

## **APPENDIX 1**

### **EXECUTIVE SUMMARY**

#### **IN INUKTITUT**



**APPENDIX 2**

**CONTAMINATED SOILS REMEDIATION**

**2003 CLOSE OUT REPORTS**



Gartner Lee Limited

February 16, 2004

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

Dear Mr. Donald:

**Re: 23305 - Contaminated Soil Remediation 2003 Close Out Reports  
Polaris Mine, Nunavut**

We are pleased to submit close out reports on the areas of contaminated soil remediated during 2003 at the Polaris Mine site. The remediation of ten (10) areas has been completed to the meet the Polaris Mine remedial targets, as documented in the approved Polaris Mine Decommissioning and Reclamation Plan, March 2001. Each area remediated during 2003, as shown on Figure 1: *Contaminated Soils Remediation Progress Plan, December 31, 2003*, is presented as a separate appendix to this letter. These close out reports serve to document the remedial activities that were undertaken and the sample results that verify completion of activities. The areas, as shown on Figure 1, are based on the Areas of Potential Environmental Concern identified in the 2000 Decommissioning and Reclamation Plan.

We trust that this is satisfactory and that you will find the information presented in this report to be complete and thorough. In our consideration, this work completes the needs for environmental remediation of the areas presented.

Yours very truly,  
GARTNER LEE LIMITED

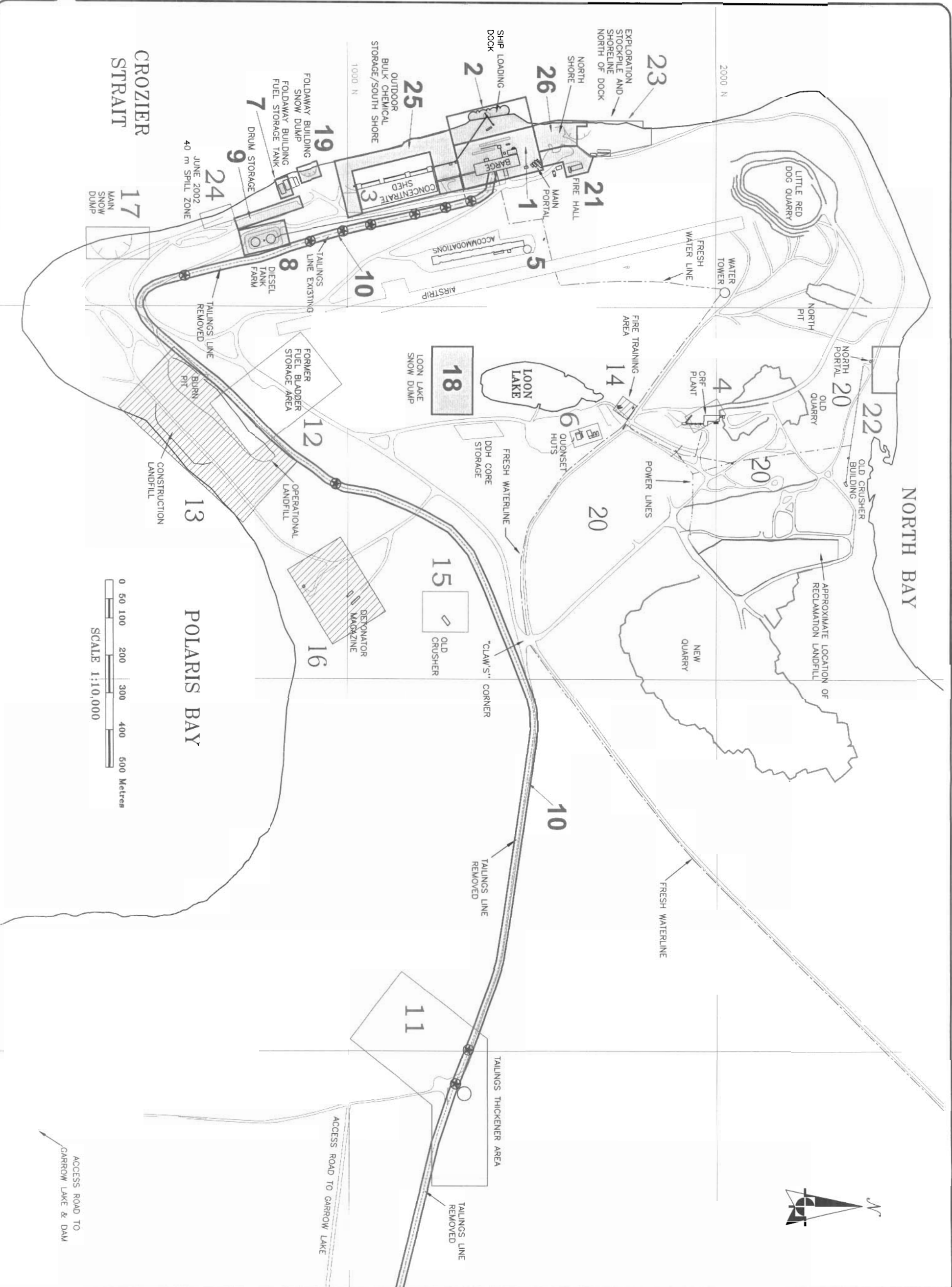
For Stephen R. Morison, M.Sc., P.Geol.  
Principal

