

## LICENCE NWB1POL0311

Pursuant to the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada*, the Nunavut Water Board, hereinafter referred to as the Board, hereby grants to

### TECKCOMINCO LIMITED

(Licensee)

of POLARIS OPERATIONS: BOX 188, RESOLUTE BAY, NU X0A 0E0  
CORPORATE ADDRESS: #600-200 BURRARD STREET, VANCOUVER, BC V1A 3E1  
(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use water or dispose of waste for a period subject to restrictions and conditions contained within this Licence:

Licence Number NWB1POL0311

Water Management Area NUNAVUT 04

Location POLARIS MINE, LITTLE CORNWALLIS ISLAND,  
NUNAVUT

Purpose INDUSTRIAL WATER USE AND WASTE DISPOSAL

Description CLOSURE AND RECLAMATION

Quantity of Water Not to be Exceeded PART C, ITEM 2

Date of Licence MARCH 1, 2003

Expiry Date of Licence DECEMBER 31, 2011

Dated this \_\_\_\_ day of April 2003 at Baker Lake, NU.

Original signed by:  
Thomas Kudloo  
Chief Executive Officer

## **PART A: SCOPE, DEFINITIONS AND ENFORCEMENT**

### **1. SCOPE**

- i. This Licence entitles the Licensee to use water and dispose of waste associated with the closure and reclamation of the Licensee's Polaris Mine, Nanisivik, Nunavut, (75° N, 97° W).
- ii. This Licence is issued subject to the conditions contained herein with respect to the taking of water and the depositing of waste of any type in any waters or in any place under any conditions where such waste or any other waste that results from the deposits of such waste may enter any waters. Whenever new Regulations are made or existing Regulations are amended by the Governor in Council under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*, or other statutes imposing more stringent conditions relating to the quantity or type of waste that may be so deposited or under which any such waste may be so deposited, this licence shall be deemed to be subject to such requirements.
- iii. Compliance with the terms and conditions of this licence does not absolve the Licensee from responsibility for compliance with all applicable legislation, guidelines and directives, including all relevant requirements of the *Metal Mining Effluent Regulations* SOR/2002-222 dated June 6, 2002;
- iv. Mining and milling are not authorized under this licence. The Licensee shall apply for an amendment to the licence without delay should the Licensee decides to reopen the mine and return to Commercial Operation.

### **2. DEFINITIONS**

In this Licence: **NWB1POL0311**

**“Act”** means the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*.

**“Acutely lethal effluent”** means effluent as defined in the *Metal Mining Effluent Regulations* SOR/2002-222 dated June 6, 2002;

**“Aliquot”** means the amount comprising a known fraction of a whole and constituting a sample used for analysis;

**“Amendment”** means a change to any terms and condition of this Licence requiring correction, addition or deletion of specific terms and conditions of the Licence;

**“Analyst”** means an Analyst designated by the Minister under Section 85 (1) of the *Act*;

**“Board”** means the Nunavut Water Board established under the Nunavut Land Claims Agreement;

**“Canadian Environmental Quality Guidelines”** means but is not limited to the following:

- (a) CCME. 1999. Canadian Environmental Quality Guidelines. Canadian Council of Ministers of the Environment, Winnipeg;
- (b) CCME. 1996. Guidance Manual for Developing Site-Specific Soil Quality Remediation Objectives for Contaminated sites in Canada. The National Contaminated Sites Remediation Program. En 108-4/9-1666e;
- (c) CCME. 1007. A Framework for Ecological Risk Assessment: Technical Appendices.
- (d) CCME. 1996. A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines. The National Contaminated Sites Remediation Program. En 108-4/8-1996e.

**“Chief Administrative Officer”** means the Executive Director of the Nunavut Water Board;

**“Commercial Operation”** in respect of a mine, means an average rate of production equal to or greater than 25 % of the design rated capacity of the mine over a period of 90 consecutive days;

**“Composite Sample”** means

- (a) a quantity of effluent consisting of not less than three equal volumes proportionate to flow that have been collected at approximately equal time intervals over a sampling period of not less than seven hours and not more than 24 hours; or
- (b) a quantity of effluent collected continuously at a constant rate or at a rate proportionate to the rate of flow of the effluent over a sampling period of not less than seven hours and not more than 24 hours.

