

## **APPENDIX 1**

### **EXECUTIVE SUMMARY IN INUKTITUT**



## ᐱᓯᓕᓯᓯ ᐅᓂᓴᓯᐅᓴᓄᐅ

ᐃᓯᓯᓕᓴᓴ ᓴᓴᐃᐃᓂᓴᓂᓴᓯᓂᐃ ᐅᓯᓯᓯᓂᐃ ᐱᓕᓂᐃ

ᐃᓴᓴᓯᓯᓯᓂᐃ ᐅᓂᓴᓂ - ᐱᓴᓴᓴᓴᓴᓴᓴ 2003ᓯ

ᐅᓂᓴᓴᓴᓴᓴᓴᓴ ᓂᓂᓂᓂᓴᓴ

ᓴᓴᓂᓴᓴ ᐃᓴᓴᓴᓴᓴᓴᓴ ᓴᓯᓴᓴᓴᓴᓴᓴᓴ

ᐃᓴᓂ ᐅᓴᓴᓴᓴ

ᐃᓴᓴᓴᓴᓴᓴᓴᓴᓴ ᓴᓴᓴᓴᓴ

6.3.11.  $\Delta \Gamma C \triangleright \sigma^{\alpha} \Gamma^C$   $\rho \delta \omega^{\epsilon} \zeta \bar{\zeta}^{\epsilon} / \wedge \Delta \omega \triangleright \alpha \Gamma^C$   $\Delta \Gamma C^b \triangleright \bar{\zeta}^{\epsilon}$

7. ሼጃፎራሜራሊኝሪ ልጋቢራፕ ሼጃፎራሜሪጃፎ ስባባፎሪሚኑሪ
8. ለራራሚኑፎ ሼጃፎራ ፋጋራፋሪሪፎሪ ሼጃፎራሜራሊኝሪ
  - 8.1. ሼጃፎራሜራሊኝሪ ሼጃፋፋሪሪፎሪፎጋፎ ስፋሪሪፎጋፎ ልጋቢራፎጋፎ ሼጃፎራሜሪጃፎ ስፋሪሪፎጋፎ ፋሪኑሪ
  - 8.2. ሼጃፋፋሪሪፎሪ ሪፎፋሪሪፋፋ ፋሪፋሪፋፋሪሪፆፆ
9. ልጋፎፆፆ ጋሃፆፆሪሚኑሪ/ልፋሪፋሪሚኑሪ
10. ፎፋሪፋሪሪፋፋ ሼጃፆፆሪሪሪሪ ሊፋሪፆ ለራራፋሚፋሪሪሪፋፋ ሼፋሪሪባፆፆ/ፋሪፋሪፋሪፆፆ ስፆፆ
11. ልሊፆፆ ፋጋፆፆ
12. ስፋሪሪሪፆ ሼፋሪሪፆ ርልፆፆፆ
  - 12.1. ፋሪፋሪፆ ልጋቢሪሪሪፆ ሊፋፆፆ ፋሊፆ ሪሪባሪሪፆ ፆፆፆ
    - 12.1.1. ፋሪፋሪፆ ልጋቢሪሪሪፆ ሊፋፆፆ ፋሪፋጋፆ ሪፆፆፆ ልጋቢሪሪሪፆፆፆ
    - 12.1.2. ፋሪፋሪፆ ልጋቢሪሪሪፆ ሊፋፆፆ ልራፋሪፆፆፆ ስባባፆሪሚኑሪ
    - 12.1.3. ፋሪፋሪፆ ሃፋሪፆፆ/ሪሪፋፆፆፆ ጋፋፆ ሪሪሪሪፆ ፆፆፆ ፋሪፆፆሚኑሪ ስፋሪፆፆፆፆፆፆፆፆ
  - 12.2. ስፆፆፆ ሼፋሪሪሪባኑሪ
    - 12.2.1. ሪፋፆ ርሪፆፆ ፆፆ ሪፆፆ
    - 12.2.2. ፋጋፆፆፆ ፋሪፆፆፆ
    - 12.2.3. ልፋሪፆፆሪሪሪፆፆ ፋሪፋጋፆ ሪፆፆፆ
  - 12.3. ስፋሪሚ ሼጃፆሜሚ ሼፋሪሪፆፆፆ
    - 12.3.1. ስፋሪሚ ሼጃፆሜሚ ሼፋሪሪፆፆፆ ልፆፆፆ ፆፆ ሪፆፆ
    - 12.3.2. ስፋሪሚ ሼጃፆሜሚ ሼፋሪሪፆፆፆ ፋጋፆፆፆ ፋሪፆፆ ሼፋሪሚ
    - 12.3.3. ስፋሪሚ ሼጃፆሜሚ ሪፆፆፆ ሼጃፆሜሚ ስባባፆፆፆ
  - 12.4. ልባሚ ሼፋሪሪፆፆፆ ልፆፆፆ ልሚ
  - 12.5. ባሪፆራፆሚ ሼፋሪሪፆፆፆ
    - 12.5.1. ሪፋፆ ርሪፆፆ ባሪፆራፆሚ ሼፋሪሪፆፆፆፆፆፆ
    - 12.5.2. ጋሪፆፆ ፋሊፆ ሪሚ ሪፆፆ ባሪፆራፆሚ ሼፋሪሪፆፆፆ
13. ሪፋፆ ርሪፆፆ ፆፆ ሪራሚኑሪ ሼፋሪሪፆፆፆ
14. ፎፋሪፋሪሪፋፋ ፆፆራፆፆ ሼፋሪሪፆፆፆ ፆፆራፆፆ ሼጃፆሜራራፆራሚኑሪ ሼፋሪሪፆፆፆ
15. ፎፋሪፋሪሪፋፋ ሼፋሪሪፆፆፆ ፋሪባሚ ሼፋሪሪፆፆፆ ሼጃፆሜራሊኝሪ
16. ፎፋሪፋሪሪፋፋ ሪፋፆ ርሪሚ ልሊፆፆራራፆፆ ሼፋሪሚፆፆፆ ሼጃፆሚኑሪ ሼጃፆሜራሊኝሪ

ΔΕΛΤΑ

- [illegible]

### 6.1.7. ᐱᕈᖅ ᐃᓪᐃᕐ/ᑭᕈᖅᐸᕐ

- ## 6.2. $\mathcal{M}_{\text{CNS}} \rightarrow \mathcal{M}_{\text{CNS}}^{\text{CNS}}$

[illegible]

- ### 6.2.2. ስጋ ርዕሰ ልሳናት ስጋ

- 6.2.3.  $L_a \triangleleft^c C \triangleleft^c \triangleleft^b C^c \triangleleft^b C^c \triangleleft^b$

- [illegible]

[illegible][illegible]

- ወደፊት ጥያቄውን በሚመለከተው አገልግሎት ላይ ማስተካከል

[illegible]

### 6.3.1. ᐃᓚᑦᑕᑦᐱᑦ ᑭᑭᓴᓴ

- [illegible]

- ለኃይለማርያም ሥልጣን ማረጋገጥ ለሚያስፈልጉት ሁሉም ጥረትና ጥረት ይደረጋል፡፡

- [illegible]

- ለትርጉሙ ርዕሰ ለትረገረመኒኒ ልኒኔ 90ኃደርኛኔ ርዕሰ ስሙፊለኒኒ.

- የኃይለገሰ ሕገመንግሥት አሰራር ለጥቅም ላይ የዋለው ልዩነት ምንጭ ሊሆን ይችላል፡፡

- ሥርዓተ ልማት የጥራት ማረጋገጫ ስርዓት ለማረጋገጥ የሚያስፈልጉትን ሰነዶች ለማረጋገጥ ማስገባት ይገባል፡፡

- $(\Delta L \Delta_c (P(\Delta_e \rho^b))^c \quad \text{ክልል ካንቨርጽ} \quad \text{ክልል ካንቨርጽ} \quad \text{ወደወረደር})^c$   
ካንቨርጽ  $\Delta_e \rho^b$  ስንት ሆኖ ምልክት ይደርስ  $(\Delta b \sigma)^c$  ካንቨርጽ ርዕሰ ምልክት.

[illegible]

- ኢትዮጵያውያን ስለሚገኙት ጉዳዮች ለሌሎች ማብራሪያና ለማሳሰቢያ ምክር ቤቱ ይረዳል።

- ለኮንፕረሽን ልገልግሎት ስለሚሰጡ ሰራተኞች ምርመራዎች<sup>፮</sup> ቀን 2002 ልዩነት ሲታይ ለኮንፕረሽን<sup>፯</sup> ቀን 12 ብቻ.

- $\neg L(\neg \sigma^a)$  (ဇေယျာ အမှန်ဟုယူဆ)

[illegible][illegible]

ΔΕΛΦΙΝΙΟ Π ΠΟΛΥΤΕΧΝΕΙΟΝ ΉΜΕΔΕΥΟΜΕΝΟΝ ΔΥΝΑΜΕΩΣ ΔΥΝΑΜΕΩΣ ΔΥΝΑΜΕΩΣ

[illegible][illegible][illegible]



12.1.3 ላይኛው የፍትሕ ምክር ቤት/የፍትሕ ምክር ቤት ማህተም ለፍትሕ ምክር ቤት ማህተም ለፍትሕ ምክር ቤት ማህተም

[illegible]

## 12.2. ጋራ ምክር ቤቱ ማረጋገጫ

### 12.2.1. ԻՎՊ՝ ԵԻԾ՝ ԳԽԼԸ ԴԴԽԼ

ᐅᓇᓂᓴᑕ ᐅᓴᑕᑕᐅᓂᓴᑦ ᐃᑦᑕᐃᑦ ᑕᑦᐅᑦ ᑦᑕᓴᓂ ᐅᓂᑲᐅᑦᐅᑦ ᐃᑕᑦᐅᑕ ᓴ ᑦᑕᑦ.

