garrow Lake Aug. 29th and no impact from the high winds was detected;

- The waters discharging from Garrow Lake into Garrow Creek were fully compliant with the water Licence during the year;
- Garrow Lake stratigraphy continued to be both physically and chemically stable based on both the May and August sampling events;
- The annual geotechnical inspection was completed by an independent professional geotechnical engineer. In the 2007 inspection, it was noted that there was a section of exposed geotextile in the channel downstream of the toe of the decommissioned dam. It was decided that the best course of action was to remove the exposed geotextile. The removal of the geotextile was completed in the 3rd quarter. There were no active areas of erosion identified; however, a minor slope failure (due to saturated soils) was identified in the 3rd quarter at the Main Portal area.

2.3.7 Quarterly and Annual Reports 2009

The combined 2009 1st and 2nd Quarter Report included an introduction, summary of 1st quarter 2009 activity, summary of 2nd quarter 2009 activity, Garrow Lake water quality and stratigraphic monitoring, notification of intent to initiate planned discharge of effluent from the Tailings Impoundment Area, water quality and environmental effects monitoring program, landfill temperature monitoring; and quarterly expenditure reports. During this period the Polaris Mine site remained un-occupied due to winter weather conditions. As there was no effluent discharge from Garrow Lake, the only monitoring undertaken was the spring sampling of Garrow Lake.

The 2009 3rd Quarter Report included an executive summary in Inuktitut; introduction; water quality monitoring including Garrow Lake effluent discharge monitoring, Garrow Lake water column, other surface waters including Little Red Dog Quarry Landfill, and Frustration Lake; physical stability of the site including subsidence survey, marine foreshore survey, annual geotechnical inspection and Garrow Lake elevations; and other site monitoring including Resolute Bay wind monitoring, landfill thermistor monitoring, and former Concentrate Storage Building soil samples.

During the 3rd quarter of 2009, the key annual monitoring requirements for the Polaris Mine were undertaken as the site was snow free during July and August. From July 19th to 24th, five (5) to seven (7) people were on site to conduct the geotechnical inspections, surveying, planning for site abandonment, retrieving thermistor data and collecting other miscellaneous samples. On July 24th, a site inspection was conducted by Indian and Northern Affairs Canada (INAC) by an INAC geotechnical engineering consultant and a water resources inspector. Subsequently water quality monitoring was continued weekly by trained local residents who flew in from Resolute Bay and by an AECOM Canada Ltd. representative who travelled to site on August 16th to conduct the Garrow Lake minimum ice thickness

sampling event. By mid-September the site was snow covered and Garrow Creek was frozen ending the water sampling for winter.

The combined 2009 4th Quarter and Annual Report included an introduction; 2009 4th quarter report reclamation activities; 2009 4th quarter site monitoring; 2009 financial reporting including updated financial report and request for adjustment; unauthorized discharges; progress report of studies and plans; executive summary of report translated into Inuktitut; summary of closure and/or reclamation work undertaken; estimate of total mine closure cost; public consultation/participation; work conducted in response to inspection or compliance reports; effluent and water quality studies conducted including quantities of freshwater pumped from Frustration Lake, Garrow Lake water column monitoring, and Garrow Lake effluent monitoring.

The following activity was reported in the 2008 4th Quarter and Annual Report:

- No unauthorized discharges or spills were reported in 2009 and no freshwater was pumped;
- On June 12th, Garrow Lake Maximum Ice Thickness sampling was done from the two (2) monitoring stations 262-3 and 262-3A. The ice was 3.5 metres thick which is substantially thicker than observed since post-closure monitoring began in 2002;
- Between July 19th and the 24th a small crew of five (5) to seven (7) people were on site to conduct the annual geotechnical inspection, topographic surveys, take soil and water samples, continue picking up of litter at the site, and conduct slope stabilization work at the Main Portal area;
- During the open water period on Garrow Lake, when no personnel were on site, the wind speeds were monitored at Resolute Bay. No significant wind events occurred during open water period of Garrow Lake;
- Minimum Ice thickness (i.e. open water) sampling of Garrow Lake was done on Aug. 16th from the two (2) required monitoring stations;
- The waters discharging from Garrow Lake into Garrow Creek were monitored and fully compliant with the water Licence during the year;
- Garrow Lake stratigraphy continued to be both physically and chemically stable based on both the June and August sampling events;
- The annual geotechnical inspection was completed by an independent professional geotechnical engineer. No unstable landforms or erosion requiring follow up were identified in the detailed inspection report;
- The topographic survey of the Subsidence Area had yet to identify any significant movement since they were initiated in 2004 let alone from year to year;
- The small slope failure on the cover over the Main Portal entrance identified in August 2008 was repaired, and the bottom half of the slope flattened with additional material added to the toe area to improve stability. This area was inspected by the INAC contracted geotechnical inspector after the work was completed;

- Contractors visited the site to view the equipment and materials remaining on site in preparation for them to submit bids on beginning the final demobilization from the island in the summer of 2010.

2.3.8 Quarterly and Annual Reports 2010

The combined 2010 1st and 2nd Quarter Report included an introduction, summary of 1st quarter 2010 activity, summary of 2nd quarter 2010 activity, Garrow Lake water quality and stratigraphic monitoring, notification of intent to initiate planned discharge of effluent from the Tailings Impoundment Area, water quality and environmental effects monitoring program, landfill temperature monitoring; and quarterly expenditure reports. During this period the Polaris Mine site remained un-occupied due to winter weather conditions. As there was no effluent discharge from Garrow Lake, the only monitoring undertaken was the spring sampling of Garrow Lake.

The 2010 3rd Quarter Report included an executive summary in Inuktitut; introduction; water quality monitoring including Garrow Lake effluent discharge monitoring, Garrow Lake water column, other surface waters including Little Red Dog Quarry Landfill, and Frustration Lake; physical stability of the site including subsidence survey, marine foreshore survey, annual geotechnical inspection and Garrow Lake elevations; other site monitoring including Resolute Bay wind monitoring, landfill thermistor monitoring, and former Concentrate Storage Building soil samples; reclamation activities; and estimated remaining financial liabilities.

During the 3rd quarter of 2010, the key annual monitoring requirements for the Polaris Mine were undertaken as the site was snow free during July and August. From July 12th to 16th up to six (6) people were on site to conduct the geotechnical inspection, surveying, planning for site abandonment, retrieving thermistor data and collected other miscellaneous samples. A site inspection was planned by Indian and Northern Affairs Canada but foggy conditions on the island prevented the inspection from occurring as planned. The planned final clean-up of the site and preparations for demobilizing from the site took place between August 15th and September 2nd, 2010. A contractor had five (5) people on site during the period undertaking the work. Teck retained AECOM Canada Ltd. to have an environmental technician on site to monitor the work done to ensure that all work complied with approved Decommissioning and Reclamation Plan (DRP) protocols. While on site the technician undertook weekly water quality sampling of Garrow Creek and the August (minimum ice conditions) sampling of Garrow Lake. At the end of the work program, the camp facilities, equipment and supplies had been moved to a staging area ready to be loaded onto a ship for removal from the island. The majority of the fuel remaining on site was burned, any hydrocarbon contaminated soils cleaned up and packaged for shipment off the island. All remaining debris was buried in the Little Red Dog Quarry Landfill under a minimum 2.5 meter thick cap. Final grading of the camp area was done to improve the appearance of the area consistent with other contouring work done previously. By mid-September the site was snow covered and Garrow Creek was frozen ending the surface water sampling for winter.

The 2010 combined 4th Quarter and Annual Report included an introduction; 2010 4th quarter reclamation activities; 2010 4th quarter site monitoring; 2010 financial reporting including updated financial report and request for adjustment; unauthorized discharges; progress report of studies and plans; executive summary of report translated into Inuktitut; summary of closure and/or reclamation work undertaken; estimate of total mine closure cost; public consultation/participation; work conducted in response to inspection or compliance reports; effluent and water quality studies conducted including quantities of freshwater pumped from Frustration Lake, Garrow Lake water column monitoring, and Garrow Lake effluent monitoring.