AL:kms

Enclosures:

Polaris Mine Operations Contaminated Soil Remediation Close Out Reports:

- Appendix A Concentrate Storage Shed Area
- Appendix B Cemented Rock Fill (CRF) Plant Fuel Storage Tank
- Appendix C Former Quonset Huts Fuel Storage Area
- Appendix D Tailings Thickener Area
- Appendix E Former Fuel Bladder Storage Area
- Appendix F Old Crusher Area
- Appendix G Main Snow Dump
- Appendix H North Portal Stockpile
- Appendix I Exploration Stockpile and Shoreline North of Dock
- Appendix J 2002 Fuel Spill



LEGEND:

- TAILINGS LINE
- TAILINGS LINE REMOVED
- POWER LINE
- WATER LINE
- ROADS
- TAILINGS LINE BREAKS

- 1 AREAS NOT MEETING REMEDIAL TARGETS AS OF DECEMBER 31, 2003
- 15 AREAS MEETING REMEDIAL TARGETS AS OF DECEMBER 31, 2003
- 16 AREAS NOT CONSIDERED AN ENVIRONMENTAL CONCERN BASED ON 2000 ENVIRONMENTAL SITE ASSESSMENT

- 1- PROCESS BARGE
- 2- SHIP LOADING DOCK
- 3- CONCENTRATE STORAGE SHED AREA
- 4- CEMENTED ROCK FILL PLANT FUEL STORAGE TANK AREA

- 5- ACCOMMODATIONS FUEL STORAGE TANK
- 6- FORMER QUONSET HUTS FUEL STORAGE AREA
- 7- FOLDAWAY BUILDINGS FUEL STORAGE TANK
- 8- DIESEL TANK FARM
- 9- OUTDOOR LUBE/HYDRAULIC OIL AND GLYCOL DRUM STORAGE
- 10- TAILINGS PIPELINE

- 11- TAILINGS THICKENER AREA
- 12- FORMER FUEL BLADDER STORAGE AREA
- 13- OPERATIONAL AND CONSTRUCTION LANDFILL AND OPEN STORAGE AREA
- 14- FIRE TRAINING AREA
- 15- OLD CRUSHER AREA
- 16- DETONATOR MAGAZINE

- 17- MAIN SNOW DUMP
- 18- LOON LAKE SNOW DUMP
- 19- FOLDAWAY BUILDING SNOW DUMP
- 20- SURFACE ABOVE FORMER ACTIVE MINING AREA
- 21- FIREHALL INCLUDING SNOW DUMP, FUEL STORAGE TANK AND ORE STOCKPILE
- 22- NORTH PORTAL STOCKPILE

- 23- EXPLORATION STOCKPILE AND SHORELINE NORTH OF DOCK
- 24- JUNE 2002 - 40 m SPILL ZONE
- 25- OUTDOOR BULK CHEMICAL STORAGE/SOUTH SHORE
- 26- NORTH SHORE

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CONTAMINATED SOIL REMEDIATION  
2003 CLOSE OUT REPORT  
POLARIS MINE, NUNAVUT

