POLARIS MINE

DECOMMISSIONING AND RECLAMATION ACTIVITIES

QUARTERLY REPORTING – 4th QUARTER 2003

SUBMITTED TO

THE NUNAVUT WATER BOARD

AND TO THE

DEPARTMENT OF INDIAN AND NORTHERN AFFAIRS CANADA

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APPPENDICES

1. EXECUTIVE SUMMARY IN INUKTITUT

Refer to Appendix 1 for an executive summary of plans, reports and studies conducted under this licence during the period October 1, 2003 to December 31, 2003 that has been translated into Inuktitut.

2. INTRODUCTION

This is the fourth quarterly Decommissioning and Reclamation progress report submitted in relation to the Polaris Mine's Decommissioning and Reclamation Plan ('Closure Plan') and in compliance of the Water Licence NWB1POL0311 issued on April 24, 2003 with and effective date of March 1, 2003.

The Polaris Closure Plan dated March 2001 received its initial conditional approval April 15, 2002. The Closure Plan was jointly conditionally approved by the Nunavut Water Board ('NWB') and the Department of Indian and Northern Affairs Canada ('INAC'). The Closure Plan has subsequently received further approvals. The approvals contain reporting requirements and this document has been prepared to consolidate all of the reporting requirements into one document. This report is being submitted to both NWB and INAC on a quarterly basis with an annual report completed by March 31st of the subsequent year.

3. STATUS OF AUTHORIZATIONS AND/OR APPROVALS

As of December, 2003, the status of project approvals received during the quarter was as follows:

1. Polaris Mine Decommissioning and Reclamation Plan – March 1, 2001
   - Previously approved.
2. DFO Authorization Under the Fisheries Act to Decommission Garrow Lake Dam and Decommission the Marine Dock and Adjacent Shoreline
   - Previously approved.
3. Application to the NWB and INAC for additional underground storage locations for disposal of hydrocarbon contaminated soils submitted on September 16, 2003.
   - Approved during the 4th Quarter.
4. Request for Modification of Haulage Location (Garrow Lake dam core material into the barge excavation) dated October 15, 2004.
   - Outstanding at the end of the 4th Quarter.
5. Application to Place Metals Contaminated Soils in LRDQL and Remaining Hydrocarbon Contaminated Soils Underground in the Mine dated December 19, 2003.
   - This was approved during the 4th Quarter.

4. UNAUTHORIZED DISCHARGES AND SUMMARY OF FOLLOW UP ACTIONS

There were no unauthorized discharges of water or effluent during the 4th Quarter of 2003.

5. PROGRESS REPORT OF STUDIES / PLANS REQUESTED

The routine monitoring required as part of the Closure Plan approvals and the Water Licence are included in other sections of the report and so are not duplicated in this section of the report.

The Closure Plan approvals and/or the Water Licence require submission of the following plans and/or reports:

a) Certified landfill cover design specifications and plans were submitted during the 3rd Quarter.
   - Approval with conditions was granted in the 4th Quarter.

b) Certified design drawings and specifications for Garrow Lake Dam Decommissioning were submitted during the 3rd Quarter.
   - Approval with conditions was granted in the 4th Quarter

c) Certified specifications and design drawings for sealing the mine entrances were submitted during the 3rd Quarter.
   - Approval was granted in the 4th Quarter.
   - The following design modifications and/or actions will be done to address concerns identified in the Approval:
     a. TCL will relocate the North Portal seal deeper into the mine to ensure there is at least 10 metres of cover (or approximately 2 tunnel diameters) of rock cover which is in excess of what has been requested.
     b. Determining actual overburden thickness versus rock thickness is not practical at this time. To ensure there is more than adequate cover thickness over the concrete seals, we will ensure that all the seals are placed deep enough into the mine that there is at least 10 metres of cover over the seal. This represents approximately 2 times the tunnel height (or more). Revised locations will be presented on the as-built drawings after construction of the seals has been completed.
     c. The area where the seals are installed will be inspected prior to installation to confirm that there are no faults in the vicinity.
     d. There will be no void space above the concrete portal seal. Muck placed between the seal and the tunnel entrance will be packed as tight as possible by mobile equipment. In no case shall the void space above the muck pile be more than 0.5 metres in height. This will be done by pushing the muck to the back using a scooptram with a push plate attached.
   - The portal seal design drawings were also submitted to the Workers' Compensation Board for review and approval. Appendix 9 of this report contains a copy of a letter from Sylvestor Wong, Chief Inspector of Mines approving the designs as submitted.

d) Certified specifications and design drawings for Decommissioning the Marine Dock and Adjacent Shoreline were submitted during the 3rd Quarter.
   - Approval with conditions was granted in the 4th Quarter

e) Questions Regarding the Garrow Lake Wave Break Structure from the NWB and DIAND were received December 22, 2003.

- Response from Teck Cominco Limited (TCL) was outstanding at the end of the quarter.

f) Requirement to Submit a Spill Response Plan as per the Water Licence.
   - A spill response plan was submitted earlier in 2003 with regulator reviews resulting in requests for revisions. The Spill Plan was updated and re-submitted in December addressing the regulators comments and updating the Plan to reflect personnel and other changes at the site during the year.
   - Appendix 8 contains a listing supplied by SNC–Lavalin Engineers and Constructors of the emergency spill response training conducted during the year. In March, 2003 there was a spill of diesel fuel (reported as required) due to a leak in a fuel line. SNC-Lavalin responded to the spill in accordance with the spill response plan and the incident in itself became a practice session that was real rather than simulated.

g) Environmental Effects Monitoring (EEM) Program Progress.
   - In December, TCL and its consultants met with the technical advisory committee of Environment Canada to review the results of the 2003 field season EEM study results and to discuss the scope and details of the 2004 field work being considered. At the end of the quarter TCL is awaiting response of its proposals from Environment Canada.

h) During August, the field work for study program required under the Department of Fisheries and Oceans (DFO) Fisheries Authorization related to Garrow Lake was undertaken. Water quality data was collected, sediments sampled and sculpins collected for analysis.
   - At the end of the quarter, work had begun on preparation of the report for DFO which should be available by early 2nd quarter of 2004.

i) TCL's request to store additional hydrocarbon contaminated soils underground was approved in a letter dated December 22, 2004.
   - The approval contained disposal requirements which will be complied with as the hydrocarbon contaminated soils are placed underground.
   - The authorization also requires that a table of information be developed and submitted with this quarterly report that:
     - Presents data to the end of the 3rd Quarter 2003.
     - Presents the original volumes of contaminated materials identified in the DRP.
     - Presents the quantities of soils disposed of to date.
     - Presents the predicted volume of soils yet to be disposed of.
     - Presents the volume of the mine workings filled with contaminated soils and the usable volume of the mine remaining available.

     This information is presented in Appendix 6 along with the mine plans of areas filled to date.

j) In December, TCL received a letter from NWB and DIAND commenting on the contents of the 1st and 2nd quarterly reports.
   - Additional information regarding percentage completion of the project and the various elements was requested. This has been incorporated into Section 7 ('Update of Decommissioning and Reclamation Schedule') of this report.

- Additional information was requested related to cost estimates provided and explanations of variances from the original budgets. This has been incorporated into this report along with the 4th Quarter budget update in Section 8 of this report.

6. DECOMMISSIONING AND RECLAMATION PROGRESS REPORT

Reclamation activities continued at higher than expected levels for the fall season to accomplish as much work as possible due to the increased quantities of contaminated soils over original estimates. Work also continued later in the fall than planned to gain as much extra earthmoving time as possible. Work related to earth excavation proceeded until the ground froze hard enough that productivity became unacceptably low. Manpower then decreased to minimal level as Christmas approached. Manpower levels were as follows:

	Peak	**Minimum**
October	120	94
November	105	72
December	72	20

6.1. Building Demolition

6.1.1. Mill / Offices / Warehouse Facilities / Barge

- As previously reported the barge has been demolished and the debris hauled to LRDQL and laid out in the pit bottom awaiting burial. Barge hull debris is being further processed (cut into smaller pieces) in LRDQL to lower the height of the debris to ensure there are no voids created by burying sections that are too large.

6.1.2. Concentrate Storage Building

- Five column stubs are all that remain of the building structure. They will be removed in the early spring of 2004.

6.1.3. Thickener Building

- A short section of tails line remaining near Garrow Lake shoreline was removed in December. There is a run of tailings line remaining up slope from the former Concentrate Storage Building. It will be removed in the spring.
- Final clean up by hand around the thickener building area remains outstanding. To be done in the spring once the snow melts.

6.1.4. CRF Plant

- Previously completed.

6.1.5. Fuel Tank Farm

- No further activity until 2004.

6.1.6. Accommodations Building

- No demolition activities in this area have been initiated as the facility will remain in active use until the summer of 2004.

6.1.7. Other Buildings / Structures

- No activities.

6.2. Earthworks

6.2.1. Marine Dock and Adjacent Shoreline

- Work ceased in the dock area early in October waiting for the sea ice to form. Weather during October delayed further significant work until early spring of 2004.
- Re-contouring of the shoreline north of the dock was on-going from Oct 10th to the end of November. Much of the protective berm at the edge of shoreline was removed once the sea ice thickened north of the dock. The sea ice will protect the shoreline from wave action until re-contouring work has been completed.

6.2.2. Garrow Lake Dam

- Excavation of the dam proceeded through until November using an excavator with a ripper to avoid the need for blasting. The ground became too hard to productively work so activities were suspended until March/April of 2004.

6.2.3. Operational Landfill

- As of November 16, approximately 16,000 cu.m. of limestone cap material was reported to have been placed by SNC. Hauling continued until November 30th at which time 98% of the cap had been placed. Will complete next spring once the snow is gone.

6.2.4. Little Red Dog Quarry Landfill ('LRDQL')

- Blasting from Bench 3 and 4 of LRDQL was on-going during the quarter until November 17th to supply limestone cover materials for the Operational Landfill. Dam shell and core materials (c/w Styrofoam insulation) were hauled and placed into LRDQL as fill for burying demolition materials.

6.2.5. Back 40 Area (Including CRF Area, New Quarry, North Pit, Subsidence Area, North Portal Area)

- Minimal activities re-contouring in this area due to winter weather. Substantial progress was made the previous quarter when the active layer was thawed.

6.2.6. Exploration Waste Rock Dump

- Continuing to remove contaminated soils from this area until ceasing work November 16th.

6.2.7. Temporary Dock

- Is forecast to be removed in March. The temporary dock consists of a number of robust steel I beams anchored into the sea bottom. There are no sheet piles associated with the temporary dock either now or in the past. In March while the ice extends to the base of the I-beams (they are in shallow water), the ice can be dug out with an excavator and the I-beams cut off just below the sea bottom. In this way sedimentation during the removal process will not be a concern.

6.2.8. Roadways

- No activity other than snow clearing.

6.3. Contaminated Soil Remediation

The Polaris Mine Decommissioning and Reclamation Plan (DRP) identified a number of locations at the mine site that had potential environmental concerns (Figure 18, Volume 1 of the DRP). These areas were identified as a result of the environmental assessments

conducted by Gartner Lee Ltd. (GLL) in 1999 and 2000 and reported in Volumes 3 and 4 of the DRP. Teck Cominco Limited (TCL) has contracted GLL to oversee the detailed assessment of these areas and to monitor the soil remediation activities. GLL has updated Figure 18 from the DRP renumbering the areas to more precisely identify them (Refer to Figure 1 in Appendix 2 of this report). TCL has been methodically remediating each of these areas. GLL guides the remediation work utilizing field screening tools such as the X-ray Fluorescence Analyzer (which can analyze for metals), Photo Ionization Detector (for hydrocarbon vapor testing) and Handby kit (for hydrocarbon concentrations in soils). As the remediation of each area is completed, GLL conducts confirmatory sampling and forwards the samples to a commercial laboratory for analysis. Once the laboratory results are received and a review of the data confirms that the remedial targets (approved in the DRP) have been achieved, then GLL prepares a 'Close-Out' report to document that successful remediation of the area has been completed. As remediation of soils in each of the areas is completed, Figure 1 of Appendix 2 will be updated to identify where work has been completed and where remedial work remains outstanding.

TCL's schedule has been to complete all of the required work on site by September 2004 (as indicated in the DRP). At that time, TCL will demobilize all personnel and equipment from the site. It is our intent to provide regulators with documentation of successful remedial work as far in advance of this date as possible. If there is additional remedial work required it is critical that this be identified as far in advance of the demobilization date as possible so that follow up work can be completed. For this reason TCL is submitting documentation of completed contaminated soils remediation as the work is completed for each discrete area rather than submitting one massive report at the end of the project for review.

TCL requests that the NWB and DIAND review the Close-Out reports as they are submitted in the quarterly reports and identifies any unresolved issues or concerns related to the areas being reported. TCL will assume that regulators are satisfied with soils remediation in these areas if no comments are received.

6.3.1. Concentrate Storage Shed and Area

- During October, final clean-up of the floor area was completed. In some areas contaminated soils were removed to bedrock. Small quantities of residual contaminated concentrate dusts have filtered into the cracks of the bedrock preventing further contaminant removal. Clean beach gravel fill was hauled in as a cover material which was completed October 26th. Refer to Appendix 2-A for a detailed discussion of remedial efforts employed for the Concentrate Storage Shed in the Close-Out report titled 'Former Concentrate Storage Shed Area'.
- Areas surrounding the perimeter of the Concentrate Storage have only limited remedial work completed to date and will be address in 2004.

6.3.2. Cemented Rock Fill (CRF) Plant Area

- As previously reported, both building demolition and soils remediation have been completed. Refer to Appendix 2-B for the GLL Close-Out report titled 'Former CRF Plant Fuel Storage Tank'.

6.3.3. Former Quonset Huts Fuel Storage Area

- An area of potential concern was identified in the 1999/2000 environmental site assessment, locally known as the High Arctic Club and associated maintenance shed. This was an area suspected of having hydrocarbon contaminated soils. Additional investigations were completed by GLL staff and confirmatory samples indicated no hydrocarbon concentrations exceeding the remedial targets. GLL's Close-Out report for this area is included in Appendix 2-C and is titled 'Former Quonset Huts Fuel Storage Area'.

6.3.4. Tailings Thickener Building and Area

- While some minor clean-up of building debris is still required in this area, the soils in the area have either been verified as meeting the remedial targets (without requiring remedial work) or as in the case of the spills pond beside the thickener, remedial activities have been undertaken and successfully completed. The results of the remedial efforts are reported in Appendix 2-D in the GLL report titled 'Former Tailings Thickener Area'.

6.3.5. Former Fuel Bladder Storage Area

- Remedial work in this area was competed earlier in the year. Attached in Appendix 2-E is the GLL Close-Out report for this area titled 'Former Fuel Bladder Storage Area'.

6.3.6. Former Crusher Area

- This area was identified as having potential for metals contaminated soils in the 1999/2000 environmental site assessments. In early August approximately 1,800 cu.m. (loose volume) of metals contaminated soils were excavated in this area. In the 3rd Quarter, confirmatory sampling was completed. Appendix 2-F includes the GLL Close-Out report for this area titled 'Old Crusher Area'.

6.3.7. Main Snow Dump

- Remedial work was completed in the 3rd Quarter. The GLL Close-Out report titled 'Main Snow Dump' is included in Appendix 2-G.

6.3.8. North Portal Ore Stockpile

- Remedial work was completed in the 3rd Quarter with confirmatory sampling results received in the 4th Quarter. Refer to Appendix 2-H for the GLL Close-Out report titled 'North Portal Stockpile'.

6.3.9. Exploration Waste Dump / Stockpile Area and Shoreline North of Dock

- The exploration waste rock dump was identified as an area of contamination in the DRP without a quantity being assigned. Substantial contaminated soils have been identified and remediated in this area. As the contamination in this area has been quantified, it has increased the estimate of the overall quantities of contaminated soils to be remediated at site. Remedial activities in this area have now been completed. This area is adjacent to the shoreline north of the dock and is reported in the Close-Out Report titled ''Exploration Stockpile and Shoreline North of the Dock' (Figure 1, Area #23) and is attached in Appendix 2-I of this report.
- This does not infer that the final contouring or re-grading has been completed in this area, only that the contaminated soils have been remediated. Additional work re-grading of the foreshore remains to be completed.

6.3.10. June 2002 Oil Spill Area

- Polaris had an oil spill at the tank farm facilities on June 25/26, 2002. Terrestrial remediation was initiated immediately and soils above the foreshore of the ocean were remediated by July 6, 2002. Gartner Lee Ltd. was on site to monitor the clean up activities and conducted the confirmatory sampling confirming the remedial targets were achieved. GLL prepared an assessment report dated November 2002 and it was submitted to the NWB and DIAND on December 2, 2002.
- Remediation of the foreshore remained outstanding at the end of 2002 and was completed early in the spring of 2003. GLL has prepared a Close-Out report titled '2002 Fuel Spill' for the foreshore area and it is enclosed in Appendix 2-J.

6.3.11. Marine Dock and Adjacent Foreshore Areas

- Minor excavation in the dock area occurred at the beginning of October removing the final remains of the hydrocarbon contamination in Cell #3. Confirmatory sampling results will be provided once excavation work is complete in this area.
- Excavation in the shoreline north of the dock continued until November 4th and activity ceased until the new year.

6.3.12. Barge Area

- Hauling of metals and hydrocarbon contaminated soils for disposal in the mine was on-going until work ceased in mid November. Hydrocarbon contamination is extending beyond expected boundaries, increasing the forecast quantities of contaminated soils. As a result additional assessment of adjacent areas using a drill was conducted to better define contaminant boundaries and to improve the accuracy of forecast quantities. As of November 10th, all excavated hydrocarbon contamination had been placed underground and approximately 30,000 cu.m. of metals contaminated soils had been stockpiled. Additional metals and hydrocarbon contaminated soils remain to be excavated from this area in 2004.

6.4. Disposal of Hazardous Materials / Special Wastes

As of December 3, 2003 the following inventory of fluids was on hand:

• 15W30 and 0W30 used oil	252 drums
• Coolant (clean)	72 drums
• Methyl Hydrate	28 drums
• Tellus Arctic	20 drums
• Varsol	4 drums
• Glycol	150 drums
• Equipment Lube oil	40 drums
• Waste Oil	90 drums
• Waste Fuel	160 drums

Incineration of waste hydrocarbons continued during the period with the following quantities being incinerated during the quarter:

2003	Wastes	Fuel
October	10,876	2,306
November	15,616	2,743
December	0	0
Total Quarter	26,492	5,049
Total YTD	50,118	8,559

Units – Imperial Gallons

- The Incinerator was mothballed in December as crew levels were decreased for the Christmas period. It will be utilized in 2004 to complete incineration of remaining hydrocarbon wastes and newly generated wastes (oil changes in mobile equipment, draining glycol from equipment as it is scrapped and from cleaning fuel tanks as they are decommissioned).

7. UPDATE OF DECOMMISSIONING AND RECLAMATION SCHEDULE

Appendix 3 contains an updated decommissioning schedule current as of December 31, 2003. The source of the data for the schedule is primarily from our demolition contactor. There are some revisions to the near term portions of the schedule as more detailed planning occurred. The project is still forecast to be completed by the end of September of 2004.

Reviews of previous quarterly reports indicated a desire to obtain regular updates on the percentage completion of the various work elements of the project. An additional column has been added to the schedule presented in Appendix 3 which estimates this for each line item in the schedule. This will be updated each quarter.

Reviews of previous quarterly reports indicated a desire to obtain regular updates on the percentage completion of the project as a whole. ***It is our judgment that as of December 31, 2003 the project is 71% complete*** (excluding site monitoring required subsequent to 2004).

8. PROJECT COST ESTIMATE UPDATE

8.1. Update of Estimated Mine Decommissioning, Reclamation and Monitoring Costs

Appendix 4 contains the detailed estimate of the Polaris Mine Decommissioning and Reclamation Plan (DRP) cost forecast updated as of December 31, 2003 in accordance with Part B, Item 3 and Part G, Item 21 and forecasts costs to the end of 2011.

In summary, total DRP costs to December 31, 2003 were $43,655,000. Estimated costs to complete decommissioning, reclamation and monitoring through to 2011 have increased to $62,312,000 from an original budget of $47,500,000. The cost report included in Appendix

4 contains discussions of the forecast project cost variances relative to the original budget as requested in the quarterly report review document submitted to TCL in December by the NWB and INAC.

9. RECLAMATION SECURITY REQUIREMENTS

Teck Cominco has submitted detailed documentation in the quarterly reports to the NWB and INAC. Excellent progress has been made in decommissioning and reclamation activities at the site on all fronts in accordance with the approved Decommissioning and Reclamation plan. The project as a whole is approximately 71% complete at year end.

While TCL has identified that there are substantial increases in quantities of contaminated soils over original estimates, TCL has been addressing this by extending the fall work season later than originally anticipated and by increasing crew sizes sooner in the New Year than originally anticipated in order to keep the project on schedule. Work is still forecasted to be completed on schedule in the fall of 2004.

Outstanding reclamation liabilities have been decreasing rapidly due to the high level of reclamation effort expended in 2003. At the end of the 4th Quarter of 2003 a detailed review of costs was conducted based on the progress made during the year and with the updated knowledge that the quantities of contaminated soils have increased substantially. The current forecast of the outstanding liability has decreased to $18,600,000 as of December 31, 2003. Teck Cominco currently has submitted $18,000,000 in security.

Work is continuing to progress at the site and by the time that this report is reviewed by the NWB and INAC the outstanding liability at the site will be less than $18,000,000.

Teck Cominco requests that as provided in the Water Licence under Part B, Paragraph 3 that the NWB and INAC agree to adjust the security requirements to $18,000,000.

10. PUBLIC CONSULTATION / PARTICIPATION

There were no public meetings held in the quarter.
Inuit employment was 14 people in October, 10 people in November and two people in December. This was a reflection of earthmoving activities decreasing as temperatures on site decreased into the winter season. Anticipate that Inuit employment will increase as earth moving activities increase again 2004.

11. SUMMARY OF WORK DONE IN RESPONSE TO INSPECTION / COMPLIANCE REPORTS

There were no site inspections during the 4th Quarter. The review of TCL's 1st and 2nd Quarter 2003 reports by the NWB and INAC contained a request for additional information regarding the project cost variances relative to the original budget. The requested information is included in the Section 8 'Project Cost Estimate Update' in the 4th Quarter report and will continue to be

submitted with the quarterly reports in the future. The quarterly report review also requested that percentage complete estimates be included in the quarterly reports and this is being done starting with this report.

The review also requests TCL to state whether or not TCL is requesting a reduction in security requirements. TCL is requesting an adjustment to the security requirements as identified above in Section 9 of this report.

12. FRESHWATER USE

Freshwater use from Frustration Lake for all uses during the 4th Quarter of 2003 was:

October 2003	3,514 cu.m.
November 2003	4,814 cu.m.
December 2003	18,926 cu.m.
Total 4th Quarter	64,695 cu.m.
Total 3rd Quarter	27,254 cu.m.
Total 2nd Quarter	29,088 cu.m.
Total 1st Quarter	56,927 cu.m.
Total Annual Used 2003	177,964 cu.m.

Water use for the year was within the 250,000 cubic metres authorized for 2003 in Part C of the Water Licence.

13. PHYSICAL MONITORING OF SITE

13.1. Disposal of Demolition Debris and Contaminated Soils

13.1.1. Disposal of Demolition Debris Into Little Red Dog Quarry Landfill

The approval letter for Landfill protocols requires us to report a record of materials (preferably in digital form). Refer to Appendix 5 for a listing of both quantities and general descriptions of the types of demolition debris transported to LRDQL during the quarter, drawings of disposal locations, and a photographic log of the work during the period. Any equipment originally containing hazardous materials such as hydraulic oils, fuel, greases and/or batteries are required to undergo an inspection to verify they have been properly prepared for disposal. As decommissioning of the mechanical portions of the barge facility was completed in prior periods, and there were no mobile equipment discarded in the period, there are no hazardous material inspections to report this period.

13.1.2. Disposal of Metals / Hydrocarbon Contaminated Soils Underground in the Mine

In the December 22, 2003 letter of approval for disposal of additional hydrocarbon contaminated soils underground, it was requested that a table be submitted that identifies:

- The original volumes of contaminated materials identified in the DRP.
- The quantities of soils disposed of to date.
- The predicted volume of soils yet to be disposed of.
- The volume of the mine workings filled with contaminated soils to date.
- The usable volume of the mine remaining available.

A table has been developed and is included in Appendix 6 of this report. Also included in Appendix 6 are the detailed plans of the mine levels showing where the contaminated soils have been place to the end of December 2003.

13.2. Thermistors Data

13.2.1. Garrow Lake Dam

Siphoning of Garrow Lake was completed in the 3rd Quarter of 2003. Removal of the dam commenced so that the thermistors in the dam have been decommissioned so there is no temperature data to be reported in the 4th Quarter of 2003 or beyond.

13.2.2. Operational Landfill

The Operational Landfill has the cover cap approximately 98% installed by the end of the 4th Quarter. As the work on the cap is not complete, the current thermistors would not provide relevant data so that recording of temperature data has been temporarily discontinued. Once construction of the cap is complete in the spring of 2004, monitoring of temperature data will resume. The Closure Plan states that a minimum of three will be maintained to confirm that freezing of the landfill has occurred.

13.2.3. Little Red Dog Quarry Landfill

Filling of LRDQL continues. The heavy metal pipes installed as housings for the thermistors have remained in intact while LRDQL is filled debris and soils. Once placing of the debris and soils are complete and the pipes are extended to their final elevation, thermistor strings will be installed in the pipes. Thermistor readings will then be recorded on a monthly basis while personnel are on site and after the fall of 2004, they will be monitored during regular site inspections.

13.3. Erosion Monitoring

13.3.1. Garrow Lake Erosion Pins

Not required in the winter season as the lake is frozen.

13.3.2. Marine Dock and Adjacent Foreshore Erosion Monitoring

Not required in the winter season as the ocean is frozen. Early in the 4th Quarter before the ocean froze, there was no active work occurring below high tide level.

14. GARROW LAKE STRATIGRAPHIC MONITORING

The Water Licence requires that a monitoring event of Garrow Lake Stratigraphy be conducted during the mid-winter, maximum ice thickness and at maximum ice melt during the summer. In previous reports, the mid winter and maximum ice thickness sampling have been submitted. The maximum ice melt sampling is normally conducted during mid August when there is usually (but not always) a brief period where Garrow Lake is ice free. Due to personnel and equipment problems the summer sampling of Garrow Lake was not able to be completed while it was ice free. To attempt to sample as soon after the maximum ice free period as possible, the ice thickness of Garrow was monitored so that the sampling event could be accomplished after the ice became strong enough to be safe to work from. However, testing of the ice thickness in October indicated that it was still not safe to take equipment out onto the ice so that the meaningful time to do the open water sampling long since passed.

Despite the low site activity planned in January, a GLL staff member will be contracted to travel to site specifically to ensure the January sampling of Garrow Lake occurs as scheduled.

15. SUMMARY OF EFFLUENT MONITORING AND EFFLUENT CHARACTERIZATION

No effluent was discharged during the quarter so effluent sampling was not required. Appendix 7 contains the effluent monitoring report submitted to Environment as required under the Metal Mining Effluent Regulations.

16. SUMMARY OF EEM STUDY PROGRAM PROGRESS

In December, Teck Cominco and its consultants (Azimuth Consulting) met with the Environment Canada's Technical Advisory Committee ('TAC') to review the 2003 summer field program and results. The purpose of the meeting was to obtain guidance regarding the requirements for the 2004 sampling program so that planning can proceed. Field conditions were extreme in 2003 and only through the diligence and hard efforts of the seasoned consultants was the program successfully undertaken. At the end of the quarter, formal response from the TAC was outstanding.

17. SUMMARY OF GARROW LAKE DFO STUDY PROGRAM PROGRESS

Laboratory results from the 2003 summer field program were received. Reporting of results will occur in the New Year.

APPENDIX 1

EXECUTIVE SUMMARY

IN INUKTITUT

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ᓄᓇᕗᖏᒥ ᐃᒪᓪᓗᓴᖅᑭᑦ ᒃᑎᒪᓴᖅᑭᑦ

ᐊᒪᓗ ᐅᑯᓄᖅᓯ

ᐃᓄᓪᓗᓴᐃᖁᑯᑦ ᒃᓇᑕᒥ

13.3. <u>ᐃᓗᓕᖅᑭᑦ</u>

1 ᐊᐅᓪᓚᔨᓂᕐᓂᖅ ᓇᐃᓕᒥᐊᓪᓚᒪᔪᖅ ᐅᓂᒃᖅ ᐃᓄᑎᑐᖅᑐᖅ

2 ᑭᓱᓕᒧᑦ

3 ᖃᓄᐃᓕᖅᑎᓕᓂᕆᔨᖅᑭᑦ ᐊᖅᑭᑎᓄᑦ ᐊᒪᓗ/ᐅᓴᓗᓂᑦ ᓇᒪᑭᔨᐅᑭᓚᒪᔪᑦ

4 ᐊᖅᑭᑕᐅᓚᒪᖅᑐᑦ ᑯᐊᑎᑕᐅᓐᓂᑦ ᐊᒪᓗ ᓇᐃᓕᒥᐊᖅᓚᒪᔪᖅ ᑭᖓᓂᐊᓂ ᖃᓄᐃᓕᒥᐊᖅᓚᓕᒪᓕᖅᑎᑦ

5 ᐱᓴᓕᐊᓂᖅᑭᓂᒃ ᐅᓂᒃᖅ ᖃᐅᔨᓴᓂᐅᔪᓂ/ᐊᖅᑭᒥᐊᖅᑎᓂᒃ ᑐᓴᖅᐅᑎᐅᔪᑦ

6 ᐃᔪᑎᖅᑕᐅᓂᖓ ᖃᓄᐃᑐᓂᖓᓄᓗ ᐅᑎᑎᑕᐅᓂᖓᓄᑦ ᖃᓄᐃᓕᓂᖓᓂᖓᓄᑦ ᐅᓂᒃᖓ

6.1 ᐃᒡᓗᓂ ᐃᔪᑎᓇᓂᖅ

6.1.1 ᓴᙵᕋᐅᒃᓴᖃᙵᒃ/ᑎᑎᕋᙵᒃ/ᓕᔅᓗᐊᖃᙵᒃ/>ᒃᑕᓭᔅᑐᖅ ᐃᒡᓗ
6.1.2 ᓴᙵᕋᐅᒃᓴᖃᙵᐅᑦ ᓕᔅᓗᐊᖃᙵᖏᑦ
6.1.3 ᑭᓂᔅᑎᓇᐅᑎᓕᐅᔅᙵᒃ ᐃᒡᓗ
6.1.4 ᖃᐃᒥᒃ ᐃᓗᓕᓕᑕᐅᔪᖅ ᓴᓇᙵᐅᑦ ᒥᒃᓱ
6.1.5 ᐅᔅᓕᐊᓗᖃᙵᐅᔪᖅ
6.1.6 ᐊᖅᑕᕐᖃᙵᐅᔪᑦ ᐃᒡᓗᐃᑦ
6.1.7 ᐊᓕᖅᑦ ᐃᒡᓗᐃᑦ/ᑭᓕᖃᕐᙵᑦ

6.2 ᓄᓇᕆᓂᖅ

6.2.1 ᑐᓴᒃᑕᕐᙵᒃ ᖃᓂᒪᔨᖏᓗ ᓕᒃᔨᖅ
6.2.2 ᑭᐊᖏ ᑕᓕᐅᑦ ᓕᒥᖏᖓ
6.2.3 ᐊᑐᕐᑕᐅᔪᖅ ᐊᒃᑕᕐᙵᒃ
6.2.4 ᐊᐅᑦᕐᑐᔪᓗ ᖃᑎ ᐃᓗᑐᕐᒪᒪᔪᖅ
6.2.5 ᑭᓕᖏᓗᔨᖃᖃᙵᒃ
6.2.6 ᖃᐅᔨᓴᕐᑦᑕᓕᐊᕆᓴᕐᑎᓗᒋᑦ ᐊᒃᑕᕐᙵᙵᓂᖅ
6.2.7 ᑐᓴᒃᑕᕐᙵᐅᒃᐃᓇᕐᑐᖅ
6.2.8 ᐊᕐᑐᑎᑦ

6.2 ᓕᖏᒪᔪᑦ ᓄᓇᐃᑦ ᓴᓗᒪᓴᕋᐅᓂᖅᑭᑦ

6.3.1 ᓴᙵᕋᐅᒃᓴᖃᙵᐅᑦ ᓕᕐᓗᐊᖏᓗ ᖃᓂᒪᔨᖏᓗ
6.3.2 ᖃᐃᕐᒥᒃ ᐃᓗᓕᕐᓕᒋᐅᔪᖅ ᐃᓗᖃᙵᐊᐅᒡ ᒥᒃᓴ
6.3.3 ᑐᐱᐅᔨᐅᓗᑎᒃ ᐅᕐᓕᐊᓗᖃᙵᐅᙵᓂᑦ ᓄᓇᖏᓂ ᒥᒃᓴ
6.3.4 ᑭᓂᕐᑕᐅᙵᐅᑦ ᐃᒃᓗᖏ ᐊᒪᓗ ᓄᓇᖏᓂ ᒥᒃᓴ
6.3.5 ᐅᕐᓕᐊᓗᖃᙵᐅᑎᖃᙵᐅᙵᓂᖅ ᐊᐅᑕᔪᓂ ᓄᓇᖏᓂ ᒥᒃᓴ
6.3.6 ᓕᖃᓕᑎᑎᙵᓂᐊᑕ ᒥᒃᓴ
6.3.7 ᐊᐅᑕᐃᔨᐃᙵᒃ
6.3.8 ᐅᐊᓇᖏᓂᓂᓴᖅ ᐅᒥᐊᔪᐊᒪ ᐅᓕᓕᓕᕐᙵᒃ ᓴᙵᕋᐅᒃᓴᕐᓂᒃ
6.3.9 ᖃᐅᔨᓴᕐᑦᑕᓕᐊᕆᓴᕐᑎᓗᒋᑦ ᐊᑕᙵᙵᓂᖅ/ᐅᔨᕋᑕᕐᙵᒃ ᐊᒪᓗ ᓕᒃᔨᔪᓕᒃᖏ ᐅᐊᓇᖏᓂᓂᓴᖅ
6.3.10 2002ᒥ ᐅᔅᓕᐊᓗᒥ ᑯᙵᔨᐅᓂᐅᑦ ᓄᓇᖏᖓ
6.3.11 ᑐᓴᒃᑕᕐᙵᒃ ᖃᓂᒪᔨᖏᓗ ᓕᒃᔨᖅᑐᖏᓂ ᖃᓂᒪᔨᖏᖓ
6.3.12 ᐃᒡᓗᑦ ᐳᒃᑕᓭᔅᑐᑦ ᖃᓂᒪᔨ

6.3 ᐃᒥᑎᓂᖅ ᓕᑯᓇᑐᖃᓂ ᑭᓕᑐᐃᓇᓕᓂᒃ/ᐱᑐᐃᓇᐅᔨᓂᒃᑭᑐᑦ ᐃᒥᑕᓴᐃᑦ

ᐃᓕᒋᐊᕐᑎᖏᑦ

1. ᐊᐅᓪᓗᓂᓄᖅ ᓇᐃᓕᑭᐊᓕᒫᖅ ᐅᓂᒃᖅ ᐃᓄᑎᑦᑐᖅ

ᐅᓂᒃᓗᐊᑕᐅᔪᖅ ᐅᖃᓕᒫᖅ ᐃᓕᑭᐊᕐᑕ 1ᒥᑐᕐᖅ.

2. ᑭᓱᓛᒪᓂᑦ

ᐅᓇ ᑎᕋᒪᑭᓕᑦᑎᓂ ᑎᕋᒪᐃᓕᖃᖅᑎᑦᔪᓂ ᐃᔪᑎᑕᐅᓂᖅᑎᓄ ᖃᓄᐃᑐᓂᕆᓂᖅᑎᓄᓗ ᐅᑎᑎᑕᐅᓂᖅᑎᑦ ᐅᓂᒃᖅᑎ ᑐᓂᕐᓴᐅᓕᐅᔪᖅ ᐱᒪᑎᖅᑐᒥ ᓴᓕᔪᐅᑦᔨᐅᕐᓂ ᐃᔪᑎᑕᐅᓂᖅᑎ ᖃᓄᐃᑐᓂᕆᓂᖅᓄᓗ ᐅᑎᑎᑕᐅᓂᖅᓄᑖᖅᑎᖅ.

3. ᖃᓄᐃᓕᖃᖅᑎᓕᓂᓕᕆᔨᖏᑦ ᐊᖏᑕᑎᓄᑦ ᐊᒪᓗ/ᐅᓪᓗᓂᓕ ᓇᒪᑭᐅᐅᔪᒪᕐᓂᒃ

ᑕᐃᒪᖅᑎᓂᑦ ᑎᓯᐱᕆ 31, 2003ᒥᓂᑦ, ᑕᐃᔨᐊ ᑲᐋᔪᑎᑐᒪᓴᐅᑐᑦ ᐊᖏᑕᐅᔪᒪᕐᓂᑦ ᑕᓪᓂ ᑎᕋᒪᑭᓕᑦᑎᓂ ᐃᒪᐃᑐᐅᑦ:

1. ᐳᓕᐊᕆᔨ ᐅᓪᓚᕐᔪᐊᖅᑎᑦ ᐃᔪᑎᑕᐅᓂᖅᑎ ᖃᓄᐃᑐᓂᕆᓂᖅᑎᓄᓗ ᐅᑎᑎᑕᐅᓂᖅ - ᒪᓕ 1, 2001
   - ᔪᐅᓂᐊᓂ ᐊᖏᑦᑕᐅᔪᒪᕐᖅ
2. ᐃᒪᒋᐅᑕᓕᖅᓂᑦ ᐱᐊᓇᖅᑎᔪᕐᓂ ᒪᓕᓗᐃᔪ ᐃᒪᒥᐅᑕᓕᕆᓂᖅ ᒪᓕᕆᖅᑎ ᐃᔪᑎᑕᐅᓇᔪᓂᖅ ᑭᐊᖅ ᑕᔪᖅᑎ ᔪᒥᖅ ᐊᒪᓗ ᐃᔪᑎᑕᐅᓂᖅᑎ ᑐᓭᑦᕕᐅᑦ ᔪᓂᐅᑦᑐᖅᓗ ᔪᖅᓴᑦᑐᔪᖅ
   - ᔪᐅᓂᐊᓂ ᐊᖏᑦᑕᐅᔪᒪᕐᖅ
3. ᑐᔪᕋᐅᑎᖅ ᐃᒪᓕᕆᓚᓂᑦ ᑲᑎᒪᓚᖏᓂᑦ ᐃᓄᓕᕆᓚᑐᖃᓂᓗ ᔪᑦᓗᐊᑦᕿᓂᕈᒪᓗᒪᓕᓗᑎᖅ ᓄᓇᐅ ᐊᒋᓂ ᐃᑎᑕᐅᔫᓂᖅ ᐅᑦᔪᐊᓗᓐᓂᔫᓄ ᐅᓪᓚᕐᔪᐊᖅᑎᑦ ᔪᑎᐱᕆ 16, 2003ᖁᑎᓗᔪᑐ.
   - ᐊᖏᑦᑕᐅᔫᖅ ᔪᑕᒪᖅᓂ ᔪᑕᒪᐃᓕᕆᖃᖅᑎᑦ ᐊᐱᖅᑐᔪᒪᓕᓗᐊᖏᖅᓂ..
4. ᑐᔪᕋᓂᖅ ᐊᖏᕈᐊᑦᑕᐅᑦᔨᓗᔪᑐ ᐅᔪᒃᑦᑎᔭᖅ ᐱᓪᓗᔪᑐ (ᑭᐊᖅ ᑕᔪᐅᑦ ᔪᒥᖅᑎᑕ ᐅᓴᕐᖅᑎ ᖁᑎᖅᑎᓂᑦ ᐳᒃᑕᓪᓕᖅᑦ ᐃᒡᓗᑦ ᐃᓂᖅᑎᓄᑦᑕᐅᑦᔨᓗᔪᑐ) ᐅᓪᓗᖅᑎ ᐅᒃᑐᑦ 15, 2004.
   - ᔪᓂ ᖃᐅᓴᐅᔪᒪᔭᖅᑐᑦ ᑎᕋᒪᐃᓕᔪᔪᕐᑐᑦ ᐊᐱᑐᔪᒪᓂᖅᑕᑦ ᑎᕋᒪᖅᑎᑦ ᓄᖅᐊᓂ.
5. ᑐᔪᕋᐅᑎᖅ ᕿᐱᕐᔫᐃᓐ ᔪᖅᑭᒪᓕᕐᑐᑦ ᐃᓗᕋᓕᐊᖅᔪᒪᓕᕐᓗᑦ ᕿᐅᖅᐅᕐᔪᕋᐅᑕᐅᔪᒪᓗᑎᖅᑐᑦ ᐊᒪᓗ ᐊᒥᐊᔨᖏᑦ ᐅᑦᔪᐊᓗᓐᓂᔫᓄ ᔪᖅᑭᒪᓕᕐᑐᑦ ᓄᓇᐃᐃᑦ ᐊᑕᓄᑕᐅᔪᒪᓗᑎᖅᑐᑦ ᐅᓴᕋᑦᕿᐃᐅᔪᒪᔪᑦ ᑎᑎᕋᑕᐅᔪᒪᕐᓂᑦ ᑎᓯᐱᕆ 19, 2003ᖁᑎᓗᔪᑐ.
   - ᔪᓂ ᖃᐅᓴᐅᔪᒪᖏᑐᑦ ᑎᕋᒪᐃᓕᔪᓯᔪᒃᑐᑦ ᐊᐱᑐᔪᒪᓂᖅᑕᑦ ᑎᕋᒪᖅᑎᑦ ᓄᓇᐃᐃᑦ.