**“Deleterious Substance”** means a substance as defined in the *Metal Mining Effluent Regulations* SOR/2002-222 dated 6 June 2002;

**“Effluent”** means mine water effluent, milling facility effluent, tailings impoundment area effluent, treatment pond effluent, treatment facility effluent other than effluent from a sewage treatment facility, seepage and surface drainage that contains a deleterious substance;

**“Engineer”** means a professional engineer registered to practice in Nunavut in accordance with the *Engineering, Geological and Geophysical Act (Nunavut)* S.N.W.T. 1998, c.38, s.5;

**“Final Discharge Point”** in respect of an effluent, means an identifiable discharge point of a mine beyond which the operator of the mine no longer exercises control over the quality of the effluent;

**“Freeboard”** means the vertical distance between the water surface elevation and the lowest elevation of the effective water containment crest of the dam, dyke or other containment structure;

**“Garrow Lake Tailings Area”** means Garrow Lake, the associated containment dam, submerged tailings lines, and any other associated facilities as outlines in Cominco Drawing No. 110-C-102 and in the “Dam Construction Review and Final As-built Evaluation, Garrow lake Containment Structure Little Cornwallis Island, NWT” dated July 1992;

**“Tailings Impoundment Area”** means Garrow Lake as defined in Schedule 2, Item 2 of the *Metal Mining Effluent Regulations* SOR/2002-222 dated 6 June 2002;

**“Geotechnical Engineer”** means an Engineer whose principal field of specialization is the design and construction of earthworks in a permafrost environment;

**“Grab Sample”** means a quantity of undiluted effluent collected at a time and place representative of the total discharge;

**“Inspector”** means an Inspector designated by the Minister under Section 85 (1) of the *Act*;

**“Licence”** means Licence **NWB1POL0311**;

**“Licensee”** means Teck Cominco Limited to whom Licence **NWB1POL0311** is issued to or assigned;

**“Modification”** means an alteration to a physical work that introduces a new structure or eliminates an existing structure and does not alter the purpose or function of the work, but does not include an expansion;

**“Minister”** means the Minister of Indian and Northern Affairs Canada;

**“Minewater”** means water that is pumped from or flows out of any underground works, adits, solution chambers or open pits;

**“Monthly Mean Concentration”** means the average value of the concentrations measures in all composite or grab samples collected from each final discharge point during each month when a deleterious substance is deposited;

**“Nunavut Land Claims Agreement”** (NLCA) means the “*Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada*,” including its preamble and schedules, and any amendments to that agreement made pursuant to it;

**“Operations Area”** means all the land and works that are used or have been used in conjunction with exploration, mining or milling activity, including;

- (a) open pits, underground mines, heap leaching areas, solution mines, buildings, ore storage areas and waste rock dumps;
- (b) tailings impoundment areas, lagoons and treatment ponds; and
- (c) cleared or disturbed areas that are adjacent to the land and works;

**“Operator”** means the person who operates, has control or custody of, or is in charge of a mine or recognized closed mine;

**“Recognized Closed Mine”** means a recognized closed mine as defined by section (1) of the *Metal Mining Effluent Regulations* SOR/2002-222 dated 6 June 2002;

**“Regulations”** means the *Northwest Territories Water Regulations* SOR/93-303 8 June, 1993.

**“Surface Drainage”** means all surface water run-off contaminated by a deleterious substance as a result of flowing over, through or out of an operations area;

**“Tailings”** means material in solid and liquid form rejected from the process plant after the recoverable minerals have been extracted;

**“Use”** means use as defined in section 4 of the *Act*.

**“Waste”** means waste as defined in section 4 of the *Act*;

**“Waste Rock”** means all unprocessed rock materials that are or were produced as a result of mining operations and having no economical value;

**“Water”** means water as defined in section 4 of the *Act*;

**“Water Supply Facilities”** comprises the area and associated intake infrastructure at Frustration Lake; and

### **3. ENFORCEMENT**

- i. Failure to comply with this Licence will be a violation of the *Act*, exposing the Licensee to the enforcement measures and the penalties provided for in the *Act*;
- ii. All inspection and enforcement services regarding this Licence will be provided by Inspectors appointed under the *Act*; and
- iii. Inspectors appointed under the *Act* enjoy with respect to this Licence, and for the

purpose of enforcing this Licence, and with respect to the use of water and deposit or discharge of waste by the licensee-all powers, privileges and protections that are conferred upon them by the *Act* or by other applicable law.

