

NORTHWEST  
TERRITORIES  
WATER BOARD



WATER REGISTER NO. N4L2-0262

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December 30, 1993

**FXED**  
Dec 30 1993

Mr. John Key  
Manager, Polaris Operations  
Cominco Metals  
Division of Cominco Limited  
POLARIS, NT X0A 0Y0

Dear Mr. Key:

**RE: COMINCO POLARIS OPERATIONS: LICENCE RENEWAL - N4L2-0262**

The Northwest Territories Water Board would like to once again commend Cominco on the time and effort put forth with regards to this licence renewal.

Enclosed please find a copy of the licence renewal for the above noted property.

As you know, there was considerable discussions during the licence renewal process regarding further scientific studies requested by various government departments. The Board eventually decided that the Licence was not to be used as a means of ensuring scientific studies are conducted.

However, due to the demand from these various government agencies, the Board would like to encourage Polaris to participate in a joint study. The following paragraphs explain in more detail the type of study that is envisioned.

The Department of Fisheries and Oceans (DFO) requests that studies, which relate the relevance of data on metal concentrations in water to those concentrations in fish and macro-invertebrates be initiated or continued where applicable. The sculpins residing in Garrow Lake are within the Tailings Containment Area and, as such, need not be protected from any adverse effects which may arise from tailings deposition into Garrow Lake. DFO requests, however, that approximately thirty to forty of those Garrow Lake sculpins be captured and analyzed for zinc, lead, copper, cadmium, antimony, and mercury. One-half of those fish would be used for whole-body

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metal analyses, and those data would be used to compare to pre-operational conditions. The remaining half would be used to obtain metal concentration data in site specific organs, such as liver, kidney, gill, and intestine from individual fish. A comparable number of sculpins from two or three reference lakes in the area would also be collected and analyzed in a similar way. DFO also requests that studies on Mya truncata from Garrow Bay and reference sites in the area be continued. Twenty to thirty of these clams per site should be collected, dissected into gill, hepatopancreas, foot, and remaining viscera, and analyzed for zinc, lead, copper, cadmium, antimony, and mercury. These data would also be compared to pre-operational data. DFO requests that sampling of sculpins and Mya truncata be conducted during the summer of 1994.

To accomplish these studies, DFO has stated they are prepared to provide a scientist to lead the studies, a supervising chemist, and other support staff to collect and dissect the sculpins and Mya truncata, and to supervise the metal analyses. The scientist and support staff are qualified SCUBA divers, and the supervising chemist has all analytical chemistry equipment and space necessary to complete these studies. DFO requires support from Cominco - Polaris in the form of lodging, meals, and assistance with transportation to Garrow Lake, Garrow Bay, and other reference sites. DFO also requires support from DIAND for metals analysis, a summer student, and for transportation costs from Winnipeg to Little Cornwallis Island return.

The Board supports DFO's request for these bio-monitoring studies, especially in view of DFO's willingness to undertake the studies in collaboration with Cominco and DIAND. The Board therefore, asks Cominco to give favourable consideration to DFO's request for the support described above. The Board has been advised that Mr. Witteman or one of his staff will be contacting you in the near future to review this request.

If you require further assistance, please do not hesitate to contact this office. If your inquiry is of a technical nature, please feel free to contact Mr. Erik Madsen at (403) 920-8141 or Mr. John Witteman at (403) 920-8240 of the Water Resources Division.

Sincerely,



Dave Nickerson  
Chairman  
N.W.T. Water Board

Encl

cc: B. Hunt, DFO  
J. Witteman, NAWP



DEC 2 0 1993

Mr. Dave Nickerson  
Chairman  
Northwest Territories Water Board  
P.O. Box 1500  
YELLOWKNIFE NT X1A 2R3



Dear Mr. Nickerson:

I am pleased to forward the enclosed water licence  
N4L2-0262 for Cominco's Polaris Mine.

I have approved this licence as recommended by the  
Board.

