APPENDIX 7

SUMMARY OF

EFFLUENT MONITORING

AND

EFFLUENT CHARACTERIZATION

teckcominco

Bruce J. Donald
Reclamation Manager

January 26, 2003

Prairie & Northern Region
Environment Canada
Room 200, 4999 98th Ave.
Edmonton, AB T6B 2X3

Attention: Peter Blackall, Regional Director of Environmental Protection

Dear Sir;

Re: Polaris Mine – 2003 4th Quarter Metal Mining Effluent Regulations Report

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 period October 1, 2003 to December 31, 2003. Only the 3rd Quarter had discharge to report. While there is no data to report other than that there was no effluent discharge, I have completed the monitoring report as required by the regulations and have attached it to this letter.

In preparation of the 4th Quarter report, a review of the information submitted with the 3rd Quarter report identified errors in Schedule 4. The despite reporting the effluent quality, the flow data was omitted. Please find attached a corrected 3rd Quarter report that includes the previously missing flow data.

If you have any questions regarding the quarterly report or aspects of the application of the MMER to the Polaris Mine, please feel free to contact me at any time.

Yours truly,

Bruce Donald

Attachments: (2) - 4th Quarter 2003 Monitoring Report & Revised 3rd Quarter 2003 Monitoring Report

cc:
Walter Kuit (Teck Cominco Limited)
Polaris Mine Site Files
Randy Baker (Azimuth Consulting Group)

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POLARIS MINE – MMER MONITORING REPORT

4th QUARTER 2003

APPENDIX A

i. Information specified by Section 8.1 of Reference Method EPS 1/Rm/13

APPENDIX B

i. Information specified by Section 8.1 of Reference Method EPS 1/Rm/14

APPENDIX C

i. Concentration & monthly mean concentrations of each deleterious substance of Schedule 4
ii. pH of the effluents samples as required by subsection 12(1)
iii. Description of sample collection method
iv. Total volume of effluent deposited during each month of the quarter as per section 19
v. Mass loading of the deleterious substances set out in Schedule 4 and as per section 20

APPENDIX D

i. Results of the effluent characterization as per paragraph 15(1)(a)

APPENDIX A

Reporting Requirements for Reference Method EPS 1/RM/13

Section 8.1.1 Effluent

i. Name & location of operation generating the effluent
   - Polaris Mine, Little Cornwallis Island, Nunavut
   - Final Discharge Point for Garrow Lake is geo referenced as 75° 22' 32" N, 97° 48' 37" W.

ii. Date & time of sampling
   - No sampling conducted as there was no effluent discharge during the quarter.

iii. Type of sample
   - No sampling conducted as there was no effluent discharge during the quarter

iv. Brief description of sampling point
   - Discharge point of siphon at Garrow Lake dam

v. Sampling method
   - No sampling conducted as there was no effluent discharge during the quarter

vi. Name of person submitting samples
   - No sampling conducted as there was no effluent discharge during the quarter

Section 8.1.2 Test Facilities and Conditions

i. Test type & method
   - No testing conducted as there was no effluent discharge during the quarter

ii. Indications of deviations from requirements in Sections 2 to 7 of Method EPS 1/RM/13
   - No deviations to report as there was no testing conducted during the quarter

iii. Name and city of testing laboratory
   - No laboratory used during the quarter

iv. Percent mortality of fish in stock tank(s)
   - None to report. There were no tests conducted during the period

v. Species of test organism
   - None to report as there were no tests conducted during the period

vi. Date and time for start of definitive test
   - None to report as there were no tests conducted during the period

vii. Person(s) performing the test and verifying the results
   - No tests performed during the quarter

viii. pH, temperature, dissolved oxygen, and conductivity of unadjusted, undiluted effluent
   - No data to report as there were no tests conducted during the period

ix. Confirmation that no adjustment of sample or solution pH occurred
   - No adjustment to report as there were no tests conducted during the period

x. Indication of aeration of test solutions before introduction of fish
   - None to report as there were no tests conducted during the period

xi. Concentrations and volumes tested
   - No data to report as there were no tests conducted during the period

xii. Measurements of dissolved oxygen, pH and temperature
   - No data to report as there were no tests conducted during the period

xiii. Number of fish added to each test vessel
   - No fish added as there were no tests conducted during the period

xiv. Mean and range of fork length of control fish at end of test
   - No data to report as there were no tests conducted during the period

xv. Mean wet weight of individual control fish at end of the test
   - No data to report as there were no tests conducted during the period

xvi. Estimated loading density of fish in test solutions
   - No data to report as there were no tests conducted during the period