## **PART B: GENERAL CONDITIONS**

1. The Water Use fee shall be paid annually in advance as set in accordance with the Regulations.
2. The Licensee shall post and maintain security in the amount of \$33.7 million in the form required by the Minister of Indian and Northern Affairs Canada, to be paid in accordance with the following schedule:
  - a. Within 90 days of issuance of the license a total amount of \$3.7 million;
  - b. Subject to Part B, Item 3 and 4, a total amount of \$18 million due December 31, 2003; and
  - c. Subject to Part B, Item 3 and 4, a total amount of \$12 million due December 31, 2004.
3. The Licensee shall provide the Board with quarterly expenditure reports (March 31, June 30, September 30, December 31) in each year which shall include, but not be limited to a summary of remediation work completed to date with the amount of credit adjustment requested, documented and related to the original remediation cost estimate dated November 2002, and adjusted for subsequent expenditure credits.
4. The Board reserves the right at any time to modify the amount and schedule of payments of security upon the submission of any party. The decision to advance or change security amounts or schedules remains within the discretion of the Board and must be based upon proof of evidence that the Licensee has failed for whatever reason to perform reclamation of the undertaking as stated in this Licence.
5. At any time during the term of this licence, the amount of security shall not be less than the estimated cost of any work required by the Board to implement corrective measures in the event of proof of detrimental effects of decommissioning and reclamation activities on water in Garrow Lake. The Licensee shall provide by November 1, 2003 a cost approximation for the estimate of security required by this clause.
6. 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 1<sup>st</sup> of the year being reported.
7. The Licensee shall maintain a copy of this Licence, all records, books of account or other documents as required as part of this or previous licenses at the Polaris Mine until such time as it is no longer practicable.
  8. The licensee shall maintain a copy of the licence and all related information at the Polaris Mine until no longer possible, after which time they shall be maintained at the Licensee's main corporate address in Canada.
  9. Any communication with respect to this Licence shall be made in writing to the attention of:

Chief Administrative Officer  
Nunavut Water Board  
P. O. Box 119  
Gjoa Haven, NU X0B 1J0  
Telephone: (867) 360-6338  
Fax: (867) 360-6369



Email: [nwblic@polarnet.ca](mailto:nwblic@polarnet.ca)

10. Any notice made to an Inspector shall be made in writing to the attention of:  
Water Resources Officer  
Nunavut District, Nunavut Region  
P.O. Box 100  
Iqaluit, NU X0A 0H0  
Telephone: (867) 975-4298  
Fax: (867) 979-6445
11. The Licensee shall submit two paper copies and one electronic copy of all reports, studies, and plans to the Board unless otherwise requested by the Board. Reports or studies submitted to the Board by the Licensee shall include a detailed executive summary in Inuktitut.
12. This Licence is not assignable except as provided in section 44 of the *Act*.

#### **PART C: CONDITIONS APPLYING TO WATER USE**

1. The Licensee shall obtain all fresh Water from Frustration Lake using the Water Supply Facilities or as otherwise approved by the Board.
2. The annual quantity of Water withdrawn from Frustration Lake shall not exceed the following annual limits unless otherwise approved by the Board:
  - i. 2003 yearly quantity not to exceed 250,000 cubic metres; and
  - ii. 2004 yearly quantity not to exceed 200,000 cubic metres.

#### **PART D: CONDITIONS APPLYING TO WASTE MANAGEMENT**

1. All Minewater shall meet the Effluent quality limits specified in Part D, Item 4.
2. The Licensee shall provide at least ten (10) days written notice to an Inspector prior to any planned discharges of Effluent from the Tailings Impoundment Area during each calendar year.
3. The Licensee shall not dilute Effluent with Water or any other Effluent prior to its deposit in Water.
4. All Effluent discharged by the Licensee shall not exceed the following Effluent quality limits at all Final Discharge Points:

Substance	Maximum Authorized Monthly Mean Concentration	Maximum Authorized Concentration in a Composite Sample	Maximum Authorized Concentration in a Grab Sample
Arsenic (As)*	0.50mg/L	0. 625mg/L	0.75 mg/L
Copper (Cu)*	0.07 mg/L	0.105 mg/L	0.14 mg/L
Lead (Pb)*	0.07 mg/L	0.105 mg/L	0.14 mg/L
Nickel (Ni)*	0.50 mg/L	0.75 mg/L	1.00 mg/L
Zinc (Zn)*	0.50 mg/L	0.75 mg/L	1.00 mg/L
Total Suspended Solids (TSS)	15.00 mg/L	22.50 mg/L	30 mg/L
Radium 226 ( <sup>226</sup> Ra)*	0.37 Bq/L	0.74 Bq/L	1.11 Bq/L
Cadmium (Cd)	0.005 mg/L	0.008 mg/L	0.01 mg/L
Mercury (Hg)	0.0005 mg/L	0.0008 mg/L	0.001 mg/L
Cyanide	0.50 mg/L	0.75 mg/L	1.00 mg/L

Note: All concentrations represent total values and \* indicates a Deleterious Substance.