### 12.2.2. $\triangleleft \mathcal{D}^c \triangleright \triangleleft^b \mathcal{C}^c \wedge^b$

▷<sub>q</sub>σ<sup>a</sup>LC ▷<sub>b</sub>c-L(▷σ<sup>a</sup>Γ<sup>c</sup> ◁<sup>c</sup>)C▷<sup>a</sup><sub>b</sub> ◁<sup>b</sup>C<sup>a</sup>Γ ▷σb▷<sub>d</sub>▷<sup>c</sup> ◁<sub>c</sub>Γ◁<sub>d</sub>▷ ▷ Γ<sup>c</sup>.

### 12.2.3. Δ<sub>3</sub>-Δ<sub>2</sub><sup>a</sup>JPL<sup>b</sup> Δ<sub>2</sub><<sub>2</sub><sup>c</sup> ρΓd<sub>2</sub><sup>d</sup>

ᐅᓇᓂᖃ ᕿᐅᑦᔭᑦᑎᖅᑦ ᐱᕈᑦᑎᖅᑦ ᑲᑦᑎᓂ ᑕᐱᐱ ᐱᑦᑕᐅᑦᔭᖅ ᐱᑦᑕᐅᑦᔭᖅ  
ᐱᑦᑕᐅᑦᑕ 2004ᖅᑕᖅ.

### 12.3 ᐅᓗᑦᕐᕐᕐ ᑦᓄᐃᑦᕐᕐᕐᕐ ᑦᓄᐅᓗᑦᕐᕐᕐᕐ

### 12.3.1. ၎်ဃုၼ် ၵ်းမၤတၢ်တၢ်တၢ် ၵ်းတၢ်တၢ်တၢ် ၵ်းတၢ်တၢ်တၢ် ၵ်းတၢ်တၢ်တၢ် ၵ်းတၢ်တၢ်တၢ်

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### 12.3.3. ၎်ဃ်ဃ် ၎်မၤအၤဃ်ဃ် ၎်မၤအၤဃ်ဃ်

[illegible]

#### 12.4. ልቦቻዊና የኔፕላይዝርታዊ ጥራት ልዩነት

[illegible][illegible][illegible]



## **APPENDIX 2**

### **SURFACE MELT WATER**

#### **SAMPLE ANALYSIS**

**POLARIS MINE**

**MELT WATER SAMPLE ANALYSIS RESULTS**

**JULY 2, 2003**

Project	Polaris 23-305 Soil/Water Analysis
Report to	Gartner Lee Ltd.
ALS File No.	T1168
Date Received	05-07-03
Date:	14-07-03

# RESULTS OF ANALYSIS

Sample ID	U/G	Water #1	Melt	Water #2
Date Sampled	02-07-03		02-07-03	
Time Sampled				
ALS Sample ID	9		10	
Nature	Water		Water	

## Physical Tests

Hardness	CaCO3	459	289
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## Total Metals

Aluminum	T-Al	<0.02	0.01
Antimony	T-Sb	<0.001	<0.0005
Arsenic	T-As	<0.002	<0.001
Barium	T-Ba	0.04	0.03
Beryllium	T-Be	<0.005	<0.005
Boron	T-B	0.3	0.3
Cadmium	T-Cd	0.0007	0.00033
Calcium	T-Ca	151	86.6
Chromium	T-Cr	<0.001	<0.0005
Cobalt	T-Co	0.003	0.0009
Copper	T-Cu	0.007	0.014
Iron	T-Fe	<0.03	<0.03
Lead	T-Pb	0.044	0.027
Lithium	T-Li	<0.05	<0.05
Magnesium	T-Mg	20	17.8
Manganese	T-Mn	0.11	0.02
Mercury	T-Hg	<0.0002	<0.0002
Molybdenum	T-Mo	0.003	0.003
Nickel	T-Ni	0.01	0.005
Selenium	T-Se	<0.004	<0.002
Silver	T-Ag	<0.0001	<0.00005
Sodium	T-Na	36	31
Thallium	T-Tl	<0.0004	0.0003
Titanium	T-Ti	<0.05	<0.05
Uranium	T-U	0.0014	0.0013
Vanadium	T-V	<0.03	<0.03
Zinc	T-Zn	1.65	1.07

## Inorganic Parameters

Sulphide	S	<0.02	<0.02
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## Extractable Hydrocarbons

EPH10-19	8.4	0.8
EPH19-32	<1	

## **APPENDIX 3**

# **ANALYSIS OF FREEZE PIPE GLYCOL AND SOIL SAMPLES FOR GLYCOL CONTAMINATION**

## **POLARIS MINE - ANALYSIS OF DOCK FREEZE PIPE COOLANT**

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**Project** Polaris Soil/Product Analysis  
**Report to** Gartner Lee Ltd.  
**ALS File No.** S8818  
**Date Received** 02/06/2003  
**Date:** 10/06/2003

### **RESULTS OF ANALYSIS**

**Sample ID** DOCK-1- 270503  
**Date Sampled** 27/05/2003  
**Time Sampled**  
**ALS Sample ID** 13  
**Nature** Product

#### **Physical Tests**

Moisture % -

#### **Glycols**

Diethylene Glycol Found  
Ethylene Glycol Found  
1,2-Propylene Glycol Not Found

#### **Polycyclic Aromatic Hydrocarbons**

Acenaphthene -  
Acenaphthylene -  
Anthracene -  
Benz(a)anthracene -  
Benzo(a)pyrene -  
Benzo(b)fluoranthene -  
Benzo(g,h,i)perylene -  
Benzo(k)fluoranthene -  
Chrysene -  
Dibenz(a,h)anthracene -  
Fluoranthene -  
Fluorene -  
Indeno(1,2,3-c,d)pyrene -  
Naphthalene -  
Phenanthrene -  
Pyrene -

#### **Extractable Hydrocarbons**

EPH10-19 -  
EPH19-32 -  
LEPH -  
HEPH -

#### **Footnotes:**



## POLARIS MINE - ANALYSIS OF DOCK FREEZE PIPE COOLANT

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**Project** Polaris Soil/Product Analysis  
**Report to** Gartner Lee Ltd.  
**ALS File No.** S8818  
**Date Received** 02/06/2003  
**Date:** 10/06/2003

### DETECTION LIMITS

**Sample ID** DOCK-1- 270503  
**Date Sampled** 27/05/2003  
**Time Sampled**  
**ALS Sample ID** 13  
**Nature** Product

### Physical Tests

Moisture % -

### Glycols

Diethylene Glycol 5  
Ethylene Glycol 5  
1,2-Propylene Glycol 5

### Polycyclic Aromatic Hydrocarbons

Acenaphthene -  
Acenaphthylene -  
Anthracene -  
Benz(a)anthracene -  
Benzo(a)pyrene -  
Benzo(b)fluoranthene -  
Benzo(g,h,i)perylene -  
Benzo(k)fluoranthene -  
Chrysene -  
Dibenz(a,h)anthracene -  
Fluoranthene -  
Fluorene -  
Indeno(1,2,3-c,d)pyrene -  
Naphthalene -  
Phenanthrene -  
Pyrene -

### Extractable Hydrocarbons

EPH10-19 -  
EPH19-32 -  
LEPH -  
HEPH -

## **POLARIS MINE - DOCK SOIL SAMPLES TESTED FOR GLYCOL CONTAMINATION**

**Project** Polaris Soil Analysis 23-305  
**Report to** Gartner Lee Ltd.  
**ALS File No.** S8646  
**Date Received** 28/05/2003  
**Date:** 05/06/2003

### **RESULTS OF ANALYSIS**

Sample ID	Dock-62-I	Dock-63-I	Dock-66-I	Dock-67-I	Dock-72-I	Dock-73-I	Dock-74-I
Date Sampled	23/05/2003	23/05/2003	23/05/2003	23/05/2003	23/05/2003	23/05/2003	23/05/2003
Time Sampled							
ALS Sample ID	1	2	3	4	5	6	7
Nature	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil

#### **Physical Tests**

Moisture %	5.6	5	4.6	4.9	6.6	6.6	4.9
pH	-	7.54	7.96	-	-	-	7.29

#### **Total Metals**

Antimony T-Sb	-	-	<20	-	-	-	-
Arsenic T-As	-	-	<10	-	-	-	-
Barium T-Ba	-	-	325	-	-	-	-
Beryllium T-Be	-	-	<1	-	-	-	-
Cadmium T-Cd	-	-	20	-	-	-	-
Chromium T-Cr	-	-	8	-	-	-	-
Cobalt T-Co	-	-	<4	-	-	-	-
Copper T-Cu	-	-	22	-	-	-	-
Lead T-Pb	-	11200	4510	-	-	-	8570
Mercury T-Hg	-	-	0.08	-	-	-	-
Molybdenum T-Mo	-	-	<8	-	-	-	-
Nickel T-Ni	-	-	16	-	-	-	-
Selenium T-Se	-	-	<4	-	-	-	-
Silver T-Ag	-	-	<4	-	-	-	-
Tin T-Sn	-	-	<10	-	-	-	-
Vanadium T-V	-	-	47	-	-	-	-
Zinc T-Zn	-	18700	8620	-	-	-	23900

#### **Glycols**

Diethylene Glycol	<10	<10	<10	<10	<10	<10	<10
Ethylene Glycol	<10	<10	<10	<10	<10	<10	<10
1,2-Propylene Glycol	<10	<10	<10	<10	<10	<10	<10

#### **Footnotes:**

Results are expressed as milligrams per dry kilogram except where noted.  
 < = Less than the detection limit indicated.

