Appendix C

Polaris Mine Operations Contaminated Soil Remediation Close Out Report: Former Quonset Huts Fuel Storage Area

Gartner Lee Limited

December 31, 2003

Mr. Bruce Donald
Teck Cominco Limited
Bag 2000
Kimberley, BC V1A 3E1

Dear Mr. Donald:

Re: 23305 – Polaris Mine Operations Contaminated Soil Remediation
Close Out Report: Former Quonset Huts Fuel Storage Area

BACKGROUND

The former Quonset Huts area (shown as Area 6 on Figure 1: *Contaminated Soils Remedial Progress Plan*) is located east of Loon Lake at 1320E and 1670N on the mine grid. This area housed the maintenance shed as well as the High Arctic Club recreation room. The shed contained various pieces of equipment, fuels, and lube oils. Areas of hydrocarbon stained soils were observed within the Quonset Hut where refueling facilities consisting of hand pumps attached to fuel drums were located. Contaminants of concern in this area were gasoline, diesel and lubricants. Figure QH-06-1 shows the area of suspected hydrocarbon concern identified during the Environmental Site Assessment (ESA) conducted in 1999 and 2000.

METHODOLOGY

Delineation

The area of suspected petroleum hydrocarbon contamination identified in the ESA was demarcated in the field.

Delineation of the hydrocarbon impacted area was accomplished through screening level sampling of the surface and subsurface material in the targeted area for remediation. This was undertaken using test pits advanced with an excavator to allow for observation of subsurface soil conditions such as fill, hydrocarbon odours, and soil discolouration. The testpits were excavated

to a depth of 1 m, approximately 0.3 m below the active permafrost layer. Samples were collected at 0.3 m intervals (0 m-0.3 m, 0.3 m-0.6 m, and 0.6 m-0.9 m) in accordance with standard GLL and TCL sampling procedures and protocols.

A line of three test pits (QH1, QH2, and QH3), spaced approximately15 m apart, within the centre of the suspected contaminated area, were excavated and sampled. The location of the test pits are shown in Figure QH-06-01. The olfactory condition and field screening measurements of the concentrations of organic vapours in the soil samples from the centre test pit (QH2) indicated possible subsurface hydrocarbon contamination. Therefore, two additional test pits were excavated and sampled eight meters to the east (QH4) and eight meters to the west (QH5) of the centre test pit (QH2).

Field screening samples were collected by hand in accordance with standard GLL and TCL sampling procedures and protocols. These samples were deposited into sealable polyethylene bags and the field screening measurements were obtained using a portable photoionization detector (PID) to measure the concentrations of organic vapours in the headspace of the sample bags.

Excavation

No excavation was required at the former Quonset Huts area.

Confirmatory Sampling

The field screening results indicated vapour readings below 65 ppm. A subset of the on site field screening samples were sent to Aurora Laboratory Services, Ltd. (ALS) of Vancouver BC, in clean Teflon lined jars to confirm the presence and nature of hydrocarbon compounds. To confirm a clean vertical profile, samples above and below the elevated organic vapour reading in test pit QH2 were sent for lab analysis. To confirm a clean horizontal profile, samples from each test pit with the highest PID reading were sent for lab analysis. Confirmation sampling locations are shown on Figure QH-06-01.

ANALYTICAL RESULTS

All samples sent to the analytical laboratory confirmed Extractable Petroleum Hydrocarbons (EPH) EPH (C_{10}-C_{19}) concentrations below the method detection limit, except for one sample from QH2 1-2 ft (0.305 m-0.61 m). However, this sample returned results below the soil quality remediation objective (SQRO) of 1,000 mg/kg. All samples confirmed EPH (C_{19}-C_{32}) concentrations just above the method detection limit and well below the SQRO of 1,000 mg/kg.

These results indicate that the elevated petroleum hydrocarbon concentration below the SQROs from test pit QH2 1-2 ft (0.305 m-0.61 m) did not migrate.

Analytical laboratory results for EPHs are summarized in Table QH-06-1. A total of seven (7) remediation confirmation samples were submitted for the former Quonset Hut area, all of which are wall composite samples collected from the test pits.

Quality Assurance and Quality Control (QA/QC)

QA/QC was performed on one laboratory replicate sample from the Quonset Area. Since the lab results were below the practical quantitation limit this QA/QC result could not be assessed as shown in Table QH-06-2.

CONCLUSIONS

Based on confirmatory sampling consistent with good practice and the approved site specific sampling procedures and protocols, investigations confirm that no exceedances of remedial targets exist at the former Quonset Huts Area. Therefore, no remedial action was required in this area to meet the Polaris Mine remedial targets as documented in the approved Polaris Mine Decommissioning and Remediation Plan, March 2001.

LIMITATIONS

This report has been prepared by Gartner Lee Limited and the information in this report is intended for the use of Teck Cominco Metals Limited during the decommissioning and reclamation program currently underway at the Polaris Mine Site. Any use which a third party makes of this report, or any reliance on or decisions made on the basis of the information in this report is the responsibility of such third parties. Gartner Lee Limited accepts no responsibility for damages, if any, suffered by the third party, based on the use of or reliance on any information contained in this report.

The scope of Gartner Lee Limited's work was limited to that described in this report. The confirmation of environmental conditions at the site of the remedial work is based on sampling at specific wall and floor locations within the excavation limits. Gartner Lee Limited has used judgement in the interpretation of the available information but subsurface physical and/or chemical characteristics may vary between or beyond sampling locations. Gartner Lee Limited is not a guarantor of the environmental condition of the site but warrants only that its work was undertaken and its report prepared in a manner consistent with the level of skill and diligence

normally exercised by competent environmental professionals practicing in the Nunavut Territory.