A screening of this project pursuant to the  
*Environmental Assessment and Review Process Guidelines  
Order* has now been completed and I am satisfied that  
any potentially adverse environmental and related  
socio-economic effects that may be caused by this  
project are insignificant or mitigable with known  
technology.

Again, thank you for your co-operation.

Yours truly,

Ronald A. Irwin, P.C., M.P.

Encl.

# NORTHWEST TERRITORIES WATER BOARD

Pursuant to the Northwest Territories Waters Act and Regulations the Northwest Territories Water Board, hereinafter referred to as the Board, hereby grants to

COMINCO LTD.  
(Licensee)  
of POLARIS, NORTHWEST TERRITORIES X0A 0Y0  
(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use water subject to the restrictions and conditions contained in the Northwest Territories Waters Act and Regulations made thereunder and subject to and in accordance with the conditions specified in this Licence.

Licence Number	<u>N4L2-0262 (RENEWAL)</u>
Licence Type	<u>"A"</u>
Water Management Area	<u>NORTHWEST TERRITORIES 04</u>
Location	<u>LITTLE CORNWALLIS ISLAND, N.W.T.</u>
Purpose	<u>WATER USE AND WASTE DISPOSAL</u>
Description	<u>FOR MINING AND MILLING UNDERTAKINGS</u>
Quantity of Water Not to be Exceeded	<u>850,000 CUBIC METRES PER YEAR</u>
Effective Date of Licence	<u>JANUARY 1, 1994</u>
Expiry Date of Licence	<u>DECEMBER 31, 2002</u>

This Licence issued and recorded at Yellowknife includes and is subject to the annexed conditions.

NORTHWEST TERRITORIES WATER BOARD

Pamela R. LeMoine  
Witness

Dave Nickerson  
Chairman

Approved by

[Signature]  
Minister of Indian Affairs  
and Northern Development

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

### **1. Scope:**

- a) This Licence allows for water use and waste disposal for industrial undertakings in mining and milling processes and associated uses by Cominco Ltd., for their Polaris Operations, Little Cornwallis Island, Northwest Territories;
- b) 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 Northwest Territories Waters 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, upon promulgation of such Regulations, to be automatically amended to conform with such Regulations; and
- c) Compliance with the terms and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of all applicable Federal, Territorial, and Municipal legislation.

### **2. Definitions in this Licence N4L2-0262:**

**"Act"** means the Northwest Territories Waters Act;

**"Analyst"** means an analyst designated by the Minister under Section 35(1) of the Northwest Territories Waters Act;

**"Board"** means the Northwest Territories Water Board established under Section 10(1) of the Northwest Territories Waters Act;

**"Inspector"** means an inspector designated by the Minister under Section 35(1) of the Northwest Territories Waters Act;

**"Licensee"** means the holder of this Licence;

**"Regulations"** means Regulations proclaimed pursuant to Section 33 of the Northwest Territories Waters Act;

**"Average Concentration"** means the average of the last four analytical results as submitted to the Board in accordance with the sampling and analysis requirements specified in the "Surveillance Network Program";

**"Freeboard"** means the vertical distance between the water line and the crest of a dam or dyke's upstream slope;

**"Garrow Lake Tailings Area"** means Garrow Lake, the associated containment dam, submerged tailings lines, and any other associated facilities as outlined 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, N.W.T." dated July 1991; and