CONTAMINATED SOILS  
REMEDIATION PROGRESS PLAN,  
DECEMBER 31, 2003

# Appendices

## **Polaris Mine Operations Contaminated Soil Remediation Close Out Reports:**

<b>Appendix A</b>	<b>Concentrate Storage Shed Area</b>
<b>Appendix B</b>	<b>Cemented Rock Fill (CRF) Plant Fuel Storage Tank</b>
<b>Appendix C</b>	<b>Former Quonset Huts Fuel Storage Area</b>
<b>Appendix D</b>	<b>Tailings Thickener Area</b>
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<b>Appendix F</b>	<b>Old Crusher Area</b>
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<b>Appendix H</b>	<b>North Portal Stockpile</b>
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<b>Appendix J</b>	<b>2002 Fuel Spill</b>



# **Appendix A**

**Polaris Mine Operations Contaminated Soil Remediation  
Close Out Report: Concentrate Storage Shed 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: Concentrate Storage Shed Area**

## SUMMARY

The Decommissioning and Reclamation Plan (March 2001) for the Polaris Mine calls for the removal of soils with concentrations of lead and zinc above the site-specific, risk based, Soil Quality Remediation Objectives (SQROs) and for the subsequent disposal of this material into the underground mine workings. This report describes and discusses the results of remediation work conducted during 2003 related to the Concentrate Storage Shed Area shown as Area 3 on Figure 1: *Contaminated Soils Remedial Progress Plan*. Remedial work to date has demonstrated that it is not possible to recover enough of the residual lead and zinc concentrate dust from a portion of the former concentrate storage shed floor to achieve the SQROs and that an alternate remedial strategy is required for this area.

The soil remediation of the area west of the former concentrate storage shed, the western portion of the floor, and the east wall of the former shed, has been completed to meet the Polaris Mine remedial targets. This conclusion is based on confirmatory sampling, consistent with the approved site specific sampling procedures and protocols. However, where limestone bedrock was encountered along the eastern portion of the floor of the former shed, significant lead and zinc concentration dust was detected within the bedrock fractures. It was not proven practical to effectively remove the concentrate dust contained within these fractures with the equipment available. The Decommissioning and Reclamation Program being implemented at the Polaris Mine was developed to limit the exposure of lead and zinc to human and other ecological receptors. The plan included soil remediation. It did not include the excavation of bedrock.

In consultation with Teck Cominco Limited (TCL), a soil cover was used to for the mitigation of the residual concentrate dust within the bedrock fractures. The area of bedrock with residual



concentrate dust has been isolated from the environment as a measure of due diligence, under a durable cover of well-graded sand and gravel material. The cover has been placed to manage against the potential contact of residual concentrate dust by human or ecological receptors. The use of a cover is consistent with the intent of the human health and ecological risk assessment closure objectives.

Soil remediation is ongoing at the Polaris Mine site. Areas adjacent to the former concentrate storage shed are to be remediated in 2004. The final contouring of the area will be undertaken following the remediation of the adjacent areas.

## BACKGROUND

The former concentrate storage shed area, shown as Area 3 on Figure 1: *Contaminated Soils Remediation Progress Plan, December 31, 2003*, is located south of the process barge and shiploading dock. The metal-clad, steel frame shed was used to store lead and zinc concentrates produced in the mill through the winter for shipment to market in the short summer shipping season. The concentrate storage shed was subdivided to provide storage capacity for 40,000 tonnes lead concentrate at the north end and 175,000 tonnes zinc concentrate at the south end. The concentrate load-out conveyors were located along the west wall of the concentrate storage shed and fed the shiploader at the loading dock. The building was demolished in August 2003.

The Environmental Site Assessment (ESA) conducted in 1999 and 2000 documented the presence of metal contaminated soil around the load-out conveyors and surrounding areas, as shown on Figure CSHED-03-1. An investigation of conditions across the floor of the concentrate storage shed was not practical when the mine was operating. However, it was concluded that the soils on the floor would be contaminated and would require remediation. The depth to bedrock underlying the floor was not known and represented a significant uncertainty at the onset of 2003 field remediation program.