## **POLARIS MINE - DOCK SOIL SAMPLES TESTED FOR GLYCOL CONTAMINATION**

**Project** Polaris Soil Analysis 23-305  
**Report to** Gartner Lee Ltd.  
**ALS File No.** S8646  
**Date Received** 28/05/2003  
**Date:** 05/06/2003

### **DETECTION LIMITS**

<b>Sample ID</b>	Dock-62-I	Dock-63-I	Dock-66-I	Dock-67-I	Dock-72-I	Dock-73-I	Dock-74-I
<b>Date Sampled</b>	23/05/2003	23/05/2003	23/05/2003	23/05/2003	23/05/2003	23/05/2003	23/05/2003
<b>Time Sampled</b>							
<b>ALS Sample ID</b>	1	2	3	4	5	6	7
<b>Nature</b>	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil

### **Physical Tests**

Moisture %	0.1	0.1	0.1	0.1	0.1	0.1	0.1
pH	-	0.01	0.01	-	-	-	0.01

### **Total Metals**

Antimony T-Sb	-	-	20	-	-	-	-
Arsenic T-As	-	-	10	-	-	-	-
Barium T-Ba	-	-	2	-	-	-	-
Beryllium T-Be	-	-	1	-	-	-	-
Cadmium T-Cd	-	-	1	-	-	-	-
Chromium T-Cr	-	-	4	-	-	-	-
Cobalt T-Co	-	-	4	-	-	-	-
Copper T-Cu	-	-	2	-	-	-	-
Lead T-Pb	-	100	100	-	-	-	50
Mercury T-Hg	-	-	0.05	-	-	-	-
Molybdenum T-Mo	-	-	8	-	-	-	-
Nickel T-Ni	-	-	10	-	-	-	-
Selenium T-Se	-	-	4	-	-	-	-
Silver T-Ag	-	-	4	-	-	-	-
Tin T-Sn	-	-	10	-	-	-	-
Vanadium T-V	-	-	4	-	-	-	-
Zinc T-Zn	-	2	2	-	-	-	1

### **Glycols**

Diethylene Glycol	10	10	10	10	10	10	10
Ethylene Glycol	10	10	10	10	10	10	10
1,2-Propylene Glycol	10	10	10	10	10	10	10

## POLARIS MINE - DOCK SOIL SAMPLES TESTED FOR GLYCOL CONTAMINATION

**Project** Polaris Soil Analysis  
**Report to** Gartner Lee Ltd.  
**ALS File No.** T5093  
**Date Received** 10/10/2003  
**Date:** 20/10/2003

### RESULTS OF ANALYSIS

<b>Sample ID</b>	DOCK- 262-I	DOCK- 264-F	DOCK- 265-F
<b>Date Sampled</b>	07/10/2003	07/10/2003	07/10/2003
<b>Time Sampled</b>			
<b>ALS Sample ID</b>	12	13	14
<b>Nature</b>	Sediment/Soil	Sediment/Soil	Sediment/Soil

#### Physical Tests

Moisture %	-	12.6	8.4
pH	-	-	-

#### Total Metals

Antimony T-Sb	-	-	-
Arsenic T-As	-	-	-
Barium T-Ba	-	-	-
Beryllium T-Be	-	-	-
Cadmium T-Cd	-	-	-
Chromium T-Cr	-	-	-
Cobalt T-Co	-	-	-
Copper T-Cu	-	-	-
Lead T-Pb	977	-	-
Mercury T-Hg	-	-	-
Molybdenum T-Mo	-	-	-
Nickel T-Ni	-	-	-
Selenium T-Se	-	-	-
Silver T-Ag	-	-	-
Tin T-Sn	-	-	-
Vanadium T-V	-	-	-
Zinc T-Zn	3140	-	-

#### Glycols

Diethylene Glycol	-	<10	<10
Ethylene Glycol	-	<10	<10
1,2-Propylene Glycol	-	<10	<10

#### Polycyclic Aromatic Hydrocarbons

Acenaphthene	-	-	<0.04
Acenaphthylene	-	-	<0.05
Anthracene	-	-	<0.05
Benz(a)anthracene	-	-	<0.05
Benzo(a)pyrene	-	-	<0.05
Benzo(b)fluoranthene	-	-	<0.05
Benzo(g,h,i)perylene	-	-	<0.05
Benzo(k)fluoranthene	-	-	<0.05
Chrysene	-	-	<0.05
Dibenz(a,h)anthracene	-	-	<0.05
Fluoranthene	-	-	<0.05
Fluorene	-	-	<0.05
Indeno(1,2,3-c,d)pyrene	-	-	<0.05
Naphthalene	-	-	<0.05
Phenanthrene	-	-	<0.05
Pyrene	-	-	<0.05

#### Extractable Hydrocarbons

EPH10-19	-	<200	<200
EPH19-32	-	<200	<200
LEPH	-	-	<200
HEPH	-	-	<200

#### Footnotes:

## POLARIS MINE - DOCK SOIL SAMPLES TESTED FOR GLYCOL CONTAMINATION

**Project** Polaris Soil Analysis  
**Report to** Gartner Lee Ltd.  
**ALS File No.** T5093  
**Date Received** 10/10/2003  
**Date:** 20/10/2003

### DETECTION LIMITS

<b>Sample ID</b>	DOCK- 262-I	DOCK- 264-F	DOCK- 265-F
<b>Date Sampled</b>	07/10/2003	07/10/2003	07/10/2003
<b>Time Sampled</b>			
<b>ALS Sample ID</b>	12	13	14
<b>Nature</b>	Sediment/Soil	Sediment/Soil	Sediment/Soil

### Physical Tests

Moisture %	-	0.1	0.1
pH	-	-	-

### Total Metals

Antimony T-Sb	-	-	-
Arsenic T-As	-	-	-
Barium T-Ba	-	-	-
Beryllium T-Be	-	-	-
Cadmium T-Cd	-	-	-
Chromium T-Cr	-	-	-
Cobalt T-Co	-	-	-
Copper T-Cu	-	-	-
Lead T-Pb	100	-	-
Mercury T-Hg	-	-	-
Molybdenum T-Mo	-	-	-
Nickel T-Ni	-	-	-
Selenium T-Se	-	-	-
Silver T-Ag	-	-	-
Tin T-Sn	-	-	-
Vanadium T-V	-	-	-
Zinc T-Zn	2	-	-

### Glycols

Diethylene Glycol	-	10	10
Ethylene Glycol	-	10	10
1,2-Propylene Glycol	-	10	10

### Polycyclic Aromatic Hydrocarbons

Acenaphthene	-	-	0.04
Acenaphthylene	-	-	0.05
Anthracene	-	-	0.05
Benz(a)anthracene	-	-	0.05
Benzo(a)pyrene	-	-	0.05
Benzo(b)fluoranthene	-	-	0.05
Benzo(g,h,i)perylene	-	-	0.05
Benzo(k)fluoranthene	-	-	0.05
Chrysene	-	-	0.05
Dibenz(a,h)anthracene	-	-	0.05
Fluoranthene	-	-	0.05
Fluorene	-	-	0.05
Indeno(1,2,3-c,d)pyrene	-	-	0.05
Naphthalene	-	-	0.05
Phenanthrene	-	-	0.05
Pyrene	-	-	0.05

### Extractable Hydrocarbons

EPH10-19	-	200	200
EPH19-32	-	200	200
LEPH	-	-	200
HEPH	-	-	200

**APPENDIX 4**

**UPDATE OF**

**DECOMMISSIONING AND RECLAMATION**

**SCHEDULE**

## POLARIS MINE - DECOMMISSIONING & RECLAMATION SCHEDULE

UPDATED AS OF September 24, 2003

ACTIVITY	Prior Periods	3rd Qtr. 2003			4th Qtr. 2003			1st Qtr. 2004			2nd Qtr. 2004			3rd Qtr. 2004		
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>CONTRACTOR MOBILIZATION</b>																
Pre-mobilization Planning / Order Materials/Equip																
Ship to Site with Contractor Equipment																
Offload Ship																
Setup Warehousing/Laydown Area																
<b>SETUP TEMPORARY FACILITIES</b>																
<b>DECOMMISSIONING UNDERGROUND</b>																
Remove / Salvage Mine Equipment & Crusher	Cancelled															
Remove Refrigeration Plant																
Remove Surface Ventilation Fans																
Seal Mine Openings																
<b>MILL / BARGE DEMOLITION</b>																
Initial Cleanup of Barge by Teck Cominco																
Removal of Barge Services																
Transfer fuel to Tank Farm & Clean Hull																
Remove hazardous Materials / Wastes																
Remove / Salvage Process Equipment																
Demolish Internal Equipment																
Demolish Structure																
Remove Hydrocarbon/Metals Contaminated Soils																
Regrade Area Surrounding Barge																
<b>PRODUCT STORAGE BUILDING DEMOLITION</b>																
Cleanup of Building / Remove Liquids from Equip.																
Demolish Exterior Conveyors																
Demolish Reclaim Conveyors																
Remove Cladding from Building																
Demolish Structure																
Demolish Foundations																
Remove Contaminated Soils																
Regrading Area																
<b>SHIP LOADER / RECLAIM CONVEYOR DEMOL.</b>																
Cleanup of Conveyor Areas/Remove Oils																
Demolish Conveyors																

## POLARIS MINE - DECOMMISSIONING & RECLAMATION SCHEDULE

UPDATED AS OF September 24, 2003

ACTIVITY	Prior Periods	3rd Qtr. 2003			4th Qtr. 2003			1st Qtr. 2004			2nd Qtr. 2004			3rd Qtr. 2004		
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>DOCK DECOMMISSIONING</b>																
Inspect / Remove Glycols from Freeze Pipes																
Remove Metals Contaminated Soils																
Remove Cells 1 & 2																
Remove Cells 3 & 4																
Removal of Temporary Dock																
Shoreline Recontouring																
Berm Removal																
Grade New Beach to Final Profiles																
<b>TAILINGS SYSTEM DEMOLITION</b>																
Final Cleanup of Thickener																
Flush Tails Lines																
Salvage Equipment																
Remove hazardous Materials / Wastes																
Remove Tails Line / Return Line																
Demolish Equipment																
Demolish Structure																
Remove Foundations																
Remove Contaminated Soils																
Regrading																
<b>GARROW LAKE / DAM DECOMMISSIONING</b>																
Drawdown Lake																
Removal of Centre Section of Dam																
Creek Channel Construction																
Final Grading / Armouring of Dam Remnants																
<b>CRF PLANT DEMOLITION</b>																
Final Cleanup of Plant																
Remove hazardous Materials / Wastes																
Demolish Plant Equipment																
Demolish Buildings																
Site Grading (Plant & Surrounding Area)																