Yours very truly,
GARTNER LEE LIMITED

Feb 17/04
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THE ASSOCIATION OF PROFESSIONAL ENGINEERS, GEOLOGISTS and GEOPHYSICISTS OF THE NORTHWEST TERRITORIES
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ATTACHMENTS

Tables

Table QH-06-1: Former Quonset Huts Fuel Storage Area Remediation Confirmation Soil Samples - Hydrocarbons
Table QH-06-2: Former Quonset Huts Fuel Storage Area Quality Assurance and Quality Control Remediation Soil Samples

Figures

Figure QH-06-1: Former Quonset Hut Area (December 31, 2003)

Table QH-06-1. Former Quonset Huts Fuel Storage Area Remediation Confirmation Soil Samples - Hydrocarbons

Gartner Lee		Location	Quonset Huts						
		Sample ID	QH1 1-2ft-C	QH2 0-1ft-C	QH2 1-2ft-C	QH2 2-3ft-C	QH3 1-2ft-C	QH4 1-2ft-C	QH5 2-3ft-C
		Date Sampled	8/8/03	8/8/03	8/8/03	8/8/03	8/8/03	8/8/03	8/8/03
		Field Screen (ppm)[b]	10	15	65	20	15	20	20
Parameter	**Units**	**Polaris Mine SQROs[a]**	**Analytical Results**						
Physical Tests									
Moisture	%	-	6.3	6.7	9.4	8.4	11.4	10.4	4.9
Extractable Hydrocarbons									
EPH C_{10}-C_{19}[c]	mg/kg	1000[e]	<200	<200	908	<200	<200	<200	<200
EPH C_{19}-C_{32}[c]	mg/kg	1000[e]	<200	248	319	<200	285	216	<200
LEPH[d]	mg/kg	1000	-	-	-	-	-	-	-
HEPH[d]	mg/kg	1000	-	-	-	-	-	-	-

Associated ALS Analytics Files: T2588

Notes.

Bold — *Concentration exceeds the Soil Quality Remediation Objective (SQRO) for the Polaris Mine Site*

"<" = less than analytical method detection limit

"-" = no result for given parameter, or no guideline

"na" = no field screening result

a) The Soil Quality Remediation Objective for the Polaris Mine Site is based on the Yukon Territorial Contaminated Sites Regulation (CSR) for Parkland Land Use

b) Field screening measurements are based on the 'dry headspace' method using a combustible gas meter calibrated to a hexane standard.

c) EPH stands for extractable petroleum hydrocarbon

d) LEPH and HEPH stand for light and heavy extractable petroleum hydrocarbons.

e) LEPH/HEPH is determined by subtracting polycyclic aromatic hydrocarbons (PAH) from EPH, therefore use of the EPH remediation objective is conservative.

Table QH-06-2. Former Quonset Huts Fuel Storage Area Quality Assurance and Quality Control Remediation Soil Samples

Gartner Lee	Parameter	EPH C_{10}-C_{19}		EPH C_{19}-C_{32}		EPH C_{10}-C_{19}			EPH C_{19}-C_{32}		
Sample ID	Relative Percent Difference (RpD)[a] / Duplicate ID	MDL	PQL[b]	MDL	PQL[b]	Sample EPH C_{10}-C_{19}	Duplicate EPH C_{10}-C_{19}	RpD[a] (%)	Sample EPH C_{19}-C_{32}	Duplicate EPH C_{19}-C_{32}	RpD[a] (%)
Analytical Laboratory Replicates											
QH4 1-2ft-C	QC# 349327	200	1000	200	1000	<200	<200	na	216	<200	na

Notes:

Bold *RpD value is greater than or equal to 50% and the concentrations of both samples are greater than the practical quantitation limit (PQL)*

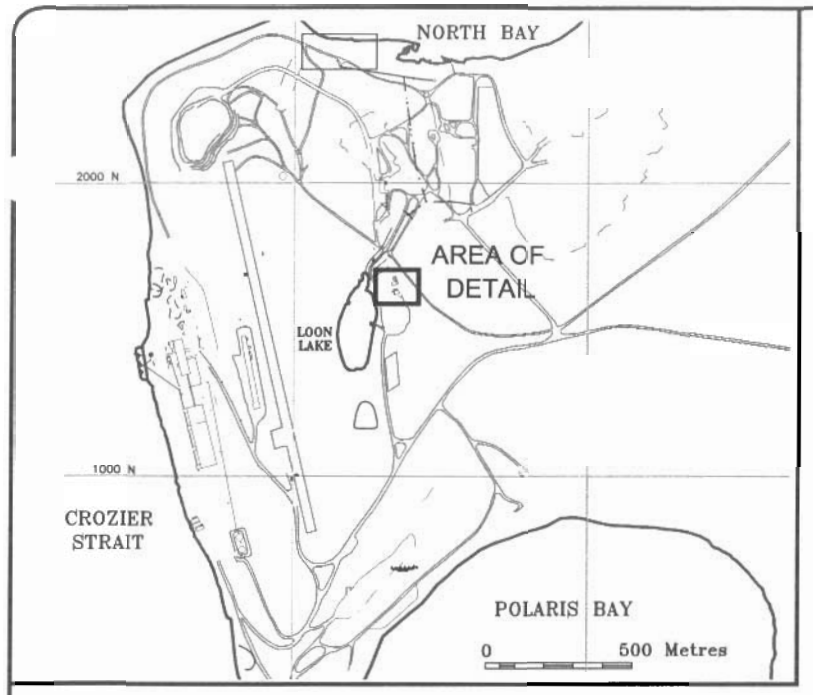
"na" = RpD value is not applicable because one or both results are less than the practical quantitation limit (PQL).