Reporting Requirements for Reference Method EPS 1/RM/13 - Continued

Section 8.1.3 Results

i. Number of mortalities of fish in each test solution
   - None to report. No tests conducted during the period

ii. Number of control fish showing atypical/stressed behaviour
   - None to report. No tests conducted.

iii. Mean mortality rate in solutions of effluent and control water
   - None to report. No tests conducted

iv. Estimate of 96-h LC50 in multi-concentration tests
   - No data to report. No tests conducted

v. Most recent 96-h LC50 for reference toxicity test(s)
   - No data to report. No tests conducted

APPENDIX B

Reporting Requirements for Reference Method EPS 1/RM/14

Section 8.1.1 Effluent

i. Name & location of operation generating the effluent
   - Polaris Mine, Little Cornwallis Island, Nunavut
   - Final Discharge Point for Garrow Lake is geo referenced as 75° 22' 32" N, 97° 48' 37" W.

ii. Date & time of sampling
   - No sampling conducted as there was no effluent discharge during the quarter.

iii. Type of sample
   - No sampling conducted as there was no effluent discharge during the quarter

iv. Brief description of sampling point
   - Discharge point of siphon at Garrow Lake dam

v. Sampling method
   - No sampling conducted as there was no effluent discharge during the quarter

vi. Name of person submitting samples
   - No sampling conducted as there was no effluent discharge during the quarter

Section 8.1.2 Test Facilities and Conditions

i. Test type & method
   - No testing conducted as there was no effluent discharge during the quarter

ii. Indications of deviations from requirements in Sections 2 to 7 of Method EPS 1/RM/13
   - No deviations to report as there was no testing conducted during the quarter

iii. Name and city of testing laboratory
   - No laboratory used during the quarter

iv. Species of test organism
   - None to report as there were no tests conducted during the period

v. Date and time for start of definitive test
   - None to report as there were no tests conducted during the period

vi. Person(s) performing the test and verifying the results
   - No tests performed during the quarter

vii. pH, temperature, dissolved oxygen, and conductivity of unadjusted, undiluted effluent
   - No data to report as there were no tests conducted during the period

viii. Confirmation that no adjustment of sample or solution pH occurred
   - No adjustment to report as there were no tests conducted during the period

ix. Indication of any adjustment of hardness of effluent sample
   - No adjustment to report as there were no tests conducted during the period

x. Indication of any aeration of sample
   - No indication to report as there were no tests conducted during the period

xi. Concentrations and volumes tested
   - No data to report as there were no tests conducted during the period

xii. Measurements of dissolved oxygen, pH and temperature
   - No data to report as there were no tests conducted during the period

xiii. Estimates of time to first brood, average number of neonates per brood, and percent mortality during the seven-day period prior to the test
   - No data to report as there were no tests conducted during the period

xiv. Number of neonates per test vessel and milliliters of solution per daphnid
   - No data to report as there were no tests conducted during the period

Reporting Requirements for Reference Method EPS 1/RM/14 - Continued

Section 8.1.3 Results

i. Number of dead and/or immobile daphnids in each test solution including controls
   - No data to report. No tests conducted during the period.

ii. For single-concentration test the number of daphnids dead in each of three replicate effluent solutions and in each of three replicate control solutions at end of test. Also report the mean value.
   - No data to report. No tests conducted during the period.

iii. Estimate of 48-h LC50 and 95% confidence limits in multi-concentration tests, 48-h EC50 for immobilization and 95% confidence limits, indication of statistical method on which results are based.
   - No data to report. No tests conducted during the period

iv. Most recent 48-h LC50 for reference toxicant test(s), reference chemical(s), date test initiated, historic geometric mean LC50 and warning limits.
   - No data to report. No tests conducted during the period.