4. ᐊᖏᑦᑕᐅᔪᒪᖏᑐᑦ ᔨᐃᑎᑦᑕᐅᓚᑦ ᐊᒪᓗ ᓇᐃᓕᑭᐊᕐᑕᒪᓕᕐᓂᑦ ᑭᖓᔪᓄᐊᓄ ᖃᓄᐃᓕᑭᐊᕐᑕᓕᒫᖅᓗ

ᐊᖏᑦᑕᐅᔪᒪᖏᑐᔪᓂᖅ ᐃᒪᒋᐊ ᔨᐃᑎᑦᔪᓂᖃᓕᐅᖏᑐᖅᑐᑦ ᔨᑎᑦᑕᐅᔪᒪᓂᖅᑕᑦ ᓄᓇᐃᓕᑭᐊᕐᑕᒪᓕᕐᓂᑦ ᑕᒪᑐᒪᓂᐅᑦᔪᖅ ᑎᕋᒪᐃᓕᑭᐊᕐᑕᒪᓕᕐᓗᑎᖅᑐᑦ ᐊᒪᓗ ᐊᒥᐊᔨᖏᑦ ᐅᑦᔪᐊᓗᓐᓂᔫᓄ ᑎᓯᐱᕆ 19, 2003ᖁᑎᓗᔪᑐ.

- ᔪᓂ ᖃᐅᓴᐅᔪᒪᖏᑐᑦ ᑎᕋᒪᐃᓕᔪᓯᔪᒃᑐᑦ ᐊᐱᑐᔪᒪᓂᖅᑕᑦ ᑎᕋᒪᖅᑎᑦ ᓄᓇᐃᐃᑦ.

5. ᐱᓕᓕᐊᓂᖏᑦ ᐅᓂᒃ ᖃᐅᔨᒪᓂᐅᔪᓂ/ᐊᖏᕈᐊᖅᑎᓂᓄ ᑐᔪᕋᐅᑎᐅᔪᒪᑦ

ᒪᑐᓂᒪᖅᑎᑦ ᐊᖏᑕᐅᔪᒪᓂᖏᑦᑕ ᐊᖏᑕᐅᔪᒪᓂᖏᑦ ᐊᒪᓗ/ᐅᓪᓗᓂᓕ ᐃᒪᒧᑦ ᐱᔪᓐᓇᐅᑎᓄ ᐅᖃᓕᑭᐊᕐᑕᒪᓕᕐᓂᑦ ᑐᔪᕋᐅᑎᐅᖅᑕᖅᑎᑦᑎᓂᑦ ᖃᓄᐃᓕᑭᐊᕐᑕᒪᓕᕐᓗᑎᖅᑐᑦ ᐊᒪᓗ/ᐅᓪᓗᓂᓕ ᐅᓂᒃᓴᓂᐅᔪᒪᔪᓂᖅᑐᑦ:

ᐃ) ᐊᖏᑦᑕᐅᔪᒪᕐᓂᖅ ᕿᐅᖅᐅᔪᐃᐃ ᖃᐅᔨᓴᖅᑎ ᐊᖏᕈᐊᖅᑎᓂᖅ ᐊᒪᓗ ᖃᓄᐃᓕᑭᐊᕐᑕᖅᑕᒪᓕᕐᓂᑦ ᑎᑎᕋᖅᑕᖏᑦᑐᑦ ᑐᓂᒃᓴᐅᓕᐅᔪᒪᓂᖅ ᐱᖓᓱᖏᓐᓂᒃ ᑎᕋᒪᐃᓕᑭᐊᕐᑕᒪᓕᕐᓗᑎᖅᑐᑦ

- ᐊᖏᑦᑕᐅᓕᐅᑐᔪᒍ ᒪᓕᓂᐊᖅᑕᖃᖅᑐᓂ ᑎᕋᒪᖅᑎᓂᒃ ᑎᕋᒪᐃᓕᑭᐊᕐᑕᒪᓕᕐᓗᑎᖅᑐᑦ.

ᐱ) ᐊᖏᑦᑕᐅᔪᒪᕐᓂᑦ ᑎᑎᕋᐅᓴᖅᓯᔪᒪᕐᓂᑦ ᐊᒪᓗ ᒪᓕᓂᐊᖅᑕᖃᖅᑐᓂ ᑭᐊᖅ ᑕᔪᐅᑦ ᔪᒥᖅᑎᑕ ᔪᒥᖅᑎᑕᐅᓂᖅᑎᓄᑦ ᐃᔪᑎᑕᐅᓂᖅᑎᓄᑦ ᑐᓂᒃᓴᐅᓕᐅᔪᒪᓂᖅ ᐱᖓᓱᖏᓐᓂᒃ ᑎᕋᒪᐃᓕᑭᐊᕐᑕᒪᓕᕐᓗᑎᖅᑐᑦ.

- ᐊᖏᑦᑕᐅᓕᐅᑐᔪᒍᖅ ᒪᓕᓂᐊᖅᑕᖃᖅᑐᓂ ᑎᕋᒪᖅᑎᓂᒃ ᑎᕋᒪᐃᓕᑭᐊᕐᑕᒪᓕᕐᓗᑎᖅᑐᑦ.

ᑎ) ᐊᖏᑦᑕᐅᔪᒪᕐᓂᑦ ᖃᓄᐃᓕᖅᓂᒪᓂᖏᑦᑕ ᐊᒪᓗ ᑎᑎᕋᐅᓴᖅᓯᔪᒪᕐᓂᑦ ᐅᓴᕋᑦᕿᐃᐅᔨᑦ ᐃᓱᕋᑦᕿᓂᖅᑕᑦ ᔪᒥᐅᑕᐅᓂᒪᓂᖏᑦᑕ ᑐᓴᕆᐅᑕᐅᓕᐅᔪᒪᕐᓂᑦ ᐱᖓᓱᖏᓐᓂᒃ ᑎᕋᒪᐃᓕᑭᐊᕐᑕᒪᓕᕐᓗᑎᖅᑐᑦ.

- ᐊᖏᑦᑕᐅᓕᐅᑐᔪᖅ ᒪᓕᓂᐊᖅᑕᖃᖅᑐᓂ ᑎᕋᒪᖅᑎᓂᒃ ᑎᕋᒪᐃᓕᑭᐊᕐᑕᒪᓕᕐᓗᑎᖅᑐᑦ.

ᑭ) ᐊᖏᑕᐅᓯᒪᔪᑦ ᖃᓄᐃᓕᖓᓂᓴᖏᑦ ᑎᑎᕋᐅᔭᓯᒪᔪᓗ ᐃᒍᑎᑕᐅᓂᖓᓄ ᑐᓚᒃᑕᕐᕕᐅᑉ ᐊᒪᓗ ᖃᓂᒋᔭᖓᑕ ᓯᔭᖓᓂ ᑐᓂᔭᐅᓚᐅᑐᑦ ᐱᖓᔪᖓᓂ ᑎᓴᒪᐃᓕᖅᖓᔪᐃ.
  - ᐊᖏᑕᐅᓚᐅᑐᖅ ᒪᓕᒋᐊᖃᑕᖃᓗᑕ ᑎᓴᒪᖓᓂ ᑎᓴᒪᐃᓕᖅᖓᔪᐃᑦ.

ᒋ) ᐊᐱᕐᑯᑏᑦ ᐱᔪᑎᓖᑦ ᑭᐊᕈ ᑕᓯᐅᑉ ᒪᓕᕐᑕᐃᓕᒪᔪᑎᒃ ᐊᕿᑕᐅᓯᒪᔪᖅ ᓄᓇᕗᒥ ᐃᒪᓕᓇᔫᖏᑕ ᑲᑎᒪᔫᖏᓂᑦ ᐃᓄᓕᓇᔫᑐᖃᑯᓂᓗ ᐱᓚᐅᑕᕗᑦ ᑎᓯᐱᓇ 22, 2003ᒥ.
  - ᓱᓕ ᑭᐅᔭᐅᓯᒪᓚᐅᖏᑐᑦᒍᑦ ᑎᒃ ᑲᒥᑯ ᓕᒥᑎᑦᑯᓂᑦ ᓂᖑᐊᓂ ᑎᓴᒪᐃᓕᖅᖓᔪᓂ.

ᒥ) ᐱᔭᐅᔭᓇᐊᖃᑐᑦ ᑐᔪᑕᐅᓗᑎᒃ ᑯᕕᔪᖃᓂᕐᐸᑦ ᖃᓄᐃᓕᐅᓇᐊᖃᒪᙵᑕ ᐊᕿᓯᒪᔪᓂ ᐃᒪᒧ ᐱᔪᓇᐅᑎᖓ ᒪᓕᓗᒍ.
  - ᑯᕕᔪᖃᓂᐸᑦ ᖃᓄᐃᓕᐅᓇᐊᖃᒪᙵᑕ ᐊᕿᓯᒪᔭᖓᑦ ᑐᓂᓚᐅᑕᖓᑦ 2003ᖑᑎᓗᒍ ᐊᒪᓗ ᐊᕿᒋᐊᕐᑕᐅᓚᐅᑐᖅ ᑐᓂᔭᐅᑲᓂᕈᓂᓗ ᑎᓯᐱᓇᐅᑎᓗᒍ.

ᓂ) ᐊᕙᑎᐅᑉ ᐊᒃᑐᕐᑕᐅᓂᖓᓄᑦ ᖃᐅᔨᓴᓂᖅ ᑲᔪᓯᑎᑕᐅᓂᖓ ᖃᓄᐃᓕᖓᓕᒪᙵᑦ.
  - ᐅᖃᐅᓯᐅᓚᐅᑐᑦ 2003ᒥ ᖃᐅᓕᓴᕈᑕᐅᓚᐅᑐᑦ ᐊᕙᑎᓕᓇᔫᑯᓗ ᐱᖃᑎᒋᔭᐅᓗᑎᒃ ᐊᒪᓗ ᐊᕋᒎᑐᖅ ᑲᔪᓯᑎᑕᐅᓚᕈᒪᔪᑦ. ᑭᐅᔪᑎᖏᑦ ᓱᓕ ᐅᑕᕿᔭᐅᔪᑦ.

ᓯ) ᐊᓚᓯᐅᑎᓗᒍ, ᑕᐃᑲᓂᓚᑕᕐᑐᓂ ᖃᐅᔮᓴᕐᑯᔮᓂᖓ ᑲᔪᓯᕐᑯᔭᐅᓂᖓ ᐃᒪᒥᐅᑕᓕᓇᔫᑯᓂᑦ ᐊᒪᓗ ᐃᒪᒥᐅᑕᓕᓇᔫᑯᑦ ᐊᖓᔪᖃᖏᓂᑦ ᑐᕋᖓᔪᑦ ᑭᐊᕈ ᑕᓯᒎᑦ ᑲᔪᓯᑎᑕᐅᓚᐅᕐᑐᑦ.
  - ᐅᓂᑲᓕᐊᖑᔪᑦ ᐃᒪᒥᐅᑕᓕᓇᔫᑯᓄᕐᑐᒃᓴᖅ ᐊᑐᐃᓇᐅᓕᓇᐊᓕᒃ ᐊᐃᐸᓇᔭᖓᓂ ᑎᓴᒪᐃᓕᖅᖓᔪᓂᑦ 2004ᖑᓕᕐᐸᑦ.

ᓕ) ᑲᒥᑯᑦ ᑐᓯᕋᑎᒋᓯᒪᔭᖓ ᓯᕐᓗᐊᑕᑲᓂᕈᒪᓗᑎᒃ ᓄᓇᐅᑉ ᐊᑕᓂ ᓱᕈᓯᒪᔪᓂ ᐅᕐᓱᐊᓗᕈᒧᓂᑦ ᐊᖏᑕᐅᓚᐅᑐᖅ ᑎᑎᖅ ᑎᑎᕋᑕᐅᓂᑯᑦ ᑎᓯᐱᓇ 22, 2004ᖑᑎᓗᒍ..

ᕕ) ᑎᓯᐱᓇᐅᑎᓗᒍ, ᑲᒥᑯᑦ ᑎᑎᖃᐅᓯᐊᓚᐅᑐᑦ ᓄᓇᕗᒥ ᐃᒪᓕᓇᔫᖏᑕ ᑲᑎᒪᔫᖏᓂᑦ ᐃᓄᓕᓇᔫᑐᖃᑯᓂᓗ ᐅᖃᐅᓯᖃᑐᓂᑦ ᓯᕗᓕᐸᖓᓂ ᐊᐃᐸᖓᓂᓗ ᐅᓂᑲᓕᐊᖑᓯᒪᔪᓂᑦ.

6. ᐃᒍᑎᕐᑕᐅᓂᖓ ᖃᓄᐃᑐᓂᖓᓄᓗ ᐅᑎᑎᑕᐅᓂᖓᑕ ᖃᓄᐃᓕᖓᓂᖓᑕ ᐅᓂᑲᖓ

ᖃᓄᐃᑐᓂᕕᓂᖓᓄ ᐅᑎᑎᑕᐅᓇᓱᓂᒧᑦ ᐱᓕᓇᐊᖑᔪᑦ ᑲᔪᓯᓚᐅᑐᑦ ᓯᕗᕙᓯᒪᓂᓴᐅᓗᑎᒃ ᓂᓇᐅᒋᔭᐅᓂᖏᓂᑦ ᐅᑭᐅᓴᑯᑦ ᕿᓚᒥᐅᓴᓕᔪᖅ ᐱᓇᓱᐊᕈᓇᖁᓗᒋᑦ ᐊᖏᓂᓴᐅᓂᖓᓄᑦ ᓱᕈᓯᒪᔪᖅ ᓄᓇ ᖃᓄᐃᑐᓇᓱᒋᔭᐅᓂᓇᓚᐅᑕᖓᓂ ᐊᖏᓂᓴᐅᒪᑦ. ᑕᐃᒪ ᐃᖃᓇᐃᔮᑏᑦ ᐅᓄᖏᓕᒋᐊᓚᐅᑐᑦ ᐅᓄᖏᓂᐸᓇᔪᓇᑕᖓᓄ ᑎᓯᐱᓇᖑᕐᑎᓗᒍ. ᐃᖃᓇᐃᔭᑎᖏᑦ 120ᐅᓚᐅᑐᑦ ᐊᒃᑐᐸᒥ 20ᖑᕈᑎ ᑯᕕᐊᓱᕕᒥ.

6.1 ᐃᓗᓂᒃ ᐃᒍᑎᓇᓃᑦ

6.1.1. ᓯᕕᕋᔭᓴᑯᕕᒃ/ᑎᑎᕋᕕᒃ/ᓯᕐᓗᐊᖃᕕᐅᔪᑦ/ᐳᒃᑖᕐᑐᖅ ᐃᓪᓗ

- ᐃᒍᑎᓇᓂᖅ ᐳᒃᑖᕐᑐᕐᒥ ᐃᓘᒥᒃ ᐱᔭᓇᓚᐅᑐᖅ ᑭᖑᓕᐸᖓᓂ ᑎᓴᒪᐃᓕᖅᖓᔪᑦ.

6.1.2. ᓴᕕᕋᔭᒃᓴᖃᕕᐅᔪᖅ ᓯᕐᓗᐊᖅ

- ᑕᓕᒪᐃᑦ ᓴᐃᓂᖏᑦ ᐃᒃᓗᐃᑦ ᐊᒥᐊᑯᑐᓕᕐᑐᑦ ᐃᓗᒥᑦ. ᐲᔭᕐᑕᐅᓚᕐᑐᑦ ᐅᐱᖓᓴᖓᓂ 2004ᒥ.

6.1.3. ᕿᓂᕐᑐᓕᐅᕐᕕᒃ ᐃᓪᓗ

- ᐅᔭᕋᑕᑕᐅᔪᑦ ᐊᒥᐊᑯᓗᑯᖏᑕ ᓱᓪᓗ%ᓂᖏᑦ ᓯᕕᖓᓂᒥᑐᑦ ᐊᒥᐊᑯᑐᓕᕐᑐᑦ ᑕᐃᓱᒪᖓ ᓴᕕᕋᔭᒃᓴᖃᕕᐅᔫᑉ ᓯᕐᓗᐊᕕᓂᖓᓂᑦ. ᐅᐱᖓᓴᑯᑦ ᐹᕐᑕᐅᓖᕐᑐᖅ..
- ᑭᖑᓕᕐᐸᖑᔪᕐᒥ ᓴᓗᒪᓴᐃᓂᖅ ᐊᐅᓚᐅᑎᓄᖏᑐᖅ ᓴᓗᒪᓴᐃᓂᒃᓴᖅ ᕿᓂᕐᑕᓕᐅᕕᕕᓂᐅ ᐃᓂᖓᑕ ᐅᐱᖓᓴᖑᓖᑐᖅ ᐱᒋᐊᑕᐅᓖᕐᑐᖅ ᐊᐳᑦ ᐊᐅᒃᐸᑦ.

6.1.4. ᕿᑯᑯᕕᒃ

- ᐱᔭᓇᑕᐅᓚᐅᑐᖅ ᓯᕗᓂᐊᓂ.

6.1.5. ᐅᕐᓱᐊᓗᖃᐅᑎᐅᔪᑦ ᖃᑕᐅᔭᑯᕕᒃ

- ᐱᒋᐊᕐᑕᐅᓚᐅᖏᑐᖅ 2004ᖑᕐᒪᑦ ᑭᓯᐊᓂ.

6.1.6. ᐊᖏᕋᖃᕕᐅᔪᑦ ᐃᓪᓗᐃᑦ

- ᑕᓇ ᐃᒡᓗ ᓱᓕ ᑕᐃᒪᐃᓕᖓᓂᐊᕐᑐᖅ ᐊᑐᑕᐅᓂᐊᑐᖅ ᐊᐅᔭᖑᕐᐸᑦ ᑭᓯᐊᓂ 2004ᖑᕐᐸᑦ.

6.1.7. ᐊᓯᖏᑦ ᐃᒃᓗᐃᑦ/ᐱᕐᑯᑎᕕᑦ

- ᐱᓕᕆᐊᖑᖏᑐᑦ.

6.2 ᓄᓇᓕᕆᓂᖅ

6.2.1 ᑐᓚᒃᑕᕐᕕᒃ ᖃᓂᒋᔭᖓᓗ ᓯᒃᔭ

- ᐊᒃᑐᐸᐅᑉ ᐱᒋᐊᕐᓂᖓᓂ ᑐᓚᑕᕐᕕᓕᕆᓂ ᓄᖅᑲᓚᐅᑐᖅ ᓯᑯᑎᐊᕆᔭᐅᓗᓂ.
- ᓄᓇᖓᑕ ᐊᕿᓱᑕᐅᓂᖓ ᐅᐊᓇᐸᓯᐊᓂ ᓯᔭᐅᑉ ᑐᓚᑕᕐᕕᐸᓯᕐᒥ ᓱᓕ ᑲᔪᓯᓚᐅᑐᖅ ᓄᕕᐱᕆᐅᑉ ᓄᖑᐊᓄ ᑎᑭᓗᒍ. ᐊᑕᖏᐸᓗᓗᒍ ᓴᐳᓗᑕᖅ ᐊᕿᑕᐅᓯᒪᓚᐅᑐᖅ ᓯᓚᑕᓄ ᑯᕕᔭᐃᑯᑖ ᐱᔭᕐᑕᐅᓚᐅᑐᖅ ᓯᑯ ᐃᔪᕐᑎᑐᐊᕐᒪᑦ.

6.2.2 ᑭᐊᕈ ᑕᓯᐅᑉ ᓯᒥᖓ

- ᐱᔭᕐᑕᐅᓂᖓ ᑰᒧᑦ ᓯᒥᐅᑉ ᑲᔪᓯᓚᐅᑐᖅ ᓄᕕᐱᕆᖑᕐᓗᒍ ᐱᔭᐃᔪᑎᐊᓗᒥᒃ ᐊᑐᕐᓗᑎᒃ ᖃᑎᑎᕆᑲᑕᕐᑯᓇᒋᑦ..

6.2.3 ᐊᑐᕐᑕᐅᔪᖅ ᐊᒃᑕᕐᕕᒃ

- 98ᐳᓴᒥᒃ ᐱᔭᕆᓯᒪᓕᑐᖅ ᖃᐸᓕᕐᓱᑕᐅᓂᖓ. ᐱᔭᕆᑕᐅᓖᕐᑐᖅ ᐅᐱᖓᑲᓂᕐᐸᑦ ᐊᐳᑎ ᐊᐅᑐᐃᓇᐅᒃᐸᑦ.

6.2.4 ᐊᐅᐸᕐᑐᑯᓗᒃ ᕿᒥ ᐅᓗᑐᕐᑎᓯᒪᔪᖅ

- ᖃᕐᑎᕆᓂ ᐊᐅᐸᑐᖅ ᕿᒥᑯᓗᒥ ᓱᓕ ᑲᔪᓯᓚᐅᑐᖅ ᓄᕕᐱᕆ 17ᒧ ᑎᑭᓗᒍ ᖃᐸᓴᕐᒥ ᐱ% ᐅᓇᓱᒃᓗᓂ ᐊᖕᒫᒃᓴᔭᒥ ᐅᔭᕋᑕᕐᕕᐅᓗᓂ ᒪᓇᐅᔪᖅ ᒪᕐᓗᑯᕐᕕᓴᕐᒧᑐᓴᒥ.
- ᑰᑉ ᓯᒥᖓᑕ ᐅᔭᕋᓴᔭᖏᑦ (ᐅᕿᑐᓴᔭᒥ ᐃᑭᐊᕐᒥᓴᒥ ᐃᓚᓕᒃ) ᐅᓯᑲᕐᑕᑕᐅᓚᐅᑐᑦ ᐊᐅᐸᑐᖅ ᕿᒥᑯᓗᒧᕈᔭᐅᓗᓂ ᓴᐅᔭᐅᔭᓴᐅᑕᐅᓗᓂ ᐃᒍᑎᑕᐅᕙᓕᐊᔪᓂ ᓴᐅᔭᐅᖃᑕᐅᓗᓂ.

6.2.5 ᑭᓱᕈᓗᔭᖃᕕᒃ (ᐃᓚᐅᓗᑎᒃ ᕿᑯᑯᕕᒃ, ᓄᑖᖅ ᑐᐊᐸᒃᑕᕐᕕᒃ, ᐅᐊᓇᐸᓯᐊᓂᑐᖅ ᐃᓗᕐᓴᖅ, ᑲᑕᑎᐊᕆᔭᐅᔪᕐᓗ ᓄᓇ, ᐅᐊᓇᐸᓯᖓᓂᑐᕐᓗ ᑐᓚᑕᕐᕕᐅᑉ ᖃᓂᒋᔮ)

- ᓄᓇᖓᑕ ᐊᕿᓱᑕᐅᒋᐊᓚᓂᖓ ᒥᑭᑐᓚᐅᑐᖅ ᐅᑭᐅᖑᓂᖓ ᐱᔪᑎᒋᓗᒍ.

6.2.6 ᖃᐅᔨᓴᕐᐸᓕᐊᓕᓴᕐᑎᓗᒋᑦ ᐊᒃᑕᕕᐱᕕᓂᖅ

- ᓱᓕ ᓱᕈᓂᑲᓂᒃ ᑐᐊᐸᖕᒥᒃ ᐱᔭᐃᔪᑦ ᑕᒪᖓ ᐱᓇᓱᐊᓂᖓ ᑕᒪᑐᒥᖓ ᓄᖅᑲᓚᐅᖅᑎᓇᒍ ᓄᕕᐱᕆ 16ᒥ.

6.2.7 ᑐᓚᒃᑕᕐᕕᐅᑲᐃᓇᕐᑐᖅ

- ᓇᓚᐅᓵᕐᑕᐅᓯᒪᔪᖅ ᐱᔭᑕᐅᓂᐊᕐᑐᖅ ᒪᕈᐅᓕᕐᐸᑦ.

6.2.8 ᐊᕐᑯᑏᑦ

- ᑭᓱᓕᕆᖏᑐᑦ ᐊᐳᑕᐃᔭᐃᓂᐅᑉ ᐊᓯᐊᓂᒃ.

6.3 ᓱᕈᓯᒪᔪᑦ ᓄᓇᐃᑦ ᓴᓗᒪᕐᓴᑕᐅᓂᖏᑦ

ᐳᓕᐊᕆᐦ ᐅᔭᕋᓯᐅᕐᕕᖓᑕ ᐃᒍᑎᑕᐅᓂᖓ ᖃᓄᐃᑐᓂᕕᓂᖓᓄ ᐅᑎᑎᑕᐅᓂᖓ ᓇᓗᓇᐃᓯᓯᒪᓕᑐᖅ ᐊᒥᓱᓂ ᐅᔭᕋᑕᕕᐅᔪᕕᓂᕐᓂᒃ ᐊᕙᑎᒧᑦ ᓱᓃᑐᐃᓇᕆᐊᓕᓂᒃ ᐃᓱᒫᓗᑕᐅᔪᓇᕐᑐᓂᒃ. ᑲᒥᑯᑯᑦ ᑲᑐᕐᓯᒪᓕᑐᑦ ᔨᓚᓚᑯᓂᒃ ᑕᒪᓇ ᖃᐅᔨᓴᕐᑯᓗᒍ ᓇᓗᓇᐃᓯᒪᑎᐊᕐᑐᓂᒃ ᑕᑯᓂᖓ ᓄᓇᐅᔪᕐᓂᒃ ᐊᒪᓗ ᖃᐅᔨᓴᕐᓗᑎᒃ ᓄᓇᖓᑕ ᐊᕿᓱᑕᐅᓂᖓᓂᒃ ᖃᓄᐃᓕᕆᓕᐊᓂᖓᓂᒃ. ᖃᓄᐃᑐᓂ%ᓂᖓᓄ ᐅᑎᑎᑕᐅᓇᓱᒃᑎᓗᒋᑦ ᐊᑐᓂ ᐱᔭᕆᐸᑕ, ᔨᓚᓚᑯᑦ ᓱᓕᓂᕋᐃᔪᓂᒃ ᑐᐊᐸᑕᓗᑎᒃᓗ ᖃᐅᔨᓴᑕᐅᔪᓴᓂᒃ ᑐᔪᑎᒋᓗᒋᑦ ᖃᐅᔨᓴᑎᓄᑦ ᖃᓄᐃᒪᖓᑕ ᖃᐅᔨᓴᕐᑎᓚᕆᑯᓄᕈᔭᐅᓗᑎᒃ. ᑕᐃᒪ ᐱᔭᐅᐸᑕ ᖃᐅᔨᔭᐅᓂᖏᑦ ᓴᓗᒪᓴᑕᐅᓇᓱᓂᖓ ᓴᓗᒪᑕᐅᓚᑕᕐᑑᕐᐸᑕ, ᑕᐃᒪ ᔨᓚᓚᑯᑦ ᐅᓂᑲᓕᐊᓕᒥᓗᑎᒃ "ᒪᑐᔪᖅ" ᑎᑎᕋᓯᒪᓂᖓᑦ ᖃᓄᐃᑐᓂᕕᓂᖓᓄᑦ ᐅᑎᑎᑕᐅᓇᓱᓂᕕᓂᖓᓂᒃ ᐱᔭᕆᑕᐅᓂᖓᓂ ᓄᓇᐅᔪᑉ ᓇᓗᓇᐃᓯᔪᑎᒃ.

ᑲᒥᑯᑯᑦ ᐊᕿᓯᒪᔭᖓ ᐃᒪᐃᓕᖓᓚᐅᑐᖅ ᑕᒪᑯᐊ ᐱᓕᕆᐊᒃᓴᐅᔪᑦ ᐱᔭᕆᑕᐅᓯᒪᑎᐊᓗᑎᒃ ᓯᑎᐱᕆ 2004ᖑᕐᐸᑦ. ᑕᐃᓱᒪᓂᐅᑎᓗᒍ, ᑲᒥᑯᑯᑦ ᐃᖃᓇᐃᔭᑎᒥᓂ ᑕᐃᑲᓂᑐᓂᕐᑎᓯᓂᐊᕐᑐᑦ ᐊᒪᓗ ᐅᕐᑯᒪᐃᑐᓂᐅᑎᖏᑦ ᓄᓇᑯᔫᑉ ᑕᐃᑲᓂᑐᓂᕐᓗᑎᒃ. ᐃᒪᐃᑐᒪᕗᒍᑦ ᑕᒪᑯᐊ ᒪᓕᒐᕐᓂᒃ ᒪᓕᒃᑎᓯᔨᐅᔪᑦ ᐸᐃᐸᕐᓂᒃ ᐱᓯᒪᓕᓗᑎᒃ ᑲᒪᑯᐊ ᐱᓕᕆᐊᖑᔪᒪᓯᒪᔪᑦ ᐱᔭᕆᓯᒪᑎᐊᓕᓂᕋᓯᒪᔪᓂᒃ ᖃᓄᐃᑐᓂᕕᓂᖓᓄ ᐅᑎᑎᑕᐅᓇᓱᓂᖓ ᑕᒪᑐᒪ ᓯᕗᓂᐊᓂ ᕿᓚᒥᐅᓴᓕᔪᖅ ᐊᔪᕐᓇᖏᐸᑦ.

ᐃᓚᒋᐊᕈᑎᑕᖃᑲᓂᕐᐸᑦ ᖃᓄᐃᑐᓂᕕᓂᖓᓄ ᐅᑎᑎᑕᐅᓇᓱᒃᑎᓗᒍ ᐱᒪᕆᐊᓗᕗᖅ ᑕᓇ ᖃᐅᔨᔭᐅᑎᑕᐅᓴᓕᔭᕆᐊᓕᒃ ᓇᓗᓇᐃᑕᐅᑲᐅᑎᒋᔭᕆᐊᓕᒃ ᕿᓚᒥᐅᓴᓕᔪᖅ ᑕᒪᓇ ᑭᖑᓂᐊᓂ ᐱᓕᕆᐊᖑᔭᕆᐊᓕᒃ ᑲᔪᓯᔪᓇᖁᓗᒍ. ᑕᒪᓇ ᐱᔪᑎᒋᓗᒍ ᑲᒥᑯᑯᑦ ᑐᔪᐃᓯᒪᔪᑦ ᑎᑎᖅᓯᒪᔪᓂ ᐱᔭᕆᑕᐅᓯᒪᔪᓂ ᓱᕈᓯᒪᓚᐅᑐᓂ ᑐᐊᐸᓂᒃ ᖃᓄᐃᑐᓂᕕᓂᖓᓄ ᐅᑎᑎᑕᐅᓇᓱᓂᖓ ᐱᔭᕆᓯᒪᓕᓂᖓᓂ ᐊᑐᓂ ᓄᓇᐅᔪᓂ ᐃᓗᐃᑳᓗᖏᖓᕐᑎᓗᒍ ᑐᔪᑕᐅᓇᓂ ᐊᑐᓂ ᐱᔭᕆᖓᑕ ᖃᐅᔨᓴᑕᐅᖃᑕᓂᐊᒪᑕ.

ᑲᒥᑯᑯᑦ ᑐᓯᕋᓯᒪᔪᑦ ᓄᓇᕗᒻᒥ ᐃᒪᓕᕆᔨᖏᑕ ᑲᑎᒪᔨᖏᓂᑦ ᐃᓄᓕᕆᔨᑐᖃᑯᓂᓗ ᕿᒥᕈᖁᔨᓗᑎᒃ ᒪᑐᓂᖏᑕ ᐅᓂᑲᖏᓂᒃ ᑐᓂᔭᐅᖃᑕᒪᑕ ᑎᓴᒪᐃᓚᖃᖓᓗᑎᒃ ᐅᓂᑲᓕᐊᖑᓯᒪᔪᑦ ᐊᒪᓗ ᐱᔭᕆᑕᐅᓯᒪᖏᑐᑦ ᐅᕙᓗᓃᑦ ᐃᓱᒫᓗᑕᐅᔪᑦ ᐅᕙᓗᓂᑦ ᐊᓯᖏᑦ ᓄᓇᐃᑦ ᐅᓂᑲᐅᓯᐅᔪᑦ. ᑲᒥᑯᑯᑦ ᒪᓕᒐᓂ ᑲᔪᓯᑎᓯᔩᑦ ᖃᓄᐃᓴᖏᓇᓯᒥᓗᓂᒥᑦ ᑐᓴᕕᒋᔭᐅᑲᓂᖏᑯᑎᒃ.

6.3.1 ᓴᕕᕋᔭᒃᓴᖃᕕᐅᑉ ᓯᕐᓗᐊᖓ ᖃᓂᒋᔭᖓᓗ

- ᐊᒃᑐᐸᐅᑎᓗᒍ, ᑭᖑᓕᕐᐹᖅ ᓴᓗᒪᓴᐃᓂᖅᑕᖃᓚᐅᑐᖅ ᓇᑎᖓ ᐱᔭᕆᑕᐅᓚᐅᑐᖅ. ᑕᑯᑲᓂᕐᓗᒍ ᐃᓚᒋᐊᕈᑦ 2-ᐃᒥᑐᖅ ᑎᑎᕋᓯᒪᑎᐊᑲᓂᕐᑐᖅ ᐅᑎᑎᑕᐅᓇᓱᓂᖓᓄᑦ ᖃᓄᐃᑐᓂᕕᓂᖓᓄᑦ ᐃᖃᓇᐃᔭᑎᑕᐅᔪᑦ ᓴᕕᕋᔭᒃᓴᖃᕕᐅᑉ ᓯᐊᕐᓗᐊᖓ ᒪᑐᓂᕐᒧᖓᔪᑦ ᐅᓂᑳ ᑕᐃᔭᐅᔪᖅ "ᓴᕕᕋᔭᒃᓴᖃᕕᕕᓂᖅ ᓯᖃᕐᓗᐊᖃᕕᕕᓂᖅ"ᒥᒃ ᑕᐃᔭᐅᔪᖅ.

6.3.2 ᕿᑯᕐᒥᒃ ᐃᓗᓕᕐᓱᑕᐅᔪᖅ ᐃᓪᓗᖃᕕᐊᑕ ᒥᒃᓴ

- ᑕᒪᕐᒥᒃ ᐃᓪᓘᒃ ᐃᒍᑎᑕᐅᓂᕆᓂᐊᓚᐅᕐᑕᖏᑦ ᐊᒪᓗ ᓱᕈᓯᒪᔪᐃᑦ ᓄᓇᖏᑦ ᐱᔭᕆᓯᒪᔪᑦ. ᑕᑯᑲᓂᕐᓗᒍ ᐃᓚᒋᐊᕈᑖ 2-ᐱᒥᑐᖅ ᔨᓚᓚᑯᓂ. ᒪᑐᔭᐅᓂᖓᓄᑦ ᐅᓂᑳᖅ ᑕᐃᔭᐅᔪᓯᓕᒃ "ᕿᑯᕐᑎᓯᒪᔪᖅ ᐃᓘᕕᓂᖅ ᐅᕐᓱᐊᓗᖃᐅᑎᖃᕕᕕᓂᖅ"ᒥᒃ.

6.3.3 ᑐᐱᐅᔭᐅᓗᑎᒃ ᐅᕐᓱᐊᓗᖃᕕᕕᓃᑦ ᓄᓇᖓᑕ ᒥᒃᓴ

- ᖃᐅᔨᓴᑕᐅᔪᑎᕕᓃᑦ ᓇᓗᓇᐃᒥᓕᐅᑐᑦ ᓱᕈᓯᒪᓂᑯ ᐅᕐᓱᐊᓗᕈᔪᖃᕈᓂᓂᖓᓂᒃ ᐅᖓᑕᓂᑐᑑᓂᑦ ᐱᐅᓯᑎᑕᐅᓇᓱᓂᐅᑉ ᑐᕋᒐᐅᑉ. ᔨᓚᓚᑯᑦ ᒪᑐᓂᒧᑦ ᐅᓂᑲᓕᐊᖓ ᑕᓱᒧᖓ ᐃᓚᐅᖃᑕᐅᔪᖅ ᐃᓚᒋᐊᕈᑎᒃ 2-ᑎᒥᑐᖅ ᑕᐃᔭᐅᓗᓂ "ᑐᐱᐅᔭᐅᓗᑎᒃ ᐅᕐᓱᐊᓗᖃᕕᕕᓃᑦ ᓱᓇᖓᑕ ᒥᒃᓴ"ᓂᒃ ᐊᑎᖓᒥᒃ.

6.3.4 ᑭᓂᕐᑐᓕᐅᕕᐅᑉ ᐃᓪᓗᖓ ᐊᒪᓗ ᓄᓇᖓᑕ ᒥᒃᓴ

- ᖃᓄᐃᑐᓂᕕᓂᖓᓄ ᐅᑎᑎᑎᓇᓱᓂ ᑲᔪᓯᓯᒪᓕᑐᖅ ᐊᒪᓗ ᐱᔭᕆᕐᑕᐅᓯᒪᑎᐊᓕᓗᑎᒃ. ᖃᓄᐃᑐᓂᕕᓂᖓᓄ ᐅᑎᑎᓇᓱᓂᕕᓂᖏᑕ ᖃᐅᔨᓴᑕᐅᓂᖏᑦ ᐅᓂᑲᓕᐊᖑᓯᒪᕗᑦ ᐃᓚᒋᐊᕈᑎᒃ 2-ᑭ ᒥᑐᑦ ᔨᓚᓚᑯᑦ ᐅᓂᑲᓕᐊᖏᓂ ᑕᐃᔭᐅᕗᑦ "ᑭᓂᕐᑐᓕᐅᕐᕕᕕᓂᐅᑉ ᐃᓪᓘᑉ ᐃᓂᕕᓂᖓ ᓄᓇᖓᑕᓗ ᒥᒃᓵ" ᑕᐃᔭᐅᕗᓯᓇᓗᓂᐅᒃ.