"-" = no result for given parameter

"<" = less than analytical method detection limit

*a) Relative Percent Difference = RpD = (Difference/Average) * 100*

*b) Practical Quantitation Limit (PQL)=5 * Method Detection Limit (MDL)*



0 5 10 20 30 Metres

SCALE 1:750

2003 CONFIRMATION SAMPLES
TEST PIT SAMPLES

Sample ID	EPH 10-19 (mg/kg)	EPH 19-32 (mg/kg)
QH1 1-2ft-C	<200	<200
QH2 0-1ft-C	<200	248
QH2 1-2ft-C	908	319
QH2 2-3ft-C	<200	<200
QH3 1-2ft-C	<200	285
QH4 1-2ft-C	<200	216
QH5 2-3ft-C	<200	<200

NOTES:

<200 Less than detection limit

EHP10-19 Extractable Petroleum Hydrocarbon (Carbon fraction 10-19) concentration obtained from ALS analytical laboratory

EPH19-32 Extractable Petroleum Hydrocarbon (Carbon fraction 19-32) concentration obtained from ALS analytical laboratory

LEGEND:

- INTERMITTENT STREAM
- FORMER LOCATION OF BUILDINGS AND FACILITES (REMOVED)
- WATER LINE
- ROADS
- EXCAVATION GRID
- AREA OF SUSPECTED HYDROCARBON CONCERN FROM 1999-2000 ENVIRONMENTAL SITE ASSESSMENT
- 2003 TEST PIT WALL SAMPLE
- TP-68 TEST PIT 1999-2000 ENVIRONMENTAL SITE ASSESSMENT

2003 SAMPLE NAMING CONVENTION

QH1-1-2ft-C
- AREA
- TEST PIT NUMBER
- DEPTH (FEET)
- TYPE C= COMPOSITE SAMPLE FLOOR-5 SAMPLES IN A 25x25m AREA WALL-5 SAMPLES ALONG 25m OF WALL
- D= DISCRETE SAMPLE
- Q= DUPLICATED QUALITY ASSURANCE/ QUALITY CONTROL SAMPLE

EPH10-19 SOIL SAMPLE CONTAINS LESS THAN 1,000 mg/kg EPH 10-19 OR EPH 19-32

EPH19-32

NOTE:
THIS IS AREA 6 SHOWN ON FIGURE 1 "CONTAMINATED SOILS REMEDIATION PROGRESS PLAN, DECEMBER 31, 2003"

SOURCE OF DRAWING:
SITE SURVEYS PROVIDED BY SNC LAVALIN SEPTEMBER, 2003

DRAWING INFORMATION:

REVIEWED BY:	KT/AL
DRAWN BY:	CPW
DATE ISSUED:	13 FEBRUARY, 2004
PROJECT NUMBER:	23-305
FILE NAME:	23305-6F-14.DWG
REVISION:	0

teckcominco

CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

FORMER QUONSET HUT AREA
(DECEMBER 31, 2003)

Gartner Lee

Figure No. QH-06-1

Appendix D

Polaris Mine Operations Contaminated Soil Remediation Close Out Report: Tailings Thickener Area

Gartner Lee Limited

December 31, 2003

Mr. Bruce Donald
Teck Cominco Limited
Bag 2000
Kimberley, BC V1A 3E1

Dear Mr. Donald:

Re: 23305 – Polaris Mine Operations Contaminated Soil Remediation
Close Out Report: Tailings Thickener Area

BACKGROUND

The tailings thickener was located at the height of land to the west of the Garrow Lake tailings disposal area, approximately 4 km from the concentrator (shown as Area 11 on Figure 1: *Contaminated Soils Remediation Progress Plan, December 31, 2003*). The tailings thickener consisted of a 40 m diameter steel tank, approximately 5 m high. It was fitted with motorized rakes and enclosed within a metal-clad, steel-frame structure, and included pumps, piping, and reagent tanks. The entire facility was mounted on a concrete foundation. A skid mounted emergency power generator, an above-ground fuel storage tank, and an emergency tailings impoundment basin (spill pond) were located adjacent to the building.

Incidents of tailing spills in the vicinity of the thickener area have been documented as part of the Environmental Site Assessment (ESA) conducted in 1999 and 2000. In April 1983 a valve coupling broke at the tailings thickener and 150-200 tonnes of tailings spilled into the emergency berm and also across the road. In April 1986 the tailings line was broken approximately 100 m north of the thickener by a D-8 Cat pushing snow, releasing 20 tonnes of tailings. Mine operations cleaned the spills immediately after each incident, but no environmental sampling was conducted to evaluate the effectiveness of the clean up activities.

The ESA identified the area as containing elevated concentrations of metals due to the tailings spills and possible wind blown dispersion of tailings and surface water runoff. It also identified possible hydrocarbon contamination around the above ground fuel storage tank, though no surficial soil staining was observed during the ESA investigation.

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METHODOLOGY

Delineation

The preliminary boundary of the remedial area, as identified in the ESA, was demarcated in the field with survey stakes. To direct the field screening sampling of soil and excavation activities a 25m x 25m sampling grid was also established over the area. The surface elevation was surveyed by SNC Lavalin.