No unauthorized discharges or spills were reported in 2010 and no freshwater was pumped. Activity on site was documented in the 3rd Quarter Report.

2.3.9 Quarterly and Annual Reports 2011

The combined 2011 1st and 2nd Quarter Report was submitted in a letter format noting that during the 1st quarter of 2011, the Polaris Mine site was unoccupied as normal due to winter weather conditions. The Report further noted that for the first time since 2004 during the post-reclamation monitoring program, the 2nd quarter sampling event for Garrow Lake was not completed due to logistical error by the courier company responsible for identifying and packaging the sample preservative which are hazardous materials.

The 2011 3rd Quarter Report included an executive summary in Inuktitut; introduction; water quality monitoring including Garrow Lake effluent discharge monitoring, Garrow Lake water column, other surface waters including Little Red Dog Quarry landfill, and Frustration Lake; physical stability of the site including subsidence survey, marine foreshore survey, annual geotechnical inspection and Garrow Lake elevations; other site monitoring including Resolute Bay wind monitoring, landfill thermistor monitoring, and former Concentrate Storage Building soil samples; reclamation activities; and estimated remaining financial liabilities.

During the 3rd quarter of 2011, the key annual monitoring requirements for the Polaris Mine were undertaken, as the site was snow free during July and August. From July 16th to 21st six (6) people were on site to conduct the geotechnical inspection, surveying, preparing for final removal of equipment from site, retrieving thermistor data and collecting other miscellaneous sample. A site inspection was conducted by four (4) representatives of Aboriginal Affairs and Northern Development Canada (AANDC) on July 17th. No reclamation activities occurred on site during July or August other than the final organizing and removal of the temporary camp and remaining equipment and supplies. These had been prepared in August 2010 for demobilizing in 2011. On September 1st, all remaining materials were removed by sealift from the site with the exception of a wood shed which was left for a local Inuit.

At the time of preparing this Report, the 2011 4th Quarter and Annual Report had not been submitted.

3 Metal Mining Effluent Regulations Reporting

3.1 MMER Reporting Requirements

Teck prepared annual and quarterly reports for submission in accordance with the Metal Mining Effluent Regulations (MMER) Part 2 Sections 21 and 22 as follows:

Part 2 Section 21 (1) and (2) – Quarterly Report

21 (1) The owner or operator of a mine shall submit to the authorization officer an effluent monitoring report for all tests and monitoring conducted during each calendar quarter not later than 45 days after the end of the quarter.

21 (2) The effluent monitoring report shall include

- a) the information specified by section 8.1 of Reference Method EPS 1/RM/13 and by section 8.1 of Reference Method EPS 1/RM/14 as required by section 18;*
- b) the concentration and monthly mean concentration of each deleterious substance set out in column 1 of Schedule 4 that is contained in effluent samples collected under subsection 12(1) and the concentrations of such deleterious substances contained in effluent samples collected under subsection 13(1) or (2);*
- c) the pH of the effluent samples as required by subsection 12(1);*
- d) whether a composite or grab sample collection method was used for each effluent sample as required by subsection 12(1);*
- e) the total volume of effluent deposited during each month of the reporting quarter as recorded under section 19;*
- f) the mass loading of the deleterious substances set out in column 1 of Schedule 4 as recorded under section 20; and*
- g) the results of the effluent characterization conducted under paragraph 15(1)(a).*

Part 2 Section 22 – Annual Report

22. The owner or operator of a mine shall submit to the authorization officer, not later than March 31 in each year, a report summarizing the effluent monitoring results for the previous calendar year in the form set out in Schedule 6.

3.2 Reports submitted

Between 2003 and 2005, thirteen (13) reports were submitted to Environment Canada as listed in [Table 2: Summary of MMER Reporting to Environment Canada](#). These reports were distributed in hardcopy

and electronic format to Environment Canada, Regional Director of Environmental Protection, Prairie & Northern Region, Room 200, 4999 98th Ave., Edmonton, AB, T6B 2X3, and through the Regulatory Information Submission System (RISS) online system.