## POLARIS MINE - DECOMMISSIONING & RECLAMATION SCHEDULE

UPDATED AS OF September 24, 2003

ACTIVITY	Prior Periods	3rd Qtr. 2003			4th Qtr. 2003			1st Qtr. 2004			2nd Qtr. 2004			3rd Qtr. 2004		
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>ACCOMODATIONS COMPLEX DEMOLITION</b>																
Establish Temporary Offices / Building Services																
Use Accomodations Complex																
Establish Temporary Camp Accomodations																
Use Temporary Camp																
Remove hazardous Materials / Wastes																
Demolish Buildings																
Regrade Area																
Remove Temporary Camp																
<b>FUEL STORAGE (TANK FARM) DEMOLITION</b>																
Use with Temporary Modifications																
Transfer Fuel to Temporary Storage																
Cleaning of Tanks / Piping																
Demolish Tanks / Piping																
Cleanup of Berm & Liner																
Site Grading																
<b>BLADDER AREA CONTAMINATED SOILS</b>																
Cleanup of Hydrocarbon Soils																
Area Grading																
<b>MISC. BUILDING DEMOLITION</b>																
Exploration Quonset Huts																
Core Shack (Atco Trailer)																
Emergency Shelter at North Portal																
Steam Wash Bay & Tire Shop (relocated in 3rd Qtr)																
Generator Building																
Bent Horn Building																
Dock Office Trailer (relocated in 3rd Qtr)																
Airstrip Storage Hut																
Fresh Water Pump House																
Frsh Water Tank & Shed																
Carpenter Shop (used as temp. warehouse)																
Shipping Containers (Sea Cans - more to move on-going)																
Foldaways by Temporary Dock (3)																
Firehall																

## POLARIS MINE - DECOMMISSIONING & RECLAMATION SCHEDULE

UPDATED AS OF September 24, 2003

ACTIVITY	Prior Periods	3rd Qtr. 2003			4th Qtr. 2003			1st Qtr. 2004			2nd Qtr. 2004			3rd Qtr. 2004		
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>OPERATIONAL LANDFILL CLOSURE</b>																
Relocate Construction Landfill																
Hauling Landfill Cover Cap Material																
<b>LRD QUARRY Landfill</b>																
Cut Notch into Quarry / Construct Haul Road																
Installation of Thermistor Pipe Stands																
Placing debris in Quarry																
Grading of Notch to Match Cap																
Placement of Cap and Final Grading																
Installation of Thermistors into Pipes																
<b>MISC. SITE RECLAMATION &amp; EARTHWORKS</b>																
Reduction in spare parts/supplies by TCML																
Ship Mill Process Chemicals South for Sale/Recycle																
Site Cleanup of scrap material during operations																
Regrading North 40 Area																
Grading of Reclamation Landfill Area																
Road Closure / Culvert Removals/Runway																
<b>DEMOBILIZE FROM SITE</b>																
Prepare Equipment / Supplies for shipping from site																
Prepare Residual Chemicals / Wastes for shipping																
Last Ship from Polaris																

## **APPENDIX 5**

# **UPDATE OF ESTIMATED MINE DECOMMISSIONING, RECLAMATION AND MONITORING COSTS**

**POLARIS MINE DECOMMISSIONING, RECLAMATION AND MONITORING COST ESTIMATE**  
**3rd QUARTER 2003 UPDATE**

	BUDGET		SEPT 30, 2003 CLAIMED TO DATE		FORECAST FINAL PROJECT COST		NOTES
	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	
<b>DEMOLITION &amp; RECLAMATION (BARE COSTS)</b>							
<b>MINE EQUIPMENT REMOVAL</b>							
Hazardous Materials Removal	35,845		853		30,845		
Mine Refrigeration Plant	145,525		14,281		92,044		
Mobile & Mine Equipment	2,919		2,524		22,919		
Remove Salvaged Mine Equipment	20,754		3,983		5,754		
Misc Sub Contract Costs	45,957		23,297		45,385		
		\$ 251,000		\$ 44,938		\$ 196,947	
<b>MINE ACCESS SEALING</b>							
Seal Mine Portals	60,000		464		73,509		
		\$ 60,000		\$ 464		\$ 73,509	
<b>CONCENTRATOR BUILDING</b>							
Miscellaneous Materials	22,092				-		
Mill Equipment Clean-Up - Fuels	16,398				-		
Mill Equipment Clean-Up	99,900		40,613		40,625		
Hazardous Materials Removal	151,117		94,476		147,099		
Barge Demolition	608,592		441,028		513,459		
Misc Process Equipment Demolition & Removal	197,432		183,317		183,346		
Misc Sub Contract Costs	88,469		83,898		87,013		
		\$ 1,184,000		\$ 843,332		\$ 971,542	
<b>CONCENTRATE STORAGE STRUCTURE &amp; EQUIPMENT</b>							
Concentrate Storage Equipment Clean-Up	26,117		1,905		1,900		
Conveyors	67,600		8,421		8,431		
Concentrate Storage Structure & Equipment	555,283		78,302		116,564		
		\$ 649,000		\$ 88,628		\$ 126,895	
<b>SHIP LOADER &amp; CONVEYOR</b>							
Conveyors	50,000		24,592		24,593		
		\$ 50,000		\$ 24,592		\$ 24,593	
<b>DOCK &amp; SHORELINE</b>							
Dock & Shoreline Reclamation	869,000		240,476		939,131		
		\$ 869,000		\$ 240,476		\$ 939,131	
<b>THICKENER &amp; TAILINGS LINES</b>							
Hazardous Materials Removal	22,577		16,452		16,456		
Tailings Thickener	377,423		91,269		113,259		
		\$ 400,000		\$ 107,721		\$ 129,715	
<b>GARROW LAKE</b>							
Garrow Lake Siphons & Lake Drawdown	120,391		202,648		204,366		
Dam/Spillway Modifications	95,467		66,583		172,865		
Escalation Allowance	3,142				-		
		\$ 219,000		\$ 269,231		\$ 377,231	
<b>CRF PLANT STRUCTURE &amp; EQUIPMENT</b>							
CRF Plant Equipment Clean-Up	7,002		1,040		1,041		
CRF Plant Equipment Removal	17,533		9,406		9,404		
CRF Plant Buildings Demolition	130,455		23,497		23,517		
Misc Sub Contract Costs	11,010		46,766		46,764		
		\$ 166,000		\$ 80,709		\$ 80,726	
<b>ACCOMMODATION COMPLEX STRUCTURE &amp; EQUIPMENT</b>							
Accommodation Complex Building Demolition	249,000		10,211		171,125		
		\$ 249,000		\$ 10,211		\$ 171,125	
<b>FUEL STORAGE &amp; HANDLING EQUIPMENT</b>							
Miscellaneous Materials	3,681		2,531		(1,319)		
Purge & Decommission Fuel Tanks	53,404		296,235		319,000		
Hazardous Materials Removal	50,645		125,575		164,272		
Fuel Pumping & Distribution Systems	87,270				90,133		
		\$ 195,000		\$ 424,341		\$ 572,086	
<b>BUILDINGS &amp; CONTAINERS</b>							
Miscellaneous Materials	1,323				-		
Misc Warehouse / Shipping Equipment	1,221		3,292		3,292		
Misc Buildings Demolition	250,456		35,397		169,268		
		\$ 253,000		\$ 38,689		\$ 172,560	
<b>MISC CONTRACTOR LABOUR</b>							
Unallocated Labour	133,000		79,131		129,027		
		\$ 133,000		\$ 79,131		\$ 129,027	
<b>GENERAL SITE GRADING</b>							
Hazardous Materials Removal	44,719		20,938		46,870		
General Site Grading & Reclamation	7,129		207,612		201,505		
Escalation Allowance	4,152				-		
		\$ 56,000		\$ 228,550		\$ 248,375	