The suspected metal contamination in the tailings thickener area, as shown on Figure TT-11-1, was attributed to air borne dispersion of tailings, and surface water runoff containing tailings sourced from the tailings thickener spill pond and the tailings line break. Therefore, delineation of the metals impacted areas was accomplished through screening-level sampling. GLL sampled near surface soil to depths up to 5 cm in accordance with standard GLL and TCL sampling procedures and protocols. Samples were analysed on site using a portable Niton X-ray fluorescence (XRF) elemental analyser. Subsets of samples field screened on site were sent to the analytical laboratory, Aurora Laboratory Services Ltd. (ALS) of Vancouver BC, to confirm the level of metals in the soil. Based on the results of the field screening sampling, GLL modified the boundaries of the area to be remediated and directed excavation.

A visual, olfactory and field screening sample inspection of the area of potential hydrocarbon contamination, shown on Figure TT-11-1, did not identify any hydrocarbon contamination. The three field screening samples of near-surface soil (depth of 0 to 30cm) were collected in accordance with standard GLL and TCL sampling procedures and protocols. These samples were deposited into sealable polyethylene bags. The field screening measurements were obtained using a portable photoionization detector (PID) to measure the concentrations of organic vapours in the headspace of the sample bags. The field screening results did not detect any elevated organic vapour concentrations, so these samples were sent to ALS as hydrocarbon confirmation samples.

Excavation

The tailings thickener building footprint and the tailings thicken spill pond were sampled and screened for metals contamination using the Niton XRF and laboratory analyses in May 2003. Screening results indicated that the south half of the tailings thickener spill pond contained lead and zinc concentrations above the Soil Quality Remediation Objectives (SQROs). In early August 2003, the south half of the tailings thickener spill pond was excavated to a depth of 0.5 m. Confirmation sampling of the excavation and the north half of the pond was performed in mid August 2003.

The area west of the former tailings thickener building, in the vicinity of the 1986 tailings line break, was sampled and screened for metals contamination using the Niton XRF in July 2003. Screening results indicated two areas, one either side of the access road, approximately 100m west of the former tailings thickener building to have lead and zinc concentrations above the SQROs. In early August 2003, these areas were excavated to a depth of 0.3 m. Confirmation sampling of the excavation was performed in mid August 2003.

The area southwest of the former tailings thickener building and spill pond, identified as possibly contaminated due to wind blown dispersion and surface water runoff of tailings was also sampled and screened for metals using the Niton XRF in July 2003. Field screening results from discrete samples TT-56-F-D and TT-46-F-D (see Figure TT-11-2) returned elevated lead concentrations of 2,018 ppm and 1,792 ppm respectively with the Niton XRF. Four composite samples and one discrete sample (TT-108-F-C, TT-109-F-C, TT-110-F-C, TT-111-F-C, TT-112-F-D) surrounding the field screening exceedances were collected and submitted to the analytical laboratory. Laboratory results confirmed that the soil in this area met the SQROs. Based on these laboratory results, no remedial excavation was performed southwest of the former thickener building.

The perimeter of the berm containing the tailings thickener spill pond was sampled and screened for metals contamination in July 2003. Screening results did not detect lead or zinc concentrations above the Niton confidence limit (1,500 ppm for Pb and 7,500 ppm for Zn). Therefore no remedial excavation was required outside the tailings thickener impoundment basin.

ANALYTICAL RESULTS

Analytical laboratory results for hydrocarbons and metals are summarized in Table TT-11-1 and TT-11-2 respectively along with the approved Polaris mine SQROs for petroleum hydrocarbons and lead and zinc. A total of twenty nine (29) remediation confirmation samples were submitted to the analytical laboratory from the tailings thickener area. Three (3) floor composite samples were analysed for hydrocarbons and twenty six (26) samples were analysed for metals: eleven (11) floor composites, four (4) floor discretes, eight (8) wall composites, two (2) wall discretes, and one (1) laboratory duplicate.

All of the hydrocarbon remediation confirmation samples returned results below the Polaris mine SQROs.

The metal remediation confirmation samples met the approved closure plan objectives for the contaminants of concern. One discrete metals sample from the tailings spill pond excavation, TT-203-F-D, returned results from the analytical laboratory slightly above the Polaris mine SQRO for lead. And, one composite sample north of the tailings spill pond excavation, TT-194-I-C, returned

field screening results above the Niton XRF confidence limit for zinc. Both the lead exceedance of 2,140 mg/kg, and the zinc exceedance of 8,643 mg/kg are less than two times the SQRO and are therefore in accordance with the site specific remedial protocol permitting for minor exceedances in less than 5% of confirmatory samples.

Total metals analysis was performed on three confirmation samples, from which two samples returned barium concentrations more than three times the generic Canadian Council of Ministers of Environment (CCME) Canadian Environmental Quality Guideline (CEQG) for Parkland land use of 500mg/kg in soil. The presence of barium can be explained by its association with lead sulphides and cavities in limestones and dolostones as commonly observed at the Polaris mine site. Lime, naturally occurring in the soil on Little Cornwallis Island, will easily immobilize barium by forming the relatively insoluble $BaCO_3$ and $BaSO_4$, and barium is easily precipitated to sulphate or carbonate (CCME 1999). The immobile nature of the barium encountered on site was also demonstrated in the 1999 ESA leachate analyses that returned barium concentrations at levels less than detection and it was therefore not identified as a contaminate of concern in the Polaris Mine ESA.

Quality Assurance and Quality Control (QA/QC)

Relative percent differences (RpD) have been calculated and compiled in table TT-11-3 for 15 on site field screened duplicates, one (1) analytical laboratory duplicate, and four (4) analytical laboratory replicates.

Some of the samples returned results below the practical quantitation limit in which case the RpD value has been identified as "na" (not available). The remaining RpD values are below 50%, indicating acceptable repeatability.