**"Waste"** means waste as defined by Section 2 of the Northwest Territories Waters Act.

**PART B: GENERAL CONDITIONS**

1. The water use fee shall be paid annually in advance.
2. The Licensee shall have posted and shall maintain a Security Deposit in the amount of One Million (\$1,000,000.00) Dollars pursuant to Section 17(1) of the Act and Section 12 of the Regulations. The Security Deposit shall be maintained until such a time as the Board is satisfied that the Licensee has complied with all provisions of the final Abandonment and Restoration Plan. This clause shall survive the expiry of this Licence or renewals thereof.
3. The Licensee shall file an Annual Report with the Board not later than March 31st of the year following the calendar year reported, which shall contain the following information:
  - a) the monthly and annual quantity in cubic metres of water pumped from Frustration Lake;
  - b) the monthly and annual quantity in cubic metres of the solid and liquid fractions of the tailings discharged to the Garrow Lake Tailings Area;
  - c) tabular summaries of all data generated under the "Surveillance Network Program";
  - d) a summary of modifications and/or major maintenance work carried out on the water supply and the Garrow Lake Tailings Area, and all associated structures;
  - e) a list of unauthorized discharges;
  - f) a summary of the results of any studies requested by the Board;
  - g) updates or approved revisions to the Contingency Plan;
  - h) updates or approved revisions to the Abandonment and Restoration Plan;
  - i) the information required by Part D, Item 7; and
  - j) any other details on water use or waste disposal requested by the Board by November 1st of the year being reported.
4. The Licensee shall comply with the "Surveillance Network Program" annexed to this Licence, and any amendment to the said "Surveillance Network Program" as may be made from time to time, pursuant to the conditions of this Licence.
5. The "Surveillance Network Program" and compliance dates specified in the Licence may be modified at the discretion of the Board.
6. Meters, devices or such methods used for measuring the volumes of water used and waste discharged shall be installed, operated and maintained by the Licensee to the satisfaction of the Inspection.
7. The Licensee shall, within sixty (60) days of the issuance of this Licence, post the necessary signs, where possible, to identify the stations of the "Surveillance Network Program". All postings shall be located and maintained to the satisfaction of the Inspector.

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

1. The Licensee shall obtain all fresh water needed for mining, domestic use and make-up water for milling, from Frustration Lake in accordance with Cominco Drawing Numbers 110-C-120, 121, 122 and 125, submitted to the Board March 27, 1980.
2. The annual quantity of water withdrawn from Frustration Lake shall not exceed 850,000 cubic metres per year.
3. The Licensee shall maximize the use of water by recycling water from the tailings stream for use within the mill.

**PART D: CONDITIONS APPLYING TO WASTE DISPOSAL**

1. The Licensee shall dispose of all mill process wastes into the Garrow Lake Tailings Area.
2. The Licensee shall operate the Garrow Lake Tailings Area according to the following conditions:
  - a) discharge of all tailings to Garrow Lake must be at a minimum depth of twenty-six (26) metres as shown on Cominco Drawing Number 110-C-102, as revised June 11, 1981;
  - b) all tailings entering Garrow Lake will be transported from the surface to the twenty-six (26) metre level through a tailings pipeline surrounded by a larger pipeline;
  - c) no surface water, except that occurring from precipitation and natural runoff shall enter the Garrow Lake Tailings Area;
  - d) at least one (1) metre of freeboard is maintained on the Garrow Lake Tailings Area Dam; and
  - e) an inspection of the Garrow Lake Tailings Area Dam shall be carried out every two (2) years commencing in the summer 1994. The inspection shall be carried out by a qualified geotechnical engineer registered in the Northwest Territories. The engineer's report shall be submitted to the Board within sixty (60) days of the inspection, including a covering letter from the Licensee outlining an implementation plan to respond to the consultant's recommendations.
3. The Licensee shall provide adequate notice to the Inspector prior to any proposed discharge of waste from the Garrow Lake Tailings Area and shall advise the Inspector prior to the anticipated cessation of discharge each year.
4. All waste discharged by the Licensee shall not exceed the following effluent quality standards:

PARAMETER	MAXIMUM AVERAGE CONCENTRATION	MAXIMUM CONCENTRATION OF ANY GRAB SAMPLE
Total Copper	0.07 mg/L	0.14 mg/L
Total Lead	0.07 mg/L	0.14 mg/L
Total Zinc	0.50 mg/L	1.00 mg/L
Total Mercury	0.0005 mg/L	0.001 mg/L
Total Cadmium	0.005 mg/L	0.01 mg/L
Total Cyanide	0.5 mg/L	1.0 mg/L

5. The Licensee shall implement measures to minimize erosion of the downstream toe of the Garrow Lake dam and the bed of Garrow Creek.
6. The Licensee shall monitor the stratification of Garrow Lake and to apply the results to a model which will predict the short and long term stability of Garrow Lake.
7. The Licensee shall include in the Annual Report the results from the model as they relate to the stability of Garrow Lake including any changes that have occurred; an assessment of the short term and long term implications on water quality including the need for any mitigative action and a plan for implementing mitigative action.