It is noted that submission of the 2004 4th Quarter Report was delayed. Since there was no discharge from the Tailings Impoundment Area during the 4th quarter Teck originally assumed that a report was not necessary; however, Environment Canada advised otherwise and Teck submitted the 2004 4th Quarter Report in March 2005. Further, the 2003 3rd Quarter Report was revised and resubmitted with the 2003 4th Quarter Report to include missing flow data. The 2003 Annual Report was also revised as the original report submitted January 27th, 2004 was not complete and contained errors. In addition, the 2004 Annual Report was revised and resubmitted in response to an August 9th, 2005 letter from Environment Canada identifying reporting deficiencies.

In addition to regular quarterly and annual reporting of routine chemical analyses and acute toxicity testing of the mine effluent (i.e., Garrow Lake discharge), a key requirement of the MMER is to undertake an Environmental Effects Monitoring (EEM) program comprised of the following two components:

- Biological monitoring studies, including a fish survey (using indicators of fish population health and fish tissue analysis) and a benthic invertebrate community survey; and
- Effluent and water quality monitoring studies during discharge intended to provide background, supporting information for the assessment and interpretation of biological monitoring. These studies included effluent characterization, water quality monitoring, and sublethal effluent testing.

Upon completion of the study, a Polaris Mine EEM Interpretive Report was submitted to Environment documenting the results of the above requirements based on historical information and data collected between 2003 and 2005.

Following its review of Teck's 2005 annual report and EEM Interpretive Report, Environment Canada forwarded Teck the results of its review on July 27th, 2006 noting some missing information in the EEM Interpretive Report and ***recognizing that there were no future MMER requirements for the Polaris Mine***. Teck provided the missing information, and subsequently in a letter dated September 15, 2006 Environment Canada informed Teck that the EEM Interpretive Report had been reviewed by a Technical Advisory Panel (TAP) consisting of representatives of Environment Canada, Fisheries and Oceans Canada, Indian and Northern Affairs Canada, and the Nunavut Water Board. ***The TAP determined that the Final EEM Interpretive Report met the EEM Program requirements.***

Table 2: Summary of MMER Reporting to Environment Canada

Year	Report Title	Date Submitted
2003		
1 st Q	Polaris Mine – 2003 1st Quarter Metal Mining Effluent Regulations Report	May 2, 2003
2 nd Q	Polaris Mine – 2003 2nd Quarter Metal Mining Effluent Regulations Report	August 14, 2003
3 rd & 4 th Q	Polaris Mine – 2003 4 th Quarter Metal Mining Effluent Regulations Report Polaris Mine – MMER Monitoring Report REVISED 3 rd Quarter 2003	January 26, 2004
Annual	Polaris Mine – 2003 ANNUAL Metal Mining Effluent Regulations Summary Report	March 31, 2004
2004		
1 st Q	Polaris Mine – 2004 1st Quarter Metal Mining Effluent Regulations Report	May 13, 2004
2 nd Q	Polaris Mine – 2004 2nd Quarter Metal Mining Effluent Regulations Report	August 11, 2004
3 rd Q	Polaris Mine – 2004 3rd Quarter Metal Mining Effluent Regulations Report	November 17, 2004
4 th Q	Polaris Mine – 2004 4th Quarter Metal Mining Effluent Regulations Report	March 15, 2005
Annual	REVISED Polaris Mine 2004 Annual MMER and EEM Report	September 28, 2005
2005		
1 st Q	Polaris Mine – 2005 1st Quarter Metal Mining Effluent Regulations Report	May 2, 2005
2 nd Q	Polaris Mine – 2005 2nd Quarter Metal Mining Effluent Regulations Report	August 8, 2005
3 rd Q	Polaris Mine 2005 3rd Quarter MMER Report	November 10, 2005
Interpretive	Interpretative Report Environmental Effects Monitoring (EEM) Teck Cominco Polaris Mine, Nunavut	December 15, 2005
Annual	Polaris Mine 2005 Annual MMER and EEM Report	February 1, 2006

3.3 Summary of Report Contents

3.3.1 Quarterly and Annual Reports 2003

Despite having a designated discharge location for effluent identified under Section 9 of the MMER, there was no discharge from the Garrow Lake Tailings Impoundment Area during the 1st, 2nd or 4th quarters of 2003. Only the 3rd quarter had discharge to report.