**POLARIS MINE DECOMMISSIONING, RECLAMATION AND MONITORING COST ESTIMATE**  
**3rd QUARTER 2003 UPDATE**

	BUDGET		SEPT 30, 2003 CLAIMED TO DATE		FORECAST FINAL PROJECT COST		NOTES
	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	
<b>LANDFILL RECLAMATION</b>							
Landfill Reclamation	432,000		645,694		800,374		
		\$ 432,000		\$ 645,694		\$ 800,374	
<b>CONTAMINATED SOILS - CLEANUP</b>							
Metals & Hydrocarbon Contaminated Soils Cleanup & Disposal	366,623		900,231		1,445,291		
Hydrocarbon Contaminated Soils (By Polaris)	6,097		13,131		13,131		
Metals Contaminated Soils (By Polaris)	173,605		52,382		52,382		
U/G Handling & Disposal Of Contaminated Soils	48,675		244,463		440,925		
		\$ 595,000		\$ 1,210,207		\$ 1,951,729	
<b>QUARRIES &amp; MINE SURFACE RECLAMATION (EARTHWORK)</b>							
Backfill & Re-Contouring	263,000		177,581		319,452		
		\$ 263,000		\$ 177,581		\$ 319,452	
<b>MISC. DEMOLITION &amp; CLEAN-UP</b>							
Misc Unallocated Clean-Up / Demo	380,000		41,405		44,157		
		\$ 380,000		\$ 41,405		\$ 44,157	
<b>EQUIPMENT PURCHASE/RENTAL</b>							
Contractor Equipment Rental	5,274,900		2,761,061		5,144,900		
Contractor Misc Equipment Purchase	719,407		432,906		448,309		
Escalation Allowance	59,693				-		
		\$ 6,054,000		\$ 3,193,967		\$ 5,593,209	
<b>MISC. SERVICES &amp; SUPPLIES</b>							
Misc Purchased Materials / Supplies	235,333		159,773		233,181		
Escalation Allowance	19,667				-		
		\$ 255,000		\$ 159,773		\$ 233,181	
<b>FUEL</b>							
Fuel Supply	3,294,536		4,216,186		4,216,186		
Fuel Taxes (Heating & Power Generation)	68,677				99,727		
Fuel Taxes (Equipment)	467,343		325,719		677,493		
Escalation Allowance	157,444				-		
		\$ 3,988,000		\$ 4,541,905		\$ 4,993,406	
<b>MAINTENANCE OF EQUIPMENT &amp; FACILITIES</b>							
Mobile Equip Maintenance	1,296,759		3,705,847		5,106,671		
Building Maintenance	506,923		1,159,481		1,388,571		
Escalation Allowance	101,318				-		
		\$ 1,905,000		\$ 4,865,328		\$ 6,495,242	
<b>PRE - PURCHASED EQUIPMENT (BY COMINCO)</b>							
Construction Equipment - Purchase (By Owner)	541,000		541,271		541,271		
		\$ 541,000		\$ 541,271		\$ 541,271	
<b>CONTRACTOR'S FIELD SUPPORT &amp; SUPPLIES</b>							
<b>TRANSPORTATION (SHIPPING)</b>							
Packing & Preparation	85,326		60,035		92,804		
Shipping Costs	948,661		1,258,272		1,870,797		
Escalation Allowance	78,013				-		
		\$ 1,112,000		\$ 1,318,307		\$ 1,963,601	
<b>CONTRACTOR MOB, DEMOB &amp; SUPERVISION</b>							
Contractor Mob/Demob	61,883		87,810		251,831		
Contractor Supervisory/Admin Personnel	2,127,339		1,839,016		2,959,195		
Safety Services & Supplies	36,000		221,846		295,231		
Misc Temporary Services / Modifications	223,824		872,350		1,008,541		
Escalation Allowance	13,954				-		
		\$ 2,463,000		\$ 3,021,022		\$ 4,514,798	
<b>MISC. SERVICES &amp; SUPPLIES</b>							
Communications & TV	374,000		91,235		217,679		
Escalation Allowance	31,000				-		
		\$ 405,000		\$ 91,235		\$ 217,679	
<b>ACCOMODATIONS</b>							
Catering	1,487,166		1,156,195		1,831,193		
Escalation Allowance	122,834				-		
		\$ 1,610,000		\$ 1,156,195		\$ 1,831,193	
<b>TRAVEL &amp; PERSONNEL</b>							
Travel (Airlines & Expenses)	1,552,881		2,052,383		3,435,600		
Travel Premium - Revised Rotation Schedule	1,072,773				-		
Misc Personnel Transport	72,274		121,525		172,274		
Escalation Allowance	575,072				-		
		\$ 3,273,000		\$ 2,173,908		\$ 3,607,874	

**POLARIS MINE DECOMMISSIONING, RECLAMATION AND MONITORING COST ESTIMATE**  
**3rd QUARTER 2003 UPDATE**

	BUDGET		SEPT 30, 2003 CLAIMED TO DATE		FORECAST FINAL PROJECT COST		NOTES
	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	
<b>CONTRACTOR INDIRECTS</b>							
<b>HO MOB &amp; DEMOB SUPPORT</b>							
Mob & Demob	1,912,000		1,526,300		1,912,376		
		\$ 1,912,000		\$ 1,526,300		\$ 1,912,376	
<b>CONTRACTOR MANAGEMENT SUPPORT</b>							
Personnel	3,928,932		2,391,496		3,928,932		
Safety & First Aid Personnel to Provide Overlap	184,068		111,792		183,644		
		\$ 4,113,000		\$ 2,503,288		\$ 4,112,576	
<b>OTHER CONTRACTOR INDIRECTS</b>							
Contractor's General Indirects	4,952,000		3,469,507		5,482,420		
		\$ 4,952,000		\$ 3,469,507		\$ 5,482,420	
<b>ENGINEERING / PROJECT MANAGEMENT</b>							
<b>ENVIRONMENTAL SITE ASSESMENT</b>							
Environmental Consultants - Site Assessment	275,787		272,949		314,609		
Site Assessment - Unallocated	207,874		105,263		191,524		
Escalation Allowance	2,339				-		
		\$ 486,000		\$ 378,212		\$ 506,133	
<b>CLOSURE PLAN</b>							
Environmental Consultants - Closure Plan	415,772		372,272		372,272		
Escalation Allowance	2,228				-		
		\$ 418,000		\$ 372,272		\$ 372,272	
<b>ENGINEERING / SPECIAL CONSULTANTS</b>							
Design Consultants - Dock / Loadout	1,316		1,413		1,413		
Design Consultants - Tailings / Garrow Lake	3,520		3,515		3,515		
Design Consultants - Dock / Loadout	79,684		65,354		79,994		
Design Consultants - Tailings / Garrow Lake	54,780		45,328		45,328		
Sitework & Demolition Procedures - Design Services	18,300		14,465		55,400		
Escalation Allowance	2,400				-		
		\$ 160,000		\$ 130,075		\$ 185,650	
<b>PROJECT MANAGEMENT CONSULTANT (HO STAFF)</b>							
Project Management - Salaries	411,069		757,118		982,069		
Project Management - Reimb Expenses	100,000		57,487		100,000		
Escalation Allowance	31,931				-		
		\$ 543,000		\$ 814,605		\$ 1,082,069	
<b>CONSTRUCTION MANAGEMENT (FIELD STAFF)</b>							
Construction Management - Salaries	2,142,878		921,834		1,755,878		
Escalation Allowance	179,122				-		
		\$ 2,322,000		\$ 921,834		\$ 1,755,878	
<b>ENVIRONMENTAL TESTING AND SAMPLING</b>							
Environmental Reclamation Supervision - Staff	337,123		265,245		668,060		
Escalation Allowance	29,550				-		
Environmental Reclamation Supervision - Testing	330,000		94,680		239,060		
Additional Sampling and Consultant Services (MMER)	0		140,996		396,192		
Escalation Allowance	26,327				-		
		\$ 723,000		\$ 500,921		\$ 1,303,312	
<b>OWNER'S COSTS</b>							
<b>SALARIES &amp; EXPENSES</b>							
Teck Cominco HO Proj Mgmt (Staff Lab)	374,631		314,923		563,132		
Teck Cominco HO Proj Mgmt (Misc Material & Exp)	199,149		131,845		178,333		
Escalation Allowance	34,220				-		
		\$ 608,000		\$ 446,768		\$ 741,465	
<b>OVERHEAD / HO SUPPORT</b>							
Land Leases, Licences	175,000		96,398		237,525		
Miscellaneous Permits	45,000		9,118		10,222		
Insurance	445,900		106,692		174,310		
Property Taxes	495,000		37,181		495,000		
Home Office General Admin (Labour & Exp)	722,384		14,313		30,000		
Public Relations	74,292		58,718		74,292		
Legal	57,540		48,021		68,431		
Escalation Allowance	168,560				-		
Misc Owner's Overhead	6,324		13,882		13,882		
		\$ 2,190,000		\$ 384,323		\$ 1,103,662	
<b>GENERAL ADMIN</b>							
Closure Management - Polaris Personnel	54,000				-		
Escalation Allowance	2,880				-		
Closure Wrap Up	5,120		27,132		45,667		
		\$ 62,000		\$ 27,132		\$ 45,667	

**POLARIS MINE DECOMMISSIONING, RECLAMATION AND MONITORING COST ESTIMATE**  
**3rd QUARTER 2003 UPDATE**

	BUDGET		SEPT 30, 2003 CLAIMED TO DATE		FORECAST FINAL PROJECT COST		NOTES
	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	
<b><u>POST RECLAMATION COSTS (2005 - 2011)</u></b>							
<b><u>SITE MONITORING AND HOLDING COSTS</u></b>							
Annual Post Closure Environmental Monitoring (2005 to 2011)	510,000				510,000		
Final Sampling Program, Data Evaluation and Reporting in 2011	160,000				160,000		
Land Lease/Licence costs from 2005 to 2011	126,000				126,000		
Property Taxes - 2005 to 2011	70,000				70,000		
Escalation Allowance	135,000				135,000		
		\$ 1,001,000		\$ -		\$ 1,001,000	Corrected typos from 2nd Qtr Report For Forecast Costs
<b><u>UNALLOCATED</u></b>							
Uncoded Forecast Cost Adjustments (Net)	-		-				
		\$ -		\$ -		\$ -	
<b>TOTAL DECOMMISSIONING / RECLAMATION &amp; MONITORING COSTS</b>		<b><u>\$ 47,500,000</u></b>		<b><u>\$ 37,094,048</u></b>		<b><u>\$ 56,925,108</u></b>	

## **APPENDIX 6**

### **COST ESTIMATE**

#### **TO**

### **RE-CONSTRUCT GARROW LAKE DAM**



***Polaris Mine Closure***  
**CASCADE PROJECT 2071**

***Garrow Lake Level Control Structure***

***Order Of Magnitude***  
***Cost Estimate***

***October 30, 2003***

# **GARROW LAKE LEVEL CONTROL STRUCTURE COST ESTIMATE**

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## 1.0 EXECUTIVE SUMMARY

In April 2002 Teck Cominco received approval to re-establish original water levels in Garrow Lake and to remove the central portion of the existing Garrow Lake Dam and re-establish natural flow out of the lake via the existing creek bed. Teck Cominco has proposed a long term sampling program which will monitor concentration of metals in the discharge into Garrow Bay. Concern has been expressed by regulators with regard to the potential for higher than anticipated levels of heavy metals (lead and zinc) in the discharge from Garrow Lake once original lake levels have been established. While Teck Cominco considers this to be a highly unlikely occurrence, contingency plans have been established to re-instate a portion of the Garrow Lake dam to raise the lake level back to 2002 levels, where it has been demonstrated that metals concentrations in the discharge remain well within allowable limits.