6.3.5 ᐅᕐᓱᐊᓗᖃᐅᑎᖃᕕᕕᓂᑦ ᐊᐅᑕᔪᓂ ᓄᓇᖓᑕ ᒥᒃᓴ

- ᖃᓄᐃᑐᓂᕕᓂᖓᓄ ᐅᑎᑎᑕᐅᓂᖓ ᑕᕙᓂ ᐱᔭᕆᑕᐅᓚᐅᑐᖅ ᑕᕙᓂ ᐊᕐᒎᑉ ᐱᒋᐊᕐᓂᖓᓂ. ᐃᓚᐅᕗᖅ ᐃᓚᒋᐊᕈᑎᒃ 2-ᒋ ᒥᑐᑦ ᔨᓚᓚᑯᑦ ᒪᑐᓂᖕᓗ ᐅᓂᑲᓕᐊᕕᓂᖅ ᑕᐃᔭᐅᓗᓂ ᐅᕐᓱᐊᓗᖃᕕᕕᓂᖅ ᐊᐅᑕᔪᓂ ᓄᓇᖓᑕ ᒥᒃᓴ"ᒥᒃ ᑕᐃᔭᐅᔪᓯᓕᒃ.

6.3.6 ᓯᖃᓕᑎᑎᕕᓂᐊᑕ ᒥᒃᓴ

- ᐱᔭᑕᐅᓂᖓ ᓱᕈᓯᒪᔫᑉ ᑐᐊᐸᐅ ᐱᔭᕇᑕᐅᓯᒪᓕᑐᖅ. ᐃᓚᒋᐊᕈᑦ 2-ᒥ ᐃᓚᐅᕗᖅ ᔨᓚᓚᑯᑦ ᒪᑐᓂᖕᓗᑦ ᐅᓂᑲᓕᐊᖏᓂᑐᖅ ᑕᕙᓂ ᑕᐃᔭᐅᕗᖅ "ᓯᖃᓕᑎᑎᕕᓂᐅᑉ ᒥᒃᓵ".

6.3.7 ᐊᐳᑕᐃᔭᐃᕕᒃ

- ᖃᓄᐃᑐᓂᕕᓂᖓᓄ ᐅᑎᑎᑕᐅᓂᖓ ᐱᔭᕆᑕᐅᓚᐅᑐᖅ ᐱᖓᔪᖓᓂ ᑎᓴᒪᐃᓕᖃᖓᔪᑦ. ᔨᓚᓚᑯᑦ ᒪᑐᓂᖕᓗᑦ ᐅᓂᑲᓕᐊᖏᓂᑐᑦ ᑕᐃᔭᐅᕗᕐᒥ "ᐊᐳᑕᐃᔭᐃᕕᒃ" ᐃᓚᐅᕗᖅ ᐃᓚᒋᐊᕈᑦ 2-ᓂ"ᒥᑐᖅ

6.3.8 ᐅᐊᓇᖓᓂᓂᕐᓴᖅ ᐅᒥᐊᔪᐊᒧᑦ ᐅᓯᓕᓱᕐᕕᒃ ᓴᕕᕋᔭᓴᓂᒃ

- ᖃᓄᐃᑐᓂᕕᓂᖓᓄ ᐅᑎᑎᑕᐅᓂᖓ ᐱᔭᕆᑕᐅᓚᐅᑐᖅ ᐱᖓᔪᖓᓂ ᓯᑕᒪᐃᓕᖃᖓᔪᓂ. ᑕᑯᓗᒍ ᐃᓚᒋᐊᕈᑦ 2-ᓯ ᔨᓚᓚᑯᑦ ᐅᓂᑲᓕᐊᖏᓂ ᑕᐃᔭᐅᔪᖅ ᐅᐊᓇᖓᓂ ᑐᓚᑕᕕᐅ.

6.3.9 ᖃᐅᔨᓴᕐᐸᓕᐊᓕᓵᕐᑎᓗᒋᑦ ᐊᑕᕐᕕᕕᓂᖅ/ᐅᔭᖃᑕᕕᒃ ᐊᒪᓗ ᓯᒃᔭᕐᐸᓯᖕ ᐅᐊᓇᖓᓂᓂᓴ

- ᖃᓄᐃᑐᓂᕕᓂᖓᓄ ᐅᑎᑎᑕᐅᓂᖓ ᑕᓱᒪ ᐱᔭᕆᑕᐅᓯᒪᓕᕐᑐᖅ. ᑕᒪᓇ ᖃᓂᒋᔭᓂᑐᖅ ᓯᒃᔭᕐᐸᓯᐅᑉ ᐅᐊᓇᖓᓂ ᑐᓚᒃᑕᕐᕕᐅᑉ ᐊᒪᓗᐅᓂᑲᓕᐊᖓ ᒪᑐᓂᒥ ᐅᓂᑲᓂᑐᖅ ᑕᐃᔭᐅᓗᓂ"

ᖃᐅᔨᓴᖅᑎᑦᑕᐃᓕᓴᖅᑎᓂᒃᑯᓂᒃ ᑲᑎᑕᐅᓂᒃᑯᐃᕐᓂᖅ ᐊᒻᒪᓗ ᓯᖏᓪᓗᓯᓚᐃᓂ ᐅᐊᓇᖏᓐᓄᑦᖃᑦ ᑐᓴᕐᕕᐅᑦ (ᓄᓇᖓᐊ 1, ᓄᓇᖏᓪ 23) ᐊᒻᒪᓗ ᐃᓕᐅᔪᖅ ᐊᓕᕿᐊᑦ 2-ᓕ ᑕᕐᓂ ᐅᓂᒃᑎᒥ.

6.3.10 ᔪᓂ 2002ᒥ ᐅᖅᓯᐊᓗᓵᐸ ᑯᕕᐱᓂᓂᑯᐊ

- ᖃᓄᐃᑐᓂᕕᓂᖏᓐᓄᓄ ᐱᓇᓯᐊᖅᓂᖅ ᓴᓗᒪᓴᐃᓂ ᓯᖏᓯᒪᔪᓂ ᓄᓇᖏᓂ ᐱᐅᓚᓯᒪᓕᕐᑐᖅ ᐊᐅᔾᖏᓐᓂ 2002 ᐊᒻᒪᓗ ᓯᔾᖏᓐᑕ ᖃᓂᒋᔾᓕ ᐅᐱᖏᓴᖏᓐᓂ 2003ᖓᑎᓗᒍ. ᖃᐅᔨᓴᑕᐅᔪᑎᕕᓂᖏᓐᓂᑦ 2002ᒥ ᐱᓕᓚᕕᕕᓂᑦ ᐅᓂᖃᐅᓯᐅᔾᓚᓚᓯᒪᔪᑦ.
- ᔨᓕᓕᑯᑦ ᐱᔾᓚᓯᓯᒪᔪᑦ ᐅᓂᖃᓕᕿᒥᓂ ᒪᑐᓂᖏᓓᓂᑦ ᑕᐃᔾᐅᐅᔪᖅ "2002ᒥ ᐅᖅᓯᐊᓗᒥ ᑯᕕᓂᑯ" ᑕᐃᔾᐅᐅᔪᑕ ᐃᓕᐅᖃᑕᐅᔪᖅ ᑕᕐᓂ ᐃᓕᓯᐊᖅᑦ 2-ᓂ ᒥᑐᖅ.

6.3.11 ᑐᓴᕐᕕᒃ ᖃᓂᒋᔾᖏᓪᓗ ᓯᖏᖏᓪᑕ ᖃᓂᒋᔾᖏᖏᓐ

- ᐊᖏᑕᐅᓂᖏᓐ ᓯᖏᖅᓯᓯᖏᓐᓄᓂ ᐅᐊᓇᖏᓐᓄᑐᖅ ᑐᓴᕐᕕᐃᓕᑦ ᓯᓂ ᖃᔪᓯᓚᐅᑐᖅ ᑎᑭᓗᒍ ᓄᕆᐊᓗ 4 ᐊᒻᒪᓗ ᓄᖅᓚᐅᑐᖅ ᐊᕐᓇᒍ ᓄᑕᖅᓴᓯᓂᖏᓐᓄᓂ.

6.3.12 ᐃᒃᓗ ᐳᒃᑕᓪᓕᖅᑎᑦ ᖃᓂᒋᔾ

- ᓄᕆᐊᓗ 10ᒥ, ᑕᒪᒥᓂᒪᖅ ᐅᖅᓯᐊᓗᓗ ᓯᖏᓯᒪᔪᑦ ᓄᓇᐅᑦ ᐊᑕᓄᖅᑕᐅᓚᐅᑐᑕᑦ ᐃᒪᖅ 20,00 ᑭᒃᑲᓗᓯᓯᒪᔪᑦ ᒥᑕᐃ ᓴᐃᔾᒋᓚ ᓯᖏᓯᒪᔪᓂ ᑐᐊᑦᒥ ᖃᓂᓗᓂᓯᑎᑕᐅᓚᐅᑐᑕᖅ. ᐃᓚᓯᐊᖏᑦ ᓴᐃᔾᒋᒃᑯ ᐊᒻᒪᓗ ᐅᖅᓯᐊᓗᓗ ᓯᖏᓯᒪᔪᖅ ᓄᓇᖓ ᓯᓂ ᐊᖏᑕᐅᓯᐊᓚᓂᐊᖅᑎᑐᖅ ᐱᔾᖅᑎᐅᓗᓂ ᑕᒪᖓ 2004ᒥ.

6.4. ᐃᓕᑕᐅᓂᖓ ᓯᖏᓯᒪᔪᐃᑦ ᑭᓯᖏᓗᔾᐅᐃᑦ/ᐱᑐᐃᓇᐅᕐᓕᑐᑦ ᐃᓕᑕᕐᓴᐃᑦ

- ᑕᓯᒪ ᐅᓂᒃᖓ ᐅᖃᐅᓯᖃᑐᖅ ᐃᒪᐃᑦ ᐃᓕᑕᕐᓴᐃᑦ ᓯᖅᓗᐊᒥᑐᑦ ᑕᐃᒃᓂ ᐃᑭᑕᐅᓚᐅᕐᓕᑕᓂᕐᓂᓂ ᐊᒻᒪᓗ/ᐅᓴᓗᓂᓪᑦ ᐊᐅᓚᐅᔾᔨᓚᐅᕐᓕᑕᓂᕐᓂᓂ ᖃᓗᓇᓄᑦ. ᐃᑭᑕᐅᓂᕐᓂᑦ ᐃᓕᑕᐅᔪᓴᑦ ᐅᖅᓯᐊᓘᓂᑦ ᑲᓇᕐᑎᐊᖅᑦ.

7. ᓄᐃᓕᓚᒪᓕᖅᓱᑦ ᐃᔪᑎᓇᓂᖅ ᖃᓄᐃᑐᓂᐊᓂᖅᓂᓗ ᐅᑎᑎᑕᐅᓂᓴᖅᓱᑕ ᐊᖏᑕᐅᔨᒪᓂᑦ

ᐃᓕᒥᐊᕐᓵ 3 ᑎᑎᕋᔪᓕᕐᑕᓴ ᖃᓄᐃᓕᖅᓱᓕᖅᓱᑕ ᐃᔪᑎᓇᓂᓗ ᐊᖏᑕᐅᔨᒪᓂᑦ ᑎᑭᐱᓇᓪ 31, 2003ᒧᑦ ᑎᑭᓗᒍ..

ᐃᔨᓪᓚᑦᑐᓂᑦ ᑎᑭᐱᓇᓪ 31, 2003ᖓᑎᓗᒍ 71ᐳᓴᓗᐊᒥ ᐱᑲᓇᔨᓕᓕᐅᑐᒍᑦ (ᐃᓕᐅᖅᑎᑐᓗᒍ ᑕᐃᒪᖅᓯᒥᖅᓱ ᖃᐅᔨᓴᓂᐅᕐᓂᖅ ᑕᐃᓚᐃᓴᓇᐊᖃᖅᓚᑦ ᑭᖓᔪᓂᑎᐊᖅᓱᓚᖅ 20-04).

8. ᖃᓄᐊᓗᐊᓚᖓᓱᑦ ᓴᓗᓚᓴᕐᑕᐅᓂᖅᓂᓗ ᐅᓗᒥᒧᑦ ᐊᑭᖓ

8.1 **ᖃᓄᐊᓗᐊᐸᓗᓯᓚᓚᖓᓱᑦ ᐅᐸᖅᑕᕐᓴᐃᒥ ᐃᔪᑎᓇᑎᓗᒋᑦ, ᐅᑎᑎᑎᓗᒋᑦ ᖃᐅᐅᔨᓴᓂᖅᓂᓗᓗ ᐊᑭᖓ**

ᐃᓕᒥᐊᕐᓵ 4 ᑎᑎᕋᔪᓕᕐᑕᓴ ᖃᓄᐊᓂᐊᕐᓯᒋᐅᔾᔨᓚᖓᓱᑦ ᐳᓕᐊᓴᐅ ᐅᐸᕆᐊᖃᓕᖅᓱᓚᖅ ᐃᔪᑎᕕᐅᓂᖅᓱᓗᓗ ᐅᑎᑎᕕᐅᓇᓯᓂᖅᓂᓂ ᖃᓄᐊᕕᓂᖅᓱᓚᖅᓂᓂ ᐊᖏᑕᐅᓚᐅᕐᓕᑕᓂᑦ ᐊᑭᕐᕕᐊᓚᐅᖃᖅᓚᑦ ᓯᑎᐱᓇᓪ 31, 2003ᖓᑎᓗᒍ.

ᓇᐃᓕᓕᐊᖅᓱᒍ, ᑕᒪᖅᒥ ᑲᑎᓗᒋᑦ ᐊᑭᓕᔪᓯᐅᐸᕐᓂᑦ ᑎᑭᐱᓇᓪ 31, 2003ᖓᑎᓗᒍ $45,655,000ᖓᓚᐅᑐᑦ. ᖃᓄᐊᓂᐊᖅᓯᓯᒪᔪᓂᖅᓂᓂ ᐱᔾᓴᐸᑦ ᐃᔪᑎᕕᐅᓂᖅᓂᓂ, ᖃᓄᐃᑐᓂᐊᓂᖅᓂᓗ ᐅᑎᑎᕕᐅᓂᖅᓂᓂ ᐊᒻᒪᓗ ᖃᐅᔨᓴᕕᐅᓂᖅᓂᓂ 2011ᒪ ᑎᑭᓗᒍ ᐊᖏᓕᓕᐅᖅᑎᑐᖅ $63,312,000ᒪᑦ $47,5000,000ᒥᑦ.

9. ᐅᑎᑎᕕᐅᓂᖅᓂᓗ ᑭᓇᐅᔾᖏᖏᓐᓂᑕ ᖃᓄᓂ ᐱᔾᓴᐊᖅᖃᓚᖓᓱᑦ

ᖃᒥᑯᑦ ᓇᓗᓇᐃᓯᓚᓕᓕᑎᓗᒋᑦ ᐊᖏᓕᔪᓴᐊᐅᔪᓗᒥ ᐊᑭᓕᓕᐅᐊᓂᓴᖅᓄᐊᖅᑐᓂᖅᓂᓂ ᖃᓄᐃᑎ ᐊᖏᑎᑎᒪᓚᖓᓱᑦ ᓯᖏᓯᒪᔪᑦ ᓄᓇᐃᑦ ᖃᓄᐃᓄᐃᓇᐅᔾᔨᓴᓕᓚᐅᖏᓐᓄᑦ ᖃᓄᐃᑐᓂᐊᓂᖅᓂᓂ, ᖃᓄᐃᑐᓂᐊᓂᖅᓂᓗ ᐅᑎᑎᕕᐅᓂᖅᓂᓂ ᐊᒻᒪᓗ ᖃᓄᐃᑐᓂᐊᓂᖅᓂᓂ ᐊᑭᓕᓕᐅᖅᑎᑐᖅ ᐅᑎᑎᕕᐅᓂᖅᓂᓂ 2011ᒪ ᑎᑭᓗᒍ ᐊᖏᓕᓕᐅᖅᑎᑐᖅ $63,312,000ᒪᑦ $47,5000,000ᒥᑦ.

ᖃᓄᐃᑐᓂᕆᓚᓄᑦ ᐅᑎᑎᑕᐅᓇᓂᕆᓚᓄ ᑭᖑᓪᓚᐊᐃ ᓯᒃᓴᐊᓗᒥᒃ ᐊᖏᑎᓪᓕᓕᐊᕐᓂ ᐱᓴᑎᒋᓗᒍ ᐊᒃᓯᖏᓗᑐᒃ ᐱᓇᓇᐊᓂᓵᓕᐅᓂᖏᓄᑦ 2003ᖏᑎᓗᒍ. ᓄᖑᐊᒃ ᑎᕿᒪᖏᓂ ᑎᕿᒪᐃᓕᓂᖃᖅᖏᖑᐃᑦ 2003ᖏᑎᓗᒍ ᑐᑭᓯᓇᓯᑎᓯᒪᕐᓂ ᖃᒥᓂᔾᔨᐅᓂ ᐊᖃᖏᓂ ᑐᖏᐃᓂᓂᓂᓵᔾᖏᓂᒃ ᑕᓪᓂ ᐊᕿᔪᕐᒥ ᓇᓕᐅᑎᓯᒪᔨᓂᒃ ᖃᐅᔨᒪᔨᐅᔨᓂ ᖃᓄ ᐊᖏᑎᑎᑭᒪᖏᓂ ᓯᕗᓯᒪᕐᓂ ᓄᓇᐃ ᐊᖏᓕᓪᓕᓐᓂᐊᓗᓂᖏᓂᒃ. ᒪᓇᐅᔨᖅ ᓂᓵᐅᓇᓐᖅ ᑭᖑᓪᓕᓯᒪᕐᓂ ᐊᖑᑎᑎᐊᓐᓂ $18,600,000ᒧᑦ ᑎᓯᐱᓵ 31, 2003ᒥ. ᐅᒥᑯᑯᑦ ᒪᓇᐅᔨᖅ ᑐᓂᓯᓯᒪᕐᓂ $18,000,000ᒥᒃ ᓇᓕᐅᑯᒪᖑᔨᖅ.

ᐱᓇᓯᐊᖏᓂᐅᔨᖅ ᐅᔨᓯᑎᐊᑐᖅ ᒪᕐᓕᖏᒥ ᐊᒪᓗ ᐅᒪ ᐅᓂᐅᖏ ᖃᒥᓂᖅᐅᓂᓕᓕᑎᓗᒍ ᓄᓇᕗᖏᒥ ᐃᒪᓕᓵᔭᖏᑦᑕ ᐅᑎᒪᔭᖏᓂᓄ ᐃᓄᓕᓵᔭᑐᖅᑯᓄᓗ ᓇᓕᐅᑯᒪᖑᔨᖅ $18,000,000ᖏᑎᔨᖅ ᒥᑭᓂᐱᐅᓕᓪᓚᖅ.

ᐅᒥᑯᑯᑦ ᑐᓯᕐᓂᑦ ᐱᐊᖏᐅᑎᐅᒪᒡᑕ ᐊᒪᓗᑦ ᐱᔨᓄᐅᑎᑦ ᐃᒪᒧᑦ ᐃᓕᖏᔪᖅᑭᑦ ᐱᒥ, ᐱᖏᔨᖏᓂ ᑐᑭᓕᓵᑦ ᓄᓄᑲᒥ ᐃᒪᓕᓕᓵᔭᑯᑦ ᐅᑎᒪᔭᖏᓂᑦ ᐃᓄᓕᓵᔭᑐᖅᑯᓄᓗ ᐊᖏᑎᖅᑎᑎᓯᑎᑎᓕᐅᕐᖏᓂᖏᓂ ᐊᖏᑭᐊᖏᓂᓗᒍ ᓄᓇᓗᐅᑯᒪᖑᔨᖅ $18,000,000ᒧᑦ:

10. ᐃᓄᓕᒫᖏᓂ ᑐᓴᖏᓯᓂᖅ/ᐃᓕᐅᑦᓓᐊᖅᑐᑦ

ᐃᓄᓕᒫᖏᓂᒃ ᑲᑎᖓᑎᑕᐅᔨᖅᓕᓕᐅᖏᑐᑭᓯ ᑕᒪᑐᒪᓂ.
ᐃᓄᐃᑦ ᐃᖅᓄᐃᑦᑎᑎᑦᓴᐅᔨᑦ 14ᖓᔪᓕᐅᑐᑦ ᐊᒃᑐᐸᒥ, 10ᖓᔪᔨᑦ ᓄᕐᐱᐱᓇᒥ ᐊᒪᓗᓂ ᒪᓕᒃ ᑎᓯᓇᓇᒥ. ᑕᓄ ᑕᐃᒪᐃᓂᓯᓇᓂᖅᖓᓂ ᓴᖅᑎᓯᔨᖅ ᓄᓄᒥᒃ ᐊᐅᓕᓯᓂᐅᐅᔨᖅ ᓯᓚᐃᓕᑎᐊᓕᐅᑐᖅ ᓂᒃᓕᓯᓂᓂ ᐱᖏᑎᓗᒍ ᐅᑭᐅᖓᖏᑦᑐᓕ. ᓂᓵᐅᓇᓐᖅ ᐃᓄᐃᑦ ᐃᖅᓄᐃᑦᑎᑎᑎᑑᓂᓐᓂᑦ ᓄᓄᒥᒃ ᐊᐅᓕᓯᓂᐅᐅᔨᖅ ᐊᖏᑕᓕᑎᐊᓚᒃᓂᓕᒫᒥᒃᑐᑦ 2004ᖏᑎᓗᒍ.

11. ᓇᐃᓇᖅᓯᒪᔨᑦ ᖃᓄᐃᓕᓂᐅᓯᒪᓕᓕᖓᑎᑦ ᖃᐅᔨᓴᕆᑕᐅᓂᒧᑦ ᑲᔨᓯᑎᑕᐅᖅᓯᐅᔨᓕᐅᑐᑦ ᒪᓕᖅᓯᐅᔨᓯᒪᔨᔪᓗ ᐅᓂᑲᖏᑦ

ᓄᓇᕗᑦᓂᖓ ᑕᒪᑐᒪᓂ ᑎᕿᒪᕗᑦᓂᖓᓂ ᑎᕿᒪᐃᓕᓂᖃᖅᖏᓂ ᐱᕕᖃᓇᐅᑦᑐᑭᓂᖃᐅᑐᑦ.

12. ᐃᒪᒪᐊᐸᒥ ᐊᑐᓂᖅ

ᐃᒪᒪᐊᐸᒥ ᐊᑐᓂᖅ ᑕᓯᖅ ᑐᕿᔅᑐᓇᕿᒥᑦ ᐱᔨᖃᐅᑎᐅᑦᑭᓴ ᓇᔪᓇᐃᓯᒪᔭᖏᓂᓕᐅᑐᑦ. ᐊᒥᓯᓂᖏᓄ ᐅᓂᖃᐅᓯᒪᔨᖅᓯᐅᔨᓕᐅᑐᑦ ᑕᐸᓂ ᐅᓂᖃᖏᒥ.

13. ᑕᐃᖃᓂᓕᖏᓓᓂᒃ ᖃᐅᔨᕿᕆᑐᑦ ᓄᓇᖏᓂ

13.1 ᐃᑎᑕᐅᓂᖏᑦ ᐃᔪᑎᑕᐅᓂᓂᐃᐃᑦ ᓯᖑᓯᒪᔨᔪᓗ ᓄᓇᐃᑦ

13.1.1 ᐃᑎᑕᐅᓂᖏᑦ ᐃᔪᑎᑕᐅᓂᓂᐃᐃᑦ ᐊᐅᐸᑐᖅ ᖃᒥᓂᔪᓗᒡ ᐃᓚᑐᑎᓯᒪᔨᒪᔭᕆᐅᓂᖏᑦ

ᐊᖏᔨᔭᖏᑐᕆᒥ ᐃᑎᑕᐅᔨᖅᓴᐅᑐᑦ ᖃᒥᓂᔪᓚᒡ ᒪᓇᐅᔨᖅ ᑎᕿᒪᐃᓕᓂᖃᖅᖏᓂ. ᐃᓕᓯᐊᖑᑦ ᑕᓕᒪᖓ ᑐᕿᖃᑎᒥᒃ ᐱᑕᖅᖃᓂᑐᖅ.

13.1.2 ᐃᑎᑕᐅᓂᖏᑦ ᕿᐃᕐᐃᐃᑦ/ᐅᕐᓯᐊᓚᓱᔨᐃᑦ ᓯᖑᑎᑕᐅᓯᒪᔨᔪᓗ ᓄᓇᖏᑦ ᐅᐅᕐᑕᐃᐅᔨᔪᓕᑕᐅᓂᖏᑦ

ᒪᓇ ᐅᓂᖃᖓᔨᖏᒥ ᐅᖃᐅᓯᐅᔨᖅ ᐊᖏᓕᓯᐊᓯᒪᓂᖏᑦ ᓯᖑᓯᒪᔨᔪᓗ ᓄᓇᐃᑦ ᖃᒪᓕᐅᑐᓂᖏᑦ ᑕᓕᒪᖓ ᒪᓇᐅᓯᒪᔨᖅ.

13.4. ᓂᐦᓪᓗᓂᓐᓕ ᖃᐅᔨᓴᕆᐅᔾᔨᒧᐊᓐᓕ ᑎᑎᕋᕆᐅᓂᖅᑕ

13.2.1 ᑭᐊᖅ ᑕᓯᐅᑦ ᓯᒥᓐᓂ

ᒥᓗᐊᓯᓂᖅ ᑭᐊᖅ ᑕᓯᓐᓂᑦ ᐱᕆᓇᕆᐅᓪᓚᐅᐅᑐᖅ ᐱᓐᓴᓐᓂ ᑎᕋᒪᐃᓕᖅᓐᓴᐃᔾᑕ 2003ᓐᔪᑎᓗᔪ. ᐋᕆᕋᕆᐅᓂᓐᓂ ᐱᑎᐊᓪᓚᐅᐅᑐᖅ ᓂᐦᓪᓚᓯᓂᓐᓕ ᖃᐅᔨᓴᕆᐅᔾᔨᒧᐊᑎᖅᑕ ᓯᒥᖅᒥᑐᑦ ᐃᔪᑎᕋᕆᐅᔾᔨᓇᓐᔪᓕᕆᓂᐅᑎᑕ ᑕᐃᒪ ᖃᓄᐃᑎ ᓂᓪᓕᐦᑎᑎᒪᓐᓂ ᑎᑎᕋᓯᒪᔾᔨᓂ ᐅᓂᖃᓄᕋᕆᐅᔾᔨᖃᐅᓕᕆᐅᑐᖅ.

13.2.2 ᐊᑐᕋᐅᔭᑦ ᐃᓗᓪᓯᓯᐅᓂᓐᓂ

ᓴᓇᕆᐅᓂᓐᓂ ᐱᒃᓗᔪ ᑕᒪᓂ, ᐅᓇᓂᓐᓂ ᓂᓪᓯᓯᓂᓐᓂᓗᓂᑦ ᖃᐅᔨᓴᕆᐅᒥ ᓄᖃᓯᒪᖃᐃᓇᓐᖅ ᒪᓇᐅᔾᔨᖅ.

13.2.3 ᐊᐅᕐᓐᖅ ᖁᒥᔪᓗ ᐃᓗᑐᑎᑕᐅᓯᒪᓂᓐᓂ

ᓯᓚ ᐊᑐᐃᓇᐅᓐᖏᑐᑦ ᖃᐅᔨᓴᕆᐅᓂᒧᑦ ᓄᓇᐅ ᓂᓪᓯᓯᓂᓐᓂᓂᑦ ᐅᓪᕆᐅᕐᑦ ᑭᓯᐊᓂ ᑐᐊᕐᓴᒧᑦ.

13.3 ᓴᓐᖅᐅᔾᖅᓪᓚᒪᓐᓕ ᖃᐅᔨᓴᓂᖅ

13.3.1 ᑭᐊᖅ ᑕᓯᓐᓂ ᓴᓐᖅᐅᔾᖅᓪᓚᒪᓐᓕ ᓇᓗᓇᐃᔪᑕᖏᑦ

Not required in the winter season as the lake is frozen.

13.3.2 ᑐᓴᒋᕐᕕᒃ ᐊᒪᓗ ᓯᒃᔦᕐᓯᓐᓕ ᖃᐅᔨᓴᓐᕆᐅᓂᖏᑦ

ᑕᒪᓇ ᐅᑭᐅᔪᑦ ᑲᒪᒋᔦᐅᖃᑕᖏᑐᖅ ᑕᓯᖅ ᓯᔪᖃᓂᓐᓄᓚᑦ.

14. ᑭᐊᖅ ᑕᓯᓐᓂ ᖃᓪᓗᓪᓂᓂᖏᑕ ᖃᐅᔨᓴᓐᕆᐅᓂᓂᖏᑦ

ᐱᑕᖃᓂᖏᑐᖅ ᑕᒪᑐᒪᓂ ᑎᓴᒪᐃᓕᓪᖃᖅᓂᓂ.

15. ᓇᐃᓕᓪᒋᐊᓐᓯᒪᔾᔪᖅ ᔪᓂᓂᖏᑕ ᐊᔪᕈᓴᕆᐅᓂᓂᖏᓂ ᐊᒪᓗ ᐊᔪᓂᓂᑦ ᖃᓄ ᐊᓯᔾᔨᕋᓕᐊᒪᓐᓕ

ᐃᓕᒋᐊᖏᑦ 7 ᑎᑎᕋᓯᒪᔾᔪᑐᕋᓕ ᔪᒥ ᖃᐅᔨᓴᓂᐅᔾᔨᑦ ᐅᓂᖃᓂᓂ ᑐᓂᔾᐅᓕᐅᑐᑦ ᐊᐢᑎᓕᓪᓕᔾᔪᓇᓕᑦ.

16. ᓇᐃᓕᒋᐊᓯᒪᔾᔨᑦ ᐊᐢᑎᑎᐅᔾᑦ ᓯᓂᑕᐅᓂᓂᓐᓕ ᖃᐅᔨᓴᕆᐅᓂᓂᒃ ᖃᓄᐃᓕᓂᓐᓕᒪᓐᓕᑦ

ᓄᓐᔪᐊᓂ ᑕᒪᑐᒪ ᑐᓴᒪᐃᓕᖅᓂᓐᓂᑕᑦ, ᐅᑕᖅᓯᓕᐅᕋᑕ ᐊᐢᑎᓕᓪᓕᔾᔪᓇᓕᑦ ᖃᓄᑕᒥ ᑭᐅᓂᐊᒪᑕ ᖃᐅᔨᓴᓂᓪᓕᐊᔨᑎᓂᓂᑦ 2004ᒥ.

17. ᓇᐃᓕᒋᐊᓯᒪᔾᔨᖅ ᑭᐊᖅ ᑕᓯᓐᓂ ᐃᒪᒥᐅᑕᓪᓚᔾᔪᑦ ᖃᐅᔨᓴᓂᓐᓂ ᖃᓄᐃᓕᓂᓐᓕᒪᓐᓕᑦ

ᐅᓂᖃᓕᐅᓂᖅ ᖃᐅᔨᓴᓂᐅᓕᐅᑐᑦ ᖃᓄᐃᓕᐅᑭᒪᓐᓕ ᓄᑕᒥ ᐊᕐᔪᔾᒥ ᓴᖅᑕᐅᖃᓂᒋᕐᑐᑦ.

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.

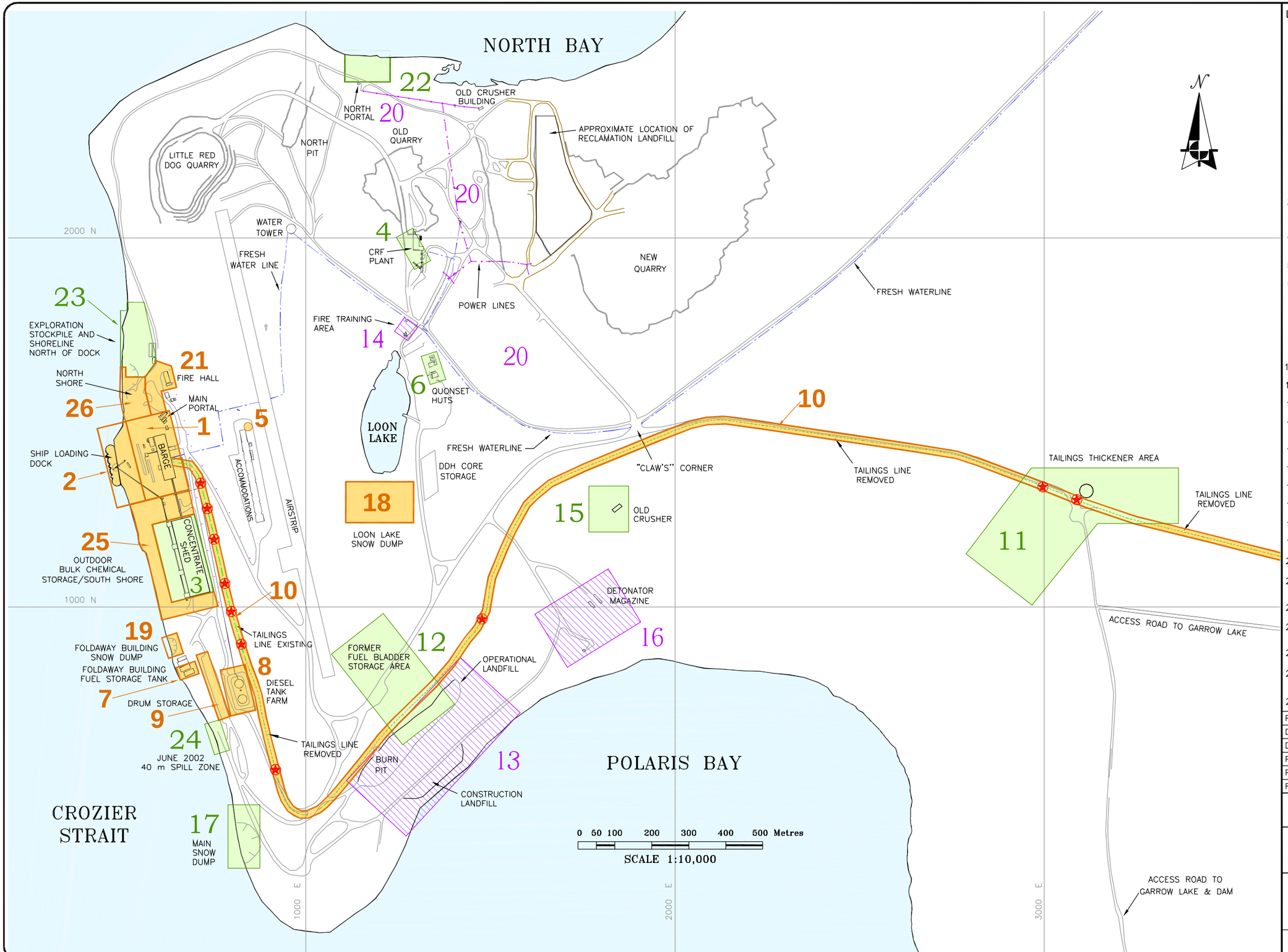
Yours very truly,
GARTNER LEE LIMITED

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

REVIEWED BY:	KT/AL
DRAWN BY:	CPW
DATE ISSUED:	13 FEBRUARY, 2004
PROJECT NUMBER:	23-305
FILE NAME:	23305-6F-01.DWG
REVISION:	0

teckcominco

CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

CONTAMINATED SOILS REMEDIATION PROGRESS PLAN, DECEMBER 31, 2003

Gartner Lee

Figure No. 1

Appendices

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

Appendix A

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

Gartner Lee

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[1] 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.

[1] 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 discretes; nine (9) wall composites; two (2) wall discretes; 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

former shed, where the soil meets the remediation criteria, the cover thickness is thinner and graded to blend in with the existing ground surface. Surveying was undertaken by SNC Lavalin to document the elevations of the excavation limits and the boundaries of the impacted areas that have been delineated. Placement of the cover material over the impacted areas was completed to a survey controlled thickness. A final survey of the finished surface following remediation of the adjacent remaining contaminated soils is to be completed in 2004.

Drainage Control

The slope of the final cover over the floor of the former concentrate storage shed has been contoured to ensure that the area will drain. To further limit the amount of runoff that traverses the cover surface, it is proposed that the area upslope of the former shed will be graded to deflect the flow around the cover.

Once the reclamation of the area upslope of the former concentrate storage shed has been completed, final contouring of the area will be done to provide a more aesthetically pleasing appearance to the area. Any contouring will result in additional native materials being placed over top of the soil cover and in no instances will the contouring reduce the thickness of the soil cover.

CONCLUSIONS

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, as documented in the approved Polaris Mine Decommissioning and Remediation Plan, March 2001.

It has not been practical to remove concentrate in the fractures of the limestone bedrock surface in this area. An alternate method has been implemented to mitigate these residual concentrates..

Furthermore, it is inappropriate to apply the SQROs to the concentration of fines that are bound in the interstices of the fractured bedrock surface. Applying these soil criteria in this situation is beyond the original intent of the risk assessment and the soil remediation targets that were developed as a result of the risk assessment. The current situation can be best explained as a minor quantity of concentrate dust that remains within the fractured bedrock surface. It is

recognized that the confirmatory test results for samples obtained at the bedrock surface do not accurately reflect the effectiveness of the remediation due to the overstatement of the residual concentrations.

In recognition of these issues, GLL recommended mitigation measures to limit human or ecological contact. Isolation under a durable cover of naturally occurring sand and gravel material that is available nearby was determined to be the most practical and effective. The cover constructed is composed of native gravels that were obtained near to the Operational Landfill area. This gravel has a suitable gradation to resist erosion from wind and surficial runoff. This natural material will also blend in with the natural surroundings and will contribute to enhancing the aesthetics of the resulting surface.

The following recommendations are provided planning of completion of the site remediation in 2004:

- Upon completion of the excavation of the remaining contaminated soils present to the north, east and south of the former concentrate storage shed area, contouring of the cover material should be undertaken to blend in with the natural surroundings.
- The hillside upslope of the Concentrate Shed will be contoured to effectively divert the majority of runoff water around the covered area.
- Confirmation of the cover thickness should be confirmed by survey data and/or test pits.
- The follow up site monitoring program to be initiated at the conclusion of the remediation should include cover stability monitoring. Results of this inspection should be included in the reporting and submitted to the regulators.

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.