Total lead and zinc concentrations greater than the SQROs were identified in test pits excavated outside of the concentrate storage shed at depths of up to 1.0 m during the ESA. The deepest soil contamination was encountered downgradient of the north doors of the concentrate storage shed.

Leachate testing (Table 6, Volume 4, ESA) of soil samples yielded low levels of leachable lead and zinc (up to 0.13 mg/L lead and 1.68 mg/L zinc) when compared to the BC Special Waste



Regulation<sup>1</sup> Leachate Quality Standards for lead (5 mg/L) and zinc (500 mg/L). These samples were collected adjacent to the concentrate storage shed. The results indicated that the potential metal leachate is low.

The original topography of the area is shown on Figure CSHED-03-1. Prior to demolition, the cut slope along the east wall outside the concentrate storage shed was backfilled with locally available soils to allow access for equipment. The soil used as backfill contained elevated lead and zinc concentrations and would require remediation.

## METHODOLOGY

### Delineation

A 25 m x 25 m grid was established to direct the field screening sample of soil inside the former concentrate storage shed and to the west towards the former outdoor bulk chemical storage area and the shoreline.

Commencing August 21, 2003, Gartner Lee Limited (GLL) sampled near-surface soil to depths of up to 5 cm across the floor of the former shed in accordance with standard GLL and Teck Cominco Limited (TCL) procedures and protocols. Samples were collected and analysed on-site using a Niton portable X-Ray fluorescence (XRF) elemental analyser. The results showed that residual lead and zinc concentrate was present across the surface.

On August 23 and 24, 2003, additional samples were collected from test pits excavated inside the former shed and outside the former west wall of the concentrate storage shed, to determine the depth of metal contamination. The results of this field screening investigation indicated that the depth of contamination was less than 0.5 m.

On September 15 and 16, 2003, discrete surface soil samples were collected at 25 m intervals along the near-vertical slope of the east wall of the excavation area, at depths of up to 5 cm. The field screening results indicated that the soil remaining outside of the former concentrate storage shed wall had lead and zinc concentrations greater than SQROs.

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<sup>1</sup> British Columbia Waste Management Act, *Special Waste Regulation* (SWR), BC Reg. 63/88, O.C. 268/88, Schedule 1.2, 1995 06 09, amended 2002.



## **Excavation**

### ***Soil***

Initially, soils were excavated and removed to a depth of 0.3 m inside the former shed and to the west of the former shed on the basis of the 2003 test pit results and the results of the ESA.

The excavated floor of the concentrate storage shed was sampled on August 27 and 29, 2003. The field screening results identified concentrations of lead and zinc above the SQROs. Successive lifts, approximately 0.3 m thick, of metal contaminated soil were then excavated until either the field screening results indicated that the SQROs for lead and zinc had been achieved or bedrock was encountered. Excavation resulted in the removal of approximately 1.0 m of contaminated soils.

The excavation in the area west of the former shed was sampled on September 1 and 2, 2003. The field screening results of samples collected in the vicinity of the former load-out conveyor and to the west of the north end of the former shed, indicated elevated lead and zinc concentrations above the SQROs. These areas were further excavated and sample field screened in 0.3 m thick lifts to a maximum depth of 0.9 m. Excavation of the area continued until field screening of discrete samples achieved results of lead and zinc concentrations below the SQROs. The contaminated soils present in this area were considered remediated and confirmation samples collected.

Based on the field screening samples gathered on September 15 and 16, 2003 from the east slope of the excavation limits, an additional 2 m to 3 m thick layer of soil was removed from the slope. All soil excavated was disposed of in the underground mine workings in accordance with regulatory approvals.

### ***Rock***

Fractured limestone bedrock was encountered along the east portion of the former footprint of the concentrate storage shed following the removal of 0.4 m to 1.0 m of contaminated soil. A variety of equipment and innovative approaches were used to scrape or scour the bedrock surface and recover the remaining fine-grained lead and zinc concentrate. The remaining soil cover above the bedrock is extremely thin or non-existent and consists of sand and silt within coarse unmineralized limestone fragments. The best efforts did not result in the complete removal of the concentrate dust from within the fractured bedrock surface. The excavated bedrock and residual concentrate was disposed of in the underground mine workings.