CONCLUSION

Based on confirmatory sampling consistent with good practice and the approved site specific sampling procedures and protocols, the remediation of the former tailings thickener area has been completed to meet the Polaris Mine remedial targets, as documented in the approved Polaris Mine Decommissioning and Remediation Plan, March 2001.

LIMITATIONS

This report has been prepared by Gartner Lee Limited and the information in this report is intended for the use of Teck Cominco Metals Limited during the decommissioning and

reclamation program currently underway at the Polaris Mine Site. Any use which a third party makes of this report, or any reliance on or decisions made on the basis of the information in this report is the responsibility of such third parties. Gartner Lee Limited accepts no responsibility for damages, if any, suffered by the third party, based on the use of or reliance on any information contained in this report.

The scope of Gartner Lee Limited's work was limited to that described in this report. The confirmation of environmental conditions at the site of the remedial work is based on sampling at specific wall and floor locations within the excavation limits. Gartner Lee Limited has used judgement in the interpretation of the available information but subsurface physical and/or chemical characteristics may vary between or beyond sampling locations. Gartner Lee Limited is not a guarantor of the environmental condition of the site but warrants only that its work was undertaken and its report prepared in a manner consistent with the level of skill and diligence normally exercised by competent environmental professionals practicing in the Nunavut Territory.

Yours very truly,
GARTNER LEE LIMITED

Feb 17/04
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AL:KT

ATTACHMENTS

Tables

Table TT-11-1	Tailings Thickener Area Remediation Confirmation Soil Samples Hydrocarbons
Table TT-11-2	Tailings Thickener Area Remediation Confirmation Soil Samples - Metals
Table TT-11-2:	Tailings Thickener Area Quality Assurance and Quality Control Remediation Soil Samples

Figures

Figure TT-11-1:	Tailings Thickener Area Conditions Before Remediation (December 31, 2003)
Figure TT-11-2:	Tailings Thickener Area Conditions After Remediation (December 31, 2003)

Table TT-11-1. Tailings Thickener Area Remediation Confirmation Soil Samples - Hydrocarbons

Gartner Lee		Location	Tailings Thickener		
		Sample ID	TT-167-F-C	TT-168-F-C	TT-169-F-C
		Date Sampled	7/29/03	7/29/03	7/29/03
		Field Screen (ppm)[b]	na	na	na
Parameter	**Units**	**Polaris Mine SQROs[a]**	**Analytical Results**		
Physical Tests					
Moisture	%	-	7	13.2	10.5
Extractable Hydrocarbons					
EPH C_{10}-C_{19}[c]	mg/kg	1000[e]	<200	<200	<200
EPH C_{19}-C_{32}[c]	mg/kg	1000[e]	250	414	242
LEPH[d]	mg/kg	1000	-	-	-
HEPH[d]	mg/kg	1000	-	-	-

Associated ALS Analytics files: T2239

Notes:

Bold *Concentration exceeds the Soil Quality Remediation Objective (SQRO) for the Polaris Mine Site*

"<" = less than analytical method detection limit

"-" = no result for given parameter, or no guideline

"na" = no field screening result

a) The Soil Quality Remediation Objective for the Polaris Mine Site is based on the Yukon Territorial Contaminated Sites Regulation (CSR) for Parkland Land Use

b) Field screening measurements are based on the 'dry headspace' method using a combustible gas meter calibrated to a hexane standard.

c) EPH stands for extractable petroleum hydrocarbon

d) LEPH and HEPH stand for light and heavy extractable petroleum hydrocarbons.

e) LEPH/HEPH is determined by subtracting polycyclic aromatic hydrocarbons (PAH) from EPH, therefore use of the EPH remediation objective is conservative.

Table TT-11-2. Tailings Thickener Area Remediation Confirmation Soil Samples - Metals

Gartner Lee

Parameter	Units	Federal CCME Guidelines		Analytical Results								
		CEQG (PL)[a]	SQRO[b]									
Location				Tailings Thickener								
Sample ID				TT-108-F-C*	TT-109-F-C*	TT-110-F-C*	TT-111-F-C*	TT-112-F-D*	TT-170-F-C	TT-173-F-C	TT-179-W-C	TT-189-W-C
Date Sampled				7/29/03	7/29/03	7/29/03	7/29/03	7/29/03	8/4/03	8/4/03	8/7/03	8/7/03
Field Screen Pb [c] (ppm)				317.14	933.37	650.03	685.53	792.2	1039.77	164	156.21	126.85
Field Screen Zn [c] (ppm)				848.6	2805.02	1827.42	1959.98	1966.24	3681.11	296.33	416.14	355.86
Physical Tests												
pH		-	-	-	-	-	8.07	-	-	8.4	-	-
Total Metals												
Antimony T-Sb	mg/kg	20[d]	-	-	-	-	<20e	-	-	<10	-	-
Arsenic T-As	mg/kg	12	-	-	-	-	11	-	-	6	-	-
Barium T-Ba	mg/kg	500	-	-	-	-	290	-	-	1910	-	-
Beryllium T-Be	mg/kg	4[d]	-	-	-	-	<1	-	-	<0.5	-	-
Cadmium T-Cd	mg/kg	10	-	-	-	-	5	-	-	1.1	-	-
Chromium T-Cr	mg/kg	64	-	-	-	-	17	-	-	14	-	-
Cobalt T-Co	mg/kg	50[d]	-	-	-	-	6	-	-	5	-	-
Copper T-Cu	mg/kg	63	-	-	-	-	36	-	-	19	-	-
Lead T-Pb	mg/kg	-	2000	186	794	707	567	523	66	<50	110	<100
Mercury T-Hg	mg/kg	6.6	-	-	-	-	<0.05	-	-	0.05	-	-
Molybdenum T-Mo	mg/kg	10[d]	-	-	-	-	<8	-	-	<4	-	-
Nickel T-Ni	mg/kg	50	-	-	-	-	31	-	-	27	-	-
Selenium T-Se	mg/kg	1	-	-	-	-	<3[e]	-	-	<2[e]	-	-
Silver T-Ag	mg/kg	20[d]	-	-	-	-	<4	-	-	<2	-	-
Tin T-Sn	mg/kg	50[d]	-	-	-	-	<10	-	-	<5	-	-
Vanadium T-V	mg/kg	130	-	-	-	-	88	-	-	67	-	-
Zinc T-Zn	mg/kg	-	10000	700	3090	1940	1570	1300	285	130	624	147