5. The Licensee shall ensure that any Effluent discharged at all Final Discharge Points:
  - i. Has a pH between 6.0 and 9.5;
  - ii. Is not an Acutely Lethal Effluent; and
  - iii. Has no visible sheen of Oil and Grease.
6. If a visible sheen of Oil and Grease is present in any Effluent, the Licensee shall ensure that the Maximum Authorized Concentration in a Grab Sample is equal to or less than 30 mg/L. The results shall be submitted to the Board in accordance with Part H, Item 30.
7. The Licensee shall maintain the Final Discharge Point Geo-referenced as (75° 22' 32" N, 97° 48' 37" W).
8. If, during the term of this Licence, additional Final Discharge Points are identified, the Licensee shall submit the information plans, specifications and a general description of each Final Discharge Point together with its specific geo-referenced location; A description of how each Final Discharge Point is designed and maintained in respect of the deposit of Deleterious Substances for each new Final Discharge Point within 30 days after the discharge point is identified and at least 60 days prior to depositing Effluent from the new Final Discharge Point and/or proposed changes are made to a Final Discharge Point.

9. The Licensee shall operate and maintain the Tailings Impoundment Area to the satisfaction of an Inspector.

## **PART E: CONDITIONS APPLYING TO EMERGENCY RESPONSE**

1. The Licensee shall submit to the Board for approval within thirty (30) days of issuance of this Licence, a revised Emergency Response Plan. This plan shall be prepared in accordance with the Nunavut Water Board's, "Guidelines for Contingency Planning" (1987). The revised Plan shall include but not be limited to:
  - i. A revised site risk analysis;
  - ii. Changes to the organization scheme for emergency responses, including the roles and responsibilities of the mine's personnel;
  - iii. Changes to alerting and notification procedures;
  - iv. Changes to the inventory of spill-response equipment, including the location of that equipment; and
  - v. Ongoing training plan for mine's personnel.
2. The Emergency Response Plan referred to in Part E, Item 1 shall be reviewed annually by the Licensee and revised as necessary to reflect changes in operation and technology.
3. The annual revisions of the Emergency Response Plan referred to in Part E, Item 2 shall be submitted to the Board as an addendum to the original plan as required in Part B, Item 6(iii).
4. If not approved by the Board, the Emergency Response Plan referred to in Part E, Item 1 shall be revised and resubmitted within thirty (30) days of receiving notification of the Board's decision.
5. If, during the period of this Licence, an unauthorized discharge of Waste and/or Effluent occurs, or if such a discharge is foreseeable, the Licensee shall:
  - i. Employ the Emergency Response Plan;
  - ii. Report the incident immediately via the 24-Hour Spill Reporting Line (867) 920-8130; and

- iii. Submit to an Inspector a detailed written report on each occurrence no later than thirty (30) days after initially reporting.

## **PART F: CONDITIONS APPLYING TO MODIFICATIONS AND CONSTRUCTION**

1. The Licensee shall submit to the Board for approval, design drawings stamped by an Engineer prior to the construction of any dams, dykes or structures intended to contain, withhold, divert or retain Water or Waste.
2. The Licensee may, without written consent from the Board, carry out Modifications to the Water Supply Facilities and Waste Disposal Facilities provided that such Modifications are consistent with the terms of this Licence and the following requirements are met:
  - i. The Licensee has notified the Board in writing of such proposed Modifications at least sixty (60) days prior to beginning the Modifications;
  - ii. Such Modifications do not place the Licensee in contravention of the Licence or the *Act*;
  - iii. The Board has not, during the ninety (90) days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than ninety (90) days; and
  - iv. The Board has not rejected the proposed Modifications.
3. Modifications for which all of the conditions referred to in Part F, Item 2 have not been met can be carried out only with written approval from the Board.
4. Where applicable, the Licensee shall provide as-built plans and drawings of the Modifications referred to in this Licence within ninety (90) days of completion of the Modification. These plans and drawings shall be stamped by an Engineer.