**PART E: CONDITIONS APPLYING TO MODIFICATIONS**

1. The Licensee may, without written consent from the Board, carry out modifications to the water supply and waste disposal facilities provided that such modifications are consistent with the terms of this Licence and the following requirements are met:
  - a) the Licensee has notified the Board in writing of such proposed modifications at least sixty (60) days prior to beginning the modifications;
  - b) such modifications do not place the Licensee in contravention of either the Licence or the Act;
  - c) the Board has not, during the sixty (60) days following notification of the proposed modifications, informed the Licensee that review of the proposal will require more than sixty (60) days; and
  - d) the Board has not rejected the proposed modifications.
2. Modifications for which all of the conditions referred to in Part E, Item 1, have not been met, can be carried out only with written consent from the Board.
3. 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 submitted to the Board on material that will reproduce with the use of a standard printer.

**PART F: CONDITIONS APPLYING TO CONTINGENCY PLANNING**

1. The Licensee shall by June 30, 1994, submit to the Board for approval a Contingency Plan in accordance with the Northwest Territories Water Board's "Guidelines for Contingency Planning, January 1987".
2. In addition to conforming with the Guidelines, the Contingency Plan shall also address the following items:
  - a) identification of the remedial action that Cominco will undertake prior to any further discharge if the average concentration of Total Zinc or Total Lead in the water measured at Station 262-7 over the course of a summer's discharge reaches 90 per cent of the maximum average concentration for these parameters as set out in Part D, Item 4;



- b) a summary of the results of investigations and test work conducted in developing a suitable process or treatment technology to ensure compliance with the effluent quality requirements; and
  - c) a plan for implementing the suitable process to ensure compliance with the effluent requirements.
- 3. If not approved by the Board, the Contingency Plan referred to in Part F, Item 1 shall be revised and resubmitted within three (3) months after notification, except in respect of Part F, Item 2, when the revision and resubmission shall be done within six (6) months after notification.
- 4. The Licensee shall annually review the Contingency Plan and modify the Plan as necessary to reflect changes in operation and technology. Any proposed modifications shall be submitted to the Board for approval.
- 5. If, during the period of this Licence, an unauthorized discharge of waste occurs, or if such a discharge is foreseeable, the Licensee shall:
  - a) employ the appropriate Contingency Plan;
  - b) report the incident immediately via the 24 Hour Spill Reporting Line. The number is (403) 920-8130; and
  - c) submit to the Inspector, a detailed report on each occurrence not later than thirty (30) days after initially reporting the event.

**PART G: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION**

- 1. The Licensee shall by July 31, 1996, submit to the Board for approval an "Interim" Abandonment and Restoration Plan in accordance with the Northwest Territories Water Board's "Guidelines for Abandonment and Restoration Planning for Mines in the Northwest Territories, September 1990".

In addition to conforming with the Guidelines, the Plan shall also address the following items:

  - a) any significant changes to the physical and chemical properties of Garrow Lake as will be determined by the ongoing data collected with regards to the model for Garrow Lake; and
  - b) the long term stability of Garrow Lake, including any monitoring that should be done; identification of when the lake will reach equilibrium; and what implications this may have to water quality to be discharged in the future.
- 2. The Licensee shall modify the Plan as referred to in Part G, Item 1, as required for its acceptance by the Board, should the Plan be deemed unacceptable to the Board. A revised Plan shall be received by the Board within six (6) months after notification.
- 3. The Licensee shall annually review the Abandonment and Restoration Plan commencing in 1997 and shall modify the Plan as necessary to reflect changes with the operation and with technology. Any proposed modifications shall be submitted to the Board for approval.
- 4. The Licensee shall complete the Abandonment and Restoration work within the time schedule specified in the Plan, or as subsequently revised and approved by the Board.