Associated ALS Analytics files: S8646, T2239, T2587, T2886, T4719, T6630

Notes:

Bold	*Exceeds the CCME Tier 1 Soil Quality Guidelines for Parkland Land Use*
Bold	*Exceeds the CCME Tier 3 Risk-Based Soil Soil Quality Remedial Objectives for the Polaris Mine Site*

<= Less than analytical method detection limit

"-" = No analysis performed for given parameter, or no guideline

a) Canadian Council of Ministers of Environment (CCME) Canadian Environmental Quality Guidelines (CEQG) - Tier 1 soil quality remediation guidelines for parkland land use (PL). The site specific factors used for determining the soil quality guideline include: soil ingestion, soil contact, and nutrient cycling.

b) Canadian Council of Ministers of Environment (CCME) Tier 3 Risk based soil quality remedial objective (SQRO) for the Polaris Mine Site.

c) Field screening measurements are based on the Niton XLi 700 Series portable X-Ray Fluorescence (XRF) elemental analyser.

d) Canadian Council of Ministers of Environment (CCME) Tier 1 parkland land use interim remediation criteria, where soil quality gudelines based on the CCME soil protocol have not been developed yet.

e) The analytical method detection limit (MDL) exceeds the CCME Tier 1 Soil Quality Remediation Guidelines for parkland land use (PL)

**Samples TT-108-F-C, TT-109-F-C, TT-110-F-C, TT-111-F-C, and TT-112-F-D are recorded as TT-108-C, TT-109-C, TT-110-C, TT-111-C, and TT-112-D in ALS report T2239*

Table TT-11-2. Tailings Thickener Area Remediation Confirmation Soil Samples - Metals

Gartner Lee

		Location	Tailings Thickener								
		Sample ID	TT-192-F-C	TT-198-F-C	TT-199-F-D	TT-200-F-C	TT-201-F-D	TT-202-F-C	TT-203-F-D	TT-204-F-C	TT-205-W-C
		Date Sampled	8/10/03	8/15/03	8/15/03	8/15/03	8/15/03	8/15/03	8/15/03	8/15/03	8/15/03
		Field Screen Pb [c] (ppm)	87.6	547.54	972.97	495.18	543.6	518.03	584.3	595.41	546.08
		Field Screen Zn [c] (ppm)	491.55	4033.51	4818.04	3745.8	3114.82	3594.29	4012.64	4018	3157.78
Parameter	**Units**	**Federal CCME Guidelines**		**Analytical Results**							
		CEQG (PL)[a]	SQRO[b]								
Physical Tests											
pH		-	-	8.25	-	-	-	-	-	-	-	-
Total Metals											
Antimony T-Sb	mg/kg	20[d]	-	<10	-	-	-	-	-	-	-	-
Arsenic T-As	mg/kg	12	-	9	-	-	-	-	-	-	-	-
Barium T-Ba	mg/kg	500	-	**1750**	-	-	-	-	-	-	-	-
Beryllium T-Be	mg/kg	4[d]	-	<0.5	-	-	-	-	-	-	-	-
Cadmium T-Cd	mg/kg	10	-	1.6	-	-	-	-	-	-	-	-
Chromium T-Cr	mg/kg	64	-	16	-	-	-	-	-	-	-	-
Cobalt T-Co	mg/kg	50[d]	-	5	-	-	-	-	-	-	-	-
Copper T-Cu	mg/kg	63	-	24	-	-	-	-	-	-	-	-
Lead T-Pb	mg/kg	-	2000	<100	<50	<100	81	1530	<100	***2140***	68	68
Mercury T-Hg	mg/kg	6.6	-	<0.05	-	-	-	-	-	-	-	-
Molybdenum T-Mo	mg/kg	10[d]	-	<4	-	-	-	-	-	-	-	-
Nickel T-Ni	mg/kg	50	-	30	-	-	-	-	-	-	-	-
Selenium T-Se	mg/kg	1	-	<2[e]	-	-	-	-	-	-	-	-
Silver T-Ag	mg/kg	20[d]	-	<2	-	-	-	-	-	-	-	-
Tin T-Sn	mg/kg	50[d]	-	<5	-	-	-	-	-	-	-	-
Vanadium T-V	mg/kg	130	-	79	-	-	-	-	-	-	-	-
Zinc T-Zn	mg/kg	-	10000	247	313	401	481	4790	293	2970	411	859

Associated ALS Analytics files: S8646, T2239, T2587, T2886, T4719, T6630

Notes:

Bold	*Exceeds the CCME Tier 1 Soil Quality Guidelines for Parkland Land Use*
Bold	*Exceeds the CCME Tier 3 Risk-Based Soil Soil Quality Remedial Objectives for the Polaris Mine Site*

<= Less than analytical method detection limit

"-" = No analysis performed for given parameter

a) Canadian Council of Ministers of Environment (CCME) Canadian Environmental Quality Guidelines (CEQG) - Tier 1 soil quality remediation guidelines for parkland land use (PL). The site specific factors used for determining the soil quality guideline include: soil ingestion, soil contact, and nutrient cycling.

b) Canadian Council of Ministers of Environment (CCME) Tier 3 Risk based soil quality remedial objective (SQRO) for the Polaris Mine Site.

c) Field screening measurements are based on the Niton XLi 700 Series portable X-Ray Fluorescence (XRF) elemental analyser.

d) Canadian Council of Ministers of Environment (CCME) Tier 1 parkland land use interim remediation criteria, where soil quality gudelines based on the CCME soil protocol have not been developed yet.

e) The analytical method detection limit (MDL) exceeds the CCME Tier 1 Soil Quality Remediation Guidelines for parkland land use (PL).