## **PART G: CONDITIONS APPLYING TO DECOMMISSIONING AND RECLAMATION**

1. The Licensee shall implement the “Polaris Mine Decommissioning and Reclamation Plan”, dated March 2001 prepared by Gartner Lee Limited for Cominco Limited as and when approved by the Board.

2. The Licensee shall review the Decommissioning and Reclamation Plan as required in Part G, Item 3 annually, and shall modify the Plan as necessary to reflect directions from the Board, changes in operations and technology, and results from restoration research and other studies. All proposed modifications to the Plan shall be submitted to the Board for approval as an addendum to the original plans as required in Part B, Item 6(iii).
3. If not approved by the Board, the Plan referred to in Part G, Item 1 shall be revised and resubmitted within thirty (30) days of receiving notification of the Board's decision.
4. The Licensee shall submit to the Board for approval by March 31, 2005, 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 requirements.
  - i. A description of how closure assessment, monitoring and treatment will be considered, including a description of any post-closure treatment potentially required for Effluent that is not acceptable for discharge as required by Part D, Item 4 from and Final Discharge Point(s);
  - ii. A description of the monitoring program for the reclamation and closure periods to be employed in relation to water quality, flow, thermal analysis, soil sampling relative to remediation objectives and geotechnical inspections to ensure long term stability of earthworks;
  - iii. Maps/drawing showing locations of all water quality monitoring and thermal analysis stations;
  - iv. A summary of monitoring stations, description, sampling requirements and analysis requirements for *in situ* and site specific parameters;
  - v. 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;
  - vi. The methodologies used to conduct Effluent characterization and Water quality monitoring, and the related method detection limits;
  - vii. A description of quality assurance and quality control measures that were implemented and the data related to the implementation of those measures;
  - viii. Sampling and testing protocols for determining the success of restoration measures undertaken should be documented; and
  - ix. Analysis of Phase I monitoring undertaken by the Licensee in accordance with

Part H.

**PART H: CONDITIONS APPLYING TO THE MONITORING PROGRAM**

**GENERAL**

1. All analyses shall be conducted in accordance with methods prescribed in the current edition of “*Standard Methods for the Examination of Water and Wastewater*”, or as prescribed by the *Metal Mining Effluent Regulations* or other accepted standards.
2. All analyses shall be performed in a laboratory approved by the Analyst.
3. The Licensee shall install meters or such devices, or use such methods as approved by the Board for measuring the volumes of Water used and Effluent discharged. The meters and measuring devices or methods shall be operated and maintained to the satisfaction of an Inspector.
4. The Licensee shall continue to maintain the necessary signs to identify the stations of the Monitoring Program. All signs shall be located and maintained to the satisfaction of an Inspector.
5. The Licensee shall collect the samples of effluent referred to in this Part without delay when the circumstances permit if, at any time, the period specified for collecting samples was extended due to:
  - i. Unforeseen circumstances cause safety concerns or access problems and render the collection of samples of effluent impracticable; or
  - ii. The Licensee notifies an inspector of the circumstances.

**GEOTECHNICAL INSPECTION**

6. 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.

**EFFLUENT MONITORING**

7. The Licensee shall not less than once per week and not less than four days apart, collect from each Final Discharge Point a grab sample or composite sample of effluent and without delay, record the pH and concentration of substances as required by Part D, Item 6.

8. The Licensee shall increase the frequency of sampling if the substance's monthly mean concentration is equal to or greater than 10% of the value set for the Maximum Monthly Mean Concentration as required under Part D, Item 4.
9. If additional Final Discharge Points are identified as required by Part D, Item 9, sampling frequency shall comply with Part H, Item 7 and Part H, Item 8, where applicable.
10. Testing conducted under Part D, Item 4 shall comply with the analytical requirements set out in Schedule 3 of the MMER and for Cadmium in accordance with the analytical requirements outlined in the Environment Canada "*Guidance Document for the Sampling and Analysis of Metal Mining Effluents*" EPS 2/MM/4-April 2001.
11. The Licensee shall maintain records relating to effluent monitoring equipment that contain:
  - i. A description of the equipment and, if applicable the manufacturer's specification and the year and model number of the equipment; and
  - ii. The results of the calibration tests of the equipment.