If you should have any questions or comments with any of the aspects of this technical letter, please call the undersigned at your convenience

Yours very truly,

GARTNER LEE LIMITED
Prepared By:

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ATTACHMENTS

Tables

Table CSHED-03-1: Concentrate Storage Shed Remediation Confirmation Soil Samples
Table CSHED-03-2: Concentrate Storage Shed Remediation Confirmation Rock Samples
Table CSHED-03-3: Concentrate Storage Shed Quality Assurance and Quality Control Samples

Figures

Figure CSHED-03-1: Concentrate Storage Shed Conditions Before Remediation (December 31, 2003)
Figure CSHED-03-2: Concentrate Storage Shed Conditions After Remediation (December 31, 2003)
Figure CSHED-03-3: Concentrate Storage Shed –Soil Cover

Table CSHED-03-1. Concentrate Storage Shed Remediation Confirmation Soil Samples - Metals

Gartner Lee		Location	Concentrate Storage Shed								
		Sample ID	CSHED-255-F-C	CHED-256-F-C	CSHED-257-F-C	CSHED-316-F-D	CSHED-352-F-D	CSHED-358-F-C	CSHED-359-F-C	CSHED-360-F-C	CSHED-361-F-C
		Date Sampled	8/31/2003	8/31/2003	8/31/2003	9/2/2003	9/2/2003	9/2/2003	9/2/2003	9/2/2003	9/2/2003
		Field Screen Pb [e] (ppm)	na	na	na	700.74	285.95	na	na	na	na
		Field Screen Zn [e] (ppm)	na	na	na	3788.79	830.27	na	na	na	na
Parameter	**Units**	**Federal CCME [a] Guidelines**		**Analytical Results**							
		CEQG (PL)[b]	**SQRO[c]**								
Physical Tests											
pH		-	-	-	-	-	8.22	-	-	-	-	-
Total Metals											
Antimony T-Sb	mg/kg	20[d]	-	-	-	-	<20[f]	-	-	-	-	-
Arsenic T-As	mg/kg	12	-	-	-	-	<10	-	-	-	-	-
Barium T-Ba	mg/kg	500	-	-	-	-	484	-	-	-	-	-
Beryllium T-Be	mg/kg	4[d]	-	-	-	-	<1	-	-	-	-	-
Cadmium T-Cd	mg/kg	10	-	-	-	-	8	-	-	-	-	-
Chromium T-Cr	mg/kg	64	-	-	-	-	5	-	-	-	-	-
Cobalt T-Co	mg/kg	50[d]	-	-	-	-	<4	-	-	-	-	-
Copper T-Cu	mg/kg	63	-	-	-	-	12	-	-	-	-	-
Lead T-Pb	mg/kg	-	2000	1300	118	281	912	338	574	622	713	270
Mercury T-Hg	mg/kg	6.6	-	-	-	-	<0.05	-	-	-	-	-
Molybdenum T-Mo	mg/kg	10[d]	-	-	-	-	<8	-	-	-	-	-
Nickel T-Ni	mg/kg	50	-	-	-	-	<10	-	-	-	-	-
Selenium T-Se	mg/kg	1	-	-	-	-	<4[f]	-	-	-	-	-
Silver T-Ag	mg/kg	20[d]	-	-	-	-	<4	-	-	-	-	-
Tin T-Sn	mg/kg	50[d]	-	-	-	-	<10	-	-	-	-	-
Vanadium T-V	mg/kg	130	-	-	-	-	20	-	-	-	-	-
Zinc T-Zn	mg/kg	-	10000	2700	1820	2890	3110	456	999	2050	1070	1080

Associated ALS Analytics files: T5093, T4927, T4772, T4634, T4151, T4079, T4071, T3583

Bold	*Concentration greater than or equal to the CCME generic soil quality guideline for Parkland (PL) land use.*
Bold	*Concentration greater than or equal to the Site-Specific Risk-Based CCME SQRO for the Polaris Mine site*

Notes:

<= Less than analytical method detection limit

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

"na" = no field screening result available

a) Canadian Council of Ministers of the Environment (CCME) standards and guidelines provides criteria based on land use activities and applies the most stringent criteria based on site-specific receptors and exposure pathway.

b) CCME Canadian Environmental Quality Guidelines (CEQG) Tier 1 Soil Quality Guidelines for Parkland (PL) land use. The site specific factors used for determining the soil quality guideline include: soil ingestion, soil contact, and nutrient cycling.

c) Site-Specific Risk-Based CCME Tier 3 Soil Quality Remediation Objective (SQRO) for the Polaris Mine site.

d) CCME CEQG Tier 1 PL land use interim remediation criteria for soil. Soil Quality Guidelines based on the CCME soil protocol have not yet been developed for a given chemical.

e) Field screening measurements are from the Niton portable X-Ray Fluorescence (XRF) elemental analyser.

f) The analytical method detection limit (MDL) exceeds the Generic CCME CEQG for Parkland (PL) land use.

Table CSHED-03-1. Concentrate Storage Shed Remediation Confirmation Soil Samples - Metals

Gartner Lee		Location	Concentrate Storage Shed								
		Sample ID	CSHED-362-F-C	CSHED-363-F-C	CSHED-364-F-C	CSHED-365-F-C	CSHED-366-F-C	CSHED-367-F-C	CSHED-403-F-C	CSHED-404-F-C	CSHED-429-F-C
		Date Sampled	9/2/2003	9/2/2003	9/2/2003	9/2/2003	9/2/2003	9/2/2003	9/1/2003	9/1/2003	9/1/2003
		Field Screen Pb [e] (ppm)	na	na	na	na	na	na	na	na	na
		Field Screen Zn [e] (ppm)	na	na	na	na	na	na	na	na	na
Parameter	**Units**	**Federal CCME [a] Guidelines**		**Analytical Results**								
		CEQG (PL)[b]	**SQRO[c]**									
Physical Tests												
pH		-	-	-	-	-	-	-	8.48	-	-	-
Total Metals												
Antimony T-Sb	mg/kg	20[d]	-	-	-	-	-	-	<20[f]	-	-	-
Arsenic T-As	mg/kg	12	-	-	-	-	-	-	<10	-	-	-
Barium T-Ba	mg/kg	500	-	-	-	-	-	-	**631**	-	-	-
Beryllium T-Be	mg/kg	4[d]	-	-	-	-	-	-	<1	-	-	-
Cadmium T-Cd	mg/kg	10	-	-	-	-	-	-	2	-	-	-
Chromium T-Cr	mg/kg	64	-	-	-	-	-	-	5	-	-	-
Cobalt T-Co	mg/kg	50[d]	-	-	-	-	-	-	<4	-	-	-
Copper T-Cu	mg/kg	63	-	-	-	-	-	-	10	-	-	-
Lead T-Pb	mg/kg	-	2000	321	139	113	266	<100	133	<100	118	307
Mercury T-Hg	mg/kg	6.6	-	-	-	-	-	-	<0.05	-	-	-
Molybdenum T-Mo	mg/kg	10[d]	-	-	-	-	-	-	<8	-	-	-
Nickel T-Ni	mg/kg	50	-	-	-	-	-	-	<10	-	-	-
Selenium T-Se	mg/kg	1	-	-	-	-	-	-	<4[f]	-	-	-
Silver T-Ag	mg/kg	20[d]	-	-	-	-	-	-	<4	-	-	-
Tin T-Sn	mg/kg	50[d]	-	-	-	-	-	-	<10	-	-	-
Vanadium T-V	mg/kg	130	-	-	-	-	-	-	33	-	-	-
Zinc T-Zn	mg/kg	-	10000	917	469	290	1060	441	404	684	442	2140

Associated ALS Analytics files: T5093, T4927, T4772, T4634, T4151, T4079, T4071, T3583

Bold	*Concentration greater than or equal to the CCME generic soil quality guideline for Parkland (PL) land use.*
Bold	*Concentration greater than or equal to the Site-Specific Risk-Based CCME SQRO for the Polaris Mine site*

Notes:

<= Less than analytical method detection limit

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b) CCME Canadian Environmental Quality Guidelines (CEQG) Tier 1 Soil Quality Guidelines for Parkland (PL) land use. The site specific factors used for determining the soil quality guideline include: soil ingestion, soil contact, and nutrient cycling.

c) Site-Specific Risk-Based CCME Tier 3 Soil Quality Remediation Objective (SQRO) for the Polaris Mine site.

d) CCME CEQG Tier 1 PL land use interim remediation criteria for soil. Soil Quality Guidelines based on the CCME soil protocol have not yet been developed for a given chemical.

e) Field screening measurements are from the Niton portable X-Ray Fluorescence (XRF) elemental analyser.

f) The analytical method detection limit (MDL) exceeds the Generic CCME CEQG for Parkland (PL) land use.

Table CSHED-03-1. Concentrate Storage Shed Remediation Confirmation Soil Samples - Metals

Gartner Lee		Location	Concentrate Storage Shed							
		Sample ID	CSHED-462-F-C	CSHED-463-F-C	CSHED-464-F-C	CSHED-465-F-C	CSHED-466-F-Q	CSHED-479-W-D	CSHED-493-W-D	CSHED-496-W-C
		Date Sampled	9/26/2003	9/26/2003	9/26/2003	9/26/2003		9/26/2003	9/26/2003	9/26/2003
		Field Screen Pb [e] (ppm)	463.55	64.44	66.72	430.36	duplicate of CSHED 465-F-C	48.66	35.15	257.91
		Field Screen Zn [e] (ppm)	7674.39	435.08	654.63	1861.07		309.02	242.37	3699
Parameter	**Units**	**Federal CCME [a] Guidelines**		**Analytical Results**							
		CEQG (PL)[b]	**SQRO[c]**								
Physical Tests											
pH		-	-	-	-	-	-	8.03	8.39	-	-
Total Metals											
Antimony T-Sb	mg/kg	20[d]	-	-	-	-	-	<20[f]	<20[f]	-	-
Arsenic T-As	mg/kg	12	-	-	-	-	-	<10	<10	-	-
Barium T-Ba	mg/kg	500	-	-	-	-	-	**719**	117	-	-
Beryllium T-Be	mg/kg	4[d]	-	-	-	-	-	<1	<1	-	-
Cadmium T-Cd	mg/kg	10	-	-	-	-	-	6	1	-	-
Chromium T-Cr	mg/kg	64	-	-	-	-	-	7	5	-	-
Cobalt T-Co	mg/kg	50[d]	-	-	-	-	-	<4	<4	-	-
Copper T-Cu	mg/kg	63	-	-	-	-	-	12	4	-	-
Lead T-Pb	mg/kg	-	2000	514	170	105	618	653	<100	<100	256
Mercury T-Hg	mg/kg	6.6	-	-	-	-	-	<0.05	<0.05	-	-
Molybdenum T-Mo	mg/kg	10[d]	-	-	-	-	-	<8	<8	-	-
Nickel T-Ni	mg/kg	50	-	-	-	-	-	11	<10	-	-
Selenium T-Se	mg/kg	1	-	-	-	-	-	<4[f]	<6[f]	-	-
Silver T-Ag	mg/kg	20[d]	-	-	-	-	-	<4	<4	-	-
Tin T-Sn	mg/kg	50[d]	-	-	-	-	-	<10	<10	-	-
Vanadium T-V	mg/kg	130	-	-	-	-	-	37	15	-	-
Zinc T-Zn	mg/kg	-	10000	6010	305	672	2350	1920	290	92	3930

Associated ALS Analytics files: T5093, T4927, T4772, T4634, T4151, T4079, T4071, T3583

Bold	*Concentration greater than or equal to the CCME generic soil quality guideline for Parkland (PL) land use.*
Bold	*Concentration greater than or equal to the Site-Specific Risk-Based CCME SQRO for the Polaris Mine site*

Notes:

<= Less than analytical method detection limit

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c) Site-Specific Risk-Based CCME Tier 3 Soil Quality Remediation Objective (SQRO) for the Polaris Mine site.

d) CCME CEQG Tier 1 PL land use interim remediation criteria for soil. Soil Quality Guidelines based on the CCME soil protocol have not yet been developed for a given chemical.

e) Field screening measurements are from the Niton portable X-Ray Fluorescence (XRF) elemental analyser.

f) The analytical method detection limit (MDL) exceeds the Generic CCME CEQG for Parkland (PL) land use.

Table CSHED-03-1. Concentrate Storage Shed Remediation Confirmation Soil Samples - Metals

Gartner Lee		Location	Concentrate Storage Shed							
		Sample ID	CSHED-497-W-C	CSHED-498-W-C	CSHED-499-W-C	CSHED-500-W-C	CSHED-501-W-C	CSHED-502-W-C	CSHED-503-W-C	CSHED-506-W-C
		Date Sampled	9/26/2003	9/26/2003	9/26/2003	9/26/2003	9/26/2003	9/26/2003	9/26/2003	9/29/2003
		Field Screen Pb [e] (ppm)	98.38	261.19	68.47	325.56	84.25	67.75	31.84	na
		Field Screen Zn [e] (ppm)	850.45	4148.73	661.99	7402.38	1174.38	1233.88	378.09	na
Parameter	**Units**	**Federal CCME [a] Guidelines**		**Analytical Results**							
		CEQG (PL)[b]	**SQRO[c]**								
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	101	1150	<100	301	<100	<100	<100	<100
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	459	5250	274	4530	1030	712	196	1070

Associated ALS Analytics files: T5093, T4927, T4772, T4634, T4151, T4079, T4071, T3583

Bold	*Concentration greater than or equal to the CCME generic soil quality guideline for Parkland (PL) land use.*
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c) Site-Specific Risk-Based CCME Tier 3 Soil Quality Remediation Objective (SQRO) for the Polaris Mine site.

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Table CSHED-03-1. Concentrate Storage Shed Remediation Confirmation Soil Samples - Metals

Gartner Lee		Location		Concentrate Storage Shed						
		Sample ID		CSHED-514-F-C	CSHED-515-F-C	CSHED-520-F-C	CSHED-530-F-C	CSHED-531-F-C	CSHED-534-F-D	CSHED-546-F-D
		Date Sampled		10/3/2003	10/3/2003	10/4/2003	10/3/2003	10/3/2003	10/3/2003	10/4/2003
		Field Screen Pb [e] (ppm)		60.53	58.83	141.24	178.47	106.13	265.92	50.76
		Field Screen Zn [e] (ppm)		342.54	404.77	565.54	4517.23	1666.95	1813.42	269.11
Parameter	**Units**	**Federal CCME [a] Guidelines**		**Analytical Results**						
		CEQG (PL)[b]	**SQRO[c]**							
Physical Tests										
pH		-	-	8.1	8.12	-	8.42	-	-	-
Total Metals										
Antimony T-Sb	mg/kg	20[d]	-	<20[f]	<20[f]	-	<20[f]	-	-	-
Arsenic T-As	mg/kg	12	-	<10	<10	-	<10	-	-	-
Barium T-Ba	mg/kg	500	-	399	413	-	161	-	-	-
Beryllium T-Be	mg/kg	4[d]	-	<1	<1	-	<1	-	-	-
Cadmium T-Cd	mg/kg	10	-	<1	<1	-	6	-	-	-
Chromium T-Cr	mg/kg	64	-	7	6	-	4	-	-	-
Cobalt T-Co	mg/kg	50[d]	-	<4	<4	-	<4	-	-	-
Copper T-Cu	mg/kg	63	-	6	6	-	6	-	-	-
Lead T-Pb	mg/kg	-	2000	<100	<100	236	127	111	478	<100
Mercury T-Hg	mg/kg	6.6	-	<0.05	<0.05	-	<0.05	-	-	-
Molybdenum T-Mo	mg/kg	10[d]	-	<8	<8	-	<8	-	-	-
Nickel T-Ni	mg/kg	50	-	12	12	-	<10	-	-	-
Selenium T-Se	mg/kg	1	-	<4[f]	<7[f]	-	<4[f]	-	-	-
Silver T-Ag	mg/kg	20[d]	-	<4	<4	-	<4	-	-	-
Tin T-Sn	mg/kg	50[d]	-	<10	<10	-	<10	-	-	-
Vanadium T-V	mg/kg	130	-	22	29	-	17	-	-	-
Zinc T-Zn	mg/kg	-	10000	183	226	353	2270	1620	1540	150

Associated ALS Analytics files: T5093, T4927, T4772, T4634, T4151, T4079, T4071, T3583

Bold	*Concentration greater than or equal to the CCME generic soil quality guideline for Parkland (PL) land use.*
Bold	*Concentration greater than or equal to the Site-Specific Risk-Based CCME SQRO for the Polaris Mine site*

Notes:

<= Less than analytical method detection limit

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

"na" = no field screening result available

a) Canadian Council of Ministers of the Environment (CCME) standards and guidelines provides criteria based on land use activities and applies the most stringent criteria based on site-specific receptors and exposure pathway.

b) CCME Canadian Environmental Quality Guidelines (CEQG) Tier 1 Soil Quality Guidelines for Parkland (PL) land use. The site specific factors used for determining the soil quality guideline include: soil ingestion, soil contact, and nutrient cycling.

c) Site-Specific Risk-Based CCME Tier 3 Soil Quality Remediation Objective (SQRO) for the Polaris Mine site.

d) CCME CEQG Tier 1 PL land use interim remediation criteria for soil. Soil Quality Guidelines based on the CCME soil protocol have not yet been developed for a given chemical.

e) Field screening measurements are from the Niton portable X-Ray Fluorescence (XRF) elemental analyser.

f) The analytical method detection limit (MDL) exceeds the Generic CCME CEQG for Parkland (PL) land use.

Table CSHED-03-2. Concentrate Storage Shed Remediation Confirmation Rock Samples - Metals

Gartner Lee		Location	Concentrate Storage Shed								
		Sample ID	CSHED-516-F-C	CSHED-517-F-C	CSHED-518-F-C	CSHED-521-F-C	CSHED-522-F-C	CSHED-523-F-C	CSHED-524-F-C	CSHED-525-F-C	CSHED-526-F-C
		Date Sampled	10/4/2003	10/4/2003	10/4/2003	10/4/2003	10/4/2003	10/4/2003	10/4/2003	10/4/2003	10/4/2003
		Field Screen Pb [e] (ppm)	5490.88	10767.14	1540.11	2166.75	4464.66	10651.02	198.95	569.6	433.2
		Field Screen Zn [e] (ppm)	6295.81	21223.17	22499.83	2857.05	14802.96	45129.58	8245.83	25098.48	14624.52
Parameter	**Units**	**Federal CCME [a] Guidelines**		**Analytical Results**								
		CEQG (PL)[b]	**SQRO[c]**									
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	***10100***	***23300***	1970	1880	***10800***	***6680***	221	565	447
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	4840	***20000***	***15300***	1290	***23500***	9450	4880	***20700***	***10500***

Associated ALS Analytics files: T5093, T4927, T4772, T4634, T4151, T4079, T4071, T3583

Bold	*Concentration greater than or equal to the CCME generic soil quality guideline for Parkland (PL) land use.*
Bold	*Concentration greater than or equal to the Site-Specific Risk-Based CCME SQRO for the Polaris Mine site*

Notes:

<= Less than analytical method detection limit

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

"na" = no field screening result available

a) Canadian Council of Ministers of the Environment (CCME) standards and guidelines provides criteria based on land use activities and applies the most stringent criteria based on site-specific receptors and exposure pathway.

b) CCME Canadian Environmental Quality Guidelines (CEQG) Tier 1 Soil Quality Guidelines for Parkland (PL) land use. The site specific factors used for determining the soil quality guideline include: soil ingestion, soil contact, and nutrient cycling.

c) Site-Specific Risk-Based CCME Tier 3 Soil Quality Remediation Objective (SQRO) for the Polaris Mine site.

d) CCME CEQG Tier 1 PL land use interim remediation criteria for soil. Soil Quality Guidelines based on the CCME soil protocol have not yet been developed for a given chemical.

e) Field screening measurements are from the Niton portable X-Ray Fluorescence (XRF) elemental analyser.

f) The analytical method detection limit (MDL) exceeds the Generic CCME CEQG for Parkland (PL) land use.

Table CSHED-03-2. Concentrate Storage Shed Remediation Confirmation Rock Samples - Metals

Gartner Lee		Location	Concentrate Storage Shed									
		Sample ID	CSHED-527-F-C	CSHED-528-F-C	CSHED-529-F-C	CSHED-532-F-C	CSHED-533-F-C	CSHED-535-F-D	CSHED-536-F-D	CSHED-537-F-C	CSHED-544-F-D	CSHED-545-F-D
		Date Sampled	10/4/2003	10/4/2003	10/4/2003	10/3/2003	10/3/2003	10/3/2003	10/3/2003	10/4/2003	10/4/2003	10/4/2003
		Field Screen Pb [e] (ppm)	511.23	489.81	691.03	627.31	777.42	550.63	151.97	1039.65	3829.4	97.7
		Field Screen Zn [e] (ppm)	32282.59	9076.14	46067	31635.7	49825.97	26207.94	8199.65	2928.35	9202.68	312.64
Parameter	**Units**	**Federal CCME [a] Guidelines**		**Analytical Results**								
		CEQG (PL)[b]	**SQRO[c]**									
Physical Tests												
pH		-	-	-	-	-	-	-	-	-	8.32	-	-
Total Metals												
Antimony T-Sb	mg/kg	20[d]	-	-	-	-	-	-	-	-	<20[f]	-	-
Arsenic T-As	mg/kg	12	-	-	-	-	-	-	-	-	<10	-	-
Barium T-Ba	mg/kg	500	-	-	-	-	-	-	-	-	487	-	-
Beryllium T-Be	mg/kg	4[d]	-	-	-	-	-	-	-	-	<1	-	-
Cadmium T-Cd	mg/kg	10	-	-	-	-	-	-	-	-	5	-	-
Chromium T-Cr	mg/kg	64	-	-	-	-	-	-	-	-	4	-	-
Cobalt T-Co	mg/kg	50[d]	-	-	-	-	-	-	-	-	<4	-	-
Copper T-Cu	mg/kg	63	-	-	-	-	-	-	-	-	4	-	-
Lead T-Pb	mg/kg	-	2000	646	626	822	567	716	653	172	1120	***6720***	<100
Mercury T-Hg	mg/kg	6.6	-	-	-	-	-	-	-	-	<0.05	-	-
Molybdenum T-Mo	mg/kg	10[d]	-	-	-	-	-	-	-	-	<8	-	-
Nickel T-Ni	mg/kg	50	-	-	-	-	-	-	-	-	<10	-	-
Selenium T-Se	mg/kg	1	-	-	-	-	-	-	-	-	<4[f]	-	-
Silver T-Ag	mg/kg	20[d]	-	-	-	-	-	-	-	-	<4	-	-
Tin T-Sn	mg/kg	50[d]	-	-	-	-	-	-	-	-	<10	-	-
Vanadium T-V	mg/kg	130	-	-	-	-	-	-	-	-	12	-	-
Zinc T-Zn	mg/kg	-	10000	***31900***	7800	***34100***	***17800***	***29300***	***20700***	5950	1980	9260	132

Associated ALS Analytics files: T5093, T4927, T4772, T4634, T4151, T4079, T4071, T3583

Bold	*Concentration greater than or equal to the CCME generic soil quality guideline for Parkland (PL) land use.*
Bold	*Concentration greater than or equal to the Site-Specific Risk-Based CCME SQRO for the Polaris Mine site*

Notes:

<= Less than analytical method detection limit

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

"na" = no field screening result available

a) Canadian Council of Ministers of the Environment (CCME) standards and guidelines provides criteria based on land use activities and applies the most stringent criteria based on site-specific receptors and exposure pathway.

b) CCME Canadian Environmental Quality Guidelines (CEQG) Tier 1 Soil Quality Guidelines for Parkland (PL) land use. The site specific factors used for determining the soil quality guideline include: soil ingestion, soil contact, and nutrient cycling.

c) Site-Specific Risk-Based CCME Tier 3 Soil Quality Remediation Objective (SQRO) for the Polaris Mine site.

d) CCME CEQG Tier 1 PL land use interim remediation criteria for soil. Soil Quality Guidelines based on the CCME soil protocol have not yet been developed for a given chemical.

e) Field screening measurements are from the Niton portable X-Ray Fluorescence (XRF) elemental analyser.

f) The analytical method detection limit (MDL) exceeds the Generic CCME CEQG for Parkland (PL) land use.

Table CSHED-03-3. Concentrate Storage Shed Quality Assurance and Quality Control Samples

Gartner Lee	Parameter	Pb		Zn		Pb			Zn		
	Relative Percent Difference (RpD)[a]	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											
CSHED-265-I-D	CSHED-561-I-Q	70	350	150	750	1039.43	1282.39	20.9	15353.33	20150.07	27.0
CSHED-277-I-D	CSHED-562-I-Q	70	350	150	750	291.32	416.70	na	2464.36	3557.9	36.3
CSHED-289-I-D	CSHED-563-I-Q	70	350	150	750	882.72	996.04	12.1	1799.25	2147.82	17.7
CSHED-302-I-D	CSHED-564-I-Q	70	350	150	750	503.14	466.81	7.5	1813.45	1547.64	15.8
CSHED-335-I-D	CSHED-565-I-Q	70	350	150	750	101.91	92.78	na	580.10	723.04	na
CSHED-346-I-D	CSHED-566-I-Q	70	350	150	750	53.55	44.07	na	333.88	329.32	na
CSHED-393-I-D	CSHED-567-I-Q	70	350	150	750	50.64	79.35	na	551.86	600.28	na
CSHED-449-I-D	CSHED-568-I-Q	70	350	150	750	100.17	119.53	na	1104.99	1594.15	36.2
CSHED-467-W-D	CSHED-569-W-Q	70	350	150	750	885.26	709.95	22.0	13309.28	11821.18	11.8
CSHED-478-W-D	CSHED-570-W-Q	70	350	150	750	49.75	73.62	na	267.29	324	na
CSHED-489-W-D	CSHED-571-W-Q	70	350	150	750	152.50	183.06	na	2751.98	4248	42.8
CSHED-43-W-D	CSHED-574-W-Q	70	350	150	750	379.34	334.00	na	1958.45	1736	12.0
CSHED-194-I-D	CSHED-575-I-Q	70	350	150	750	550.24	423.82	na	6083.64	4638	27.0
CSHED-205-I-D	CSHED-576-I-Q	70	350	150	750	122071.22	125311.18	2.6	839056.75	829004	1.2
CSHED-206-I-D	CSHED-577-I-Q	70	350	150	750	757.22	692.51	8.9	3685.68	3399	8.1
CSHED-217-I-D	CSHED-578-I-Q	70	350	150	750	3506.13	3427.62	2.3	908.04	853	6.2
CSHED-218-I-D	CSHED-579-I-Q	70	350	150	750	3694.48	4937.02	28.8	962.66	1153	18.0
CSHED-225-I-D	CSHED-580-I-Q	70	350	150	750	2678.75	2434.17	9.6	78068.78	74599	4.5
CSHED-233-I-D	CSHED-581-I-Q	70	350	150	750	1308.80	1356.69	3.6	91405.45	95032	3.9
CSHED-355-F-C	CSHED-583-F-Q	70	350	150	750	6959.30	6160.91	12.2	119372.92	106503	11.4
Analytical Laboratory Duplicates											
CSHED-465-F-C	CSHED-466-F-C	100	500	2	10	618	653	5.5	2350	1920	20.1
Analytical Laboratory Replicates											
CSHED-534-F-D	QC# 358812	100	500	2	10	478	225	na	1540	1070	36
CSHED-514-F-C	QC# 358194	100	500	2	10	<100	<100	na	183	150	20
CSHED-520-F-C	QC# 358195	100	500	2	10	236	162	na	353	250	34
CSHED-500-W-C	QC# 357530	100	500	2	10	301	242	na	4530	3690	20
CSHED-463-F-C	QC# 356998	100	500	2	10	170	<100	na	305	334	9
CSHED-359-F-C	QC# 355056	100	500	2	10	622	647	4	2050	1350	41
CSHED-401-F-C	QC# 355053	100	500	2	10	327	314	na	2140	2160	0.9

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

Notes:

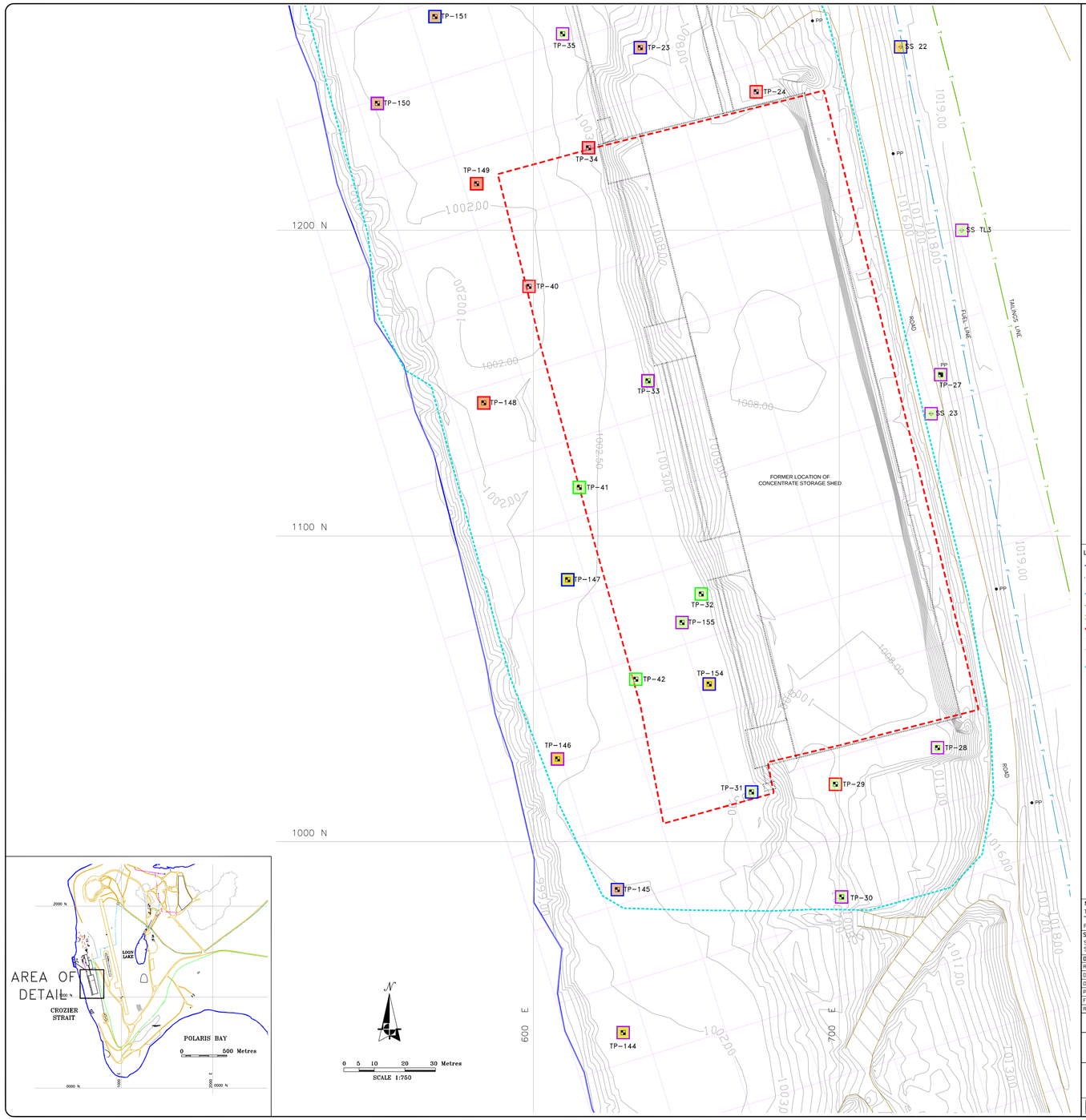
"na" = RpD value is not applicable because one or both results are less than the practical quantitation limit (PQL).

"-" = 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)*



LEGEND:

- SHORE LINE
- FORMER LOCATION OF CONCENTRATE STORAGE SHED
- FUEL LINE
- TAILINGS LINE
- ROADS
- LIMIT OF 2003 EXCAVATION
- EXCAVATION GRID
- GROUND CONTOURS BEFORE REMEDIATION (m)
- AREA OF CONCERN FOR METALS CONTAMINATION FROM THE 1999-2000 ENVIRONMENTAL SITE ASSESSMENT (ESA)
- PP POWER POLE
- TP-28 TEST PIT – 1999 AND 2000 ENVIRONMENTAL SITE ASSESSMENTS
- SS 22 SURFACE SAMPLE (1999/2000 ENVIRONMENTAL SITE ASSESSMENT)

ZINC CONCENTRATION IN SOILS (1999 & 2000 DATA)

- 0–1000 PPM
- 1000–5000 PPM
- 5000–10,000 PPM
- >10,000 PPM

LEAD CONCENTRATION IN SOILS (1999 & 2000 DATA)

- 0–1,000 PPM
- 1,000–2,000 PPM
- > 2,000 PPM

NOTE:
THIS IS AREA 3 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-04.DWG
REVISION:	0

teckcominco

CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

CONCENTRATE STORAGE SHED CONDITIONS BEFORE REMEDIATION (DECEMBER 31, 2003)

Gartner Lee

Figure No. CSHED-03-1

2003 CONFIRMATION SAMPLES

FLOOR SAMPLES

Sample ID	Lead (mg/kg)	Zinc (mg/kg)
CSHED-255-F-C	1300	2700
CSHED-256-F-C	118	1820
CSHED-257-F-C	281	2890
CSHED-316-F-D	912	3110
CSHED-352-F-D	338	456
CSHED-358-F-C	574	999
CSHED-359-F-C	622	2050
CSHED-360-F-C	713	1070
CSHED-361-F-C	270	1080
CSHED-362-F-C	321	917
CSHED-363-F-C	139	469
CSHED-364-F-C	113	290
CSHED-365-F-C	266	1060
CSHED-366-F-C	<100	441
CSHED-367-F-C	133	404
CSHED-403-F-C	<100	684
CSHED-404-F-C	118	442
CSHED-429-F-C	307	2140
CSHED-462-F-C	514	6010
CSHED-463-F-C	170	305
CSHED-464-F-C	105	672
CSHED-465-F-C	618	2350
CSHED-466-F-Q Duplicate of CSHED-465-F-C	653	1920
CSHED-514-F-C	<100	183
CSHED-515-F-C	<100	226
CSHED-516-F-C	10100	4840
CSHED-517-F-C	23300	20000
CSHED-518-F-C	1970	15300
CSHED-520-F-C	236	353
CSHED-521-F-C	1880	1290
CSHED-522-F-C	10800	23500
CSHED-523-F-C	6680	9450
CSHED-524-F-C	221	4880
CSHED-525-F-C	565	20700
CSHED-526-F-C	447	10500
CSHED-527-F-C	646	31900
CSHED-528-F-C	626	7800
CSHED-529-F-C	822	34100
CSHED-530-F-C	127	2270
CSHED-531-F-C	111	1620
CSHED-532-F-C	567	17800
CSHED-533-F-C	716	29300
CSHED-534-F-D	478	1540
CSHED-535-F-D	653	20700
CSHED-536-F-D	172	5950
CSHED-537-F-C	1120	1980
CSHED-544-F-D	6720	9260
CSHED-545-F-D	<100	132
CSHED-546-F-D	<100	150

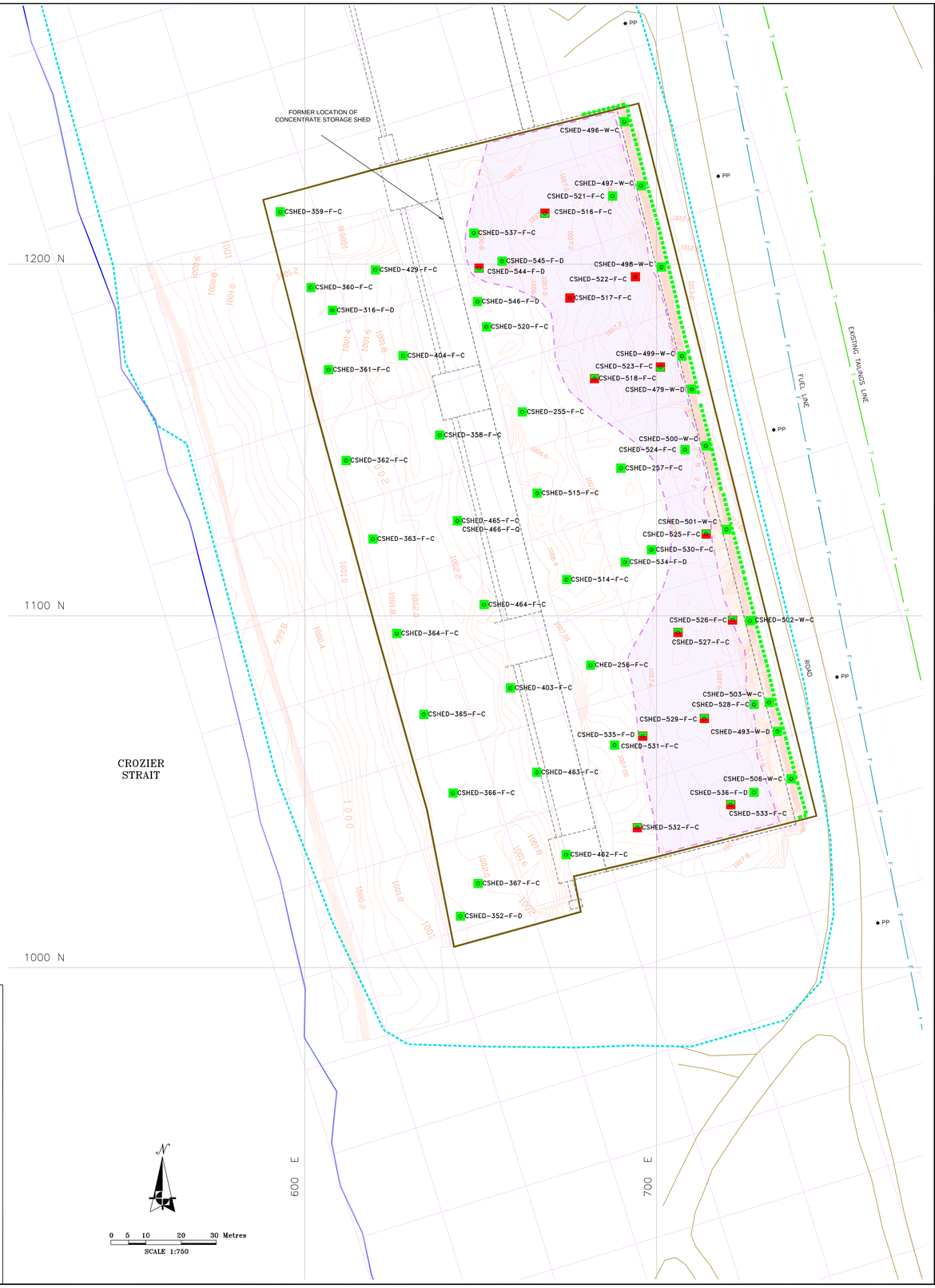
WALL SAMPLES

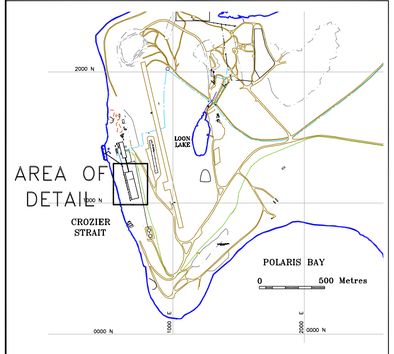
Sample ID	Lead (mg/kg)	Zinc (mg/kg)
CSHED-479-W-D	<100	299
CSHED-493-W-D	<100	92
CSHED-496-W-C	256	3930
CSHED-497-W-C	101	459
CSHED-498-W-C	1150	5250
CSHED-499-W-C	<100	274
CSHED-500-W-C	301	4530
CSHED-501-W-C	<100	1030
CSHED-502-W-C	<100	712
CSHED-503-W-C	<100	196
CSHED-506-W-C	<100	1070

RESULTS IN **RED** INDICATE SAMPLE CONTAINING
≥ 2000 mg/kg LEAD OR ≥ 10,000 mg/kg ZINC

NOTES:

<100	Less than detection limit
Lead, Zinc	Lead or Zinc concentrations obtained from ALS analytical laboratory





LEGEND:

- PP — POWER POLE
- FORMER LOCATION OF BUILDINGS AND FACILITES (REMOVED)
- SHORE LINE
- FUEL LINE
- LOCATION OF EXISTING TAILINGS LINE
- ROADS
- EXCAVATION GRID
- CONTOURS – BASE OF EXCAVATION (m)
- GROUND CONTOURS (m) BASED ON SEPT. 2003 SURVEY
- LIMIT OF 2003 EXCAVATION
- AREA OF METAL CONCERN FROM 1999–2000 ENVIRONMENTAL SITE ASSESSMENT
- BEDROCK NEAR SURFACE AS OBSERVED VISUALLY IN THE FIELD

2003 SAMPLES

- CONFIRMATORY FLOOR OR WALL SAMPLE

2003 SAMPLE NAMING CONVENTION

AREA – SAMPLE ID – CSHED-462-F-C – 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

LOCATION F= FLOOR SAMPLE
I= INTERMEDIATE FLOOR SAMPLE
W= WALL SAMPLE

- SAMPLE CONTAINS LESS THAN 10,000 mg/kg ZINC
- SAMPLE CONTAINS LESS THAN 2,000 mg/kg LEAD
- AREA OF WALL COMPOSITE WALL SAMPLE CONTAINS LESS THAN 10,000 mg/kg ZINC OR 2,000 mg/kg LEAD
- SAMPLE CONTAINS GREATER THAN OR EQUAL TO 10,000 mg/kg ZINC
- SAMPLE CONTAINS GREATER THAN OR EQUAL TO 2,000 mg/kg LEAD

NOTE:
THIS IS AREA 3 SHOWN ON FIGURE 1 "CONTAMINATED SOILS REMEDIATION PROGRESS PLAN, DECEMBER 31, 2003"

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

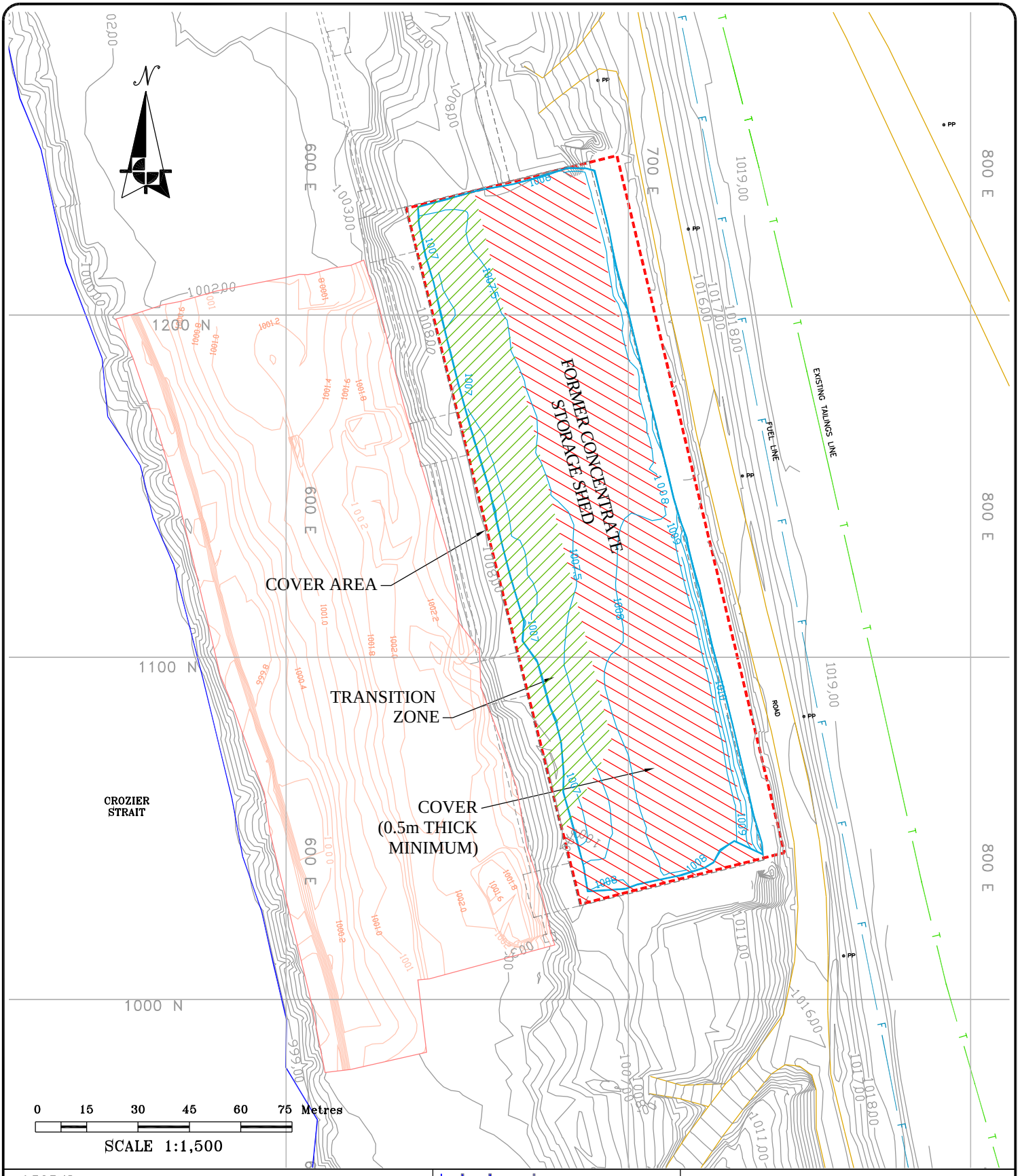
DRAWING INFORMATION:	
REVIEWED BY:	KT/AL
DRAWN BY:	CPW
DATE ISSUED:	13 FEBRUARY, 2004
PROJECT NUMBER:	23–305
FILE NAME:	23305–6F–10.DWG
REVISION:	0

teckcominco

CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

CONCENTRATE STORAGE SHED CONDITIONS AFTER REMEDIATION (DECEMBER 31, 2003)

Gartner Lee | Figure No. CSHED-03-2



LEGEND:

- GROUND CONTOURS AREAS NOT REMEDIATED (m)
- CONTOURS – BACKFILL (m)
- CONTOURS BASE OF EXCAVATION (m)
- SOIL COVER (0.5m THICK MINIMUM)
- TRANSITION ZONES (VARIABLE THICKNESS)

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DRAWING INFORMATION:	
REVIEWED BY:	AL
DRAWN BY:	CPW
DATE ISSUED:	13 FEBRUARY, 2004
PROJECT NUMBER:	23-305
FILE NAME:	23305-6F-09.DWG
REVISION:	0

CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

CONCENTRATE STORAGE SHED - SOIL COVER

Gartner Lee

FIGURE NO. CSHED-03-3

Appendix B

Polaris Mine Operations Contaminated Soil Remediation Close Out Report: Cemented Rock Fill (CRF) Plant Fuel Storage Tank

Gartner Lee

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: Cemented Rock Fill (CRF) Plant Fuel Storage Tank Area

BACKGROUND

The Cemented Rock Fill (CRF) plant (shown as Area 4 on Figure 1: *Contaminated Soils Remedial Progress Plan*) was located south of the old quarry between 3300E and 1980E on the mine grid. The CRF was used to produce quarried limestone backfill material for the underground mine. Contaminant sources at the CRF plant include two above ground storage tanks (ASTs) used for storage and dispensing diesel fuel.

The 1999 Environmental Site Assessment (ESA) revealed hydrocarbon contamination in the direct vicinity of the ASTs located at the west and south wall of the CRF plant. In 2000, three step-out test pits were excavated to determine the extent of the contamination. Sample test results from the test pits did not show any hydrocarbon contamination.

METHODOLOGY

Excavation

The excavation of the CRF plant fuel storage area proceeded, based on the results of the ESA data gathered in 1999 and 2000, that identified localised hydrocarbon contamination as shown in Figure CRF-04-1. No further delineation work was conducted in 2003.

.

Excavation of hydrocarbon contamination at the CRF plant occurred on June 27, 2003 in two isolated areas. The limits of the excavation are outlined in Figure CRF-04-2 and soils were removed to a depth of 1.0 m. A very weak olfactory indication of hydrocarbon impacted soil was detected from one of the two areas. The soil excavated from this area was disposed of in the underground mine workings in accordance with regulatory approvals. Upon completion of the excavation, composite samples were collected in accordance with standard GLL and TCL sampling procedures and protocols. The 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. The field screening results did not detect elevated organic vapour concentrations, so these samples were sent to Aurora Laboratory Services Ltd. (ALS) as confirmation samples.. Sample locations are located in Figure CRF-04-2.

ANALYTICAL RESULTS

Approximately 40 m^3 of contaminated soil was removed from the CRF plant area. Laboratory results for the CRF plant excavation are summarized in Table CRF-04-1. A total of five (5) samples were submitted for this area: one (1) discrete wall, two (2) discrete floors and two (2) composite floors. All samples submitted returned concentrations below the Polaris Mine SQRO.

Quality Assurance/ Quality Control (QA/QC)

QA/QC was performed on one analytical laboratory replicate from the former CRF plant fuel storage area. Since the lab results were below the practical quantitation limit this QA/QC result could not be assessed, as summarized in Table CRF-04-2.

CONCLUSIONS

Based on confirmatory sampling, consistent with good practice and the approved site specific sampling procedures and protocols, the remediation of the former CRF plant fuel storage 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

ORIGINAL COPY SIGNED AND STAMPED

Arlene Laudrum, P.Geol.
Remediation Supervisor, Polaris Mine Project

AL:KT

ATTACHMENTS

Tables

Table CRF-04-1: Cemented Rock Fill Plant Remediation Confirmation Soil Samples - Hydrocarbons

Table CRF-04-2: Cemented Rock Fill Plant Quality Assurance and Quality Control Remediation Soil Samples

Figures

Figure CRF-04-1: Cemented Rock Fill Plant Area Conditions Before Remediation (December 31, 2003)

Figure CRF-04-2: Cemented Rock Fill Plant Area Conditions After Remediation (December 31, 2003)

Table CRF-04-1. Cemented Rock Fill Pant Remediation Confirmation Soil Samples - Hydrocarbons

Gartner Lee		Location	Cemented Rock Fill (CRF) Plant					
		Sample ID	CRF-4-F-C	CRF-6-F-D	CRF-12-F-Q (duplicate of CRF-6-F-D)	CRF-7-W-D	CRF-8-F-C	CRF-11-W-D
		Date	6/28/2003	6/28/2003	6/28/2003	6/28/2003	6/28/2003	6/28/2003
		Field Screen (ppm)[b]	15	20	na	na	10	20
Parameter	**Units**	**Polaris Mine SQROs[a]**	**Analytical Results**					
Physical Tests								
Moisture	%	-	6.4	4.8	7.6	5.9	5.2	5.2
Extractable Hydrocarbons								
EPH C_{10}-C_{19}	mg/kg	1000 [d]	<200	<200	<200	<200	<200	<200
EPH C_{19}-C_{32}	mg/kg	1000 [d]	<200	<200	<200	<200	<200	<200
LEPH	mg/kg	1000	-	-	-	-	-	-
HEPH	mg/kg	1000	-	-	-	-	-	-

Associated ALS Analytics Files: S9892

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 CRF-04-2. Cemented Rock Fill Plant 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}		
	Relative Percent Difference (RpD)[a]	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] (%)
Sample ID	**Duplicate ID**										
Analytical Laboratory Duplicate											
CRF-6-F-D	CRF-12-F-Q	200	1000	200	1000	<200	<200	na	<200	<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)*

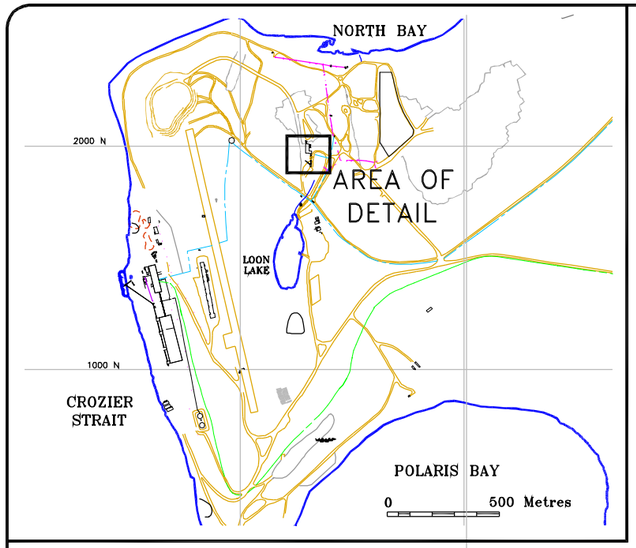
"na" = RpD value is not applicable because one or both results are less than the practical quantitation limit (PQL).

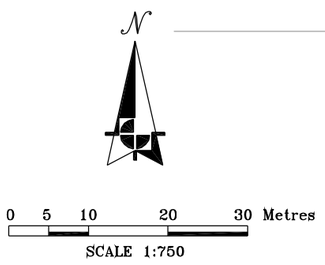
"-" = no result for given parameter

"<" = less than analytical method detection limit

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

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





2000 N

1900 N

1200 E

1300 E

TP-72

TP-73

TP-74

CRF-1

CRF PLANT

FORMER DIESEL TANK LOCATION

TP-75

CRF-2

CRF-3

FORMER DIESEL TANK LOCATION

ROAD

WATER LINE

TP-71

PP

PP

PP

LEGEND:

- LOCATION OF EXISTING STRUCTURE AND/OR FACILITY
- WATER LINE
- POWER LINE
- PP POWER POLE
- ROADS
- EXCAVATION GRID
- CREST OF SLOPE
- AREA OF CONCERN FOR HYDROCARBON CONTAMINATION FROM THE 1999-2000 ENVIRONMENTAL SITE ASSESSMENT (ESA)
- TP-72 TEST PIT - 1999 AND 2000 ENVIRONMENTAL SITE ASSESSMENTS

ZINC CONCENTRATION IN SOILS (1999 & 2000 DATA)

- 0-1000 PPM
- 1000-5000 PPM
- 5000-10,000 PPM
- >10,000 PPM

LEAD CONCENTRATION IN SOILS (1999 & 2000 DATA)

- 0-1,000 PPM
- 1,000-2,000 PPM
- > 2,000 PPM
- EPH 10-19 OR EPH 19-32 CONCENTRATION IN SOIL GREATER THAN OR EQUAL TO 1,000 mg/kg
- EPH 10-19 OR EPH 19-32 CONCENTRATION IN SOIL LESS THAN 1,000 mg/kg

NOTE:

THIS IS AREA 4 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-07.DWG
REVISION:	0

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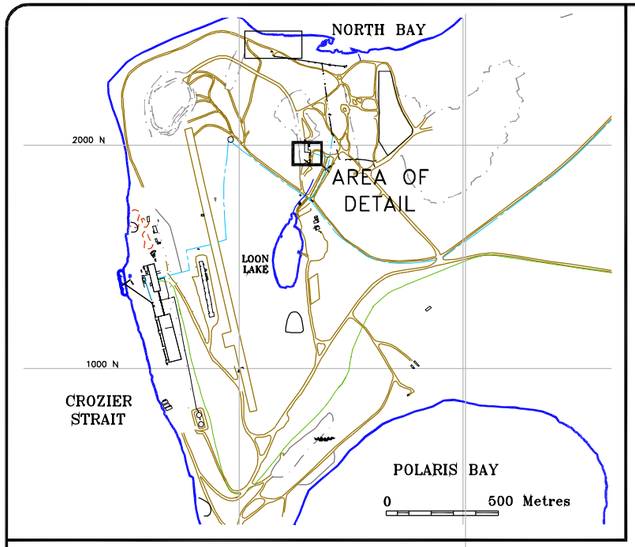
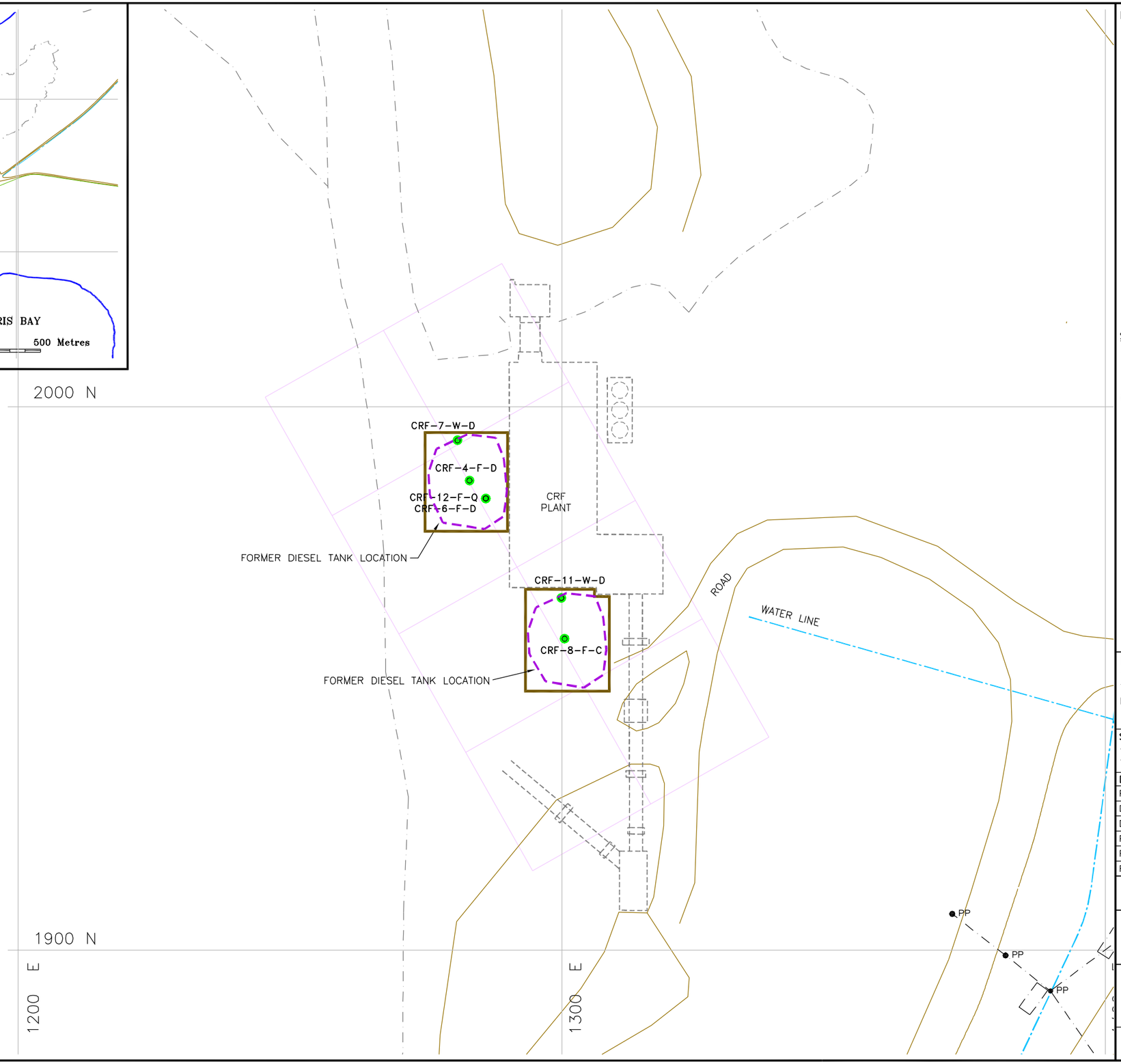
CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

CEMENTED ROCK FILL PLANT AREA CONDITIONS BEFORE REMEDIATION (DECEMBER 31, 2003)

Gartner Lee

Figure No. CRF-04-1





N

0 5 10 20 30 Metres

SCALE 1:750

2003 CONFIRMATION SAMPLES
FLOOR SAMPLES

Sample ID	EPH10-19 (mg/kg)	EPH19-32 (mg/kg)
CRF-4-F-D	<200	<200
CRF-6-F-D	<200	<200
CRF-12-F-Q Duplicate of CRF-6-F-D	<200	<200
CRF-8-F-C	<200	<200

WALL SAMPLES

Sample ID	EPH10-19 (mg/kg)	EPH19-32 (mg/kg)
CRF-7-W-D	<200	<200
CRF-11-W-D	<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:

- FORMER LOCATION OF BUILDINGS AND FACILITES (REMOVED)
- CREST OF SLOPE
- POWER LINE
- WATER LINE
- ROADS
- EXCAVATION GRID
- AREA OF HYDROCARBON CONCERN FROM 1999-2000 ENVIRONMENTAL SITE ASSESSMENT
- APPROXIMATE LIMIT OF 2003 EXCAVATION
- PP POWER POLE

2003 SAMPLES

- CONFIRMATORY FLOOR OR WALL SAMPLE

SAMPLE NAMING CONVENTION

CRF-7-W-D
- AREA
- SAMPLE ID
- 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
- LOCATION F= FLOOR SAMPLE; I= INTERMEDIATE FLOOR SAMPLE; W= WALL SAMPLE

EPH10-19 / EPH19-32 SOIL SAMPLE FROM EXCAVATION CONTAINS LESS THAN 1,000 mg/kg EPH 10-19 OR EPH 19-32

NOTE:
THIS IS AREA 4 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-11.DWG
REVISION:	0

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CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

CEMENTED ROCK FILL PLANT AREA CONDITIONS AFTER REMEDIATION (DECEMBER 31, 2003)

Gartner Lee

Figure No. CRF-04-2

Appendix C

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

Gartner Lee

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

ORIGINAL COPY SIGNED AND STAMPED

Arlene Laudrum, P.Geol.
Remediation Supervisor, Polaris Mine Project
Senior Geologist

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Karlette Tunaley, E.I.T.
Field Scientist

AL:KT

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	8/8/2003	8/8/2003	8/8/2003	8/8/2003	8/8/2003	8/8/2003	8/8/2003
		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}		
	Relative Percent Difference (RpD)[a]	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] (%)
Sample ID	**Duplicate ID**										
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)*

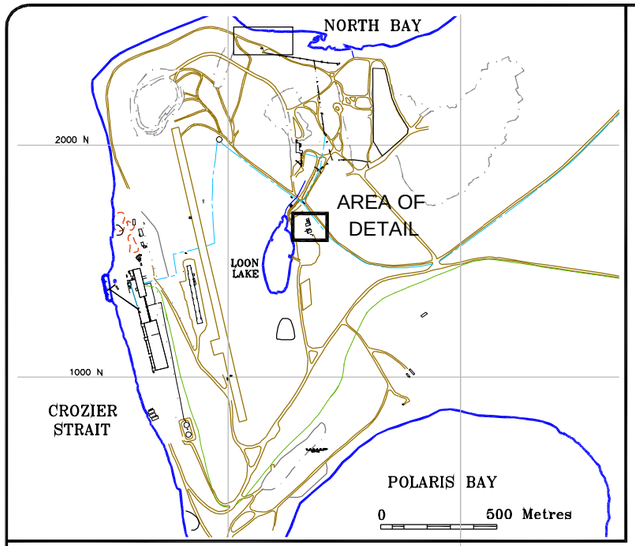
"na" = RpD value is not applicable because one or both results are less than the practical quantitation limit (PQL).

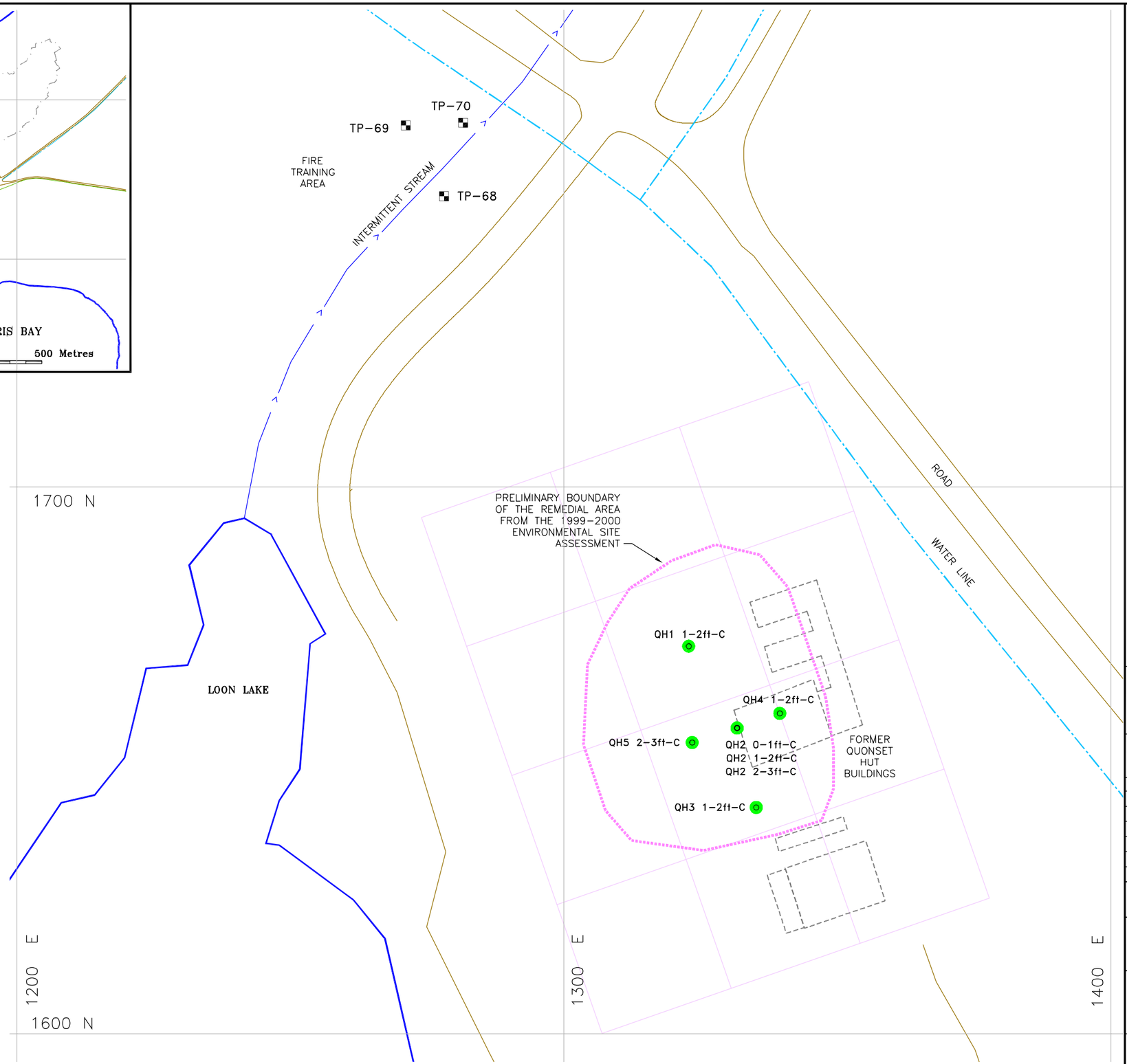
"-" = no result for given parameter

"<" = 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
- 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
- DEPTH (FEET)

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

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.

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

ORIGINAL COPY SIGNED AND STAMPED

Arlene Laudrum, P.Geol.
Remediation Supervisor, Polaris Mine Project

ORIGINAL COPY SIGNED

Karlette Tunaley, EIT
Field Scientist

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	7/29/2003	7/29/2003	7/29/2003
		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		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	7/29/2003	7/29/2003	7/29/2003	7/29/2003	7/29/2003	8/4/2003	8/4/2003	8/7/2003	8/7/2003
				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
		CEQG (PL)[a]	SQRO[b]	Analytical Results									
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

Parameter	Units	Federal CCME Guidelines		Analytical Results								
		CEQG (PL)[a]	SQRO[b]									
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				8/10/2003	8/15/2003	8/15/2003	8/15/2003	8/15/2003	8/15/2003	8/15/2003	8/15/2003	8/15/2003
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
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		8/15/2003	8/15/2003	8/15/2003	8/15/2003	8/15/2003	8/15/2003	8/15/2003	8/15/2003
		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}		
	Relative Percent Difference (RpD)[a]	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] (%)
Sample ID	**Duplicate ID**										
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 (1*

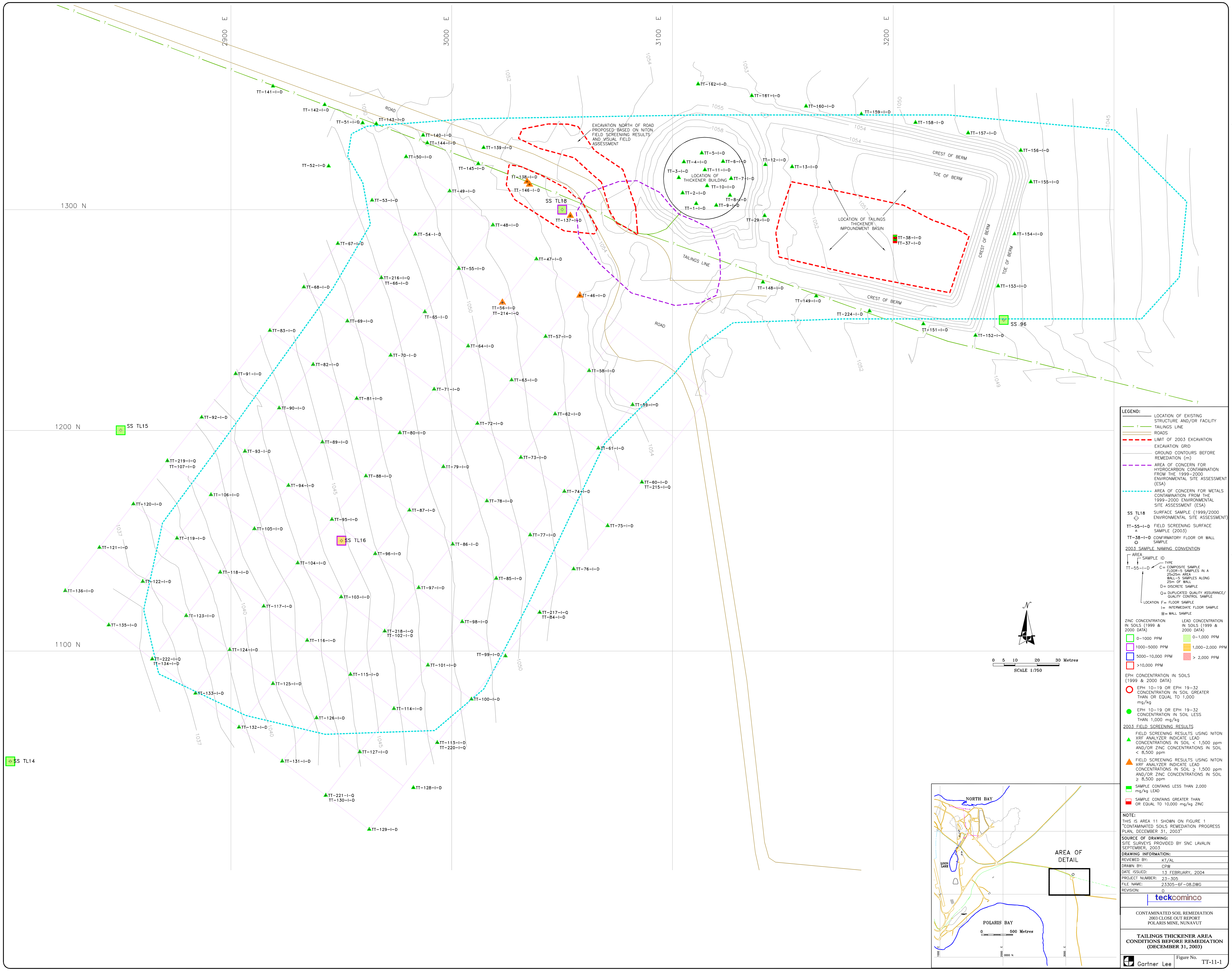
"na" = RpD value is not applicable because one or both results are less than the practical quantitation limit (PQL).

"-" = 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)*


2900 E
3000 E
3100 E
3200 E
1300 N
1200 N
1100 N
ROAD
TAILINGS LINE
EXCAVATION NORTH OF ROAD PROPOSED BASED ON NITON FIELD SCREENING RESULTS AND VISUAL FIELD ASSESSMENT
LOCATION OF THICKENER BUILDING
LOCATION OF TAILINGS THICKENER IMPOUNDMENT BASIN
CREST OF BERM
TOE OF BERM
SS TL18
SS TL15
SS TL16
SS TL14
SS 96
TT-141-I-D
TT-142-I-D
TT-51-I-D
TT-143-I-D
TT-140-I-D
TT-144-I-D
TT-139-I-D
TT-50-I-D
TT-52-I-D
TT-145-I-D
TT-138-I-D
TT-146-I-D
TT-49-I-D
TT-53-I-D
TT-137-I-D
TT-48-I-D
TT-54-I-D
TT-67-I-D
TT-47-I-D
TT-55-I-D
TT-216-I-Q
TT-66-I-D
TT-68-I-D
TT-46-I-D
TT-56-I-D
TT-214-I-Q
TT-65-I-D
TT-69-I-D
TT-83-I-D
TT-57-I-D
TT-64-I-D
TT-70-I-D
TT-82-I-D
TT-91-I-D
TT-58-I-D
TT-63-I-D
TT-71-I-D
TT-81-I-D
TT-90-I-D
TT-59-I-D
TT-62-I-D
TT-92-I-D
TT-72-I-D
TT-80-I-D
TT-89-I-D
TT-93-I-D
TT-61-I-D
TT-73-I-D
TT-219-I-Q
TT-107-I-D
TT-79-I-D
TT-88-I-D
TT-94-I-D
TT-60-I-D
TT-215-I-Q
TT-74-I-D
TT-106-I-D
TT-120-I-D
TT-78-I-D
TT-87-I-D
TT-95-I-D
TT-105-I-D
TT-75-I-D
TT-77-I-D
TT-119-I-D
TT-121-I-D
TT-86-I-D
TT-96-I-D
TT-104-I-D
TT-118-I-D
TT-76-I-D
TT-122-I-D
TT-85-I-D
TT-97-I-D
TT-103-I-D
TT-136-I-D
TT-117-I-D
TT-123-I-D
TT-217-I-Q
TT-84-I-D
TT-98-I-D
TT-135-I-D
TT-218-I-Q
TT-102-I-D
TT-116-I-D
TT-124-I-D
TT-99-I-D
TT-222-I-Q
TT-134-I-D
TT-101-I-D
TT-115-I-D
TT-125-I-D
TT-133-I-D
TT-100-I-D
TT-114-I-D
TT-126-I-D
TT-132-I-D
TT-113-I-D
TT-220-I-Q
TT-127-I-D
TT-131-I-D
TT-128-I-D
TT-221-I-Q
TT-130-I-D
TT-129-I-D
TT-162-I-D
TT-161-I-D
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TT-153-I-D
TT-152-I-D
TT-151-I-D
TT-224-I-D
TT-149-I-D
TT-148-I-D
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TT-12-I-D
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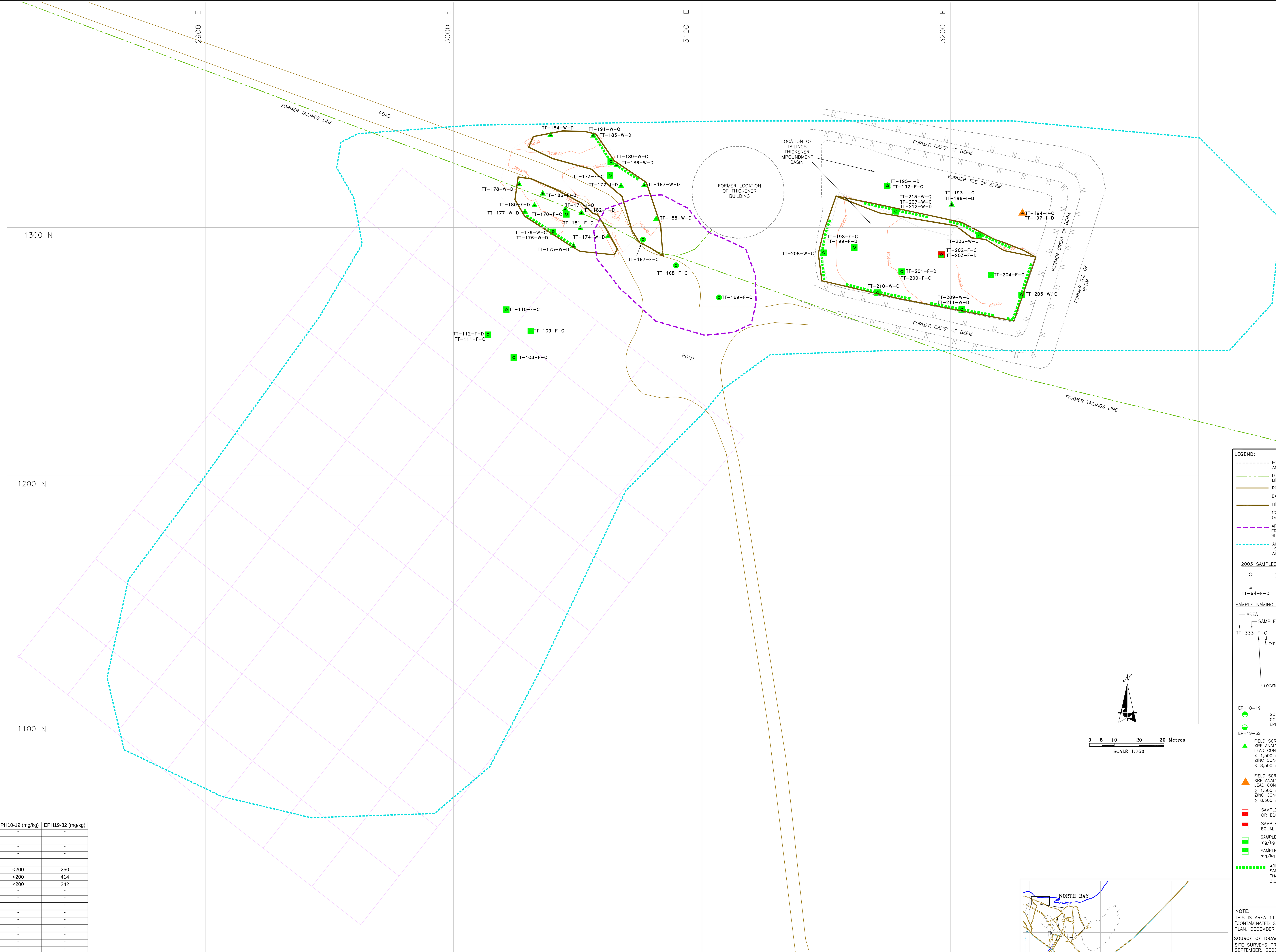
TT-38-I-D
TT-37-I-D
TT-5-I-D
TT-4-I-D
TT-6-I-D
TT-3-I-D
TT-11-I-D
TT-7-I-D
TT-10-I-D
TT-2-I-D
TT-8-I-D
TT-9-I-D
TT-1-I-D
0 5 10 20 30 Metres
SCALE 1:750
NORTH BAY
POLARIS BAY
AREA OF DETAIL
0 500 Metres
LEGEND:
LOCATION OF EXISTING STRUCTURE AND/OR FACILITY
TAILINGS LINE
ROADS
LIMIT OF 2003 EXCAVATION
EXCAVATION GRID
GROUND CONTOURS BEFORE REMEDIATION (m)
AREA OF CONCERN FOR HYDROCARBON CONTAMINATION FROM THE 1999-2000 ENVIRONMENTAL SITE ASSESSMENT (ESA)
AREA OF CONCERN FOR METALS CONTAMINATION FROM THE 1999-2000 ENVIRONMENTAL SITE ASSESSMENT (ESA)
SS TL18 SURFACE SAMPLE (1999/2000 ENVIRONMENTAL SITE ASSESSMENT)
TT-55-I-D FIELD SCREENING SURFACE SAMPLE (2003)
TT-38-I-D CONFIRMATORY FLOOR OR WALL SAMPLE
2003 SAMPLE NAMING CONVENTION
AREA
SAMPLE ID
TYPE
TT-55-I-D
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
LOCATION F= FLOOR SAMPLE
I= INTERMEDIATE FLOOR SAMPLE
W= WALL SAMPLE
ZINC CONCENTRATION IN SOILS (1999 & 2000 DATA)
0-1000 PPM
1000-5000 PPM
5000-10,000 PPM
>10,000 PPM
LEAD CONCENTRATION IN SOILS (1999 & 2000 DATA)
0-1,000 PPM
1,000-2,000 PPM
> 2,000 PPM
EPH CONCENTRATION IN SOILS (1999 & 2000 DATA)
EPH 10-19 OR EPH 19-32 CONCENTRATION IN SOIL GREATER THAN OR EQUAL TO 1,000 mg/kg
EPH 10-19 OR EPH 19-32 CONCENTRATION IN SOIL LESS THAN 1,000 mg/kg
2003 FIELD SCREENING RESULTS
FIELD SCREENING RESULTS USING NITON XRF ANALYZER INDICATE LEAD CONCENTRATIONS IN SOIL < 1,500 ppm AND/OR ZINC CONCENTRATIONS IN SOIL < 8,500 ppm
FIELD SCREENING RESULTS USING NITON XRF ANALYZER INDICATE LEAD CONCENTRATIONS IN SOIL ≥ 1,500 ppm AND/OR ZINC CONCENTRATIONS IN SOIL ≥ 8,500 ppm
SAMPLE CONTAINS LESS THAN 2,000 mg/kg LEAD
SAMPLE CONTAINS GREATER THAN OR EQUAL TO 10,000 mg/kg ZINC
NOTE:
THIS IS AREA 11 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-08.DWG
REVISION: 0
teckcominco
CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT
TAILINGS THICKENER AREA
CONDITIONS BEFORE REMEDIATION
(DECEMBER 31, 2003)
Gartner Lee
Figure No. TT-11-1