APPENDIX C

2003 4th QUARTER MMER REPORT

LOCATION - FINAL DISCHARGE POINT FROM GARROW LAKE (GARROW LAKE DAM SIPHONS)

CONCENTRATIONS OF EFFLUENT FOR MMER SCHEDULE 4 SAMPLED WEEKLY

Sample Taken During The Week of	Date Sample Taken	DELETERIOUS SUBSTANCE (mg/L)[1]								pH[1]	Collection Method
		Arsenic	Copper	Cyanide	Lead	Nickel	Zinc	TSS	Radium 226[1]		
06-Oct-03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]
13-Oct-03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]
20-Oct-03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]
27-Oct-03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]
03-Nov-03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]
10-Nov-03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]
17-Nov-03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]
24-Nov-03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]
01-Dec-03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]
08-Dec-03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]
15-Dec-03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]
22-Dec-03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]
29-Dec-03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]

Note[1] - All concentrations are in mg/L except Radium 226 which is Bq/L and pH which is in pH units

Note[2] - "na" refers to no effluent discharge to sample

MONTHLY MEAN CONCENTRATIONS OF EFFLUENT FOR MMER SCHEDULE 4

MONTH OF	MONTHLY MEAN CONCENTRATION[1] OF DELETERIOUS SUBSTANCE[3]							
	Arsenic	Copper	Cyanide	Lead	Nickel	Zinc	TSS	Radium 226
July/03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]
August/03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]
September/03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]

Note[1] - All concentrations are in mg/L except Radium 226 which is Bq/L

Note[2] - "na" refers to no effluent discharge to sample

Note[3] - Monthly Mean Concentrations - the MEAN value of the concentrations measured in all water samples collected during each month when a deleterious substance is deposited.

MASS LOADING OF DELETERIOUS SUBSTANCE FOR EACH DAY SAMPLED

Sample Taken During The Week of	Date Sample Taken	DAILY MASS LOADING OF DELETERIOUS SUBSTANCE (kg/day)[1]								Average Daily Flow Rate (m^3/day)
		Arsenic	Copper	Cyanide	Lead	Nickel	Zinc	TSS	Radium 226[1]	
06-Oct-03	na[2]	0	0	0	0	0	0	0	0	0
13-Oct-03	na[2]	0	0	0	0	0	0	0	0	0
20-Oct-03	na[2]	0	0	0	0	0	0	0	0	0
27-Oct-03	na[2]	0	0	0	0	0	0	0	0	0
03-Nov-03	na[2]	0	0	0	0	0	0	0	0	0
10-Nov-03	na[2]	0	0	0	0	0	0	0	0	0
17-Nov-03	na[2]	0	0	0	0	0	0	0	0	0
24-Nov-03	na[2]	0	0	0	0	0	0	0	0	0
01-Dec-03	na[2]	0	0	0	0	0	0	0	0	0
08-Dec-03	na[2]	0	0	0	0	0	0	0	0	0
15-Dec-03	na[2]	0	0	0	0	0	0	0	0	0
22-Dec-03	na[2]	0	0	0	0	0	0	0	0	0
29-Dec-03	na[2]	0	0	0	0	0	0	0	0	0

Note[1] - Mass Loading is in kilograms per day of the deleterious substance deposited except Radium 226 which is in Bq per day

Note[2] - "na" refers to no effluent discharge to sample

MASS LOADING PER CALENDAR MONTH FOR EACH DELETERIOUS SUBSTANCE

CALENDAR MONTH OF	MASS LOADING[1] FOR DELETERIOUS SUBSTANCE (kg/month)[2]								Average Weekly Flow Rate[3] (m^3/week)	Total Monthly Volume[4] (m^3/month)
	Arsenic	Copper	Cyanide	Lead	Nickel	Zinc	TSS	Radium 226[2]		
October/03	0	0	0	0	0	0	0	0	0	0
November/03	0	0	0	0	0	0	0	0	0	0
December/03	0	0	0	0	0	0	0	0	0	0

Note[1] - Total Mass Loading for Calendar month calculated by multiplying the Average Daily Mass Loading for the Month x # days in the month

Note[2] - Mass loading units are in kg per month except Radium 226, which is in Bq permonth

Note[3] - Average Weekly Flow Rate calculated by multiplying Average Daily Flow Rate x 7 days per week

Note[4] - Total Monthly Volume calculated by multiplying Average Daily Flow Rate for the month x days in month

APPENDIX D

RESULTS OF EFFLUENT CHARACTERIZATION

AS PER PARAGRAPH 15(1)(a)

No effluent samples were collected during the 4th Quarter of 2003 as there was no effluent discharge.
No Acute Lethality Testing conducted during the quarter as there was no effluent being discharged.