In order to determine financial liability should such action be required, Teck Cominco requested Cascade Management Inc to prepare an order of magnitude cost estimate of the construction of such a level control structure.

This cost estimate has been prepared as requested and Cascade Management Inc are of the opinion that, subject to the assumptions outlined in this report, this structure could be completed for a total cost of \$1,270,000, plus or minus 25%. The following report is intended to outline the basis of this estimate and the assumptions made in arriving at the estimated cost.

## **2.0 BASIS OF ESTIMATE**

### **2.1 SCOPE OF ESTIMATE**

#### **Estimate Format**

Project cost codes have been established for the Polaris Mine Closure and Reclamation work currently underway. For simplicity, the same coding structure was used for this estimate.

The cost estimate is to be considered “Order of Magnitude” only and is based on certain assumptions with regard to Scope of Work, using historical (i.e. recent actual cost experience) pricing data for the Polaris Reclamation.

#### **Purpose of Estimate**

To provide a reasonable estimate of cost exposure (liability) to Teck Cominco should it become necessary to reinstate Garrow Lake water levels.

#### **Work Included**

- Carry out site investigation and prepare detail drawings and specifications for construction of level control structure.
- Procurement of necessary materials and construction services.
- Construct level control structure, including field supervision and quality control inspections.
- Cleanup and demobilize from site.

#### **Work Excluded**

- Environmental sampling and testing.
- Regulatory approvals and permits.
- Escalation

### **2.2 INFORMATION BASIS & ASSUMPTIONS**

#### **Project Schedule**

It has been assumed that the work would be carried out in one construction season, most likely during the period of mid-July to mid-August. It is estimated that 30 working days would be required for work on site.

#### **Design**

For purposes of estimating it has been assumed that the level control structure would be of sufficient height to raise the water level of Garrow Lake back to 2002 levels (approximately 1.5M) and would be located across the creek bed in the

location of the existing dam. Allowance has been made for provision of a synthetic liner to provide an impermeable core. A rock lined spillway would be provided to effect natural discharge from Garrow Lake.

It should be noted that the impact of the design of the actual structure on the cost of construction is somewhat less significant than normal, due to the high cost of mobilizing and demobilizing personnel and equipment to and from the site. Once personnel and equipment have been mobilized to the site, actual construction costs should be adequately covered by the current estimate and contingency allowances.

### **Procurement**

Materials would be purchased in advance by Teck Cominco and delivered to the island for use by the Contractor. Construction would be competitively bid.

### **Construction Philosophy**

Local contractors, competitively bid on a Lump Sum basis.

### **Construction Facilities**

Temporary camp will be required (tents) with regular air support from Resolute Bay. Supervisors of the work will be required to be fully trained in emergency first aid. Basic emergency supplies will be provided by the Contractor.

## **2.3 PRICES**

### **Labour Rates**

Crew size has been established based on the assumed Scope of Work. Labour rates are based on current labour rates for the Polaris project, with applicable additives for Contractor's overhead and overtime premiums. Labour costs have been estimated using the following crew requirements;

- 1 Foreman
- 3 Equipment Operators
- 1 Mechanic
- 1 Surveyor
- 1 Cook
- 1 Bull Cook

### **Material Prices**

- Cost allowance.

### **Equipment Prices**

- Based on historical data.

Equipment costs are based on the following requirements;

- 1 Excavator
- 1 Dozer
- 1 Loader
- 1 Truck
- 1 Temp Camp

### **Currency & Escalation**

- All costs are estimated in 2003 Canadian Dollars. No allowance has been made for escalation since it is unknown when, or if, the work would be required.
- 

### **Taxes & Duty**

Included where applicable.

## **2.4 ACCURACY OF ESTIMATE**

Given the level of detail available and the assumptions made, it would be reasonable to expect an accuracy of  $\pm 25\%$  of estimated cost, including contingency.

## **2.5 CONTINGENCIES**

### **Project Contingency**

Given the expected accuracy of the estimate, for financial planning purposes Cascade Management would recommend, and have included, a contingency of 25 percent.

## 2.6 ESTIMATE SUMMARY

Based on the above, the Order of Magnitude cost estimate for construction of a level control structure at Garrow Lake has been determined as per the following summary;

▪ Base Construction Cost	369,000
▪ Transportation (Shipping)	150,000
▪ Mobilization & Demobilization	78,500
▪ Accommodations/Camp	49,500
▪ Contractor Overhead	162,000
▪ Engineering	121,350
▪ Construction Supervision	57,650
▪ Owner's Project Management	<u>31,000</u>
Sub Total	1,019,000
▪ Contingency	<u>251,000</u>
TOTAL	\$1,270,000

A copy of the detailed cost estimate is included for reference in the Appendix of this report.

## 3.0 APPENDICIES

### 3.1 Detailed Cost Estimate

## **APPENDIX 1**

### **DETAILED COST ESTIMATE**



**Client:** Teck Cominco  
**Project:** 2071: Polaris Estimate - Sept 30,

## Garrow Lake - Reinstall Level Control Structure: Extended Costs, Item Details

COST CENTER && PROJECT CODE	QTY	Units	Hrs	LABOUR AND EQUIPMENT			MATERIAL / LUMP SUM		Misc Allowance	TOTAL
				Lab Cost	Const Equip	Sub Con	Material	Lump Sum		
141 LEVEL CONTROL STRUCTURE										
<u>1410-02.280-01 - Dam/Spillway Modifications</u>										
0002 Mobilize to site and set up plant	8.0	Day	768	40,059	35,264	0	0	0	0	75,323
0003 Supply Equipment Consumables (Ground Engaging Tools)	1.0	Allow	0	0	0	0	25,000	0	0	25,000
0004 Spare parts and maintenance supplies for equipment	30.0	Day	0	0	0	0	26,460	0	0	26,460
0005 Fuel & Lube Allowance	30.0	Day	0	0	0	0	9,930	0	0	9,930
0006 Supply impermeable liner for dam core (if	1.0	Allow	0	0	0	0	25,000	0	0	25,000
0007 Re-establish dam core 40m long X 25m wide X 3m high (3000 cm @ 200 cm/day = 15 days)	15.0	Day	1,440	75,110	66,120	0	0	0	0	141,230
0008 Tear down and demobilize	7.0	Day	672	35,052	30,856	0	0	0	0	65,908
0099 Rounding Off Adjustment	1.0	Lot	0	0	0	0	0	0	149	149
Sub Total:			2,880	150,221	132,240	0	86,390	0	149	369,000

## 211 TRANSPORTATION (SHIPPING)

### **2110-01.100-02 - Shipping Costs**

0002 Shipping - Resolute to LCI.	3.0	Day	0	0	0	0	0	0	75,000	75,000
0003 Demobilization - Shipping from LCI to Resolute	3.0	Day	0	0	0	0	0	0	75,000	75,000
<i>Sub Total:</i>			0	0	0	0	0	0	150,000	150,000

## 212 CONTRACTOR MOB, DEMOB & SUPERVISION

### **2120-01.005-01 - Contractor Mob/Demob**

0002 Mobilization - Preparation and loading/unloading of equipment	72.0	MT	0	0	0	0	0	0	25,200	25,200
0003 Mobilization - Load and unload fuel in 45 gallon drums; 8 per pallet = 5000 gal or 14 Tonnes	14.0	MT	0	0	0	0	0	0	4,900	4,900
0004 Mobilization - Load & Unload Two Containers ( Tools and Mechanics shop)	2.0	Ea	0	0	0	0	0	0	6,000	6,000
0005 Mobilization - Load & Unload One container of misc gear (lube oil, filters, etc.)	1.0	Ea	0	0	0	0	0	0	3,000	3,000

COST CENTER && PROJECT CODE	QTY	Units	Hrs	LABOUR AND EQUIPMENT			MATERIAL / LUMP SUM		Misc Allowance	TOTAL
				Lab Cost	Const Equip	Sub Con	Material	Lump Sum		
0008 Demobilization - Load & Unload Fuel drums and pallets	1.0	Lot	0	0	0	0	0	0	4,900	4,900
0009 Demobilization - Load & Unload Containers	3.0	Ea	0	0	0	0	0	0	9,000	9,000
0010 Demobilization - Load and unload equipment	72.0	MT	0	0	0	0	0	0	25,200	25,200
0099 Rounding Off Adjustment	1.0	Lot	0	0	0	0	0	0	300	300
<i>Sub Total:</i>			0	0	0	0	0	0	78,500	78,500

## 215 ACCOMODATIONS

### 2150-01.810-01 - Site Accommodations / Camp Costs

0001 Camp Costs - Assume \$50.00 / Manday X 8 men = \$400 per day)	30.0	Day	0	0	0	12,000	0	0	0	12,000
0002 Airfares based on 8 men on site for 30 days (\$3,000 per man)	8.0	Ea	0	0	0	24,000	0	0	0	24,000
0003 Sustaining air freight assuming two flights per week @ \$1500/Trip (9 Trips)	9.0	Trips	0	0	0	13,500	0	0	0	13,500
<i>Sub Total:</i>			0	0	0	49,500	0	0	0	49,500

## 319 GENERAL CONTRACTOR OH

### 3190-01.000-00 - Contractor's Overhead - Summary Account (Lump Sum)

0000 General Contractor Overhead	15.0	%	0	0	0	0	0	0	97,050	97,050
0001 Contractor's Fee	10.0	%	0	0	0	0	0	0	64,700	64,700
0099 Rounding Off Adjustment	1.0	Lot	0	0	0	0	0	0	250	250
<i>Sub Total:</i>			0	0	0	0	0	0	162,000	162,000

## 721 ENGINEERING / SPECIAL CONSULTANTS

### 721B-17.110-05 - Design Consultants - Tailings / Garrow Lake

0000 Design Of Replacement Level Control Structure	15.0	%	0	0	0	0	0	0	121,350	121,350
<i>Sub Total:</i>			0	0	0	0	0	0	121,350	121,350