LEGEND:

FORMER LOCATION OF BUILDINGS AND FACILITES (REMOVED)
LOCATION OF FORMER TAILINGS LINE
ROADS
EXCAVATION GRID
LIMIT OF 2003 EXCAVATION
CONTOURS – BASE OF EXCAVATION (m)
AREA OF HYDROCARBON CONCERN FROM 1999–2000 ENVIRONMENTAL SITE ASSESSMENT
AREA OF METAL CONCERN FROM 1999–2000 ENVIRONMENTAL SITE ASSESSMENT

2003 SAMPLES

CONFIRMATORY FLOOR OR WALL SAMPLE
TT-64-F-D FIELD SCREENING SURFACE SAMPLE

SAMPLE NAMING CONVENTION

TT-333-F-C
AREA
SAMPLE ID
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
LOCATION F= FLOOR SAMPLE
I= INTERMEDIATE FLOOR SAMPLE
W= WALL SAMPLE

EPH10-19
EPH19-32
SOIL SAMPLE FROM EXCAVATION CONTAINS LESS THAN 1,000 mg/kg EPH 10-19 OR EPH 19-32

FIELD SCREENING RESULTS USING NITON XRF ANALYZER INDICATE LEAD CONCENTRATIONS IN SOIL < 1,500 mg/kg AND/OR ZINC CONCENTRATIONS IN SOIL < 8,500 mg/kg

FIELD SCREENING RESULTS USING NITON XRF ANALYZER INDICATE LEAD CONCENTRATIONS IN SOIL ≥ 1,500 mg/kg AND/OR ZINC CONCENTRATIONS IN SOIL ≥ 8,500 mg/kg

SAMPLE CONTAINS GREATER THAN OR EQUAL TO 10,000 mg/kg ZINC
SAMPLE CONTAINS GREATER THAN OR EQUAL TO 2,000 mg/kg LEAD
SAMPLE CONTAINS LESS THAN 10,000 mg/kg ZINC
SAMPLE CONTAINS LESS THAN 2,000 mg/kg LEAD
AREA OF WALL COMPOSITE WALL SAMPLE CONTAINS LESS THAN 10,000 mg/kg ZINC OR 2,000 mg/kg LEAD

2003 CONFIRMATION SAMPLES

WALL SAMPLES

Sample ID	Pb-N (mg/kg)	Zn-N (mg/kg)	Pb (mg/kg)	Zn (mg/kg)
TT-174-W-D	616.6	1827.06	-	-
TT-175-W-D	150.23	381.45	-	-
TT-176-W-D	239.83	1272.42	-	-
TT-177-W-D	123.35	291.47	-	-
TT-178-W-D	148.4	317.41	-	-
TT-179-W-C	-	-	110	624
TT-184-W-D	352.84	908.66	-	-
TT-185-W-D	121.23	346.87	-	-
TT-186-W-D	108.52	265.73	-	-
TT-187-W-D	95.67	289.49	-	-
TT-188-W-D	124.24	337.58	-	-
TT-189-W-C	-	-	<100	147
TT-191-W-Q Duplicate of TT-189-W-C	106.06	212.49	-	-
TT-205-W-C	-	-	68	859
TT-206-W-C	-	-	-50	299
TT-207-W-C	-	-	61	402
TT-208-W-C	-	-	880	3910
TT-209-W-C	-	-	66	514
TT-210-W-C	-	-	210	1310
TT-211-W-D	-	-	880	6940
TT-212-W-D	-	-	<100	699
TT-213-W-Q Duplicate of TT-212-W-D	-	-	120	413

FLOOR SAMPLES

Sample ID	Pb-N (mg/kg)	Zn-N (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	EPH10-19 (mg/kg)	EPH19-32 (mg/kg)
TT-108-F-C	-	-	186	700	-	-
TT-109-F-C	-	-	794	3090	-	-
TT-110-F-C	-	-	707	1940	-	-
TT-111-F-C	-	-	567	1570	-	-
TT-112-F-D	-	-	523	1300	-	-
TT-167-F-C	-	-	-	-	<200	250
TT-168-F-C	-	-	-	-	<200	414
TT-169-F-C	-	-	-	-	<200	242
TT-170-F-C	-	-	66	285	-	-
TT-171-I-D	157.53	406.68	-	-	-	-
TT-172-I-D	139.56	219.4	-	-	-	-
TT-173-F-C	-	-	<50	130	-	-
TT-180-F-D	138.19	362.62	-	-	-	-
TT-181-F-D	261.31	748.06	-	-	-	-
TT-182-F-D	286.81	1209.61	-	-	-	-
TT-183-F-D	147.53	641.83	-	-	-	-
TT-192-F-C	-	-	<100	247	-	-
TT-193-I-C	1271.25	5761.06	-	-	-	-
TT-194-I-C	1377.38	8643	-	-	-	-
TT-195-I-D	27.69	280.45	-	-	-	-
TT-196-I-D	826.84	5009.6	-	-	-	-
TT-197-I-D	1030.98	3189.89	-	-	-	-
TT-198-F-C	-	-	<50	313	-	-
TT-227-F-Q Duplicate of TT-198-F-C	585.16	3914.66	-	-	-	-
TT-199-F-D	-	-	<100	401	-	-
TT-200-F-C	-	-	81	481	-	-
TT-201-F-D	-	-	1530	4790	-	-
TT-202-F-C	-	-	<100	293	-	-
TT-203-F-D	-	-	2140	2970	-	-
TT-204-F-C	-	-	68	411	-	-
TT-224-I-D	1383	6075	-	-	-	-

RESULTS IN **RED** INDICATE SAMPLE CONTAINING
≥ 2000 mg/kg LEAD OR ≥ 10,000 mg/kg ZINC

NOTES:

<200, <50, <100 Less than detection limit

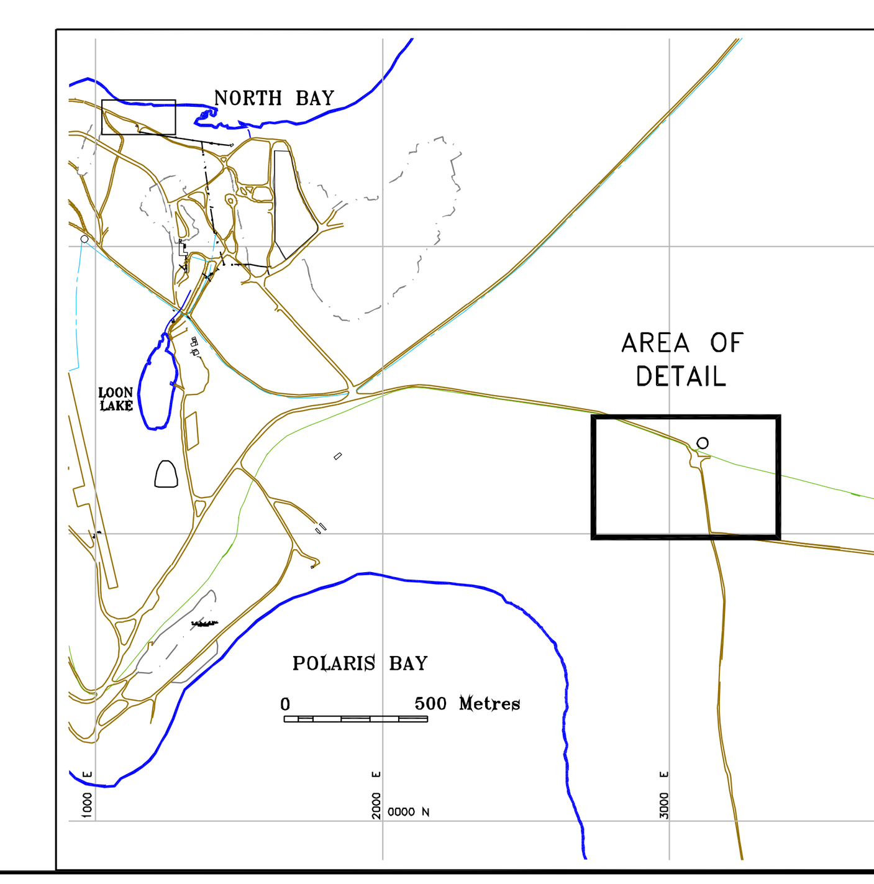
\- Sample not analyzed

Pb-N Zn-N Lead or Zinc concentrations - Field measurements from the Niton portable X-ray fluorescence (XRF) elemental analyses

Pb Zn Lead or Zinc concentrations obtained from ALS analytical laboratory

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



NOTE:
THIS IS AREA 11 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-12.DWG
REVISION:	0

teckcominco

CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

TAILINGS THICKENER AREA CONDITIONS AFTER REMEDIATION (DECEMBER 31, 2003)

Gartner Lee

Figure No. TT-11-2

Appendix E

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

Gartner Lee

Gartner Lee Limited

December 31, 2003

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

Dear Mr. Donald:

Re: 23845 – Polaris Mine Operations Contaminated Soil Remediation
Close Out Report: Former Fuel Bladder Storage Area

BACKGROUND

The former fuel bladder storage area (shown as Area 12 in Figure 1: *Contaminated Soils Remediation Progress Plan, December 31, 2003*) is located to the east of the south end of the airstrip. The fuel storage area was used during construction of the mine facility and was decommissioned in late 1981. Anecdotal information indicated that a spill incident occurred in this area late in 1981.

The Environmental Site Assessment (ESA) conducted in 1999 and 2000 found petroleum hydrocarbon contamination within the saturated interval of the active permafrost layer, generally from 0.4 m to 0.6 m below ground level to the depth of continuous permafrost at 0.8 m to 1.0 m. The contamination was found to extend south of the fuel bladder storage area and down a south-facing slope toward the tailings line, terminating at the top of the operational landfill. Figure BLA-12-1 shows the location and results of testpits from the ESA and the preliminary boundary of the targeted area for remediation.

The depth of hydrocarbon contamination identified during the ESA testpitting at the former fuel bladder storage area ranged between 0.4 m to 0.9 m below the surface. Testpitting down the slope and adjacent to the tailings line at the operational landfill indicated that the hydrocarbon contamination extended to a depth of 1.0 m.

METHODOLOGY

Delineation

The preliminary boundary of the remedial area, as identified in the ESA, was demarcated in the field with survey stakes and the surface elevation was surveyed by SNC Lavalin. To direct the field screening sampling of soil and excavation activities, a 25 m x 25 m sampling grid was established over the former fuel bladder storage area (upper bladder excavation). A 10 m x 10 m sampling grid was established on the south-facing slope, and at the operational landfill (lower bladder excavation).

Delineation of the hydrocarbon impacted area was accomplished through screening level sampling of the surface and subsurface material in the targeted area for remediation. GLL sampled the soil in accordance with standard GLL and TCL sampling procedures and protocols.

Frozen near-surface soils (depth of 0 to 30cm) were broken up using a D10 bulldozer with a ripper tooth . Soil samples for field screening were collected by hand and deposited into a sealable polyethylene bag. Ripping of soil within the targeted area for remediation commenced April 23, 2003. Eight discrete soil samples were collected in each 25 m x 25 m grid cell over the former fuel bladder storage area.

Commencing May 3, 2003, subsurface sampling was performed in boreholes at a nominal 10m spacing along the south-facing slope and at the operational landfill. Boreholes were advanced with an air rotary quarry drill. Boreholes were drilled to a depth up to 1.5 m. Composite soil samples were collected at 0.5 m intervals of the drill returns that accumulated at the mouth of the borehole. Following the collection of each sample the surface surrounding the borehole was cleared of the drill cuttings to expose fresh snow.

To delineate hydrocarbon contamination for excavation the visual appearance and odour of the soil was used, along with field screening measurements of the concentrations of organic vapours in the soil samples. The field screening measurements were obtained using a portable photo-ionization detector (PID) to measure the concentrations of organic vapours in the headspace of the sample bags. Subsets of the samples field screened on site were sent to the analytical laboratory, Aurora Laboratory Services Ltd. (ALS) of Vancouver, BC, to verify the presence and nature of the hydrocarbon compounds. Based on results of the field screening sampling, GLL modified-relocated the area to be remediated and excavation commenced.

Excavation

On April 28, 2003 excavation of the upper fuel bladder area commenced, based on revised boundaries provided by GLL to TCL and SNC Lavalin on April 25, 2003. The ripped soil within the excavation boundaries was pushed up into a stockpile using the D10 bulldozer and loaded out into trucks with an excavator. Initially, a swath approximately 10 m wide inside the excavation limits was removed with the bucket of an excavator. The upper bladder excavation was undertaken in five lifts. Approximately 30 cm thickness of soil was removed with each lift. Screening level sampling was undertaken at the base of each lift to re-define the remedial boundary for excavation.

Excavation limits for the lower fuel bladder area were provided to TCL and SNC Lavalin on May 8, 2003. Drill results indicated that the hydrocarbon contamination extended to a depth of 1.0 m. Excavation of the lower fuel bladder area was accomplished by the removal of the upper 1 m lift using the D10 bulldozer, prior to GLL undertaking additional field screening sampling, and directing the removal of discrete areas of residual elevated hydrocarbon contaminated soil.

The limits of the excavation are shown on Figure BLA-12-2. A volume of approximately 12,500 m^3 was excavated from the former fuel bladder storage area. This material was disposed of in the underground mine workings in accordance with regulatory approvals.

Confirmatory Sampling

Soil samples were collected at the excavation limits and submitted to ALS for extractable petroleum hydrocarbons (EPH) and polycyclic aromatic hydrocarbons (PAH). Composite samples were collected from 25 m x 25 m areas of the floor of the excavation and over a length of 25 m on the wall of the excavation. Additional excavation was undertaken in areas that did not meet the soil quality remediation objectives (SQROs). Upon receipt of soil results that met the SQROs the final excavation limits were surveyed and the area backfilled to inhibit erosion.

ANALYTICAL RESULTS

Analytical laboratory results for Extractable Petroleum Hydrocarbons (EPH) and Polycyclic Aromatic Hydrocarbons (PAH) are summarized in Tables BLA-12-1 and BLA 12-2 respectively, along with the approved Polaris Mine SQROs for petroleum hydrocarbons. A total of fifty three (53) remediation confirmation soil samples were submitted for the former fuel bladder storage area and returned concentrations below the SQROs: twenty nine (29) composite floors, five (5) discrete floors, fifteen (15) composite walls, and four (4) QA/QC duplicate samples. The soil quality results and the lateral limits of the excavation are shown on Figure BLA-12-2.

All confirmatory soil sample results from the former fuel bladder storage area meet the SQROs for Polaris Mine.

Quality Assurance and Quality Control (QA/QC)

QA/QC measures associated with collecting and analysing soil were implemented during the remediation of the bladder area, including submission of blind duplicates to the analytical laboratory, analysis of analytical laboratory replicates, and comparison of analytical laboratory EPH results with the portable photoionization detector (PID) organic vapour headspace measurements.

Relative percent differences (RpDs) have been calculated and compiled in Table BLA-12-3 for the analytical laboratory duplicate results and the laboratory replicate results. All of the samples returned results below the practical quantitation limit in which case the RpD value has been identified as "na" (not available) in Table BLA-12-3.

CONCLUSION

Based on confirmatory sampling, consistent with good practice and the approved site specific sampling procedures and protocols, the remediation of the former fuel bladder storage 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

ORIGINAL COPY SIGNED AND STAMPED

Arlene Laudrum, P.Geol.
Remediation Supervisor, Polaris Mine Project
Senior Geologist

ORIGINAL COPY SIGNED

Karlette Tunaley, E.I.T.
Field Scientist

AL:KT

ATTACHMENTS

Tables

Table BLA-12-1: Former Fuel Bladder Storage Area Remediation Confirmation Soil Samples Hydrocarbon
Table BLA-12-2: Former Fuel Bladder Storage Area Remediation Confirmation Soil Samples Polycyclic Aromatic Hydrocarbons (PAHs)
Table BLA-12-3: Former Fuel Bladder Storage Area Quality Assurance and Quality Control Remediation Soil Samples

Figures

Figure BLA-12-1: Former Fuel Bladder Storage Area Conditions, Before Remediation (December 31, 2003)
Figure BLA-12-2: Former Fuel Bladder Storage Area Conditions, After Remediation (December 31, 2003)

Table BLA-12-1. Former Fuel Bladder Storage Area Remediation Confirmation Soil Samples - Hydrocarbons

Gartner Lee		Location	Bladder							
		Sample ID	BLA-162-I-D	BLA-249-F-C	BLA-252-F-C	BLA-253-F-C	BLA-254-F-C	BLA-255-F-C	BLA-256-I-C	BLA-260-W-C
		Date Sampled	5/2/2003	5/14/2003	5/14/2003	5/14/2003	5/14/2003	5/14/2003	5/14/2003	5/14/2003
		Field Screen (ppm)[b]	30	75	65	60	60	60	60	55
Parameter	**Units**	**Polaris Mine SQROs[a]**	**Analytical Results**							
Physical Tests										
Moisture	%	-	13.1	11.4	14.8	6.5	24.6	13.4	5.5	31
Extractable Hydrocarbons										
EPH C_{10}-C_{19}[c]	mg/kg	1000[e]	<200	617	621	385	<200	<200	913	<200
EPH C_{19}-C_{32}[c]	mg/kg	1000[e]	<200	<200	<200	<200	<200	<200	<200	219
LEPH[d]	mg/kg	1000	<200	-	-	-	-	<200	-	-
HEPH[d]	mg/kg	1000	<200	-	-	-	-	<200	-	-

Associated ALS Analytics Files: T3179, S9893, S9892, S9797, S9214, S8818, S8240, S7847.

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 BLA-12-1. Former Fuel Bladder Storage Area Remediation Confirmation Soil Samples - Hydrocarbons

Gartner Lee		Location	Bladder							
		Sample ID	BLA-261-I-C	BLA-262-F-Q (duplicate of BLA-255-F-C)	BLA-263-I-Q (duplicate of BLA-256-I-C)	BLA-308-W-C	BLA-310-W-C	BLA-311-F-C	BLA-312-W-C	BLA-313-F-C
		Date Sampled	5/14/2003	5/14/2003	5/14/2003	5/28/2003	5/28/2003	5/28/2003	5/28/2003	5/28/2003
		Field Screen (ppm)[b]	50	60	60	na	50	na	40	na
Parameter	**Units**	**Polaris Mine SQROs[a]**	**Analytical Results**							
Physical Tests										
Moisture	%	-	7.4	15.7	10.9	9.3	7.2	11.1	9.7	9.9
Extractable Hydrocarbons										
EPH C_{10}-C_{19}[c]	mg/kg	1000[e]	825	<200	788	633	<200	256	263	<200
EPH C_{19}-C_{32}[c]	mg/kg	1000[e]	<200	<200	<200	<200	<200	<200	<200	<200
LEPH[d]	mg/kg	1000	-	<200	-	-	-	-	-	-
HEPH[d]	mg/kg	1000	-	<200	-	-	-	-	-	-

Associated ALS Analytics Files: T3179, S9893, S9892, S9797, S9214, S8818, S8240, S7847.

Notes:

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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 BLA-12-1. Former Fuel Bladder Storage Area Remediation Confirmation Soil Samples - Hydrocarbons

Gartner Lee		Location	Bladder							
		Sample ID	BLA-314-F-C	BLA-315-F-C	BLA-316-F-C	BLA-317-F-C	BLA-318-F-C	Bla-332-F-C	Bla-333-F-C	Bla-334-F-C
		Date Sampled	5/28/2003	5/28/2003	5/28/2003	5/28/2003	5/28/2003	6/7/2003	6/7/2003	6/7/2003
		Field Screen (ppm)[b]	35	na	35	na	30	5	0	0
Parameter	**Units**	**Polaris Mine SQROs[a]**	**Analytical Results**							
Physical Tests										
Moisture	%	-	9.4	10.4	8.9	11	12.7	8.3	11.3	13.5
Extractable Hydrocarbons										
EPH C_{10}-C_{19}[c]	mg/kg	1000[e]	576	385	<200	376	215	894	<200	<200
EPH C_{19}-C_{32}[c]	mg/kg	1000[e]	<200	<200	<200	<200	<200	<200	<200	<200
LEPH[d]	mg/kg	1000	-	-	<200	-	-	-	-	-
HEPH[d]	mg/kg	1000	-	-	<200	-	-	-	-	-

Associated ALS Analytics Files: T3179, S9893, S9892, S9797, S9214, S8818, S8240, S7847.

Notes:

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

"<" = less than analytical method detection limit.

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"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 BLA-12-1. Former Fuel Bladder Storage Area Remediation Confirmation Soil Samples - Hydrocarbons

Gartner Lee		Location	Bladder							
		Sample ID	Bla-336-F-C	Bla-338-F-C	BLA-339-F-C	BLA-341-W-C	BLA-342-F-C	BLA-343-F-C	BLA-344-F-C	BLA-345-W-C
		Date Sampled	6/7/2003	6/7/2003	6/14/2003	6/14/2003	6/14/2003	6/25/2003	6/25/2003	6/14/2003
		Field Screen (ppm)[b]	10	0	0	0	0	24	0	0
Parameter	**Units**	**Polaris Mine SQROs[a]**	**Analytical Results**							
Physical Tests										
Moisture	%	-	11	7	9.9	5.6	6.2	9.2	9.9	6.2
Extractable Hydrocarbons										
EPH C_{10}-C_{19}[c]	mg/kg	1000[e]	214	<200	<200	<200	<200	<200	296	<200
EPH C_{19}-C_{32}[c]	mg/kg	1000[e]	<200	<200	<200	250	<200	<200	<200	<200
LEPH[d]	mg/kg	1000	-	-	-	-	-	-	-	-
HEPH[d]	mg/kg	1000	-	-	-	-	-	-	-	-

Associated ALS Analytics Files: T3179, S9893, S9892, S9797, S9214, S8818, S8240, S7847.

Notes:

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

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"-" = 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 BLA-12-1. Former Fuel Bladder Storage Area Remediation Confirmation Soil Samples - Hydrocarbons

Gartner Lee		Location	Bladder							
		Sample ID	BLA-346-W-C	BLA-348-W-C	BLA-349-W-C	BLA-350-W-C	BLA-351-W-C	BLA-357-F-D	BLA-358-F-D	BLA-359-F-C
		Date Sampled	6/14/2003	6/14/2003	6/14/2003	6/14/2003	6/14/2003	6/25/2003	6/25/2003	6/25/2003
		Field Screen (ppm)[b]	0	0	0	0	0	10	10	0
Parameter	**Units**	**Polaris Mine SQROs[a]**	**Analytical Results**							
Physical Tests										
Moisture	%	-	10	7.7	7.3	8.1	9	11.7	6.5	7.8
Extractable Hydrocarbons										
EPH C_{10}-C_{19}[c]	mg/kg	1000[e]	<200	<200	<200	<200	<200	<200	<200	<200
EPH C_{19}-C_{32}[c]	mg/kg	1000[e]	<200	<200	<200	<200	<200	<200	<200	<200
LEPH[d]	mg/kg	1000	-	<200	-	-	-	-	-	-
HEPH[d]	mg/kg	1000	-	<200	-	-	-	-	-	-

Associated ALS Analytics Files: T3179, S9893, S9892, S9797, S9214, S8818, S8240, S7847.

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 BLA-12-1. Former Fuel Bladder Storage Area Remediation Confirmation Soil Samples - Hydrocarbons

Gartner Lee		Location	Bladder							
		Sample ID	BLA-360-F-C	BLA-361-F-D	BLA-362-F-D	BLA-363-F-Q (duplicate of BLA-361-F-D)	BLA-364-F-Q (duplicate of BLA-344-F-C)	BLA-374-F-C	BLA-375-W-C	BLA-376-F-C
		Date Sampled	6/25/2003	6/25/2003	6/25/2003	6/25/2003	6/25/2003	6/28/2003	6/28/2003	6/28/2003
		Field Screen (ppm)[b]	25	5	25	na	na	30	25	25
Parameter	**Units**	**Polaris Mine SQROs[a]**	**Analytical Results**							
Physical Tests										
Moisture	%	-	9.6	10.9	9.3	10.9	10.4	0.1	0.1	0.1
Extractable Hydrocarbons										
EPH C_{10}-C_{19}[c]	mg/kg	1000[e]	748	<200	<200	<200	<200	<200	213	<200
EPH C_{19}-C_{32}[c]	mg/kg	1000[e]	<200	<200	<200	<200	<200	<200	<200	<200
LEPH[d]	mg/kg	1000	-	-	-	-	-	<200	-	-
HEPH[d]	mg/kg	1000	-	-	-	-	-	<200	-	-

Associated ALS Analytics Files: T3179, S9893, S9892, S9797, S9214, S8818, S8240, S7847.

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 BLA-12-1. Former Fuel Bladder Storage Area Remediation Confirmation Soil Samples - Hydrocarbons

Gartner Lee		Location	Bladder					
		Sample ID	BLA-377-F-C	BLA-378-W-C	BLA-379-F-C	BLA-380-F-D	BLA-381-W-C	BLA-382-W-C
		Date Sampled	6/28/2003	6/28/2003	8/22/2003	8/22/2003	8/22/2003	8/22/2003
		Field Screen (ppm)[b]	25	10	10	10	15	10
Parameter	**Units**	**Polaris Mine SQROs[a]**	**Analytical Results**					
Physical Tests								
Moisture	%	-	0.1	0.1	11.4	21.6	10	11.2
Extractable Hydrocarbons								
EPH C_{10}-C_{19}[c]	mg/kg	1000[e]	<200	<200	<200	<200	443	<200
EPH C_{19}-C_{32}[c]	mg/kg	1000[e]	<200	221	232	<200	<200	<200
LEPH[d]	mg/kg	1000	-	-	-	-	-	-
HEPH[d]	mg/kg	1000	-	-	-	-	-	-

Associated ALS Analytics Files: T3179, S9893, S9892, S9797, S9214, S8818, S8240, S7847.

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 BLA-12-2. Former Fuel Bladder Storage Area Remediation Confirmation Soil Samples - Polycyclic Aromatic Hydrocarbons (PAHs)

Gartner Lee	Polaris Mine	Location	Bladder					
		ALS Sample ID	BLA-162-I-D	BLA-255-F-C	BLA-262-F-Q (duplicate of BLA-255-F-C)	BLA-316-F-C	BLA-348-W-C	BLA-374-F-C
		Date Sampled	5/2/2003	5/14/2003	5/14/2003	5/28/2003	6/14/2003	6/28/2003
Parameter	**Remediation Objectives**	**Units**	**Analytical Results**					
Polycyclic Aromatic Hydrocarbons	**CEQG [b]**							
Acenaphthene	-	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Acenaphthylene	-	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	-	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benz(a)anthracene	1[c]	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	0.7	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	1[c]	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,I)perylene	-	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	1[c]	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	-	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	1[c]	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	-	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	-	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3,-c,d)pyrene	1[c]	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Napthalene	0.6	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	5[c]	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	10[c]	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Associated ALS Analytics Files: T3179, S9893, S9892, S9797, S9214, S8818, S8240, S7847.

Notes:

a) "<" = less than analytical method detection limit.

b) CEQG = Canadian Environmental Quality Guidelines for Parkland Land Use.

c) This interim remediation criterion (CCME 1991) was put in place prior to the development of the soil protocol (CCME 1996). The criterion should be used until superseded by a full guideline.

Table BLA-12-3. Former Fuel Bladder 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}		
	Relative Percent Difference (RpD)[a]	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] (%)
Sample ID	**Duplicate ID**										
Analytical Laboratory Duplicates											
BLA-255-F-C	BLA-262-F-Q	200	1000	200	1000	<200	<200	na	<200	<200	na
BLA-256-I-C	BLA-263-I-Q	200	1000	200	1000	913	<200	na	<200	<200	na
BLA-361-F-D	BLA-363-F-Q	200	1000	200	1000	100	<200	na	<200	<200	na
BLA-344-F-C	BLA-364-F-Q	200	1000	200	1000	296	<200	na	<200	<200	na
Analytical Laboratory Replicates											
BLA-314-F-C	QC# 337956	200	1000	200	1000	576	524	na	<200	<200	na
BLA-379-F-C	QC# 351478	200	1000	200	1000	<200	<200	na	232.0	223.0	na

Notes:

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

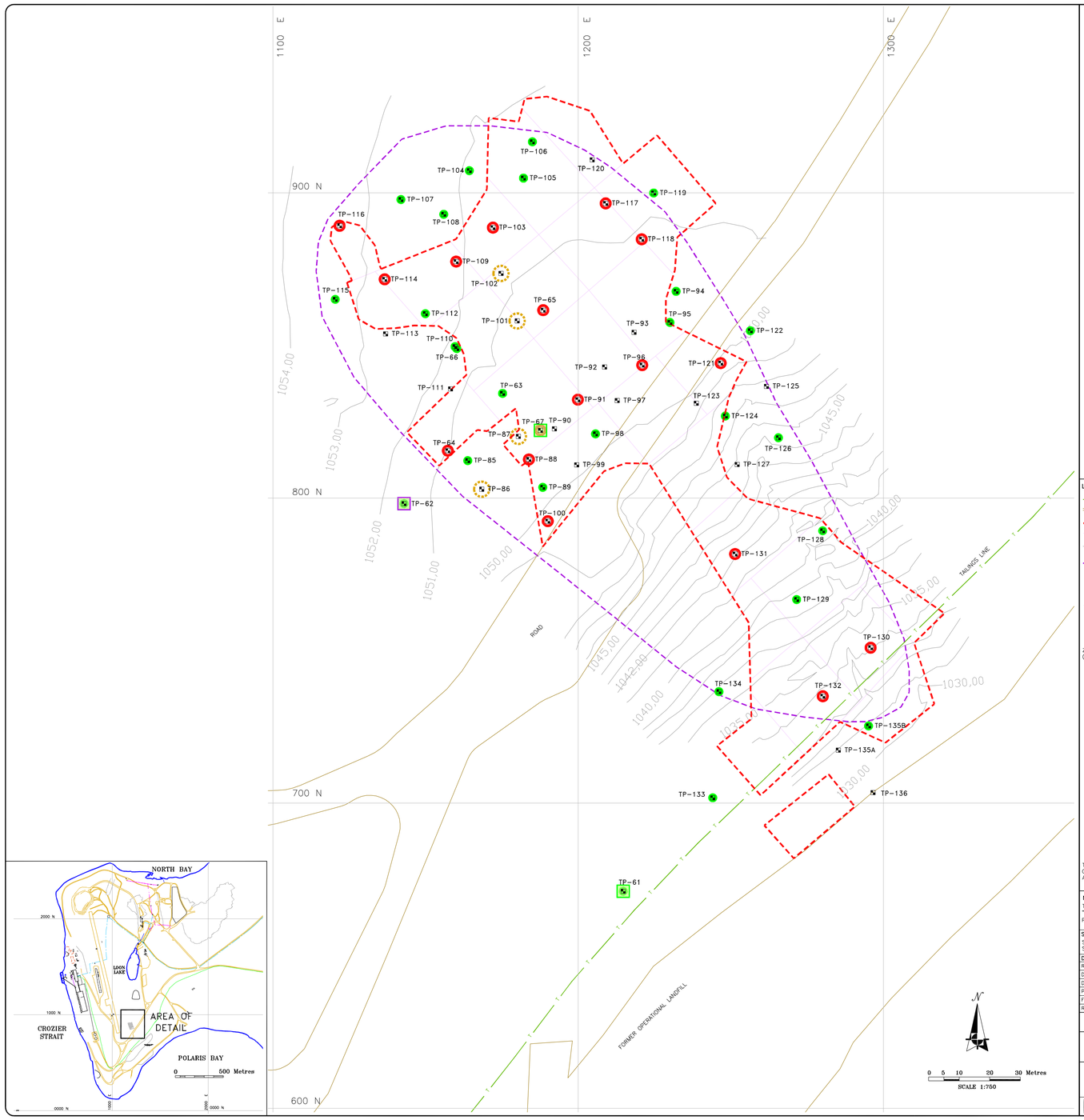
"na" = RpD value is not applicable because one or both results are less than the practical quantitation limit (PQL).