POLARIS MINE – MMER MONITORING REPORT

REVISED 3rd QUARTER 2003

APPENDIX A

i. Information specified by Section 8.1 of Reference Method EPS 1/Rm/13: 96 hr acute rainbow trout test

APPENDIX B

i. Information specified by Section 8.1 of Reference Method EPS 1/Rm/14: 72 hr acute *Daphnia magna* test

APPENDIX C

i. Information specified in Schedule 5 of the MMER (June 2002) for Reference Method EPAW 95-EPA West Coast: 7-day Topsmelt Survival and Growth Test.

APPENDIX D

i. Information specified in Schedule 5 of the MMER (June 2002) for Reference Method EPS 1/Rm/27-EC: 92 hr Echinoderm (sand dollar) Fertilization Test (Annual)

APPENDIX E

i. Information specified in Schedule 5 of the MMER (June 2002) for Reference Method EPA/600/4-91-003, Method 1009.0: Algae (*Champia parvula*) 7-day Sublethal Growth Test (Annual).

APPENDIX F (Mass Loadings)

i. Concentration & monthly mean concentrations of each deleterious substance of Schedule 4
ii. pH of the effluents samples as required by subsection 12(1)
iii. Description of sample collection method
iv. Total volume of effluent deposited during each month of the quarter as per section 19
v. Mass loading of the deleterious substances set out in Schedule 4 and as per section 20

APPENDIX G

i. Results of the effluent characterization as per paragraph 15(1)(a)

APPENDIX A

96-h Acute Rainbow Trout Toxicity Test

Reporting Requirements for Reference Method EPS 1/RM/13

Section 8.1.1 Effluent

i. Name & location of operation generating the effluent
   - Polaris Mine, Little Cornwallis Island, Nunavut
   - Final Discharge Point for Garrow Lake is geo referenced as 75° 22' 32" N, 97° 48' 37" W.

ii. Date & time of sampling
   - Samples for monthly acute toxicity testing were collected
   - Test 1: Wednesday July 30, 2003 - 1:00 PM
   - Test 2: Wednesday August 20, 2003 - 12:30 AM
   - Test 3: Tuesday September 16, 2003 - 5:00 PM

iii. Type of sample
   - Final effluent water

iv. Brief description of sampling point
   - 20m downstream of the siphon discharge point at Garrow Lake dam

v. Sampling method
   - Water was collected from at least 15cm below the surface using a water pump with silicon tubing
   - Water was collected from the upstream direction
   - The pump was flushed with site water for at least one minute prior to sample collection
   - 2 x 20L sample bottles were filled

vi. Name of person submitting samples
   - Dennis Lu (Gartner Lee)

Section 8.1.2 Test Facilities and Conditions

i. Test type & method
   - 96-hour Rainbow Trout LC_{50}

ii. Indications of deviations from requirements in Sections 2 to 7 of Method EPS 1/RM/13
   - No deviations from requirements
   - Salinity controls were run
   - Sample water salinity was 2ppt (Test 1); 4ppt (Test 2), and 6ppt (Test 3)

iii. Name and city of testing laboratory
   - EVS Environment Consultants, North Vancouver, BC

iv. Percent mortality of fish in stock tank(s)
   - Test 1: 0.1%
   - Test 2: 0.1%
   - Test 3: 1%

v. Species of test organism
   - Rainbow Trout (*Oncorhynchus mykiss*)

vi. Date and time for start of definitive test
   - Test 1: Saturday August 2, 2003 - 2:00 PM
   - Test 2: Friday August 22, 2003 - 12:30 PM
   - Test 3: Friday September 19, 2003 - 5:00 PM

vii. Person(s) performing the test and verifying the results
   - Andy Diewald, Devika Jayaweera, May Lee

viii. pH, temperature, dissolved oxygen, and conductivity of unadjusted, undiluted effluent
   - Test 1: pH - 7.8, T - 15.0°C, DO - 10.0mg/L, C - 4100µmhos/cm
   - Test 2: pH - 7.8, T - 15.0°C, DO - 10.1mg/L, C - 6000µmhos/cm
   - Test 3: pH - 8.1, T - 16.0°C, DO - 10.0mg/L, C - 8000µmhos/cm