#### **ACUTE LETHALITY AND *DAPHNIA MAGNA* TESTING**

12. The Licensee shall collect from each Final Discharge Point a grab sample and conduct an Acute Lethality Test in accordance with the requirements and procedures specified in Environment Canada's "*Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout*" Reference Method EPS 1/RM/13;
  - i. Monthly in accordance with the Section 5 or 6 of the specified reference;
  - ii. Without delay in accordance with procedure set out in Section 6 of the specified reference if a deposit of deleterious substance occurs.
13. The Licence shall select and record the sampling date not less than 30 days in advance of collecting the grab sample as required in Part H, Item 12 and collect the samples not less than 15 days apart.
14. If a sample of Effluent is determined to be acutely lethal the Licensee shall:
  - i. Without delay conduct Effluent Characterization as required by Part H, Item 30 on an aliquot of the monthly sample required by Part H, Item 12 (i);
  - ii. Collect from each Final Discharge Point a grab sample twice a month and conduct sampling in accordance with Section 6 of Reference Method EPS 1/RM/13 referred to in Part H, Item 12;

- iii. Collect grab samples not less than seven days apart.
- 15. The Licensee may resume sampling and testing as required in Part H, Item 12 if the effluent is determined not to be acutely lethal in three consecutive tests conducted in accordance with Part H, Item 14 (ii).
- 16. The Licensee shall ensure the grab sample taken as required in Part H, Item 12 is of sufficient volume to conduct all sampling requirements of Part H, Item 12, 14 and 17, where applicable and if necessary.
- 17. The Licensee shall conduct *Daphnia magna* monitoring tests in accordance with Environment Canada's "*Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia magna*" Reference Method EPS 1/RM/14;
  - i. At the same time as acute lethality test are required under Part H, Item 12 or 14;
  - ii. On aliquots of samples collected as required in Part H, Item 12 or 14.
- 18. The Licensee shall record without delay the information required by S. 8.1 of the reference methods referred to in Part H, Item 12 and 17.

#### **VOLUME AND EFFLUENT FLOW RATE**

- 19. The volume of effluent discharged from the Final Discharge Point (Station No. 262-7) shall be measured and recorded daily during periods of flow.
- 20. If new Final Discharge Points are identified in accordance with Part D, Item 9, the Licensee shall measure and record the total monthly volume of effluent deposited from each new final discharge point.
- 21. The Licensee shall measure and record the flow at Station No. 262-7 as required by Part H, Item 22(i).
- 22. The Licensee shall record the total monthly effluent volume deposited from each final discharge point. The total monthly volume deposited shall be based on the average of the flow rates and the Licensee shall:
  - i. Measure flow rates at the same time samples are collected as required in Part H, Item 7 to 9 where applicable unless the licensee uses a system that takes continuous measurements;
  - ii. Use monitoring equipment that is accurate to within 15 % of measured flow; and



- iii. Calibrate the monitoring equipment not less than once in each year and record the results.

## **CALCULATION OF LOADING**

- 23. The Licensee shall record in kilograms the mass loading of the substances required by Part D, Item 4 contained in the effluent deposited from each final discharge point for each day on which a sample is collected for the substance under Part H, Item 7 to 9 where applicable.
- 24. The Licensee shall determine mass loading by multiplying the concentration of the substance recorded as determined Part H, Item 7 to 9 where applicable by the total volume of effluent deposited from each final discharge point on the day on which the sample is collected.
- 25. The Licensee shall determine the mass loading for each calendar month by multiplying the average of all mass loadings determined for that month under Part H, Item 24 by the number of days in that calendar month during which there was a deposit.
- 26. If the analytical result from any test conducted under Part H, Item 7 to 9 where applicable is less than one-tenth of the method detection limit as required under Part H, Item 10, the test result shall be considered to be zero for the purpose of performing a calculation under Part H, Item 24.

## **REPORTING REQUIREMENTS**

- 27. 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).
28. The Licensee shall submit to Board annually, no later than March 31, a report summarizing the Effluent monitoring results for the previous calendar year as required in Part B, Item 6(ix)(b).
29. The Licensee shall notify an Inspector without delay and provide a written report of the test results to the Inspector within 30 days after the tests have been completed if the results of the effluent monitoring tests conducted under Part H, Item 7 to 9 and/or Part H, Item 12 to 14 where applicable indicate that limits set in Part D, Item 4 and 5 have been exceeded.