## 732 CONSTRUCTION MANAGEMENT (FIELD STAFF)

### 7320-01.010-01 - Construction Management - Salaries

0000 Teck Cominco Field Supervision and Construction Management	1.0	Lot	400	48,000	0	0	0	0	0	48,000
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COST CENTER && PROJECT CODE	QTY	Units	LABOUR AND EQUIPMENT			MATERIAL / LUMP SUM		Misc Allowance	TOTAL
			Hrs	Lab Cost	Const Equip	Sub Con	Material	Lump Sum	
<i>Sub Total:</i>			400	48,000	0	0	0	0	48,000
<b><u>7320-01.010-02 - Construction Management - Reimb Expenses</u></b>									
0000 Teck Cominco Field Supervision and Construction Management - Expenses	1.0	Allow	0	0	0	0	0	9,650	9,650
<i>Sub Total:</i>			0	0	0	0	0	9,650	9,650

## 811 OWNER'S PROJECT MANAGEMENT

<b><u>8110-17.020-01 - Cominco HO Proj Mgmnt (Staff Lab)</u></b>									
0001 Teck Cominco HO Administration and Project Management - Salaries	1.0	Mhrs	160	19,200	0	0	0	0	19,200
<i>Sub Total:</i>			160	19,200	0	0	0	0	19,200
<b><u>8110-17.030-01 - Cominco HO Proj Mgmnt (Misc Material &amp; Exp)</u></b>									
0002 Teck Cominco HO Administration and Project Management - Expenses (based on two round trips to site plus misc office expenses)	1.0	Allow	0	0	0	0	0	11,800	11,800
<i>Sub Total:</i>			0	0	0	0	0	11,800	11,800

## 981 CONTINGENCY

<b><u>9810-19.900-01 - Project Contingency - General</u></b>									
0001 Project Contingency	25.0	%	0	0	0	0	0	254,500	254,500
0002 Rounding Off Adjustment	-1.0	Lot	0	0	0	0	0	-3,500	-3,500
<i>Sub Total:</i>			0	0	0	0	0	251,000	251,000

<i>Project Total:</i>			3,440	217,421	132,240	49,500	86,390	0	784,449	1,270,000
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## **APPENDIX 7**

### **TECK COMINCO RESPONSE TO JULY 2003 INAC SITE INSPECTION**



**John Knapp**  
**Site Manager**

September 8, 2003

Indian and Northern Affairs Canada  
Land Administration  
Box 100  
Iqaluit, NU  
X0A 0H0

**Attention:** Carl McLean, Manager, Land Administration

Dear Mr. McLean,

**Re: Polaris Mine Closure DIAND Inspection July 2 – 3, 2003**

This letter has been written in response to your letter of July 22, 2003, regarding DIAND's comments respecting observations made during a site visit July 2<sup>nd</sup> – 3<sup>rd</sup>. Firstly, I wish to apologize for the delayed response to the concerns raised in your letter. Please be assured that your comments and concerns received immediate attention. The preparation of this response was delayed by a combination of personnel scheduling issues, coupled with the high workloads associated with the compressed summer construction season. I am confident that you will note significant progress, in compliance with approved procedures and protocols, during your next site visit, scheduled for the near future. For clarity, the concerns and questions raised in your letter of July 22<sup>nd</sup> have been copied to this letter and I will deal with each as they are presented.

**Operational Landfill:**

- 1) It was not clear who was responsible for inspecting construction of the cover material, since the GLL site staff are only involved with confirmation testing of the contaminated site reclamation aspects of the work. TC must ensure that the landfill cover is inspected to insure it meets the guidelines in the reclamation plan.

*Teck Cominco representatives ensure that construction standards pertaining to the entire project are met. Compaction tests have been performed, and material sizing has been initiated. Recording of thermistor readings was initiated in March 1999 and continued throughout the course of the project until summer 2003. Thermistor data for this year has been reported in the 1<sup>st</sup> and 2<sup>nd</sup> quarter project reports to you and the NWB. The placement of the covercap during summer 2003 resulted in the destruction of these*

**Cominco Mining Partnership**

**c/o Teck Cominco Metals Ltd./Polaris Reclamation Project**

**P.O. Box 188, Resolute Bay, NU X0A 0VO • Tel: 867-253-2201/2241 • Fax: 867-253-6862**

*instruments, but they will be reinstated upon completion of the construction work. Readings will be obtained, recorded, and reported as required by the terms of the Polaris Water License and Reclamation and Closure Plan approval.*

*As-builts will be prepared once construction is complete. Surveying is an ongoing process to maintain adequate construction controls and to ensure placement of sufficient cover materials. In August, 2003, following the placement of the underlying portion of the covercap, a Nunavut registered professional geotechnical engineer from EBA Engineering was engaged to conduct a site examination of the work undertaken to date and to ensure compliance with the design criteria. No significant issues were raised. This inspection was done as part of the annual geotechnical inspection of the landfill and other surface structures as required by our Water Licence, with the formal inspection report to be submitted by the middle of October.*

Please forward information pertaining to the construction of the Operational Landfill to DIAND including thermistor readings, material testing results (moisture contents, grain size, density) and as-built drawings. The thermal analysis for the cover design assumed certain properties for the cover material(s). TC should verify that these assumptions are valid for the actual materials being placed. The final thickness of the cover should be based on the actual cover material properties.

*Please see above. Material sizing and moisture results will be reported in the upcoming Quarterly report. All indications to date are that the covercap will exceed the design criteria, resulting in an increased factor of safety.*

## 2) Tailing Thickener

A considerable amount of loose Styrofoam and fiberglass insulation was noted in the debris around the tailings thickener pad. This material is easily blown around and distributed over the site and must be cleaned up before the elements carry this material offsite. Once all of the contaminated fill is removed from the thickener pad and area TC must conduct confirmatory soil testing.

*The loose Styrofoam and fibreglass that was noted in the area of the thickener has been contained and removed. Although the material spread to a greater than anticipated extent, it should be noted that the reason that it had not been cleaned up prior to the date of the inspection was that the tundra was still water logged and any effort to even walk in the area would have produced significant environmental degradation. Greater efforts to contain demolition debris are now being expended. Further, work schedules in areas involving foam insulation products are being reviewed for opportunities to further reduce the risks of spreading materials by wind.*

No mention was made in the closure plan about retaining the lagoon and dikes, and filling with excavated spoil. If the lagoon remains, it will be a prominent embankment structure on the surface of the land, and hence will not satisfy the overall reclamation philosophy of returning the site to as natural a condition as possible. TC should clarify their position in writing for approval by DIAND and the other regulators.

*Numerous approaches, suggestions, and opportunities are considered during any project. This holds true of the Polaris Reclamation and Closure Project as well. Teck Cominco confirms that there were discussions regarding the merits of utilising the overflow lagoon at the tailings thickener as a depository for some of the frozen core from the Garrow Lake dam. However, this idea has since been abandoned, and at no point did Teck Cominco Limited consider implementing this approach without the knowledge and agreement of the Regulatory parties concerned. We are cognisant of the attention this project is receiving, and of the need to follow the procedures and protocols established in conjunction with the Regulators. Any work plan that deviates from what is established in the Plan will be discussed with, and approved by, the appropriate regulators prior to implementation.*

3) Frustration Lake Jetty

Concern was noted by the inspection team about the erosion of the road due the meltwater runoff. TC plans to flatten out the shoulders and generally contour the road to the surrounding terrain. We remind TC to ensure that natural drainage courses are not blocked and that excessive erosion will not be initiated due to improper contouring.

*Teck Cominco acknowledges that the access road to the Frustration Lake jetty was partially washed out on the date of the inspection. This has been an ongoing difficulty even during the operational period. Teck Cominco confirms their intent to restore natural drainage courses and to remove improvements that impede the natural flows. During 2004, the Frustration Lake access road, the pipeline, culverts, and cribbing will be removed, and the roadway and pipebed recontoured to blend smoothly with the existing topography so as to not impede natural drainage.*

4) Little Red Quarry

The preferred method of tire disposal is to shred the tires. However, if shredding is not possible, TC should ensure that all tires be placed into the bottom of the pit so that there is no chance that they could work their way to the surface. The tires should be dispersed so that there isn't a concentration of tires in any one area. Tires should be placed flat to minimize void space and subsequent settlement. If a lot of tires remain to be disposed of, another option may be to place them into an underground drift, where the landfilling protocols would not be an issue.

*Teck Cominco Limited will ensure the tires are placed flat within areas of demolition debris. Where possible, the preferred location will be underwater, prior to covering with infill material, thereby eliminating the potential for void space. Tires will be dispersed to avoid concentrations of such debris in any given area.*

Although there is photo documentation and surveying being done of the material placed into the quarry, a lot of the material does not appear to be placed in a manner that

minimizes voids. This issue must be corrected immediately and placement practices must conform to the protocols given in the joint authorization.

*The placement and subsequent covering of demolition debris is a several-step process. If the material is observed in the early stages, it would be concluded that demolition protocols were not being followed. However, Teck Cominco is confident that the contractor is following the protocols, and doing a good job of placing material so as to minimize void spaces. Initially, material is discharged from the haul truck into large temporary stockpiles with significant void space. These piles are then rehandled with bulldozers or wheeled loaders to reduce the thickness of the material and to reduce the likelihood of void space when fill material is placed. Large pieces such as piping and structural steel columns that would create voids are processed with the hydraulic shears and siding is compacted in the bailer prior to burial. In many cases, an excavator fitted with the hydraulic shears is used to place large pieces underwater prior to covering with fill, which eliminates the possibility of void spaces remaining.*

TC must ensure that they immediately implement a plan to cleanup any future spills or fluid releases within the LRD Quarry. ....It is important that TC ensure that wastes are clean of fluids before placing them into the LRD Quarry and that measures are in place to remove and deal with any contaminating fluids in the pit. We request that TC periodically conduct and record the results of confirmatory sampling of water quality, particularly for the presence of hydrocarbons and salts in the pit wastewater. These results must be provided to DIAND with the along with quarterly reports.