Table TT-11-2. Tailings Thickener Area Remediation Confirmation Soil Samples - Metals

Gartner Lee

		Location	Tailings Thickener							
		Sample ID	TT-206-W-C	TT-207-W-C	TT-208-W-C	TT-209-W-C	TT-210-W-C	TT-211-W-D	TT-212-W-D	TT-213-W-Q* (duplicate of TT-212-W-D)
		Date Sampled	8/15/03	8/15/03	8/15/03	8/15/03	8/15/03	8/15/03	8/15/03	8/15/03
		Field Screen Pb [c] (ppm)	606.34	635.34	537.52	587.84	540.97	561.56	561.56	502.05
		Field Screen Zn [c] (ppm)	3372.76	3265.26	3174.71	3804.01	3326.74	3035.47	3035.47	2879.27
Parameter	**Units**	**Federal CCME Guidelines**		**Analytical Results**							
		CEQG (PL)[a]	SQRO[b]								
Physical Tests											
pH		-	-	-	-	-	-	-	-	-	-
Total Metals											
Antimony T-Sb	mg/kg	20[d]	-	-	-	-	-	-	-	-	-
Arsenic T-As	mg/kg	12	-	-	-	-	-	-	-	-	-
Barium T-Ba	mg/kg	500	-	-	-	-	-	-	-	-	-
Beryllium T-Be	mg/kg	4[d]	-	-	-	-	-	-	-	-	-
Cadmium T-Cd	mg/kg	10	-	-	-	-	-	-	-	-	-
Chromium T-Cr	mg/kg	64	-	-	-	-	-	-	-	-	-
Cobalt T-Co	mg/kg	50[d]	-	-	-	-	-	-	-	-	-
Copper T-Cu	mg/kg	63	-	-	-	-	-	-	-	-	-
Lead T-Pb	mg/kg	-	2000	<50	61	880	66	210	880	<100	120
Mercury T-Hg	mg/kg	6.6	-	-	-	-	-	-	-	-	-
Molybdenum T-Mo	mg/kg	10[d]	-	-	-	-	-	-	-	-	-
Nickel T-Ni	mg/kg	50	-	-	-	-	-	-	-	-	-
Selenium T-Se	mg/kg	1	-	-	-	-	-	-	-	-	-
Silver T-Ag	mg/kg	20[d]	-	-	-	-	-	-	-	-	-
Tin T-Sn	mg/kg	50[d]	-	-	-	-	-	-	-	-	-
Vanadium T-V	mg/kg	130	-	-	-	-	-	-	-	-	-
Zinc T-Zn	mg/kg	-	10000	299	402	3910	514	1310	6940	699	413

Associated ALS Analytics files: S8646, T2239, T2587, T2886, T4719, T6630

Notes:

Bold	*Exceeds the CCME Tier 1 Soil Quality Guidelines for Parkland Land Use*
Bold	*Exceeds the CCME Tier 3 Risk-Based Soil Soil Quality Remedial Objectives for the Polaris Mine Site*

<= Less than analytical method detection limit

"-" = No analysis performed for given parameter

a) Canadian Council of Ministers of Environment (CCME) Canadian Environmental Quality Guidelines (CEQG) - Tier 1 soil quality remediation guidelines for parkland land use (PL). The site specific factors used for determining the soil quality guideline include: soil ingestion, soil contact, and nutrient cycling.

b) Canadian Council of Ministers of Environment (CCME) Tier 3 Risk based soil quality remedial objective (SQRO) for the Polaris Mine Site.

c) Field screening measurements are based on the Niton XLi 700 Series portable X-Ray Fluorescence (XRF) elemental analyser.

d) Canadian Council of Ministers of Environment (CCME) Tier 1 parkland land use interim remediation criteria, where soil quality gudelines based on the CCME soil protocol have not been developed yet.

e) The analytical method detection limit (MDL) exceeds the CCME Tier 1 Soil Quality Remediation Guidelines for parkland land use (PL).

**Sample TT-213-W-Q is recorded incorrectly as TT-213-F-Q in ALS report T6630*

Table TT-11-3. Tailings Thickener Area Quality Assurance and Quality Control Remediation Soil Samples