There were no non-compliant concentrations related to MMER Schedule 4 limits and no non-compliant results of the acute lethality tests during the year; however, Teck conducted only one series of sub-lethal effluent testing contrary to the requirements of Part 1, Section 6 of the MMER. The annual report contains a letter Teck's consultants explaining the error.

The 2003 Annual Report included the 3rd quarter regulatory data set.

3.3.2 Quarterly and Annual Reports 2004

There was no discharge from the Garrow Lake Tailings Impoundment Area during the 1st, 2nd or 4th quarters of 2004. Only the 3rd quarter had discharge to report.

During the 3rd quarter of 2004, discharge from Garrow Lake was no longer controlled by siphoning as Garrow Dam had been removed earlier in the year. As a result the timing of flow and a wide fluctuation in flow rates was experienced. Flow initiated in the beginning of July later than expected due to an unseasonably cold winter and spring. Flow continued through July and August. The associated water quality sampling and environmental effects monitoring were conducted as required but with some complications. To ensure that two sub-lethal toxicity tests were conducted in 2004, Teck initiated testing with its first water sampling event of the season; however, on its first attempt, there were problems with the laboratory specimens and *Champia parvula* sexual reproduction tests were not conducted. Subsequently, Teck conducted two additional sub-acute toxicity tests which were successfully processed.

The first water sample of the discharge season taken on July 7th, 2004 at the final discharge point was out of compliance with respect to Total Suspended Solids (TSS); however, all other MMER Schedule 4 parameters were compliant and the results of acute lethality testing showed no acute toxicity. Subsequent sampling results for TSS, metals concentrations and acute toxicity were compliant. The TSS exceedance was due to the initial ice melt unplugging Garrow Lake, resulting in a flushing of sediment.

Effluent from Garrow Lake ceased flowing by mid-August but surface run-off from adjacent slopes maintained water flow at the designated final discharge point into August. By August 17th there was still water at the final discharge point in a pool but the flow was too low to be measured; however, Teck continued to collect water samples for the remainder of August, so there are water quality results presented in the report until August 31, 2004 but the loading calculations were zero due to the lack of flow for the last three weekly samples.

The 2004 Annual Report included the 3rd quarter regulatory data set.

3.3.3 Quarterly and Annual Reports 2005

There was no discharge from the Garrow Lake Tailings Impoundment Area during the 1st or 4th quarters of 2005. Only the 2nd and 3rd quarters had discharge to report.

During the 2nd quarter of 2005 flow initiated at the end of June, thus only one sample was collected. All MMER routine parameters, plus additional Environmental Effects Monitoring (EEM) water quality parameters were analyzed on this sample; however, only the final discharge point was accessible at this time due to ice conditions in Garrow Bay precluding sample collection from the receiving and reference stations. An oversight by the ALS lab resulted in mercury, nitrate, and alkalinity analysis being conducted slightly after the holding times. A written explanation of this oversight is appended to the 2nd Quarter Report. Concentrations of all deleterious substances were well within Schedule 4 limits. Toxicity testing was not conducted during this sampling event due to the logistics around the statutory holiday which affected laboratory shipping, receiving and testing and holding times.