"-" = 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).*


1100 E
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TP-127
TP-86
TP-89
TP-62
TP-100
TP-128
TP-131
TP-129
TP-130
TP-134
TP-132
TP-135B
TP-135A
TP-133
TP-136
TP-61
ROAD
TAILINGS LINE
FORMER OPERATIONAL LANDFILL
0 5 10 20 30 Metres
SCALE 1:750
NORTH BAY
LOON LAKE
AREA OF DETAIL
CROZIER STRAIT
POLARIS BAY
0 500 Metres
LEGEND:
TAILINGS LINE
ROADS
LIMIT OF 2003 EXCAVATION
EXCAVATION GRID
GROUND CONTOURS BEFORE REMEDIATION (m)
AREA OF CONCERN FOR HYDROCARBON CONTAMINATION FROM THE 1999-2000 ENVIRONMENTAL SITE ASSESSMENT (ESA)
TEST PIT - 1999 AND 2000 ENVIRONMENTAL SITE ASSESSMENTS
TP-122
STAINING DUE TO POSSIBLE PETROLEUM HYDROCARBON CONTAMINATION VISUALLY OBSERVED IN 1999-2000
ZINC CONCENTRATION IN SOILS (1999 & 2000 DATA)
0-1000 PPM
1000-5000 PPM
5000-10,000 PPM
>10,000 PPM
LEAD CONCENTRATION IN SOILS (1999 & 2000 DATA)
0-1,000 PPM
1,000-2,000 PPM
> 2,000 PPM
EPH 10-19 OR EPH 19-32 CONCENTRATION IN SOIL GREATER THAN OR EQUAL TO 1,000 mg/kg
EPH 10-19 OR EPH 19-32 CONCENTRATION IN SOIL LESS THAN 1,000 mg/kg
TEST PITS WITHOUT ANY EPH EXCEEDANCE OR COMPLIANCE INDICATION MEANS THAT EPH ANALYTICAL LAB DATA IS NOT AVAILABLE
NOTE:
THIS IS AREA 12 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-05.DWG
REVISION: 0
teckcominco
CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT
FORMER FUEL BLADDER STORAGE AREA
CONDITIONS BEFORE REMEDIATION
(DECEMBER 31, 2003)
Gartner Lee
Figure No.
BLA-12-1

2003 CONFIRMATION SAMPLES

EXCAVATION WALL SAMPLES

Sample ID	EPH 10-19 (mg/kg)	EPH 19-32 (mg/kg)
BLA-260-W-C	<200	219
BLA-308-W-C	633	<200
BLA-310-W-C	<200	<200
BLA-312-W-C	263	<200
BLA-341-W-C	<200	250
BLA-345-W-C	<200	<200
BLA-346-W-C	<200	<200
BLA-348-W-C	<200	<200
BLA-349-W-C	<200	<200
BLA-350-W-C	<200	<200
BLA-351-W-C	<200	<200
BLA-375-W-C	213	<200
BLA-378-W-C	<200	221
BLA-381-W-C	443	<200
BLA-382-W-C	<200	<200

EXCAVATION FLOOR SAMPLES

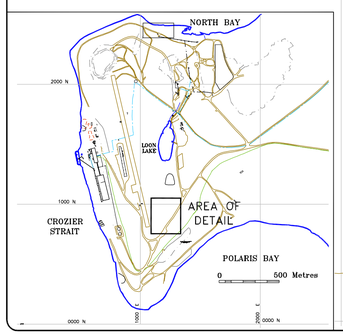
Sample ID	EPH 10-19 (mg/kg)	EPH 19-32 (mg/kg)
BLA-162-I-D	<200	<200
BLA-249-F-C	617	<200
BLA-252-F-C	621	<200
BLA-253-F-C	385	<200
BLA-254-F-C	<200	<200
BLA-255-F-C	<200	<200
BLA-262-F-Q (duplicate of BLA-255-F-C)	<200	<200
BLA-256-I-C	913	<200
BLA-263-I-Q (duplicate of BLA-256-I-C)	788	<200
BLA-261-I-C	825	<200
BLA-311-F-C	256	<200
BLA-313-F-C	<200	<200
BLA-314-F-C	576	<200
BLA-315-F-C	385	<200
BLA-316-F-C	<200	<200
BLA-317-F-C	376	<200
BLA-318-F-C	215	<200
BLA-332-F-C	894	<200
BLA-333-F-C	<200	<200
BLA-334-F-C	<200	<200
BLA-336-F-C	214	<200
BLA-338-F-C	<200	<200
BLA-339-F-C	<200	<200
BLA-342-F-C	<200	<200
BLA-343-F-C	<200	<200
BLA-344-F-C	296	<200
BLA-364-F-Q (duplicate of BLA-344-F-C)	<200	<200
BLA-357-F-D	<200	<200
BLA-358-F-D	<200	<200
BLA-359-F-C	<200	<200
BLA-360-F-C	748	<200
BLA-361-F-D	<200	<200
BLA-363-F-Q (duplicate of BLA-361-F-D)	<200	<200
BLA-362-F-D	<200	<200
BLA-374-F-C	<200	<200
BLA-376-F-C	<200	<200
BLA-377-F-C	<200	<200
BLA-379-F-D	<200	232
BLA-380-F-D	<200	<200

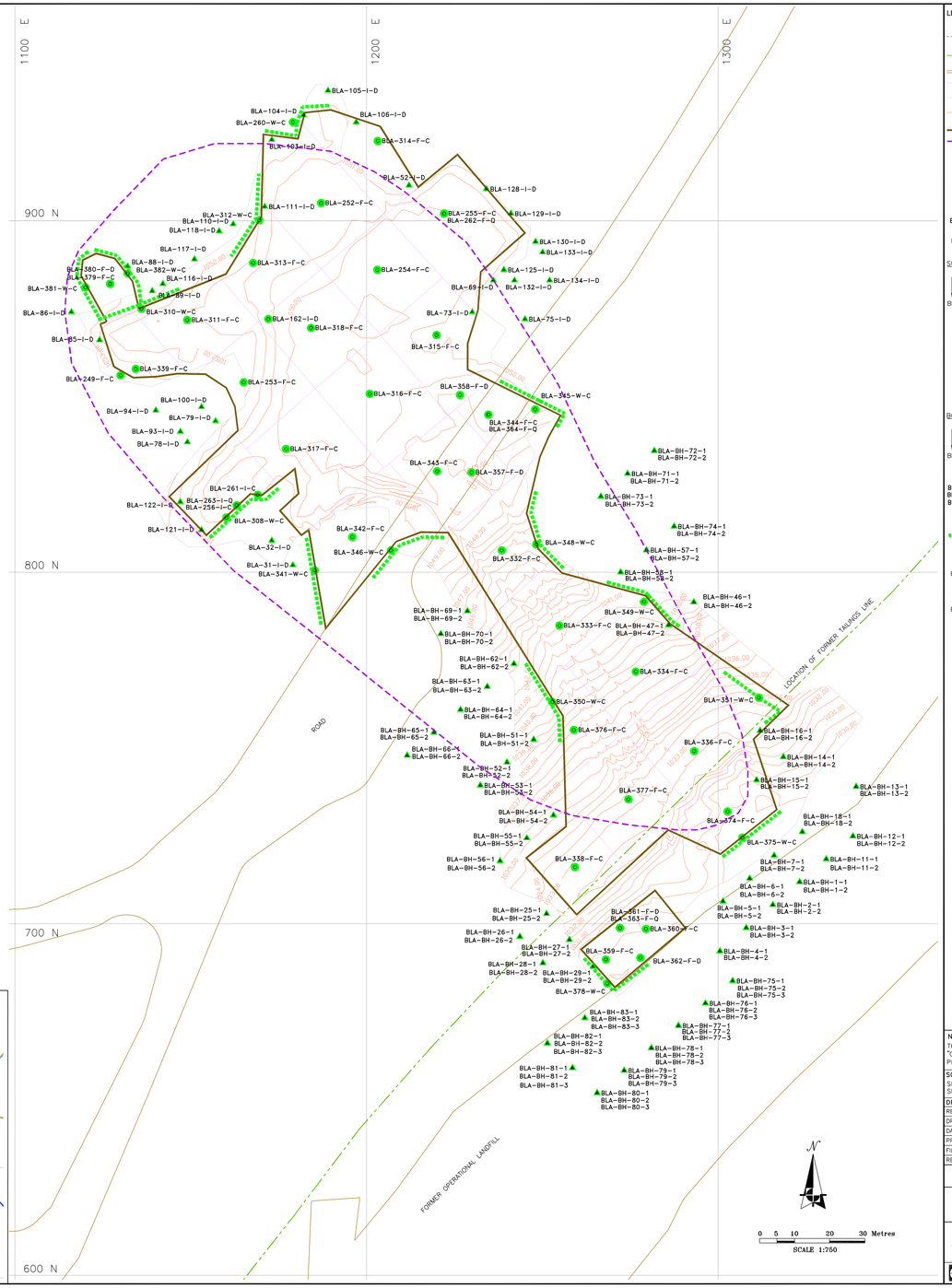
NOTES:

<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:

- FORMER LOCATION OF BUILDINGS AND FACILITIES (REMOVED)
- LOCATION OF FORMER TAILINGS LINE
- ROADS
- EXCAVATION GRID
- LIMIT OF EXCAVATION SURVEY
- CONTOURS – BASE OF EXCAVATION (m)
- LIMIT OF 2003 EXCAVATION
- AREA OF HYDROCARBON CONCERN FROM 1999-2000 ENVIRONMENTAL SITE ASSESSMENT

2003 SAMPLES

- CONFIRMATORY FLOOR OR WALL SAMPLE
- BLA-BH-70-1 FIELD SCREENING BOREHOLE SAMPLE
- BLA-31-I-D FIELD SCREENING SURFACE SAMPLE

SURFACE SAMPLE NAMING CONVENTION

BLA-333-F-C

- AREA
- SAMPLE ID
- 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
- LOCATION F= FLOOR SAMPLE
  I= INTERMEDIATE FLOOR SAMPLE
  W= WALL SAMPLE

BOREHOLE SAMPLE NAMING CONVENTION

BLA-BH-70-1

- AREA
- BOREHOLE ID
- DEPTH

BLA-BH-53-1 =1 INDICATES 0-0.5m DEPTH
BLA-BH-53-2 =2 INDICATES 0.5-1m DEPTH
BLA-BH-53-3 =3 INDICATES 1.0-1.5m DEPTH

- AREA OF WALL COMPOSITE SAMPLE CONTAINS LESS THAN 1,000 mg/kg EPH10-19 OR EPH19-32
- EPH10-19 / EPH19-32 SOIL SAMPLE FROM EXCAVATION CONTAINS LESS THAN 1,000 mg/kg EPH 10-19 OR EPH 19-32
- FIELD SAMPLE FROM SURFACE OR BOREHOLE CONTAINS LESS THAN 80 ppm VAPOUR

NOTE:
THIS IS AREA 12 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-15.DWG
REVISION:	0

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CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

FORMER FUEL BLADDER STORAGE AREA CONDITIONS AFTER REMEDIATION (DECEMBER 31, 2003)

Gartner Lee | Figure No. BLA-12-2

Appendix F

Polaris Mine Operations Contaminated Soil Remediation Close Out Report: Old Crusher Area

Gartner Lee

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: Old Crusher Area

BACKGROUND

The area known as the old crusher (shown as area 15 on Figure 1: *Contaminated Soils Remediation Program Plan, December 31, 2003*) was the site of the Cedar Rapids Crusher and was located at 1840E and 1270N on the mine grid. The Crusher was used to crush and process lead ore. This structure was in operation for only three years after which, the ore was shipped to the barge for direct processing. Contamination in this area was assumed to be due to wind dispersion.

METHODOLOGY

Delineation

A 20 m x 20 m sampling grid was established in the area of suspected metals contamination identified in the Environmental Site Assessment (ESA) as shown in Figure CR-15-1.

Delineation of the metals impacted area was accomplished through screening level sampling of the surface material within the sampling grid. These samples were collected by hand in accordance with standard GLL and TCL sampling procedures. On August 3, 2003, a total of 62 soil samples were collected from the area covered by the grid. Soil samples from the initial field screening were prepared and analyzed with the Niton XRF. Based on the results of screening sampling GLL modified the area to be remediated to include two zones of contamination. One sample (CR-48-I-D) collected outside of these two areas returned field screening results of lead at 1,554 mg/kg and zinc at 2,360 mg/kg. Given these relatively low field

screening results, remediation at this sample point, shown on Figure CR-15-1, was not considered necessary.

Excavation

The initial screening of the field results indicated that there were two zones of contamination. These two areas were demarcated in the field and excavated to a depth of 0.5 m. Samples were collected from the floors and walls of the excavated area on August 10, 2003. All of the samples collected after the excavation met the soil quality remediation objectives (SQROs).

The limits of the excavation together with the sample locations are located in Figure CR-15-2. The soil excavated was disposed of in the underground mine workings in accordance with regulatory approvals.

ANALYTICAL RESULTS

Analytical laboratory results for the former crusher are presented in Table CR-15-1. A total of 14 samples were submitted for this area: two (2) discrete floor, eight (8) composite walls, three (3) composite floors, and one (1) duplicate. All samples submitted returned concentrations below the Polaris Mine SQROs.

Quality Assurance and Quality Control (QA/QC)

QA/QC was performed on one analytical laboratory replicate, one analytical laboratory duplicate, and four on-site field screening duplicates. Relative percent differences (RpDs) for the duplicate and replicate results have been calculated and summarized in Table CR-15-2 providing confidence that the SQROs have been met.

The RpDs generated from the laboratory replicate results are below the site specific remediation protocol of 50% and therefore acceptable.

The RpD generated from the laboratory duplicate zinc results is above 50%, however both the sample and duplicate results were well below the SQROs, providing confidence that the confirmatory sample result is acceptable in showing the zinc concentration below the remediation target. The variance between the sample and its duplicate is likely a result of sample inhomogeneity caused by the presence of coarse ore fragments.

One on-site field screening sample and duplicate returned lead and zinc RpD's above 50%. However, the area represented by those samples was further excavated until the SQROs were met.

CONCLUSIONS

Based on confirmatory sampling, consistent with good practice and the approved site specific sampling procedures and protocols, the remediation of the old crusher 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

ORIGINAL COPY SIGNED AND STAMPED

Arlene Laudrum, P.Geol.
Remediation Supervisor, Polaris Mine Project

ORIGINAL COPY SIGNED

Brenda Bolton, GIT
Field Scientist

ATTACHMENTS

Tables

Figures

Table CR-15-1. Old Crusher Area Remediation Confirmation Soil Samples - Metals

Gartner Lee		Location		Old Crusher										
		Sample ID		CR-66-F-C	CR-67-F-C	CR-79-F-Q* (duplicate of CR-67-F-C)	CR-68-F-C	CR-69-F-C	CR-70-W-C	CR-71-W-C	CR-72-W-C	CR-73-W-C	CR-74-W-C	CR-75-W-C
		Date Sampled		8/10/2003	8/10/2003	8/10/2003	8/10/2003	8/10/2003	8/10/2003	8/10/2003	8/10/2003	8/10/2003	8/10/2003	8/10/2003
		Field Screen Pb (ppm)[c]		150.59	186.06	29.63	208.03	153.41	48.37	37.11	92.77	17.18	107.2	36.87
		Field Screen Zn (ppm)[c]		341.99	416.65	283.37	430.14	395	271.84	212.81	256.59	207.59	409.4	268.28
Parameter	**Units**	**Federal CCME Guidelines**		**Analytical Results**										
		CEQG (PL)[a]	**SQRO[b]**											
Physical Tests														
pH		-		8.81	-	-	-	-	-	-	-	-	-	-
Total Metals														
Antimony T-Sb	mg/kg	20[d]		<20	-	-	-	-	-	-	-	-	-	-
Arsenic T-As	mg/kg	12		11	-	-	-	-	-	-	-	-	-	-
Barium T-Ba	mg/kg	500		**798**	-	-	-	-	-	-	-	-	-	-
Beryllium T-Be	mg/kg	4[d]		<1	-	-	-	-	-	-	-	-	-	-
Cadmium T-Cd	mg/kg	10		<1	-	-	-	-	-	-	-	-	-	-
Chromium T-Cr	mg/kg	64		12	-	-	-	-	-	-	-	-	-	-
Cobalt T-Co	mg/kg	50[d]		4	-	-	-	-	-	-	-	-	-	-
Copper T-Cu	mg/kg	63		18	-	-	-	-	-	-	-	-	-	-
Lead T-Pb	mg/kg		2000	<200	209	328	235	<200	<200	<200	<200	<200	<200	<200
Mercury T-Hg	mg/kg	6.6		0.07	-	-	-	-	-	-	-	-	-	-
Molybdenum T-Mo	mg/kg	10[d]		<8	-	-	-	-	-	-	-	-	-	-
Nickel T-Ni	mg/kg	50		21	-	-	-	-	-	-	-	-	-	-
Selenium T-Se	mg/kg	1		<3[e]	-	-	-	-	-	-	-	-	-	-
Silver T-Ag	mg/kg	20[d]		<4	-	-	-	-	-	-	-	-	-	-
Tin T-Sn	mg/kg	50[d]		<10	-	-	-	-	-	-	-	-	-	-
Vanadium T-V	mg/kg	130		61	-	-	-	-	-	-	-	-	-	-
Zinc T-Zn	mg/kg		10000	155	170	400	228	141	55	52	65	49	108	85

Associated ALS Analytics files: T2886

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

na = No field screening result available

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 CR-79-F-Q is recorded as CR-79-F-C in ALS report T2886*

Table CR-15-1. Old Crusher Area Remediation Confirmation Soil Samples - Metals

Gartner Lee		Location	Old Crusher		
		Sample ID	CR-76-W-C	CR-77-F-D*	CR-78-F-D**
		Date Sampled	8/10/2003	8/10/2003	8/10/2003
		Field Screen Pb (ppm)[c]	292.62	290.15	308.5
		Field Screen Zn (ppm)[c]	535.48	683.87	560.14
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	227	<200	184
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	202	331	201

Associated ALS Analytics files: T2886

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

na = No field screening result available

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 CR-77-F-D is recorded as CR-77-D in ALS report T2886*

***Sample CR-78-F-D is recorded incorrectly as CR-78-P-D in ALS report T2886*

Table CR-15-2. Old Crusher Area Quality Assurance and Quality Control Remediation Soil Samples

Gartner Lee	Parameter	Pb		Zn		Total Pb			Total Zn		
	Relative Percent Difference (RpD)[a]	MDL	PQL[b]	MDL	PQL[b]	Sample Pb	Duplicate Pb	RpD[a] (%)	Sample Zn	Duplicate Pb	RpD[a] (%)
Sample ID	**Duplicate ID**										
On Site Field Screening Duplicates											
CR-12-I-D	CR-64-I-Q	20	100	60	300	483	376	25.1	818	681	18.3
CR-23-I-D	CR-37-I-Q	20	100	60	300	182	395	**74.1**	659	1701	**88.3**
CR-47-I-D	CR-63-I-D	20	100	60	300	422	285	38.9	752	648	14.8
CR-49-I-D	CR-65-I-D	20	100	60	300	498	453	9.6	961	954	0.7
Analytical Laboratory Duplicate											
CR-67-F-C	CR-79-F-Q	200	1000	4	20	209	328	na	170	400	**80.7**
Analytical Laboratory Replicates											
CR-76-W-C	QC# 350293	200	1000	4	20	227	223	na	202	185	8.8

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)*

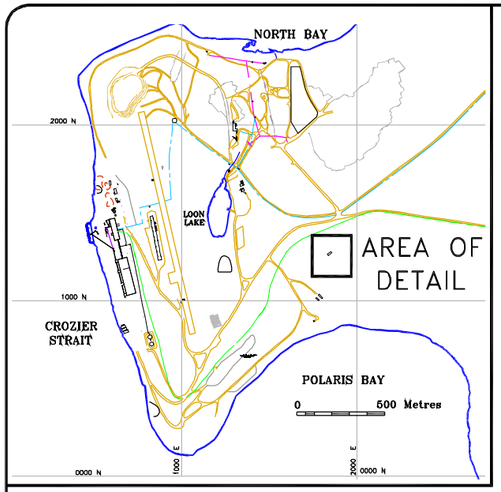
"na" = RpD value is not applicable because one or both results are less than the practical quantitation limit (PQL).

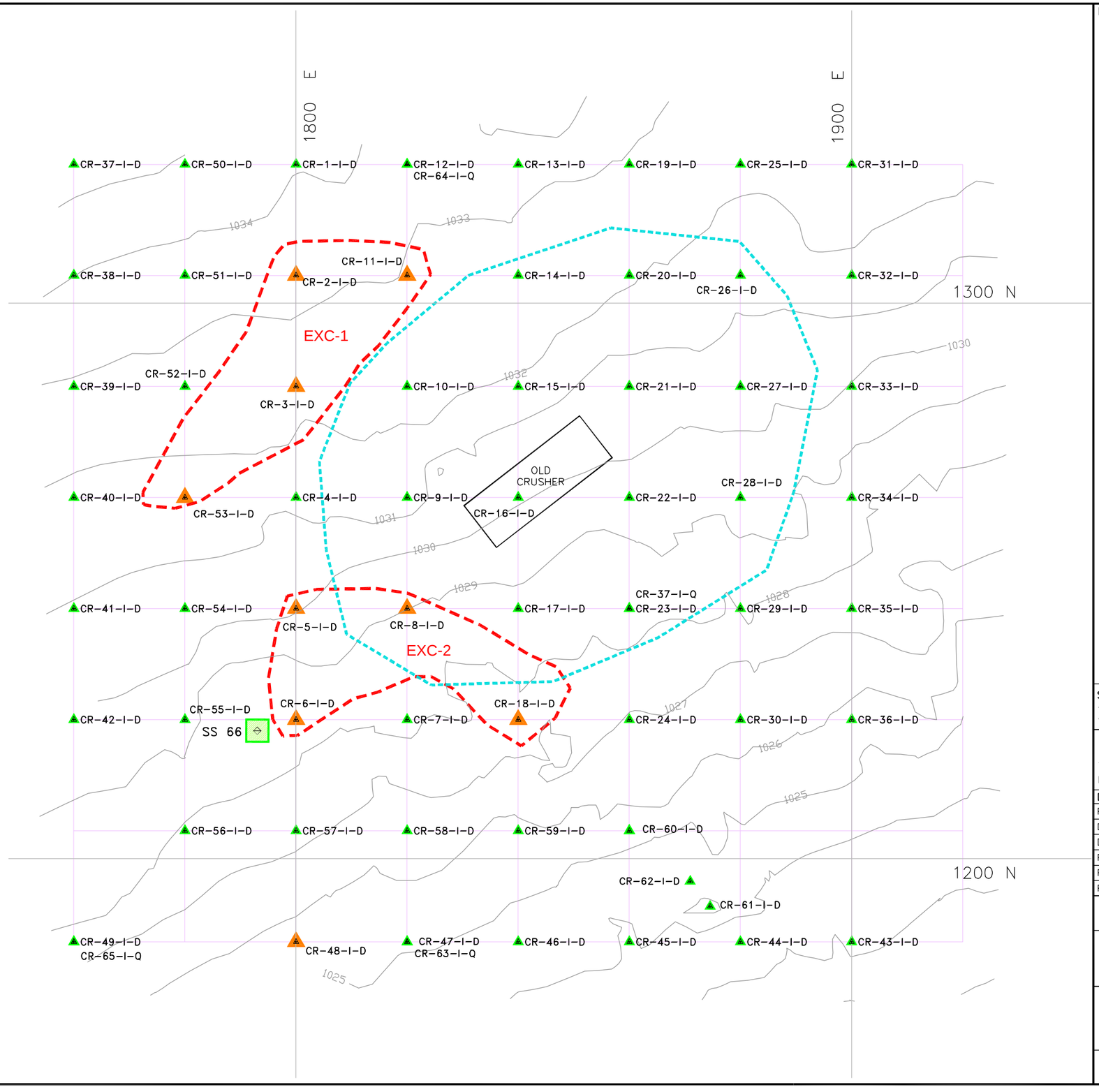
"-" = no result for given parameter

"<" = less than analytical method detection limit

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

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





N

0 5 10 20 30 Metres

SCALE 1:750

LEGEND:

- LOCATION OF EXISTING BUILDING AND/OR FACILITY
- LIMIT OF 2003 EXCAVATION
- EXCAVATION GRID
- GROUND CONTOURS BEFORE REMEDIATION (m)
- AREA OF CONCERN FOR METALS CONTAMINATION FROM THE 1999–2000 ENVIRONMENTAL SITE ASSESSMENT (ESA)
- SS 22 — SURFACE SAMPLE (1999/2000 ENVIRONMENTAL SITE ASSESSMENT
- CR-7-I-D — FIELD SCREENING SURFACE SAMPLE (2003)

2003 SAMPLE NAMING CONVENTION

CR-7-I-D
- AREA
- SAMPLE ID
- 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
- LOCATION F= FLOOR SAMPLE
  - I= INTERMEDIATE FLOOR SAMPLE
  - W= WALL SAMPLE

ZINC CONCENTRATION IN SOILS (1999 & 2000 DATA)

- 0–1000 PPM

LEAD CONCENTRATION IN SOILS (1999 & 2000 DATA)

- 0–1,000 PPM
- FIELD SCREENING RESULTS USING NITON XRF ANALYZER INDICATE LEAD CONCENTRATIONS IN SOIL ≥ 1,500 ppm AND/OR ZINC CONCENTRATIONS IN SOIL ≥ 8,500 ppm
- FIELD SCREENING RESULTS USING NITON XRF ANALYZER INDICATE LEAD CONCENTRATIONS IN SOIL < 1,500 ppm AND/OR ZINC CONCENTRATIONS IN SOIL < 8,500 ppm

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

NOTE:
THIS IS AREA 15 SHOWN ON FIGURE 1 "CONTAMINATED SOILS REMEDIATION PROGRESS PLAN, DECEMBER 31, 2003"

DRAWING INFORMATION:

REVIEWED BY:	KT/AL
DRAWN BY:	CPW
DATE ISSUED:	13 FEBRUARY, 2004
PROJECT NUMBER:	23-305
FILE NAME:	23305-6F-03.DWG
REVISION:	0

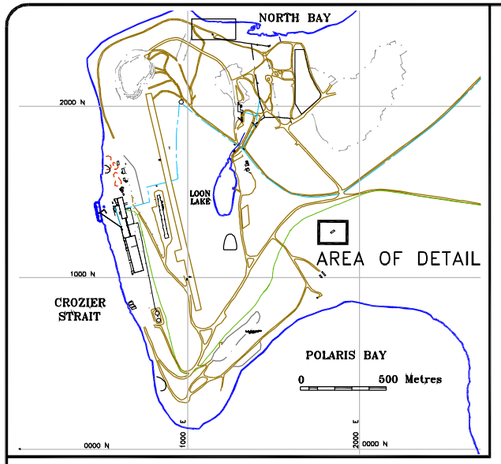
teckcominco

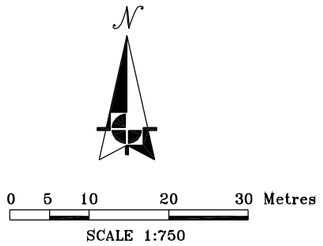
CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

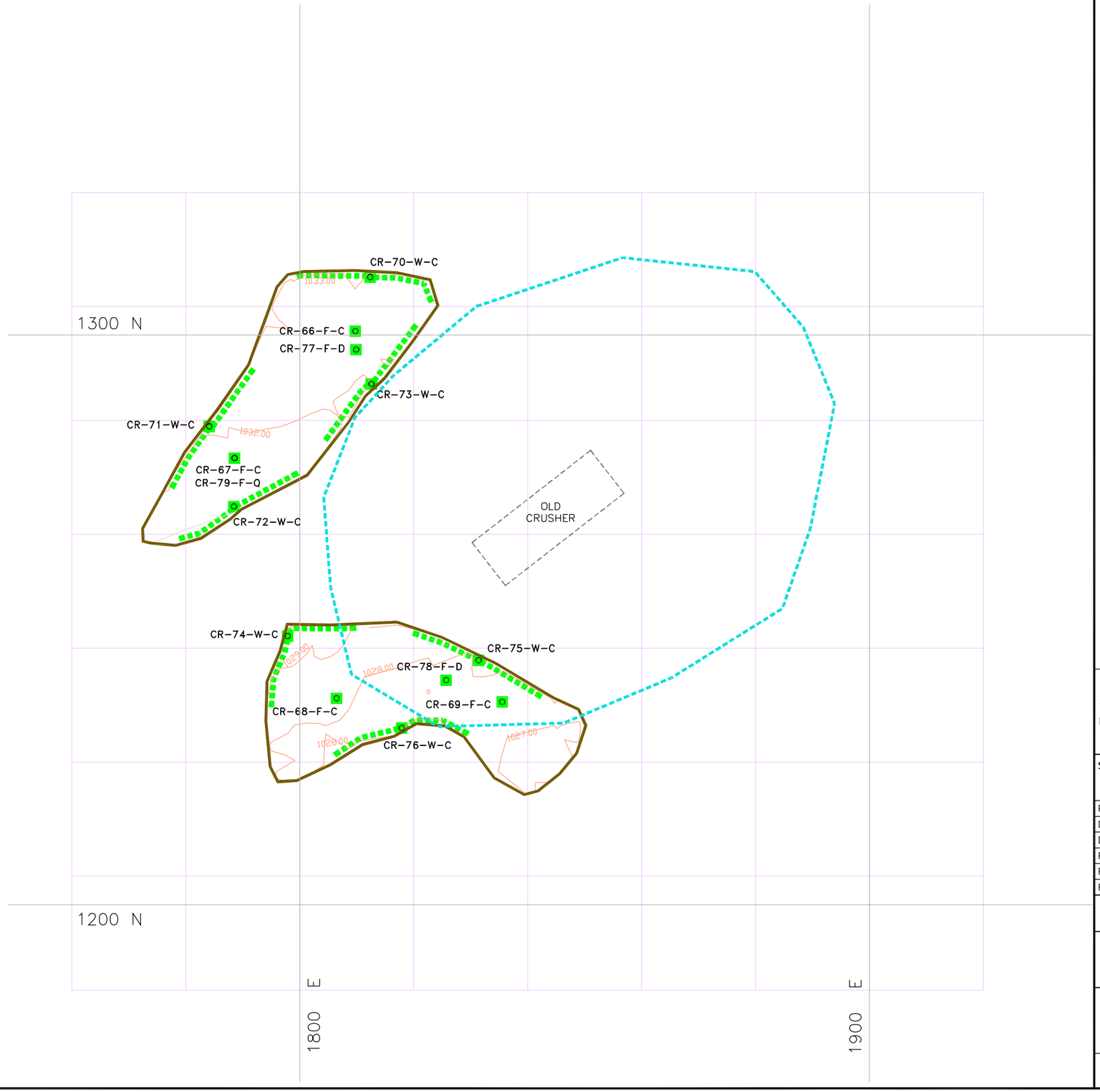
OLD CRUSHER AREA CONDITIONS BEFORE REMEDIATION (DECEMBER 31, 2003)

Gartner Lee

Figure No. CR-15-1







2003 CONFIRMATION SAMPLES

FLOOR SAMPLES

Sample ID	Pb (mg/kg)	Zn (mg/kg)
CR-66-F-C	<200	155
CR-67-F-C	209	170
CR-79-F-Q Duplicate of CR-67-F-C	328	400
CR-68-F-C	235	228
CR-69-F-C	<200	141
CR-77-F-D	<200	331
CR-78-F-D	184	201

WALL SAMPLES

Sample ID	Pb (mg/kg)	Zn (mg/kg)
CR-70-W-C	<200	55
CR-71-W-C	<200	52
CR-72-W-C	<200	65
CR-73-W-C	<200	49
CR-74-W-C	<200	108
CR-75-W-C	<200	85
CR-76-W-C	227	202

NOTES:

<200 Less than detection limit

Pb, Zn Lead or Zinc concentrations obtained from ALS analytical laboratory

LEGEND:

- FORMER LOCATION OF BUILDINGS AND FACILITES (REMOVED)
- ROADS
- EXCAVATION GRID
- LIMIT OF 2003 EXCAVATION
- CONTOURS – BASE OF EXCAVATION (m)
- AREA OF METAL CONCERN FROM 1999–2000 ENVIRONMENTAL SITE ASSESSMENT

2003 SAMPLES

O CONFIRMATORY FLOOR OR WALL SAMPLE

SAMPLE NAMING CONVENTION

CR-73-W-C

- AREA
- SAMPLE ID
- 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
- LOCATION F= FLOOR SAMPLE, I= INTERMEDIATE FLOOR SAMPLE, W= WALL SAMPLE

SAMPLE CONTAINS LESS THAN 10,000 mg/kg ZINC

SAMPLE CONTAINS LESS THAN 2,000 mg/kg LEAD

AREA OF WALL COMPOSITE WALL SAMPLE CONTAINS LESS THAN 10,000 mg/kg ZINC OR 2,000 mg/kg LEAD

NOTE:
THIS IS AREA 15 SHOWN ON FIGURE 1 "CONTAMINATED SOILS REMEDIATION PROGRESS PLAN, DECEMBER 31, 2003"

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

REVIEWED BY:	KT/AL
DRAWN BY:	CPW
DATE ISSUED:	13 FEBRUARY, 2004
PROJECT NUMBER:	23–305
FILE NAME:	23305–6F–02.DWG
REVISION:	0

teckcominco

CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

OLD CRUSHER AREA CONDITIONS AFTER REMEDIATION (DECEMBER 31, 2003)

Gartner Lee

Figure No. CR-15-2

Appendix G

Polaris Mine Operations Contaminated Soil Remediation Close Out Report: Main Snow Dump

Gartner Lee

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: Main Snow Dump

BACKGROUND

The main snow dump (shown as Area 17 shown Figure 1: *Contaminated Soils Remediation Progress Plan*) was one of four locations used for the storage of snow that had been collected from travel routes on the Polaris mine site. The snow dumps were identified as areas of environmental concern in the Environmental Site Assessment (ESA), due to the inclusion of particulates with elevated lead and zinc concentrations. Prior to the ESA, snow dumping at the main snow dump had ceased, and any remaining snow had been removed.

The main snow dump (MSD) was located at the southern tip of the mine site peninsula. Once the Snow Dump was removed, five test pits were excavated in the underlying soils during the Environmental Site Assessment (ESA) conducted in 1999 and 2000 as shown in Figure SD-17-1. Test pits MSD-1 through MSD-4 were excavated downslope between the former Snow Dump and the ocean. Test pit MSD-5 was excavated upslope of the former Snow Dump to provide background metal concentrations in soils for the area.

The ESA testpit results are as follows:

- the stratigraphy in the vicinity of the main snow dump consists of beach gravels, sands and stones, underlain by bedrock at depths ranging from 0.2 m to 0.55 m below ground surface;
- MSD-1 intersected lead and zinc concentrations greater than the soil quality remediation objective (SQRO) of 2,000 mg/kg for lead and 10,000 mg/kg for zinc from 0.1 m to 0.5 m;
- MSD-2 intersected lead and zinc concentrations greater than the SQROs from 0.1 m to 0.3 m;
- MSD-3 intersected lead and zinc concentrations greater than the SQROs from 0.1 m to 0.3 m;

- MSD-5 background concentrations of lead and zinc were: 652 mg/kg of lead and 788 of mg/kg zinc; and
- MSD-4 located to the west of the Snow Dump did not intersect elevated concentrations of lead or zinc indicating that the contamination did not extend outside the immediate area of the snow dump face.

Total metal analysis of the samples collected at the snow dump showed that cadmium concentrations were greater than the generic Canadian Council of Ministers of Environment (CCME) Canadian Environmental Quality Guidelines (CEQG) for Parkland land use in test pits MSD-1, 2, 3, located at the snow dump face.

METHODOLOGY

Excavation

The excavation of the main snow dump proceeded based on the results of the 1999/2000 ESA data.

Three 25 m x 25 m square blocks were excavated to a depth of 0.5 m using MSD-1, MSD-2 and MSD-3 as their respective center points. The initial excavation was completed on August 13, 2003, and 18 samples were collected the same day. Soil samples from the initial excavation were prepared and field screened with the Niton X-Ray Fluorescence (XRF) elemental analyzer.

The contaminated portions of the floors and walls were identified and an additional 0.3m of material was excavated from the floor. The excavation limits surrounding MSD-3 and MSD-1 were also expanded as follows:

- The 25 m x 25 m square block around MSD-3 was stepped out 10m to the north and 15 m to the south, creating a 50 m x 25 m block; and
- The 25 m x 25 m square block surrounding MSD-1 was stepped out 10m to the north and 10 m to the east, creating a 35 m x 35 m block.

The second sampling event occurred on August 19, 2003, and a total of fourteen (14) floor and wall samples were collected. Results of this sampling event indicated that, while the majority of the samples met the SQROs, some metal contamination remained in the floor.

The third excavation of 0.3 m was completed on August 24, 2003, and samples were taken on the same day. A total of six (6) confirmation samples were collected, and all of them passed the field screening.

The limits of the excavation are outlined in Figure SD-17-2 and soils were removed to a maximum depth of 0.9 m in some areas. This material was disposed of in the underground workings in accordance with regulatory approvals. Sample locations are also shown in Figure SD-17-2.

ANALYTICAL RESULTS

Laboratory results for the main snow dump are located in Table SD-17-1. A total of 17 confirmatory samples were submitted for this area: two (2) discrete wall; one (1) discrete floor; seven (7) composite floors; and seven (7) composite walls. All samples submitted returned lead and zinc concentrations below the Polaris Mine SQRO's.

Total metal analyses were performed on four (4) composite confirmatory samples. 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. One floor sample, located in the southernmost excavation grid cell, returned a nickel concentration of 63 mg/kg, which is greater than the generic CCME, CEQG for Parkland land use, 50 mg/kg. The total metal analyses and leachate analyses conducted during the ESA did not identify nickel as a contaminate of concern.

Given the immobile nature of nickel encountered on site, demonstrated by the leachate results and relatively low level of concentrations, no further remedial excavation work is considered necessary to meet the approved closure plan objectives.

Quality Assurance and Quality Control (QA/QC)

Relative percent differences (RpD) have been calculated and compiled in table SD-17-2 for five (5) on site field screening duplicates and two (2) analytical laboratory duplicates of confirmatory samples.

The analytical laboratory replicate QA/QC results provide confidence that the SQROs have been met despite the RpD value above 50% for two QA/QC sets. All sample results and replicate results were well below the SQRO. The variance between the sample and its replicate may be a result of sample inhomogeneity as the material sampled was very coarse.

Three of the RpDs generated from the field screening duplicates are above the site specific protocol of 50%. These include the field screening sample and duplicate results from:

- SD-25-W-C and SD-36-W-Q for lead;
- SD-25-W-C and SD-36-W-Q for zinc; and
- SD-43-F-C and SD-44-F-Q for zinc.

In each instance, the field screening sample and its duplicate both returned Niton XRF results well below the SQRO suggesting that these sample results are acceptable in meeting the remedial objectives. However, it indicates the variability. The variance between the sample and its duplicate is likely a result of sample heterogeneity.

CONCLUSION

Based on confirmatory sampling consistent with good practice and the approved site specific sampling procedures and protocols, the remediation of the main snow dump 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

ORIGINAL COPY SIGNED AND STAMPED

Arlene Laudrum, P.Geol.
Remediation Supervisor, Polaris Mine Project

ORIGINAL COPY SIGNED

Karlette Tunaley, EIT
Field Scientist

AL:KT

ATTACHMENTS

Tables

Table SD-17-1: Main Snow Dump Remediation Confirmation Soil Samples - Metals
Table SD-17-2: Main Snow Dump Quality Assurance and Quality Control Remediation Soil Samples

Figures

Figure SD-17-1: Main Snow Dump Area Conditions, Before Remediation (December 31, 2003)
Figure SD-17-2: Main Snow Dump Area Conditions, After Remediation (December 31, 2003)

Table SD-17-1. Main Snow Dump Remediation Confirmation Soil Samples - Metals

Gartner Lee		Location	Snow Dump									
		Sample ID	SD-7-F-C*	SD-8-F-D**	SD-10-W-C	SD-12-W-C	SD-13-F-C	SD-22-F-C	SD-24-W-C	SD-28-W-C	SD-33-F-C	SD-34-W-C
		Date Sampled	8/18/2003	8/18/2003	8/18/2003	8/18/2003	8/18/2003	8/19/2003	8/19/2003	8/19/2003	8/19/2003	8/19/2003
		Field Screen Pb [c] (ppm)	159.32	205.84	256.07	363.77	136.37	290.02	224.46	256.96	301.51	287.42
		Field Screen Zn [c] (ppm)	934.42	1058.66	1141.67	386.82	573.55	369.9	354.53	299.97	444.73	336.33
Parameter	**Units**	**Federal CCME Guidelines**		**Analytical Results**								
		CEQG (PL)[a]	**SQRO[b]**									
Physical Tests												
pH			-	-	-	-	-	8.25	9.4	9.22	-	-	-
Total Metals												
Antimony T-Sb	mg/kg	20[d]	-	-	-	-	-	<30[e]	<20	<20	-	-	-
Arsenic T-As	mg/kg	12	-	-	-	-	-	<20[e]	<10	<10	-	-	-
Barium T-Ba	mg/kg	500	-	-	-	-	-	469	318	274	-	-	-
Beryllium T-Be	mg/kg	4[d]	-	-	-	-	-	<2	<1	<1	-	-	-
Cadmium T-Cd	mg/kg	10	-	-	-	-	-	<2	<1	<1	-	-	-
Chromium T-Cr	mg/kg	64	-	-	-	-	-	<6	5	4	-	-	-
Cobalt T-Co	mg/kg	50[d]	-	-	-	-	-	<6	<4	<4	-	-	-
Copper T-Cu	mg/kg	63	-	-	-	-	-	<3	9	7	-	-	-
Lead T-Pb	mg/kg	-	2000	<200	<200	<200	250	<200	194	200	181	239	189
Mercury T-Hg	mg/kg	6.6	-	-	-	-	-	<0.05	<0.05	<0.05	-	-	-
Molybdenum T-Mo	mg/kg	10[d]	-	-	-	-	-	<20[e]	<8	<8	-	-	-
Nickel T-Ni	mg/kg	50	-	-	-	-	-	<20	<10	<10	-	-	-
Selenium T-Se	mg/kg	1	-	-	-	-	-	<2[e]	<3[e]	<3[e]	-	-	-
Silver T-Ag	mg/kg	20[d]	-	-	-	-	-	<6	<4	<4	-	-	-
Tin T-Sn	mg/kg	50[d]	-	-	-	-	-	<20	<10	<10	-	-	-
Vanadium T-V	mg/kg	130	-	-	-	-	-	11	34	31	-	-	-
Zinc T-Zn	mg/kg	-	10000	316	433	215	2480	101	110	101	95	129	110

Associated ALS Analytics files: T4634, T4071, T3279, T3191, T3069

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

na = No field screening result available

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 SD-7-F-C is recorded as SD-07-F-C in ALS report T3191*

***Sample SD-8-F-D is recorded as SD-08-F-D in ALS report T3191*

Table SD-17-1. Main Snow Dump Remediation Confirmation Soil Samples - Metals

Gartner Lee		Location		Snow Dump					
		Sample ID		SD-37-W-C	SD-38-W-D*	SD-39-W-C	SD-40-W-D	SD-41-F-C	SD-47-F-C
		Date Sampled		8/24/2003	8/24/2003	8/24/2003	8/24/2003	8/24/2003	9/27/2003
		Field Screen Pb [c] (ppm)		58.5	91.03	73.12	269.84	269.38	na
		Field Screen Zn [c] (ppm)		295.15	1048.22	573.7	1306.18	827.22	na
Parameter	**Units**	**Federal CCME Guidelines**		**Analytical Results**					
		CEQG (PL)[a]	**SQRO[b]**						
Physical Tests									
pH			-	-	-	-	-	8.48	-
Total Metals									
Antimony T-Sb	mg/kg	20[d]	-	-	-	-	-	<10	-
Arsenic T-As	mg/kg	12	-	-	-	-	-	10	-
Barium T-Ba	mg/kg	500	-	-	-	-	-	83	-
Beryllium T-Be	mg/kg	4[d]	-	-	-	-	-	0.7	-
Cadmium T-Cd	mg/kg	10	-	-	-	-	-	3.5	-
Chromium T-Cr	mg/kg	64	-	-	-	-	-	46	-
Cobalt T-Co	mg/kg	50[d]	-	-	-	-	-	18	-
Copper T-Cu	mg/kg	63	-	-	-	-	-	16	-
Lead T-Pb	mg/kg	-	2000	<50	93	265	859	231	1120
Mercury T-Hg	mg/kg	6.6	-	-	-	-	-	<0.05	-
Molybdenum T-Mo	mg/kg	10[d]	-	-	-	-	-	<4	-
Nickel T-Ni	mg/kg	50	-	-	-	-	-	**63**	-
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	-	-	-	-	-	46	-
Zinc T-Zn	mg/kg	-	10000	200	638	1020	1040	1090	2920

Associated ALS Analytics files: T4634, T4071, T3279, T3191, T3069

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

na = No field screening result available

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 SD-38-W-D is recorded incorrectly as SD-38-W-C in ALS report T3279*

Table SD-17-2. Main Snow Dump Quality Assurance Quality Control Remediation Soil Samples

Gartner Lee	Parameter	Pb		Zn		Total Pb			Total Zn		
	Relative Percent Difference (RpD)[a]	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											
SD-3-W-C	SD-19-W-Q	70	350	150	750	523	682	26.4	1806	1808	0.1
SD-12-W-C	SD-35-W-Q	70	350	150	750	364	330	na	387	352	na
SD-25-W-C	SD-36-W-Q	70	350	150	750	476	1166	**84.1**	1704	4401	**88.4**
SD-41-F-C	SD-45-F-Q	70	350	150	750	269	135	na	827	409	na
SD-43-F-C	SD-44-F-Q	70	350	150	750	2779	2653	4.7	4224	1901	**75.8**
Analytical Laboratory Replicates											
SD-34-W-C	QC# 351553	100	500	2	10	189	194	na	110	138	22.6
SD-12-W-C	QC# 351520	100	500	2	10	250	226	na	2480	255	**162.7**

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)*

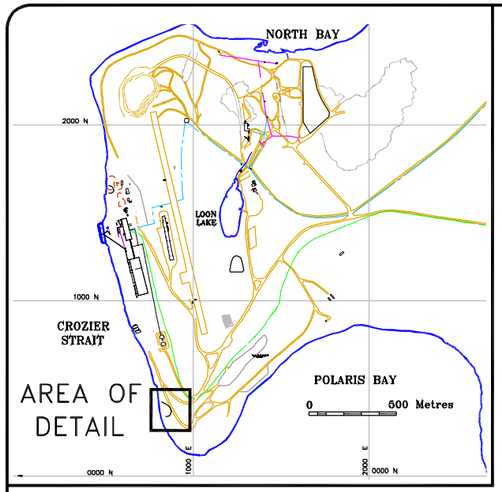
"na" = RpD value is not applicable because one or both results are less than the practical quantitation limit (PQL).