5. Notwithstanding the time schedules referred to in Part G, Item 4, the Licensee shall endeavour to carry out progressive restoration of areas which are abandoned prior to closure of operations.
6. Compliance with the Abandonment and Restoration Plan specified in this Licence will not limit the legal liability of the Licensee, other than liability arising by operation of this Act.

NORTHWEST TERRITORIES WATER BOARD

Pamela R. LeMoine  
Witness

Dave Nickerson  
Chairman

# NORTHWEST TERRITORIES WATER BOARD

LICENSEE:	COMINCO LTD., POLARIS OPERATIONS
LICENCE NUMBER:	N4L2-0262
EFFECTIVE DATE OF LICENCE RENEWAL:	JANUARY 1, 1994
EFFECTIVE DATE OF SURVEILLANCE NETWORK PROGRAM:	JANUARY 1, 1994

## SURVEILLANCE NETWORK PROGRAM

### A. Location of Surveillance Stations

<u>Station Number</u>	<u>Description</u>
262-1	Frustration Lake pumphouse.
262-2	Garrow Lake above tailings discharge point.
262-3	Garrow Lake at centre.
262-4	Garrow Lake near outlet.
262-5	Garrow Creek approximately 200 metres downstream from Garrow Lake outlet.
262-6	Final mill tailings at automatic sampler prior to discharge from the mill.
262-7	Outlet from Garrow Lake at the dam - discharge siphons.

### B. Sampling and Analysis Requirements

1. The height of the tailings pile at Station Number 262-2 shall be measured on a monthly basis if not prohibited by ice conditions.
2. Immediately after any maintenance work has been conducted on any portion of the pipeline from the shore to the discharge end, divers shall confirm that all tailings are discharging at the end of the pipeline.
3. Water at Station Number 262-3 shall be sampled three times per year, (once during mid winter, once during maximum ice thickness, and once during maximum melt), at the approximate depths of 3, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22 and 40 metres, and also at 0 and 1.5 metres during periods of open water. The samples shall be analyzed for the following parameters:

Total Lead	pH
Total Zinc	Temperature
Hydrogen Sulfide	Conductivity

4. Water at Station Number 262-3 shall be sampled during the same time periods as in Part B, Item 3 at the approximate depths of 3 and 10 metres, and also at 0 and 1.5 metres during periods of open water. The samples shall be analyzed for the following parameters:

Total Copper	Total Nickel
Total Cyanide	Total Arsenic
Total Cadmium	Total Mercury
Total Antimony	

5. Tailings discharge at Station Number 262-6 shall be sampled monthly, with the twelve (12) monthly samples being combined into one (1) composite sample at year end. A complete metal scan shall be carried out on this composite sample.

6. Water at Station Number 262-7 shall be sampled every three (3) days during periods of discharge and analyzed for the following parameters:

Total Lead	Total Zinc
pH	

7. All sampling, sampling preservation, and analysis shall be conducted in accordance with methods prescribed in the current edition of "Standard Methods for the Examination of Water and Wastewater", or by such other methods as approved by the Analyst.
8. All analysis shall be performed in a laboratory approved by the Analyst.
9. A revised quality assurance/quality control plan which addresses both field and laboratory requirements shall be submitted to the Analyst for approval by March 31, 1994.
10. The plan referred to in Part B, Item 9, shall be implemented as approved by the Analyst.