*Steps have been taken to ensure compliance with this issue. Teck Cominco have conducted tests to verify that freezing point depression has not occurred. The test report is appended to this letter, and will be submitted with the next Quarterly Report. The need for immediate resolution of the issue precluded submission of the samples to an outside laboratory. Since the underlying question concerned the freezing point of the water, the water was sampled, cooled, and its freezing point noted. No significant difference from fresh water properties was noted.*

TC must also provide DIAND with a quarterly report that includes an inventory of the material, locations of the material, and photo documentation of the debris disposed of in LRD.

*This material has been submitted in the Quarterly reports as required under the terms of the joint Plan approval.*

#### 5) Mill Barge Complex

During demolition work, the north end of the barge rose a total of 1.4 m. TC should ensure that these conditions do not pose a threat to the safety of the demolition works underway.

*The fact that the mill/barge complex would float during demolition was anticipated during the planning stages of the project and the resulting demolition plan was developed*



*to exploit this situation. In no case were employees or equipment placed at risk. The barge was free-floating from the outset, consistent with observations made by staff during the operating phase of the mine. As a result, there were no sudden movements or shifts in the barge while it rose in the excavation as its weight decreased during the course of demolition. Ultimately, before the hull integrity was compromised, the excavation was dewatered of accumulated meltwater that was disposed of underground as previously approved by DIAND, EC, and NWB. The final hull demolition is being done in the dry, and is progressing well.*

As noted at the tailings thickener, TC must collect all loose insulation and materials that can blow around. Regular policing of the grounds around areas of demolition would ensure that debris is not carried off site by the wind.

*Demolition is an ongoing process and loose insulation etc. is being exposed daily. Such material is collected on a daily basis in order to prevent dispersal by the wind. Other aspects of the project where this remains an issue, such as at the Tailings dam, are being evaluated for alternatives and opportunities that would diminish the risk of materials being spread by the elements.*

#### 6) Meltwater Runoff Disposal Area

TC was required to take at least one meltwater sample for analysis for potential hydrocarbon and mineral sulphide contamination. Please forward this information, as well as a revised description of the actual meltwater storage plan to DIAND.

*Samples were taken and submitted to an outside laboratory for analysis. The results will be included in the next Quarterly Report, but they have been appended to this letter for your review during the upcoming site visit. Additionally, the meltwater, which ultimately accumulated in the barge area excavation, was tested several times to determine its salt content and to verify that the water would freeze as expected. All determinations indicated that although the water was contaminated, its physical properties, specifically its S.G. and freezing point, remained very similar to those of fresh water.*

*The meltwater disposal took place as described in the March 20<sup>th</sup> letter to DIAND, EC, and NWB. Non-contaminated meltwater was contained and directed through uncontaminated ditching to the ocean. Water that entered the industrial areas of the facility was automatically deemed to be contaminated. Initial meltwaters mobilized some hydrocarbons within the area, as expected, and were passed through an oil-water separator before being pumped into the underground receiving environment. Later, as the melt progressed, and hydrocarbons diminished, the water flows exceeded the capacity of the oil-water separator. This water, while contaminated, did not bear free hydrocarbons and was discharged directly into the underground workings. The receiving environment was checked routinely by the Underground Supervisor and his observations logged. At no time was water discharged without his knowledge and agreement. The remaining capacity of the receiving environment was monitored, and at no time was it exceeded. Ventilation checks with respect to volumes and air quality were conducted on*

*an ongoing basis to ensure environmental and safety issues were dealt with. Further, the discharged water was monitored to ensure there were no free hydrocarbons, and that it was freezing in place as expected.*

7) Contaminated Soils Storage Area(s)

An updated estimate of the breakdown of contaminated soils placed underground must be provided to DIAND, as well as the locations being used for disposal.

*The quantities and location maps are available in the quarterly report. The updated estimates for final quantities are not yet available due to difficulties in determining the contaminant boundaries in certain specific areas. This information will be provided in the Polaris Quarterly report as soon as it is available, as required by the terms of the joint approval of the Closure and Reclamation Plan. Teck Cominco Metals Limited would welcome the opportunity to discuss this further during your scheduled site visit.*

8) Ammonium Nitrate Storage Area

DIAND's preferred method of disposing any unused amounts of ammonium nitrate is to mix it with diesel fuel into ANFO and detonate it on site at a safe location, rather than landfilling. This will also get rid of some of the leftover diesel fuel. This would also be subject to approval of the other regulators

*The majority of this material will be consumed during the decommissioning period as stated in the Inspection Report. Significant quantities are required to produce the necessary rock and infill material for the Polaris landfill covercaps. It will not be used at Garrow Lake dam. Remaining quantities will be disposed of utilising methods that are acceptable to all the regulatory agencies concerned. There are, however, significant environmental and safety concerns relating to the destruction of Ammonium Nitrate by detonation. Since Ammonium Nitrate is not classified as a hazardous material Teck Cominco Limited recommends that this material be disposed of in the underground workings where it will be inaccessible and encapsulated due to the portal plugs. Additionally, the presence of permafrost throughout the underground workings will prevent any dispersal by water. Teck Cominco Metals Limited views this approach as consistent with the approvals already received under the closure plan.*

9) Reclamation Costs and Schedule

TC must submit monthly and quarterly statements of the cost tracking for the decommissioning and reclamation activities, including the percentage of work completed and estimated cost to complete, as required by their Water License. This is required for ongoing assessment of their closure bond and security requirements.

*The approval under the Water Licence that contains the bonding requirements specifies that schedule and cost forecasts are to be provided on a quarterly basis. We understand*

*the need for this information to be submitted so that DIAND and the NWB are aware of any significant changes to schedules or costs. The 1<sup>st</sup> and 2<sup>nd</sup> Quarterly reports for 2003 have been submitted and contain this information. The next formal report will be submitted by November 15, 2003 and contain both current costs and forecast costs to complete the decommissioning and reclamation work. If more frequent updates on progress and costs are desired, we suggest a monthly conference call where any significant issues can be discussed in a timely manner and provide an opportunity for other areas of interest to also be discussed.*

We request TC to submit an updated list of activities and timelines for all aspects of the reclamation.

*This has been recently submitted in the 2<sup>nd</sup> Quarter project report submitted to DIAND and the NWB.*

We appreciate that DIAND feels that Teck Cominco is progressing very well towards our reclamation objectives and remain confident that all applicable standards and commitments are at the least being met, and in many cases exceeded.

Please feel free to contact me if the above leads to any concerns or further questions.

Yours truly,

***Cominco Mining Partnership***

John Knapp  
Site Manager  
Polaris Reclamation Project

Enclosures (2)

cc: Mr. Philippe DiPizzo, Nunavut Water Board  
Mr. Bruce Donald, Reclamation Manager, TCL  
Mr. Bob Hutchinson, General Manager, Projects, TCL  
Mr. Walter Kuit, Director, Environmental Affairs, TCL  
Ms. Colette Meloche, Environmental Assessment Specialist, EC

## **APPENDIX 8**

### **LITTLE RED DOG QUARRY LANDFILL WATER SAMPLE ANALYSIS AND FREEZE TEST RESULTS**

**Project** 23305 Polaris Water Analysis  
**Report to** Gartner Lee Ltd.  
**ALS File No.** T2135  
**Date Received** 31/07/2003  
**Date:** 08/08/2003

## RESULTS OF ANALYSIS

## Detection Limits

## Results

<b>Sample ID</b>	LRD-1	25 07 03
<b>Date Sampled</b>	25/07/2003	
<b>Time Sampled</b>	11:20	
<b>ALS Sample ID</b>	1	
<b>Nature</b>	Water	

### Physical Tests

Conductivity (uS/cm)	2	3280
pH	-	-

### Dissolved Anions

Alkalinity-Total CaCO3	1	64
Alkalinity-Bicarbonate CaCO3	1	64
Chloride Cl	5	577

### Total Metals

Antimony T-Sb	-	-
Arsenic T-As	-	-
Barium T-Ba	-	-
Beryllium T-Be	-	-
Cadmium T-Cd	-	-
Chromium T-Cr	-	-
Cobalt T-Co	-	-
Copper T-Cu	-	-
Lead T-Pb	-	-
Mercury T-Hg	-	-
Molybdenum T-Mo	-	-
Nickel T-Ni	-	-
Selenium T-Se	-	-
Silver T-Ag	-	-
Tin T-Sn	-	-
Vanadium T-V	-	-
Zinc T-Zn	-	-

### Extractable Hydrocarbons

EPH10-19	0.3	1
EPH19-32	1	1

### Footnotes:

< = Less than the detection limit indicated.

EPH = Extractable Petroleum Hydrocarbons.

Water samples only - Results are expressed as milligrams per litre except where noted.

Water samples only - EPH10-19 is equivalent to EHW10-19.



## MEMORANDUM

To: Bruce Donald, Teck Cominco Ltd.

CC: John Knapp Date: August 15, 2003

From: Dennis Lu Ref: 23305

Subject: Freezing point of LRD Water

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The purpose of this exercise was to determine the freezing point of water contained at the Little Red Dog Quarry (LRD). A sample was taken from the LRD on August 15, 2003 to characterize the freezing point. An electronic multimeter (YSI 85D) was used to determine the temperature and salinity. For the purposes of comparing the freezing point of LRD pit water to distilled water, a control sample of distilled water was run.

The samples were stored in 300mL beakers in the freezer until the samples were approximately 40% frozen. At this point the ice in the beaker was broken up and the instrument inserted in the ice/water mixture. The mixture was then stirred in order to maintain a constant temperature. When the readings became stable, temperature and salinity parameters were taken. The results from the experiment are as follows:

Parameter	LRD Water	Distilled Water (control)
Temperature	0.1°C	0.3°C
Salinity	1.1ppt	0.0ppt

A photo to illustrate the process is located below.



Photo 1: Top view of measuring instrument and LRD ice/water mixture.