## **EFFLUENT CHARACTERIZATION**

30. The Licensee shall conduct Effluent characterization by analyzing a sample of effluent and recording the hardness and alkalinity of the sample and the concentrations, in total values, of the following:
- i. aluminum;
  - ii. cadmium;
  - iii. iron;
  - iv. subject to Part H, Item 35, mercury;
  - v. molybdenum;
  - vi. ammonia; and
  - vii. nitrate.
31. The effluent characterization as required in Part H, Item 30 shall be conducted four times per calendar year and not less than one month apart, on aliquots of effluent sample collected under Part H, Item 7 to 9, with the first characterization to be conducted on an aliquot of effluent sample collected not later than June 6, 2003.
32. The recording of the concentration of total mercury in effluent referred to Part H, Item 30 may be discontinued if that concentration is less than 0.10 µg/L in 12 consecutive samples collected under Part H, Item 31.
33. Quality assurance and quality control measures shall be implemented that will ensure the accuracy of the effluent characterization data.

## **SUBLETHAL TOXICITY**

34. The Licensee shall conduct sublethal toxicity testing in accordance with the applicable methods referred to in Schedule 5-S.5 of the *Metal Mining Effluent Regulations* and record the results for:
  - i. A fish species, an invertebrate species, a plant species and
  - ii. An algal species, in the case of effluent deposited into fresh waters; and
  - iii. A fish species, an invertebrate species and an algal species, in the case of effluent deposited into marine or estuarine waters.
35. The sublethal toxicity tests shall be conducted on the aliquots of effluent sample collected in accordance with Part H, Item 31 from the mine's *final discharge point that has potentially the most adverse environmental impact on the environment*, taking into account the mass loadings of the substances set out in Part D, Item 4 as determined under Part H, Item 24 and the manner in which the effluent mixes within the exposure area.
36. The Licensee shall conduct the sublethal toxicity tests in accordance with Part H, Item 34 and 36, two times each calendar year for three years and once each year after the third year, with the first testing to occur on an effluent sample collected not later than June 6, 2003.

## **WATER QUALITY MONITORING**

37. The Licensee shall collect water samples beginning June 6, 2003:
  - i. Four times per calendar year and not less than one month apart on the samples of water collected the exposure area surrounding the point of entry of effluent into water from each final discharge point and from the related reference areas, and
  - ii. At the same time that the biological monitoring studies are conducted on samples of water collected in the areas that are selected in accordance with Part H, Item 40.
38. For the samples required in Part H, Item 37 the Licensee shall record:
  - i. The temperature of the water and the dissolved oxygen concentration in the water in the exposure and reference areas where the samples are collected;
  - ii. The pH, hardness and alkalinity of the water samples and the concentration of the substances set out in Part H, Item 30; and

- iii. The concentration of the substances set out in Part D, Item 4.
- 39. The Licensee shall submit to the Board the exact location of water sampling reference areas as referred to in Part H, Item 37 (i) within 30 days of identifying such areas.
- 40. The Licensee shall implement quality assurance and quality control measures that will ensure the accuracy of water quality monitoring data required in Part H, Item 38.

## **BIOLOGICAL MONITORING**

- 41. The Licensee shall submit to the Board for approval by June 16, 2003 the Biological Monitoring studies as required by Part 2 of Schedule 5 of the *Metal Mining Effluent Regulations*.
- 42. The Licensee shall submit the Board for approval by June 30, 2003 the Terms of Reference to study the following:
  - i. the metal concentration in benthic sediment adjacent to the shore of Garrow Lake, Garrow Creek and Garrow Bay;
  - ii. the metal concentration of a representative species in Garrow Lake and Garrow Bay;
  - iii. and the monitoring of erosion rates of the shore of Garrow lake and Garrow creek.

## **CHANGES TO THE MONITIRONG PROGRAM**

- 43. The Post-Closure Monitoring (Phase I) described in the “Polaris Mine Decommissioning and Reclamation Plan”, dated March 2001 prepared by Gartner Lee Limited for Cominco Limited and the additional monitoring requirements listed in Table I are effective upon issuance of the Licence. The Board may modify these requirements upon application by the licensee and the submission of evidence to support the requested changes.
- 44. The Licensee shall submit for review the results of the monitoring requirements in Table 1 in accordance with Part B, Item 6.

## **TABLE 1 – SUMMARY OF MONITORING REQUIREMENTS**