## **Confirmatory Sampling**

Confirmatory samples of soil and rock were collected at the excavation limits. The samples were collected and prepared in accordance with standard GLL and TCL procedures and protocols and



submitted to the analytical laboratory, Aurora Laboratory Services Ltd. (ALS) of Vancouver, BC, to verify that the soil remediation objectives are met.

#### ***Floor Samples***

Composite samples were collected from each 25 m x 25 m area over the base of the excavation. Randomly selected discrete samples were also collected to provide an indication of the variability present in the soil of the composite samples. Additional excavation was undertaken in areas of the floor that did not meet the SQROs, and where bedrock had not been encountered.

#### ***Wall Samples***

On September 29, 2003, discrete samples were collected from the 4 m to 5 m high east slope with the aid of an excavator. The excavator positioned on top of the slope scrapped its bucket (approximately 1.2 m wide) along the near-vertical surface of the slope every 5 m to 10 m. Wall samples were collected directly from the bucket of the excavator and any residual material left in the bucket between scrapings was either dumped or swept out of the bucket.

SNC Lavalin surveyed the surface elevation of the final excavation limits, prior to the area being backfilled.

## **ANALYTICAL RESULTS**

The analytical laboratory results are summarized on Table CSHED-03-1 and Table CSHED-03-2. A total of sixty (60) confirmatory samples of soil and rock were submitted from the former concentrate shed storage area: forty (40) floor composites; eight (8) floor discrettes; nine (9) wall composites; two (2) wall discrettes; and one (1) duplicate. The soil quality results and the lateral limits of the excavation are shown on Figure CSHED-03-2.

The analytical results of all samples from the area west of the concentrate shed and the eastern slope of the excavation limits had concentrations of lead and zinc below the SQROs. Of the twenty-nine (29) samples (twenty-three [23] composite, six [6] discrete) collected from the floor of the former concentrate shed, sixteen (16) samples, generally from the west side of the former building, met the SQROs.

The thirteen (13) confirmation (ten [10] composite and three [3] discrete) samples, as shown on Figure CSHED-03-2 that exceeded the SQROs for lead and/or zinc were collected from areas excavated to bedrock. Lead exceedances occur in the northeast end where lead was historically stored and bedrock was encountered. Zinc exceedances occur in the southeast end where zinc was historically stored and bedrock was encountered. Residual lead exceedances range from 6,720 mg/kg to 23,300 mg/kg and zinc exceedances range from 10,500 mg/kg to 34,100 mg/kg.



Discrete samples were collected along with the following composite samples:

Composite Sample ID	Lead (mg/kg)	Zinc (mg/kg)	Discrete Sample ID	Lead (mg/kg)	Zinc (mg/kg)
CSHED-537-F-C	1120	1980	CSHED-544-F-D	6720	9260
			CSHED-545-F-D	<100	132
CSHED-520-F-C	236	353	CSHED-546-F-D	<100	150
CSHED-531-F-C	111	1620	CSHED-535-F-D	653	20700
CSHED-533-F-C	172	5950	CSHED-536-F-D	716	29300
CSHED-530-F-C	127	2270	CSHED-534-F-D	478	1540
CSHED-360-F-C	713	1070	CSHED-316-F-C	912	3110
CSHED-367-F-C	133	404	CSHED-352-F-D	338	456
CSHED-499-W-C	<100	274	CSHED-497-W-D	<100	290
CSHED-503-W-C	<100	196	CSHED-493-W-D	<100	92

Total metal analyses were performed on eight randomly selected confirmation samples taken from the final floor and walls of the excavation. Two samples returned barium concentrations, (not identified as a metal of concern in the ESA), greater than the generic Canadian Council of Ministers of Environment (CCME) Canadian Environmental Quality Guidelines (CEQG) for parkland land use. Barium concentrations in the samples which had lead and zinc below the SQROs, were relatively high when compared to the generic CCME CEQG for parkland land use. In contrast, the results from samples collected from the bedrock surface where lead and zinc exceeded the SQROs, exhibited low barium concentrations.

#### Quality Assurance and Quality Control (QA/QC)

Relative percent differences (RpD's) have been calculated and compiled in Table CSHED-03-3 for the twenty (20) field screening duplicate results, the single analytical laboratory duplicate result and the seven (7) laboratory replicate results.