During the 3rd quarter of 2005, MMER and EEM data was conducted by flying scientists/ technicians to site on a weekly basis. The MMER effluent characterization monitoring, bioassay testing, and environmental effects monitoring were conducted throughout the quarter. Due to the short season of flow, two sets of acute and sub-lethal toxicity tests were conducted within the quarter on July 16th and August 9th, 2005, corresponding to the dates of EEM quarterly water quality monitoring samples collected at effluent, exposure and reference stations. A quarterly effluent sample plus acute and sub-lethal toxicity samples were also collected on July 6th, 2005, but due to fog conditions at the mine, the toxicity samples did not make it to the labs within holding times and were discarded. The effluent sample was analyzed for the MMER and EEM parameters. No exposure or reference samples were collected on July 6th, 2005, since Garrow Bay was still ice-covered.

MMER water quality monitoring was conducted on a weekly basis throughout most of the season. Between August 20 – 23 and after August 27th, 2005, access to the site was not possible due to weather conditions. On September 13th, 2005, a quarterly event with acute toxicity testing was planned; however, upon arrival onsite, it was observed that Garrow Creek (final discharge point) was frozen.

There were no exceedances of MMER Schedule 4 Limits for the 2005 season, and there was no acute toxicity in Rainbow trout and Daphnia tests. Holding times for nitrate and alkalinity were exceeded in the July 6th, 2005 sample due to an oversight by the ALS lab. This situation is explained in a letter from ALS provided in Appendix to the 3rd Quarter Report.

The 2005 Annual Report included the 2nd and 3rd quarter regulatory data set.

3.3.4 EEM Interpretive Report 2005

A draft study design for the Polaris Mine Environmental Effects Monitoring (EEM) Program was submitted to Environment Canada in June 2003 and approved with minor clarifications. Following completion of field reconnaissance work conducted in Garrow Lake and Garrow Bay in summer 2003 an addendum to the draft study design was prepared finalizing the study design for the program.

In accordance with the MMER, the EEM program was comprised of the following two components:

- Biological monitoring studies, including a fish survey (using indicators of fish population health and fish tissue analysis) and a benthic invertebrate community survey; and
- Effluent and water quality monitoring studies during discharge intended to provide background, supporting information for the assessment and interpretation of biological monitoring. These studies included effluent characterization, water quality monitoring, and sublethal effluent testing.

The purpose of the Polaris Mine EEM Interpretive Report was to document results of the above requirements based on historical information and data collected between 2003 and 2005. To supplement the Interpretive Report, a discussion of anticipated future trends in effluent characteristics was included to provide some context for understanding potential implications for receiving environment water quality in the long-term.

The Interpretive Report was organized in a format consistent with discussions and feedback received from members of the Technical Advisory Panel as follows:

- Section 1 – Introduction
- Section 2 – Summary of available information and data
 - Study design, including historical synopsis (Appendix A)
 - Addendum to the study design (Appendix B), including
 - Results of 2003 field reconnaissance studies conducted in Garrow Bay documenting field effluent plume delineation, underwater video survey, fish survey, intertidal and sub-tidal sediment survey.
 - Results of theoretical effluent plume modeling.
 - Overview of 2004 EEM field program (Appendix C)
 - Effluent and water quality data from 2003 to 2005 (Appendix D)

- Section 3 – Discussion of future trends in effluent characteristics, including:
 - Summary of 2003 Garrow Lake limnological and ecological investigations conducted to fulfill obligations under a DFO habitat authorization permit (Appendix E)
 - Discussion of likely future effluent characteristics and potential effects
- Section 4 – References

Despite considerable planning and efforts spent in conducting biological monitoring studies in Garrow Bay, a formal EEM program could not be implemented due to the harsh field conditions encountered on Little Cornwallis Island. Notwithstanding this, historical information as well as more recent data, especially those collected in the field during the 2003 reconnaissance studies, were considered relevant for understanding the likelihood of adverse biological effects occurring in the Garrow Bay receiving environment.

The assessment presented in the EEM Interpretive Report concluded that the likelihood of potential effects to marine life in Garrow Bay was negligible to low. Furthermore, since concentrations of zinc in surface waters of Garrow Lake and Garrow Creek appeared to have decreased considerably since mining ceased in 2002, the likelihood of future long term effects was also considered negligible.

Appendix A. CD of all NWB and MMER Reports