Reporting Requirements for Reference Method EPS 1/RM/13

ix. Confirmation that no adjustment of sample or solution pH occurred
- Test 1: No pH adjustment
- Test 2: No pH adjustment
- Test 3: No pH adjustment

x. Indication of aeration of test solutions before introduction of fish
- Test 1: 6.5 ± 1 mL/min/L for 60mins
- Test 2: 6.5 ± 1 mL/min/L for 90mins
- Test 3: 6.5 ± 1 mL/min/L for 120mins

xi. Concentrations and volumes tested
- Concentrations (% effluent volume / total volume) tested and total volumes used were:
- Control (0%) - 12 L (test 1&2), 15 L (test 3)
- 6.25% - 12 L (test 1&2), 15 L (test 3)
- 12.5% - 12 L (test 1&2), 15 L (test 3)
- 25% - 12 L (test 1&2), 15 L (test 3)
- 50% - 12 L (test 1&2), 15 L (test 3)
- 100% - 12 L (test 1&2), 15 L (test 3)
- Salinity Control - 12 L (test 1&2), 15 L (test 3)

xii. Measurements of dissolved oxygen, pH and temperature
- Test 1: DO: 8.2 - 10.1 mg/L, pH: 7.0 - 7.8, T: 15.0 °C
- Test 2: DO: 8.2 - 10.1 mg/L, pH: 7.1 - 7.8, T: 15.0 °C
- Test 3: DO: 8.2 - 10.0 mg/L, pH: 6.6 - 8.1, T: 15.0 - 16.0 °C

xiii. Number of fish added to each test vessel
- 10 fish/ vessel

xiv. Mean and range of fork length of control fish at end of test
- Test 1: 42mm (40-44)
- Test 2: 38mm (35-42)
- Test 3: 36mm (32-40)

xv. Mean wet weight of individual control fish at end of the test
- Test 1: 0.57g (0.43-0.68)
- Test 2: 0.59g (0.43-0.72)
- Test 3: 0.50g (0.35-0.61)

xvi. Estimated loading density of fish in test solutions
- Test 1: 0.48g/L
- Test 2: 0.49g/L
- Test 3: 0.33g/L

Section 8.1.3 Results

i. Number of mortalities of fish in each test solution
- Results were the same for Test 1, Test 2, and Test 3, except where noted
- Control (0%) - 0
- 6.25% - 0
- 12.5% - 0
- 25% - 0
- 50% - 0 (test 1&2), 1 (test 3)
- 100% - 0
- Salinity Control - 0

Reporting Requirements for Reference Method EPS 1/RM/13

ii. Number of control fish showing atypical/stressed behaviour
- None in Test 1, Test 2, or Test 3

iii. Mean mortality rate in solutions of effluent and control water
- Results were the same for Test 1, Test 2, and Test 3, except where noted
- Control (0%) - 0%
- 6.25% - 0%
- 12.5% - 0%
- 25% - 0%
- 50% - 0% (test 1&2), 10% (test 3)
- 100% - 0%
- Salinity Control - 0%

iv. Estimate of 96-h LC50 in multi-concentration tests
- Results were the same for Test 1, Test 2, and Test 3
- 96hr LC_{50} concentration > 100% effluent

v. Most recent 96-h LC50 for reference toxicity test(s)
- Reference toxicity tests for Toxicant: SDS
- Test 1: (Jul-10-03) 96-h LC_{50} = 36mg/L SDS, 95% CL = 30-42mg/L
- Test 2: (Aug-5-03) 96-h LC_{50} = 24mg/L SDS, 95% CL = 18-32mg/L
- Test 3: (Sep-3-03) 96-h LC_{50} = 24mg/L SDS, 95% CL = 22-26mg/L

APPENDIX B

72-h Acute *Daphnia magna* Toxicity Test