Gartner Lee	Parameter	Pb		Zn		EPH		Total Pb			Total Zn		
	Relative Percent Difference (RpD)[a]	MDL	PQL[b]	MDL	PQL[b]	MDL	PQL[b]	Sample Pb	Duplicate Pb	RpD[a] (%)	Sample Zn	Duplicate Zn	RpD[a] (%)
Sample ID	Duplicate ID												
On Site Field Screening Duplicates													
TT-56-I-D	TT-214-I-Q	70	350	150	750	-	-	2018	2059	2.0	3987	4038	1.3
TT-60-I-D	TT-215-I-Q	70	350	150	750	-	-	263	127	na	663	272	na
TT-66-I-D	TT-216-I-Q	70	350	150	750	-	-	551	567	2.8	1827	1882	3.0
TT-84-I-D	TT-217-I-Q	70	350	150	750	-	-	119	170	na	188	309	na
TT-102-I-D	TT-218-I-Q	70	350	150	750	-	-	165	190	na	336	335	na
TT-107-I-D	TT-219-I-Q	70	350	150	750	-	-	286	312	na	712	704	na
TT-113-I-D	TT-220-I-Q	70	350	150	750	-	-	144	114	na	345	354	na
TT-130-I-D	TT-221-I-Q	70	350	150	750	-	-	128	146	na	238	334	na
TT-134-I-D	TT-222-I-Q	70	350	150	750	-	-	136	148	na	234	296	na
TT-146-I-D	TT-223-I-Q	70	350	150	750	-	-	4102	4382	6.6	24625	24151	1.9
TT-173-F-C	TT-190-F-Q	70	350	150	750	-	-	164	136.43	na	296.33	314.24	na
TT-179-W-C	TT-225-W-Q	70	350	150	750	-	-	156.21	158.75	na	416.14	380.68	na
TT-185-W-D	TT-191-W-Q	70	350	150	750	-	-	121.23	106.06	na	346.87	212.49	na
TT-189-W-C	TT-226-W-Q	70	350	150	750	-	-	126.85	139.87	na	355.86	324	na
TT-198-F-C	TT-227-F-Q	70	350	150	750	-	-	547.54	585.16	6.6	4033.51	3914.66	3.0
Analytical Laboratory Duplicates													
TT-212-W-D	TT-213-W-Q	100	500	2	10	-	-	<100	120	na	699	413	na
Analytical Laboratory Replicates													
TT-168-I-C	QC# 348009	-	-	-	-	200	1000	-	-	-	-	-	-
TT-173-F-C	QC# 349326	50	250	1	5	-	-	<50	<50	na	130	149	13.6
TT-199-F-D	QC# 364669	100	500	2	10	-	-	<100	<100	na	401	452	na
TT-212-W-D	QC# 364670	100	500	2	10	-	-	<100	120	na	699	351	na

Notes:

Bold *RpD value is greater than or equal to 50% and the concentrations of both samples are greater than the practical quantitation limit (PQL)*

"na" = RpD value is not applicable because one or both results are less than the practical quantitation limit (PQL).

"-" = no result for given parameter

"<" = less than analytical method detection limit

*a) Relative Percent Difference = RpD = (Difference/Average) * 100*

*b) Practical Quantitation Limit (PQL)=5 * Method Detection Limit (MDL)*

Table TT-11-3. Tailings Thickener Area Quality Assurance and Quality Control Remediation Soil Samples

Gartner Lee	Parameter	Pb		Zn		EPH C_{10}-C_{19}			EPH C_{19}-C_{32}		
Sample ID	Relative Percent Difference (RpD)[a] Duplicate ID	MDL	PQL[b]	MDL	PQL[b]	Sample EPH C_{10}-C_{19}	Duplicate EPH C_{10}-C_{19}	RpD[a] (%)	Sample EPH C_{19}-C_{32}	Duplicate EPH C_{19}-C_{32}	RpD[a] (%)
On Site Field Screening Duplicates											
TT-56-I-D	TT-214-I-Q	70	350	150	750	-	-	-	-	-	-
TT-60-I-D	TT-215-I-Q	70	350	150	750	-	-	-	-	-	-
TT-66-I-D	TT-216-I-Q	70	350	150	750	-	-	-	-	-	-
TT-84-I-D	TT-217-I-Q	70	350	150	750	-	-	-	-	-	-
TT-102-I-D	TT-218-I-Q	70	350	150	750	-	-	-	-	-	-
TT-107-I-D	TT-219-I-Q	70	350	150	750	-	-	-	-	-	-
TT-113-I-D	TT-220-I-Q	70	350	150	750	-	-	-	-	-	-
TT-130-I-D	TT-221-I-Q	70	350	150	750	-	-	-	-	-	-
TT-134-I-D	TT-222-I-Q	70	350	150	750	-	-	-	-	-	-
TT-146-I-D	TT-223-I-Q	70	350	150	750	-	-	-	-	-	-
TT-173-F-C	TT-190-F-Q	70	350	150	750	-	-	-	-	-	-
TT-179-W-C	TT-225-W-Q	70	350	150	750	-	-	-	-	-	-
TT-185-W-D	TT-191-W-Q	70	350	150	750	-	-	-	-	-	-
TT-189-W-C	TT-226-W-Q	70	350	150	750	-	-	-	-	-	-
TT-198-F-C	TT-227-F-Q	70	350	150	750	-	-	-	-	-	-
Analytical Laboratory Duplicates											
TT-212-W-D	TT-213-W-Q	100	500	2	10						
Analytical Laboratory Replicates											
TT-168-I-C	QC# 348009	-	-	-	-	<200	<200	na	414	467	na
TT-173-F-C	QC# 349326	50	250	1	5	-	-	-	-	-	-
TT-199-F-D	QC# 364669	100	500	2	10	-	-	-	-	-	-
TT-212-W-D	QC# 364670	100	500	2	10	-	-	-	-	-	-

Notes:

Bold *RpD value is greater than or equal to 50% and the concentrations of both samples are greater than the practical quantitation limit (I*

"na" = RpD value is not applicable because one or both results are less than the practical quantitation limit (PQL).

"-" = no result for given parameter

"<" = less than analytical method detection limit

*a) Relative Percent Difference = RpD = (Difference/Average) * 100*

*b) Practical Quantitation Limit (PQL)=5 * Method Detection Limit (MDL)*