Some of the samples returned results below the practical quantitation limit (PQL) in which case the RpD value has been identified as "na" (not available). The remaining RpD values are below 50% indicating acceptable repeatability in accordance with the approved standard GLL and TCL procedures and protocols.



## **DISCUSSION**

### **Variability of Soil Analytical Results**

Comparison of discrete and composite sample results collected from within the same 25 m x 25 m area indicates significantly variable results, as shown on the summary table above. The samples with the greatest variability between a discrete and its composite were all collected from within areas of bedrock. Thus the trend in variability is attributed to the inhomogeneous distribution of lead and zinc concentrate dust within an area.

### **Barium in Soil**

Barium is a common gangue mineral associated with lead sulfides, and it is found in cavities in limestone and dolostone. Thus, the presence of elevated concentrations of barium can be attributed to natural mineralization associated with the Polaris limestone/dolostone hosted lead/zinc orebody. The approved site-specific remedial objectives allow for minor exceedances in a small percentage (less than 5%) of the confirmatory samples so long as the concentration is less than twice the remedial target. The residual soils within the excavation limits are considered to be in accordance with the Polaris Mine remedial objectives, since the barium concentrations are less than twice the remedial target.

### **Bedrock Contamination**

Bedrock was encountered along the eastern portion of the floor of the former shed at unexpectedly shallow depths following the removal of 0.5 m to 1.0 m of soil contaminated with lead and zinc concentrate.

Concentrate dust appears to have migrated vertically through the soil layer overlying the bedrock surface during mine operations and during remedial excavations.

During ship loading operations it is reported that the mine scoop was used on occasion to loadout lead and zinc concentrate from the floor of the shed. The use of the scoop would have created pits in the soil overlying the bedrock. This created isolated pockets of concentrate in contact with bedrock. Initial intrusive investigations had not identified the variability in the vertical extent of contamination along the floor of the former concentrate storage shed.

The remedial excavation method used has resulted in lead and zinc concentrate blending with the underlying soil and infiltrating the rock. The use of a ripper tooth to break up the soil and fractured bedrock caused lead and zinc concentrate dust to be furrowed into the underlying clean material.



To meet the sampling protocol, fine-grained soil was preferentially scoured from within the fractured surface of the limestone bedrock during sample collection. This practice resulted in sampling that focused on the concentrate dust enriched soil present within the rock fractures and therefore produced higher overall values lead and zinc.

Samples collected from bedrock were predominantly composed of coarse unmineralized limestone fragments larger than 2 mm. Sample preparation protocols dictate that soil samples are sieved to remove clasts larger than 2 mm prior to field screening and/or laboratory analysis. Typically this procedure is intended to homogenize the soil sample to improve repeatability, however in the case of bedrock samples the analytical results likely represent of the mix of soil and concentrate that has been worked into the bedrock fractures either during operations or during remediation excavation activities.

The SQROs and the decommissioning and reclamation plan was developed for the remediation of contaminated soil, not rock. The occurrence of contaminated soil within bedrock fractures warrants a different remediation approach.

## **ALTERNATE REMEDIAL STRATEGY**

Removal of small quantities of residual soil impacted with lead and zinc concentrate from within the fractured limestone bedrock by the remedial methods originally proposed proved impractical. Therefore, GLL investigated alternative methods to limit the contact of this material to human or ecological receptors and found that the best alternative was to isolate the residual concentrate dust under a durable cover of sand and gravel, a soil cover. The placement of the soil cover meets the principal objective of the original remediation plan, which is to eliminate the exposure pathways of the lead and zinc concentrate to human and ecological receptors at the Polaris Mine site. This alternate remedial strategy is discussed in the following section.