**C. Other Requirements**

1. The monthly quantity of water pumped from Frustration Lake shall be recorded in cubic metres.
2. The monthly quantity of the solid and liquid fractions of mill waste pumped to the Garrow Lake Tailings Area shall be recorded in cubic metres.
3. During periods of flow, the volume of effluent discharged at Station Number 262-7 shall be measured and recorded daily in cubic metres.
4. The monthly readings of the thermistors installed in the core of the Garrow Lake Dam shall be recorded.
5. The monthly quantity of ore milled shall be recorded in tonnes.
6. The water level in Garrow Lake shall be measured and recorded at both break-up and just prior to freeze-up.

D. Reports

The Licensee shall within sixty (60) days following the month being reported, submit to the Board all data and information required by the "Surveillance Network Program", including the results of the approved quality assurance plan.

NORTHWEST TERRITORIES WATER BOARD

Pamela R. LeMoine  
Witness

Dave Nickerson.  
Chairman

**GENERAL PROCEDURES FOR THE ADMINISTRATION OF LICENCES  
ISSUED UNDER THE NORTHWEST TERRITORIES WATERS ACT  
IN THE NORTHWEST TERRITORIES**

1. At the time of issuance, a copy of the Licence is placed on the Water Register in the Office of the Northwest Territories Water Board in Yellowknife, and is then available to the public.
2. To enforce the terms and conditions of the Licence, the Minister of Indian Affairs and Northern Development has appointed Inspectors in accordance with Section 35(1) of the Northwest Territories Waters Act. The Inspectors coordinate their activities with officials of the Water Resources Division of the Department of Indian Affairs and Northern Development. The Inspector responsible for Cominco Ltd., Polaris Operation is located in the Iqaluit District Office.
3. To keep the Water Board and members of the public informed of the Licensee's conformity to Licence conditions, the Inspectors prepare reports which detail observations on how each item in the Licence has been met. These reports are forwarded to the Licensee with a covering letter indicating what action, if any, should be taken. The inspection reports and covering letters are placed on the public Water Register, as are any responses received from the Licensee pertaining to the inspection reports. It is therefore of prime importance that you react in all areas of concern regarding all inspection reports so that these concerns may be clarified.
4. If the renewal of a Licence is contemplated it is the responsibility of the Licensee to apply to the Water Board for a new Licence. The past performance of the Licensee, new documentation and information, and points raised during a public hearing, if required, will be used to determine the terms and conditions of any new Licence. Please note that if the Licence expires and another has not been issued, then the water and waste disposal must cease, or Cominco Ltd., Polaris Operation would be in contravention of the Northwest Territories Waters Act. It is suggested that an application for renewal of an "A" type licence, such as your Licence, be made one year in advance of the existing licence expiry date and renewal of a "B" type licence be made six months in advance of the existing expiry date.
5. If, for some reason, an existing Licence requires amendment, then a public hearing may be required. You are reminded that applications for amendments should be submitted as soon as possible to provide the Water Board with ample time to go through the amendment process. Usually this should be at least six (6) months. The Surveillance Network Program annexed to the Licence, however, can be modified at the discretion of the Board and does not require a public hearing. A request for any proposed change to the Surveillance Network Program should be forwarded to the Board in writing, including a rationale for the change.

6. Specific clauses of your Licence make reference to the Board, Inspector or Analyst. The contact person, address, phone and fax number of each is:

**BOARD:** Executive Assistant  
Northwest Territories Water Board  
Box 1500  
YELLOWKNIFE, NT X1A 2R3

Phone No: (403) 920-8191  
Fax No: (403) 873-9572

**INSPECTOR:** Inspector  
Baffin District Office  
Northern Affairs Program  
Department of Indian Affairs  
and Northern Development  
Box 100  
IQALUIT, NT XOA OH0

Phone No: (819) 979-4405  
Fax No: (819) 979-6445

**ANALYST:** Analyst  
Water Laboratory  
Northern Affairs Program  
Department of Indian Affairs  
and Northern Development  
Box 1500  
4601 - 52nd Avenue  
YELLOWKNIFE, NT X1A 2R3

Phone No: (403) 920-8129  
Fax No: (403) 873-9300