### **Exposure Pathways**

#### ***Dissolved Phase Pathways***

Theoretically, lead and zinc sulfides could disassociate into elemental compounds and migrate in the dissolved phase thus producing metal leachate. However, it is anticipated mobilization of dissolved metals in water will not result from the residual concentrate dust in volumes or concentrations high enough to pose a threat to the environment, based on the following:



- a low potential for the concentrate dust to migrate in the dissolved phase as indicated by the 1999/2000 ESA leachate test results;
- the low average ground temperature and the short thaw season attributed to the high latitude location of Little Cornwallis Island, as documented in the ESA, restricts the rate of oxidation reactions;
- extremely low precipitation on Little Cornwallis Island limits the infiltration and generation of runoff water;
- the small quantity of concentrate distributed over a relatively large area and tied up within bedrock;
- no visible evidence of acid rock drainage (ARD) on Little Cornwallis Island from outcrops of metal sulphides;
- the calcareous nature of the limestone bedrock would neutralize small amounts of acidity.

#### *Direct And Indirect Pathways*

In the risk assessment used to develop the Decommissioning and Reclamation Plan for the Polaris Mine, the primary concern was based entirely on direct and indirect soil contact in order to limit the exposure of lead and zinc to human and other ecological receptors. Therefore, it is important to consider the depth of influence of human or biological activity in the subsurface as this dictates the thickness of cover that is required to prevent direct or indirect soil contact.

#### **Depth of Cover**

The depth of influence of human or biological activity in the subsurface is an important consideration in determining the thickness of cover required to prevent direct or indirect soil contact. At Little Cornwallis Island, the typical plant root depth is within the upper 10 cm of the soil.

Within British Columbia, the Ministry of Water Land and Air protection considers the top 15 cm of soil to be the effective plant root zone in most cases and the area inhabited by most soil-dwelling invertebrates. It is also assumed that human exposure as a result of incidental ingestion (e.g., soil inhalation of re-suspended dust), or dermal contact would all be limited to the surficial soil layer. Similarly, ecological exposure as a result of burrowing activity, incidental ingestion of soil, inhalation of impacted dust and consumption of indirectly impacted plants or prey would also be limited to the top soil layer.

The BC Ministry of Energy and Mines (BC MEM) considers that a well-graded silty, sand and gravel cover two or three times the depth of the rooting zone provides a conservative estimate of the required cover in circumstances where the prevention of oxidation is not an issue (personal communication Kim Bellefontaine, Senior Mine Review Geologist, BC MEM).



The placement of the soil cover to a minimum thickness of 0.5 m is considered to be conservative as a remedial measure given the anticipated lack of human redevelopment and occupation of the site or biological (shallow rooted plants or burrowing organisms) activity in this area. Therefore, based on the above information, a minimum cover thickness of 0.5 m was considered sufficient to effectively break the indirect and direct exposure pathways.

### **Soil Cover**

The cover was placed to minimize potential human or ecological receptor contact with the floor of the excavation where contaminated soils were trapped in the fractured bedrock and could not be effectively removed.

#### ***Areal Coverage***

The area that required a soil cover was determined by the screening and confirmatory sample results from the former concentrate storage shed floor. (i.e., areas with bedrock outcrop that could not meet the remedial target concentrations). The area requiring full soil cover (0.5 m thick) is shown on Figure CSHED-03-3 and correlates approximately with the area of exposed bedrock as illustrated on Figure CSHED-03-2.

#### ***Cover Material***

The soil cover consists of a well-graded material containing a sufficient proportion of fine-grained material in order to encapsulate the residual concentrate in soil particles of roughly comparable dimensions. The cover is also coarse enough so that it is resistant to erosion by wind and water. Use of a well-graded sand and gravel with trace to some silt meets both requirements. A significant quantity of surficial runoff is not expected and water erosion of the cover should not be a significant concern, since the area is predominantly flat lying and upslope contouring will provide drainage control.

At the Polaris Mine Site, there were two readily available materials for use as potential cover in the Concentrate Storage Shed area – quarried shale or deposits of sand and gravel. Preliminary grain size analysis from two samples of quarried shale indicated that these shale samples consisted of primarily gravel sized particles. It was therefore determined that the quarried shale did not possess a suitable grain size gradation to be used as a source for the cover material. Gravel from the area east of the Operational Landfill is described as a clean, fairly well-graded, sandy gravel to a well-graded, sand and gravel with a of trace silt. Of the sources available, this material was available in sufficient quantities that best suit the requirements for the cover.

#### ***Cover Thickness***

The minimum cover thickness of 0.5 m has been applied wherever the confirmatory samples indicate that lead or zinc concentrations exceed the remediation criteria. . At the west side of the