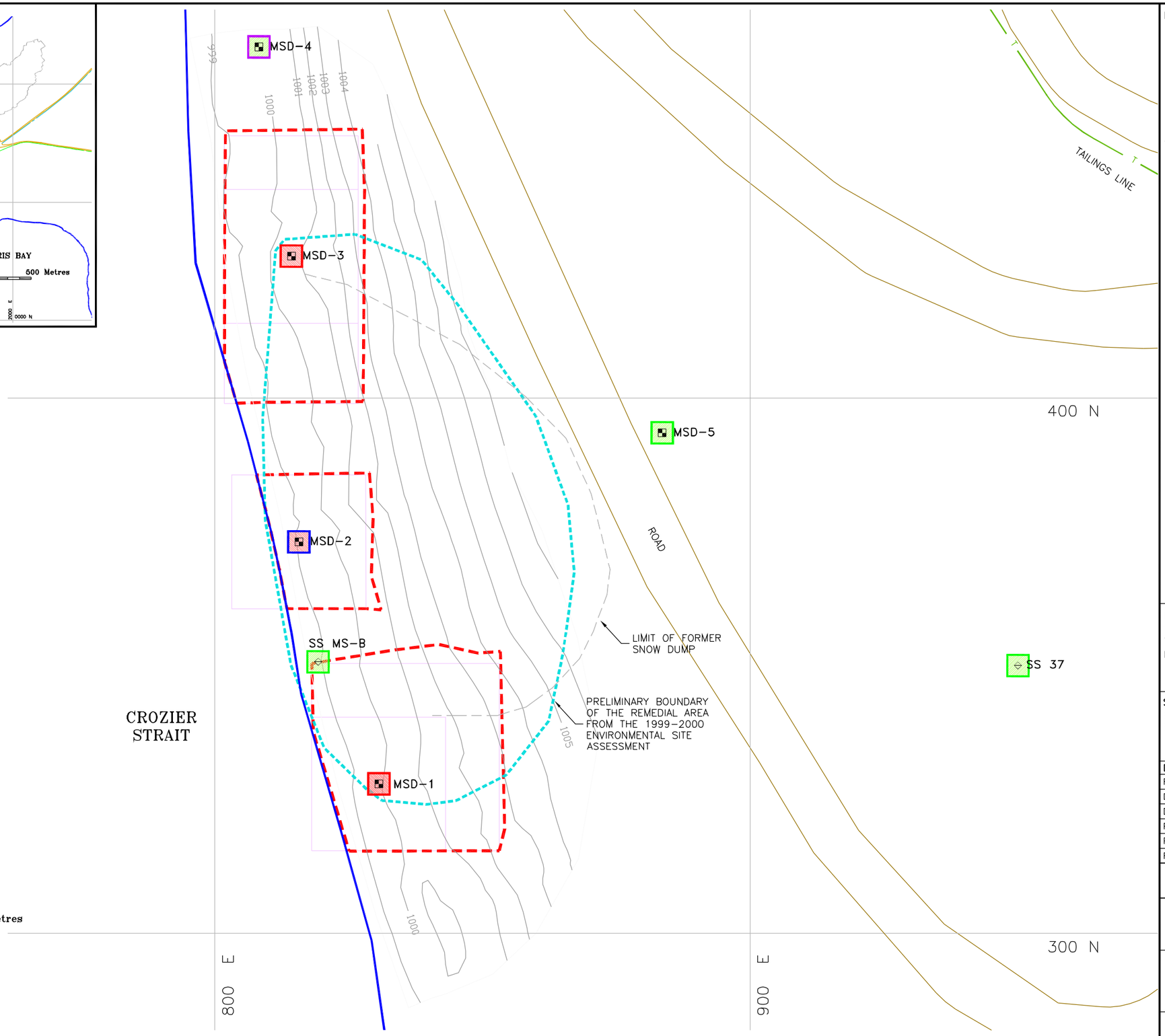
"-" = no result for given parameter

"<" = less than analytical method detection limit

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

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





N

0 5 10 20 30 Metres

SCALE 1:750

LEGEND:

- SHORE LINE
- TAILINGS LINE
- ROADS
- LIMIT OF 2003 EXCAVATION
- EXCAVATION GRID
- GROUND CONTOURS BEFORE REMEDIATION (m)
- LIMIT OF FORMER SNOW DUMP
- AREA OF CONCERN FOR METALS CONTAMINATION FROM THE 1999-2000 ENVIRONMENTAL SITE ASSESSMENT (ESA)
- MSD-5 — TEST PIT – 1999 AND 2000 ENVIRONMENTAL SITE ASSESSMENTS
- SS 22 — SURFACE SAMPLE (1999/2000 ENVIRONMENTAL SITE ASSESSMENT)

ZINC CONCENTRATION IN SOILS (1999 & 2000 DATA)

- 0-1000 PPM
- 1000-5000 PPM
- 5000-10,000 PPM
- >10,000 PPM

LEAD CONCENTRATION IN SOILS (1999 & 2000 DATA)

- 0-1,000 PPM
- 1,000-2,000 PPM
- > 2,000 PPM

NOTE:
THIS IS AREA 17 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-06.DWG
REVISION:	0

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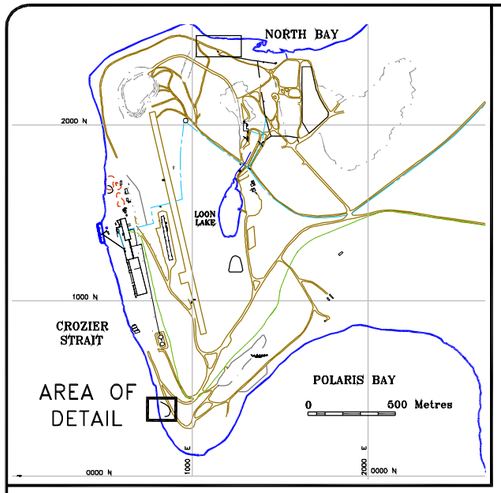
CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

MAIN SNOW DUMP AREA CONDITIONS BEFORE REMEDIATION (DECEMBER 31, 2003)

Gartner Lee

Figure No. SD-17-1



N

0 5 10 20 30 Metres

SCALE 1:750

2003 CONFIRMATION SAMPLES

FLOOR SAMPLES

Sample ID	Lead (mg/kg)	Zinc (mg/kg)
SD-7-F-C	<200	316
SD-8-F-D	<200	433
SD-13-F-C	<200	101
SD-22-F-C	194	110
SD-33-F-C	239	129
SD-41-F-C	231	1090
SD-47-F	1120	2920

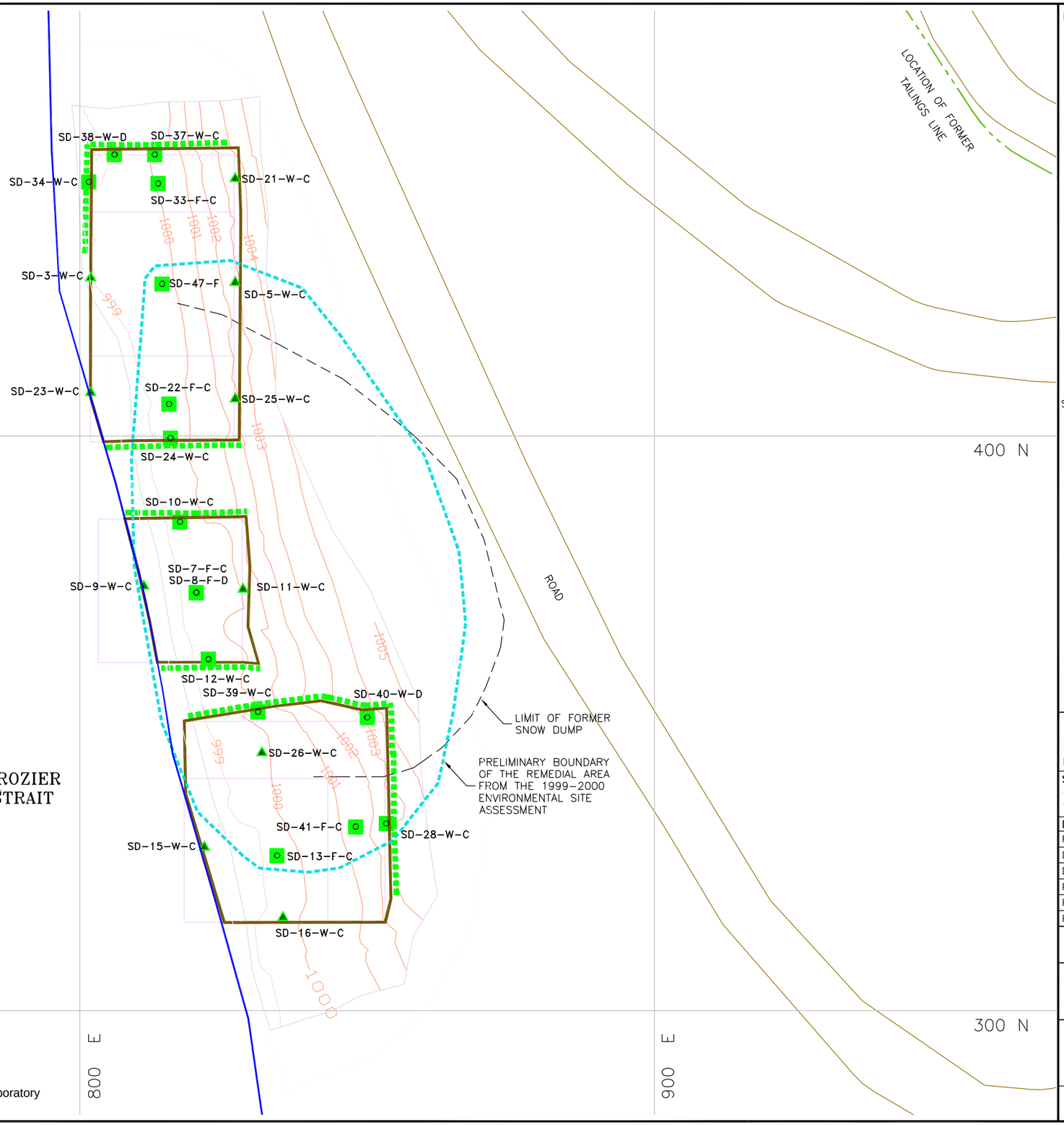
WALL SAMPLES

Sample ID	Lead (mg/kg)	Zinc (mg/kg)
SD-10-W-C	<200	215
SD-12-W-C	250	2480
SD-24-W-C	200	101
SD-28-W-C	181	95
SD-34-W-C	189	110
SD-37-W-C	<50	200
SD-38-W-D	93	638
SD-39-W-C	265	1020
SD-40-W-D	859	1040

NOTES:

<200 Less than detection limit

Lead, Zinc Lead or Zinc concentrations obtained from ALS analytical laboratory



LEGEND:

- SHORE LINE – LOW TIDE
- LIMIT OF FORMER SNOW DUMP
- LOCATION OF FORMER TAILINGS LINE
- ROADS
- EXCAVATION GRID
- LIMIT OF 2003 EXCAVATION
- CONTOURS – BASE OF EXCAVATION (m)
- LIMIT OF EXCAVATION SURVEY
- AREA OF METAL CONCERN FROM 1999-2000 ENVIRONMENTAL SITE ASSESSMENT

2003 SAMPLES

- CONFIRMATORY FLOOR OR WALL SAMPLE
- FIELD SCREENING SAMPLE

2003 SAMPLE NAMING CONVENTION

SD-8-F-C
- AREA
- SAMPLE ID
- 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
- LOCATION F= FLOOR SAMPLE, I= INTERMEDIATE FLOOR SAMPLE, W= WALL SAMPLE

- SAMPLE CONTAINS LESS THAN 10,000 mg/kg ZINC
- SAMPLE CONTAINS LESS THAN 2,000 mg/kg LEAD
- AREA OF WALL COMPOSITE WALL SAMPLE CONTAINS LESS THAN 10,000 mg/kg ZINC OR 2,000 mg/kg LEAD
- FIELD SAMPLE RESULTS FROM NITON XRF ANALYSIS SHOW LEAD CONCENTRATION LESS THAN 1750 mg/kg AND ZINC CONCENTRATION LESS THAN 7500 mg/kg

NOTE:

THIS IS AREA 17 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-13.DWG
REVISION:	0

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CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

MAIN SNOW DUMP AREA CONDITIONS AFTER REMEDIATION (DECEMBER 31, 2003)

Gartner Lee

Figure. SD-17-2

Appendix H

Polaris Mine Operations Contaminated Soil Remediation Close Out Report: North Portal Stockpile

Gartner Lee

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: North Portal Stockpile

BACKGROUND

The north portal stockpile is located north east of the airstrip on North Bay and it is shown as Area 22 on Figure 1: *Contaminated Soils Remediation Progress Plan, December 31, 2003*. During the exploration and pre-mining phases, waste rock produced underground was stockpiled at the north portal. More recently, the north portal stockpile was used as a temporary storage area for high grade lead ore.

Waste rock material from the underground mine comprises limestone and shale. Geochemical testing of representative samples of limestone and shale waste rock was conducted in 1999 as part of the Environmental Site Assessment (ESA) performed by Gartner Lee Limited (GLL). The test results indicated these rock types are not acid generating and do not present a risk of metal leaching.

No intrusive sampling (test pitting or drilling) was undertaken at the north portal during the ESA investigations. The area was identified as metal contaminated in the 2000 ESA, based on the use of the area for storage of high grade lead ore.

METHODOLOGY

Delineation

To direct field screening sampling of soil and excavation activities a 25 m x 25 m sampling grid was established in the area of suspected metals contamination identified in the 2000 ESA. The surface elevation was surveyed by SNC Lavalin.

Primary delineation of the metals impacted area commenced June 28, 2003, and sampling of the subsurface material was accomplished by drilling boreholes at the accessible 25 m x 25 m grid points. The presence of a snow pile at the time of drilling and the active use of the underground portal, limited the accessible points. Twenty two (22) boreholes were advanced with an air rotary quarry drill to depths of up to 6.5 m. Composite soil samples of the drill returns that accumulated at the mouth of the borehole were collected at 0.5 m intervals. Following the collection of each sample, the surface surrounding the borehole was cleared of the drill cuttings to expose fresh snow.

Samples were analysed on site using a Niton portable X-Ray Fluorescence (XRF) elemental analyzer. The results of this field screening exercise indicated that there were elevated lead and zinc concentrations in seven (7) of the boreholes, to depths ranging from 0.5 m to 3.5 m as shown on Figure NP-22-1.

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. The results are shown in the following table:

	Lead Concentration (mg/kg)		**Zinc Concentration (mg/kg)**	
Sample Number	**Niton Portable XRF**	**Analytical Laboratory**	**Niton Portable XRF**	**Analytical Laboratory**
NP-BH-12-4	935	1,430	6,438	8,450
NP-BH-14-1	1,800	1,950	7,987	7,290
NP-BH-17-2	3,427	3,980	9,555	8,450

These results demonstrate that treating on-site field screening concentrations of lead greater than 1,500 mg/kg and zinc greater than 8,500 mg/kg as if they exceeded the site specific Soil Quality Remediation Objectives (SQROs) for lead (2,000 mg/kg) and zinc (10,000 mg/kg) is conservative

for the specific type of contaminated soil in this area. GLL directed remedial excavation based on the results of the field screening sampling.

Excavation

Teck Cominco Limited (TCL) and GLL established a plan to direct excavation around six (6) of the borehole locations NP-BH-12, NP-BH-4, NP-BH-17, NP-BH-16, NP-BH-21, and NP-BH-22 with elevated lead and zinc concentrations. Because the analytical laboratory result for NP-BH-14-1 met the SQROs, no remedial excavation was performed around this isolated borehole.

Excavation was restricted to elevations above the original ground surface prior to stockpiling activities. The plan stipulated that excavation adjacent to the tidal zone be permitted only at low tide.

Excavation of the north portal stockpile area commenced in early August 2003. Soil was ripped within the excavation boundaries using a ripper tooth, and pushed into stockpiles that were loaded onto trucks with an excavator. Excavation was subdivided into two areas, an east and a west. This material was disposed of in the underground workings in accordance with regulatory approvals.

Confirmation Sampling

To further direct the excavation, soil samples were collected across the floor and along the wall of the excavation limits in accordance with standard GLL and TCL sampling procedures and protocols. The samples analyzed using the Niton XRF. Composite samples were collected from 25 m x 25 m areas of the floor of the excavation and over a length of 25 m on the wall of the excavation.

Samples were submitted to ALS to verify the concentration of metals. Additional excavation was undertaken in areas that did not meet the SQROs. The east excavation removed material depths between 0.3 m and 1.0 m and the west excavation extended to depths between 1.5 m and 5.0 m. Upon receipt of the soil results that met the SQROs the final excavation limits were surveyed.

ANALYTICAL RESULTS

Analytical laboratory results for metals are summarized in Table NP-22-1, along with the approved Polaris Mine SQROs for lead and zinc. A total of forty three (43) remediation confirmation samples were submitted from the former north portal area: seventeen (17) composite floors, five (5) discrete floors, eighteen (18) composite walls, two (2) discrete walls, and two (2) quality assurance quality control (QA/QC) samples. The soil quality results and the lateral limits of the excavation are shown on Figure NP-22-2.

The metal remediation confirmation samples met the approved closure plan objectives. 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. Minor exceedances were obtained from one duplicate QA/QC sample, NP-165-W-Q, with a lead and zinc concentrations (2,030 mg/kg lead, 12,100 mg/kg zinc) above the SQROs. However, the analytical results for the duplicate NP-164-W-C met the SQROs.

Three (3) of the four (4), confirmation samples analyzed for total metals analysis returned minor exceedances of nickel. Nickel concentrations ranged from 52 mg/kg to 63 mg/kg. The generic Canadian Council of Ministers of Environment (CCME) Canadian Environmental Quality Guideline (CEQG) for parkland land use is 50 mg/kg nickel in soil. Nickel was not identified as a contaminant of concern in the Polaris Mine ESA. No exceedances were obtained during the investigations in 1999 and 2000, and the leachate analysis returned nickel concentrations at levels less than detection. Given the immobile nature of the nickel encountered on site, as demonstrated by the leachate results and the relatively low level of concentrations, no further remedial excavation work is considered necessary to meet the approved closure plan objectives.

Quality Assurance and Quality Control (QA/QC)

Relative percent differences have been calculated and compiled in Table NP-22-2 for sixteen (16) on site field screened duplicates, two (2) analytical laboratory duplicates, and five (5) analytical laboratory replicates for a total of twenty three (23) QA/QC samples.

Twenty (20) of the sample results and their duplicate/replicate results returned acceptable RpDs, below the site specific remediation protocol of 50%. Some of the samples returned results below the practical quantitation limit in which case the RpD value has been identified as “na” (not

applicable). The RpDs for sample NP-164-W-C and its duplicate, NP-165-W-Q met the RpD objective even though the results for NP-165-W-Q were above the SQROs for lead and zinc. The results for NP-164-W-C met the remedial objectives for these parameters.

Three (3) analytical laboratory samples and their laboratory replicates returned RpDs above 50%. Analytical laboratory sample NP-65-W-C and its duplicate, NP-182-W-Q, returned a lead RpD above the 50%. Sample NP-74-F-C and its replicate returned their lead and zinc RpDs above 50%. Sample NP-89-W-C and its replicate returned their zinc RpD above 50%.

The variance between the sample and its duplicate is likely a result of sample inhomogeneity caused by the presence of very coarse high grade ore fragments. Therefore, the QA/QC samples from the north portal area serve to document the variable nature of the metal concentrations in the soil and to provide confidence that the remediation of the north portal area complies with the SQROs.

CONCLUSIONS

Based on confirmatory sampling consistent with good practice and the approved site specific sampling procedures and protocols, the remediation of the former north portal stockpile 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

ORIGINAL COPY SIGNED AND STAMPED

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ATTACHMENTS

Tables

Table NP-22-1: North Portal Stockpile Remediation Confirmation Soil Samples - Metals
Table NP-22-2: North Portal Stockpile Quality Assurance and Quality Control Remediation Soil Samples

Figures

Figure NP-22-1: North Portal Stockpile Conditions Before Remediation (December 31, 2003)
Figure NP-22-2: North Portal Stockpile Conditions After Remediation (December 31, 2003)

Table NP-22-1. North Portal Stockpile Remediation Confirmation Soil Samples - Metals

Gartner Lee		Location		North Portal Stockpile										
		Sample ID		NP-BH-14-1	NP-63-F-C*	NP-64-W-C	NP-65-W-C**	NP-66-F-C	NP-69-W-C	NP-71-F-C	NP-72-F-C	NP-73-F-C	NP-74-F-C	NP-75-F-D
		Date Sampled		6/29/2003	8/24/2003	8/19/2003	8/24/2003	8/19/2003	8/19/03	8/19/2003	8/19/2003	8/19/2003	8/19/2003	8/19/2003
		Field Screen Pb[c] (ppm)		1800	na	na	na	na	na	121.83	108.42	134.87	117.4	200.2
		Field Screen Zn[c] (ppm)		7987.2	na	na	na	na	na	746.82	674.1	821.5	1179.27	1036.9
Parameter	**Units**	**Federal CCME Guidelines**		**Analytical Results**										
		CEQG (PL)[a]	**SQRO[b]**											
Physical Tests														
pH		-	-	-	-	-	-	9	-	-	-	-	-	-
Total Metals														
Antimony T-Sb	mg/kg	20[d]	-	-	-	-	-	<10	-	-	-	-	-	-
Arsenic T-As	mg/kg	12	-	-	-	-	-	9	-	-	-	-	-	-
Barium T-Ba	mg/kg	500	-	-	-	-	-	111	-	-	-	-	-	-
Beryllium T-Be	mg/kg	4[d]	-	-	-	-	-	1	-	-	-	-	-	-
Cadmium T-Cd	mg/kg	10	-	-	-	-	-	3	-	-	-	-	-	-
Chromium T-Cr	mg/kg	64	-	-	-	-	-	43	-	-	-	-	-	-
Cobalt T-Co	mg/kg	50[d]	-	-	-	-	-	15	-	-	-	-	-	-
Copper T-Cu	mg/kg	63	-	-	-	-	-	14	-	-	-	-	-	-
Lead T-Pb	mg/kg	-	2000	1950	230	557	307	400	1910	344	120	168	284	143
Mercury T-Hg	mg/kg	7	-	-	-	-	-	<0.05	-	-	-	-	-	-
Molybdenum T-Mo	mg/kg	10[d]	-	-	-	-	-	<4	-	-	-	-	-	-
Nickel T-Ni	mg/kg	50	-	-	-	-	-	**56**	-	-	-	-	-	-
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	-	-	-	-	-	45	-	-	-	-	-	-
Zinc T-Zn	mg/kg	-	10000	7290	764	4740	1740	1300	7100	708	633	703	1710	611

Associated ALS Analytics files: T6438, T5345, T4772, T4327, T4151, T3279, T3069, T1369

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

na = No field screening result available

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 NP-63-F-C is recorded as NP-63 in ALS report T3279* ***Sample NP-65-W-C is recorded as NP-65 in ALS report T3279*

Table NP-22-1. North Portal Stockpile Remediation Confirmation Soil Samples - Metals

Gartner Lee		Location	North Portal Stockpile										
		Sample ID	NP-76-F-C	NP-77-F-C	NP-78-W-D	NP-79-W-C	NP-80-W-C*	NP-81-W-C	NP-82-F-C	NP-83-F-C	NP-84-W-C	NP-85-W-C**	NP-86-W-C
		Date Sampled	8/19/2003	8/19/2003	8/19/2003	8/19/2003	19/8/2003	8/19/2003	8/19/2003	8/19/2003	8/19/2003	19/8/2003	8/19/2003
		Field Screen Pb[c] (ppm)	111.17	146.05	130.6	29.26	307.04	141.96	89.08	100.28	215.07	133.86	106.46
		Field Screen Zn[c] (ppm)	1106.64	915.34	659.31	364.36	1671.55	651.02	445.45	349.5	1297.16	747.25	528.52
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	114	333	303	759	363	139	211	191	1630	384	105
Mercury T-Hg	mg/kg	7	-	-	-	-	-	-	-	-	-	-	-
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	756	908	449	389	1820	705	443	888	1720	1340	538

Associated ALS Analytics files: T6438, T5345, T4772, T4327, T4151, T3279, T3069, T1369

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

na = No field screening result available

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 NP-80-W-C is recorded as NP-80 in ALS report T6438*

***Sample NP-85-W-C is recorded as NP-85 in ALS report T6438*

Table NP-22-1. North Portal Stockpile Remediation Confirmation Soil Samples - Metals

Gartner Lee		Location		North Portal Stockpile										
		Sample ID		NP-87-F-C	NP-88-W-C	NP-89-W-C*	NP-90-F-C	NP-91-F-C	NP-92-W-C	NP-93-W-C*	NP-95-W-C	NP-97-W-D	NP-127-W-C	NP-128-W-C
		Date Sampled		8/19/2003	8/19/2003	19/8/2003	8/19/2003	8/19/2003	8/19/2003	19/8/2003	8/19/2003	8/19/2003	9/14/2003	9/14/2003
		Field Screen Pb[c] (ppm)		422.24	254.65	312.59	392.25	195.11	280.59	207.44	167.03	539.49	81.22	728.67
		Field Screen Zn[c] (ppm)		2559.36	1918.12	1840.07	1854.87	1068.8	1503.76	1351.7	1015.26	2211.77	355.88	6292.34
Parameter	**Units**	**Federal CCME Guidelines**		**Analytical Results**										
		CEQG (PL)[a]	**SQRO[b]**											
Physical Tests														
pH		-	-	9	-	-	-	-	-	-	-	-	-	-
Total Metals														
Antimony T-Sb	mg/kg	20[d]	-	<10	-	-	-	-	-	-	-	-	-	-
Arsenic T-As	mg/kg	12	-	10	-	-	-	-	-	-	-	-	-	-
Barium T-Ba	mg/kg	500	-	107	-	-	-	-	-	-	-	-	-	-
Beryllium T-Be	mg/kg	4[d]	-	1	-	-	-	-	-	-	-	-	-	-
Cadmium T-Cd	mg/kg	10	-	11	-	-	-	-	-	-	-	-	-	-
Chromium T-Cr	mg/kg	64	-	45	-	-	-	-	-	-	-	-	-	-
Cobalt T-Co	mg/kg	50[d]	-	18	-	-	-	-	-	-	-	-	-	-
Copper T-Cu	mg/kg	63	-	17	-	-	-	-	-	-	-	-	-	-
Lead T-Pb	mg/kg	-	2000	1500	462	444	480	302	149	333	106	579	<100	477
Mercury T-Hg	mg/kg	7	-	<0.05	-	-	-	-	-	-	-	-	-	-
Molybdenum T-Mo	mg/kg	10[d]	-	<4	-	-	-	-	-	-	-	-	-	-
Nickel T-Ni	mg/kg	50	-	**63**	-	-	-	-	-	-	-	-	-	-
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	-	48	-	-	-	-	-	-	-	-	-	-
Zinc T-Zn	mg/kg	-	10000	3520	1370	2990	1820	1590	566	855	722	1170	333	6240

Associated ALS Analytics files: T6438, T5345, T4772, T4327, T4151, T3279, T3069, T1369

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

na = No field screening result available

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 NP-89-W-C is recorded as NP-89 in ALS report T6438*

***Sample NP-93-W-C is recorded as NP-93 in ALS report T6438*

Table NP-22-1. North Portal Stockpile Remediation Confirmation Soil Samples - Metals

Gartner Lee	Location	North Portal Stockpile										
	Sample ID	NP-131-F-C	NP-160-F-C	NP-161-W-C	NP-164-W-C	NP-165-W-Q (Duplicate of NP-164-W-C)	NP-169-F-D	NP-171-F-D	NP-174-F-D	NP-180-F-C*	NP-181-F-C	NP-182-W-Q (Duplicate of NP-65-W-C)**
	Date Sampled	9/14/2003	9/19/2003	9/19/2003	9/30/2003	9/30/2003	10/8/2003	10/8/2003	10/8/2003	10/11/2003	10/11/2003	8/24/2003
	Field Screen Pb[c] (ppm)	840.46	na	na	1231.08	1607.1	431.14	347.19	807.06	94.16	808.64	na
	Field Screen Zn[c] (ppm)	5609.83	na	na	7364.82	11013.15	1295.24	2040.79	4414.62	565.45	5466.62	na
Parameter	**Units**	**Federal CCME Guidelines**		**Analytical Results**								
		CEQG (PL)[a]	**SQRO[b]**									
Physical Tests												
pH		-	-	-	8	-	-	-	8	-	-	-	-	-
Total Metals												
Antimony T-Sb	mg/kg	20[d]	-	-	<10	-	-	-	<30[e]	-	-	-	-	-
Arsenic T-As	mg/kg	12	-	-	11	-	-	-	<20[e]	-	-	-	-	-
Barium T-Ba	mg/kg	500	-	-	65	-	-	-	207	-	-	-	-	-
Beryllium T-Be	mg/kg	4[d]	-	-	1	-	-	-	<2	-	-	-	-	-
Cadmium T-Cd	mg/kg	10	-	-	9	-	-	-	7	-	-	-	-	-
Chromium T-Cr	mg/kg	64	-	-	24	-	-	-	<6	-	-	-	-	-
Cobalt T-Co	mg/kg	50[d]	-	-	15	-	-	-	<6	-	-	-	-	-
Copper T-Cu	mg/kg	63	-	-	11	-	-	-	6	-	-	-	-	-
Lead T-Pb	mg/kg	-	2000	1550	353	1240	1820	***2030***	1050	449	1330	97	1090	613
Mercury T-Hg	mg/kg	7	-	-	<0.05	-	-	-	<0.05	-	-	-	-	-
Molybdenum T-Mo	mg/kg	10[d]	-	-	<4	-	-	-	<20[e]	-	-	-	-	-
Nickel T-Ni	mg/kg	50	-	-	**52**	-	-	-	<20	-	-	-	-	-
Selenium T-Se	mg/kg	1	-	-	<2[e]	-	-	-	<4[e]	-	-	-	-	-
Silver T-Ag	mg/kg	20[d]	-	-	<2	-	-	-	<6	-	-	-	-	-
Tin T-Sn	mg/kg	50[d]	-	-	<5	-	-	-	<20	-	-	-	-	-
Vanadium T-V	mg/kg	130	-	-	27	-	-	-	8	-	-	-	-	-
Zinc T-Zn	mg/kg	-	10000	6310	3030	9350	8600	***12100***	2990	2240	5610	844	8690	2320

Associated ALS Analytics files: T6438, T5345, T4772, T4327, T4151, T3279, T3069, T1369

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

na = No field screening result available

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 NP-180-F-C is recorded incorrectly as NP-180-F-C in ALS report T5345*

***Sample NP-182-W-Q is recorded as NP-65-dup in ALS report T3279*

Table NP-22-2. North Portal Stockpile Quality Assurance and Quality Control Remediation Soil Samples

Gartner Lee	Parameter	Pb		Zn		Total Pb			Total Zn		
	Relative Percent Difference (RpD)[a]	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											
NP-BH-2-6	NP-BH-2-9	20	100	60	300	175	194	10.2	1470	1250	16.2
NP-BH-4-5	NP-BH-4-7	20	100	60	300	290	250	15.0	2949	2600	12.6
NP-BH-5-6	NP-BH-5-11	20	100	60	300	226	174	26.3	1970	1880	4.7
NP-BH-8-6	NP-BH-8-3	20	100	60	300	177	192	8.3	2130	1909	10.9
NP-BH-10-2	NP-BH-10-3	20	100	60	300	55	49	11.6	193	167	na
NP-BH-12-10	NP-BH-12-4	20	100	60	300	1040	935	10.6	6739	6438	4.6
NP-BH-12-9	NP-BH-12-7	20	100	60	300	187	82	na	597	564	5.7
NP-BH-15-4	NP-BH-15-8	20	100	60	300	45	46	na	344	295	na
NP-BH-16-5	NP-BH-16-9	20	100	60	300	464	545	16.0	4608	4160	10.2
NP-BH-17-14	NP-BH-17-5	20	100	60	300	2040	1560	26.7	4627	3850	18.3
NP-BH-18-15	NP-BH-18-2	20	100	60	300	417	273	41.7	803	600	28.8
NP-BH-18-4	NP-BH-18-13	20	100	60	300	188	187	0.1	530	474	11.2
NP-BH-18-10	NP-BH-18-14	20	100	60	300	42	20	na	60	560	na
NP-BH-19-8	NP-BH-19-13	20	100	60	300	20	20	na	60	60	na
NP-BH-20-12	NP-BH-20-13	20	100	60	300	20	20	na	60	60	na
NP-BH-22-8	NP-BH-22-1	20	100	60	300	8218	7795	5.3	35277	30899	13.2
Analytical Laboratory Duplicates											
NP-164-W-C	NP-165-W-C	50	250	1	5	1820	2030	10.9	8600	12100	33.8
NP-65-W-C	NP-182-W-C	50	250	1	5	307	613	**66.5**	1740	2320	28.6
Analytical Laboratory Replicates											
NP-74-F-C	QC# 351552	50	250	1	5	284	1460	**135**	1710	3160	**60**
NP-92-W-C	QC# 351551	50	250	1	5	149	97	42	566	694	20
NP-128-W-C	QC# 355290	50	250	1	5	477	657	32	6240	10100	47
NP-174-F-D	QC# 359675	200	1000	3	15	1330	916	36.9	5610	5910	5.2
NP-89-W-C	QC# 363881	50	250	1	5	444	486	9.0	2990	1580	**61.7**

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)*

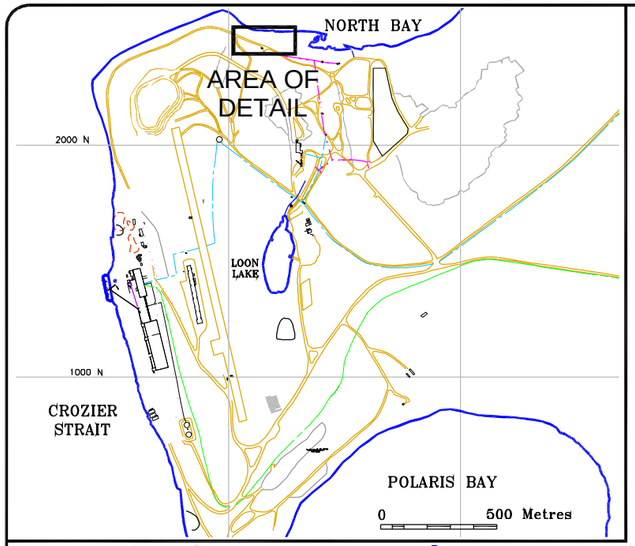
"na" = RpD value is not applicable because one or both results are less than the practical quantitation limit (PQL).

"-" = 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)*



N

0 5 10 20 30 Metres

SCALE 1:750

2500 N

2400 N

1100 E

1200 E

NORTH BAY

NP-BH-4 1m

NP-BH-3

NP-BH-17 2m

NP-BH-18

NP-BH-19

NP-BH-20

NP-BH-13

NP-BH-12 1m

NP-BH-5

NP-BH-2

NP-BH-9

NP-BH-8

NP-BH-11

NP-BH-6

NP-BH-1

NP-BH-16 1m

NP-BH-10

NP-BH-7

SHED

NP-BH-14 0.5m

NP-BH-15

NP-BH-21 3.5m

NP-BH-22 1.5m

ROAD

OUTLINE OF FORMER SNOW DUMP AREA

NORTH PORTAL

PP

LEGEND:

- LOCATION OF EXISTING BUILDING AND/OR FACILITY
- POWER LINE
- PP POWER POLE
- SHORE LINE
- ROADS
- LIMIT OF 2003 EXCAVATION
- EXCAVATION GRID
- GROUND CONTOURS BEFORE REMEDIATION (m)
- APPROXIMATE LOCATION OF FORMER SNOW DUMP BASED ON GARTNER LEE FIELD OBSERVATIONS
- AREA OF CONCERN FOR METALS CONTAMINATION FROM THE 1999-2000 ENVIRONMENTAL SITE ASSESSMENT (ESA)

2003 FIELD SCREENING SAMPLES

AREA — BOREHOLE ID

NP-BH-2

- BOREHOLE - GLL 2003
- 1m DEPTH OF PROPOSED EXCAVATION (m) BASED ON FIELD SCREENING RESULTS
- FIELD SCREENING RESULTS USING NITON XRF ANALYZER INDICATE LEAD CONCENTRATIONS IN SOIL ≥ 1,500 ppm AND/OR ZINC CONCENTRATIONS IN SOIL ≥ 8,500 ppm
- FIELD SCREENING RESULTS USING NITON XRF ANALYZER INDICATE LEAD CONCENTRATIONS IN SOIL < 1,500 ppm AND/OR ZINC CONCENTRATIONS IN SOIL < 8,500 ppm

NOTE:

THIS IS AREA 22 SHOWN ON FIGURE 1 "CONTAMINATED SOILS REMEDIATION PROGRESS PLAN, DECEMBER 31, 2003"

SOURCE OF DRAWING:

SITE SURVEYS PROVIDED BY SNC LAVALIN OCTOBER, 2003

DRAWING INFORMATION:

REVIEWED BY:	KT/AL
DRAWN BY:	CPW
DATE ISSUED:	13 FEBRUARY, 2004
PROJECT NUMBER:	23-305
FILE NAME:	23305-5D-02R1.DWG
REVISION:	1

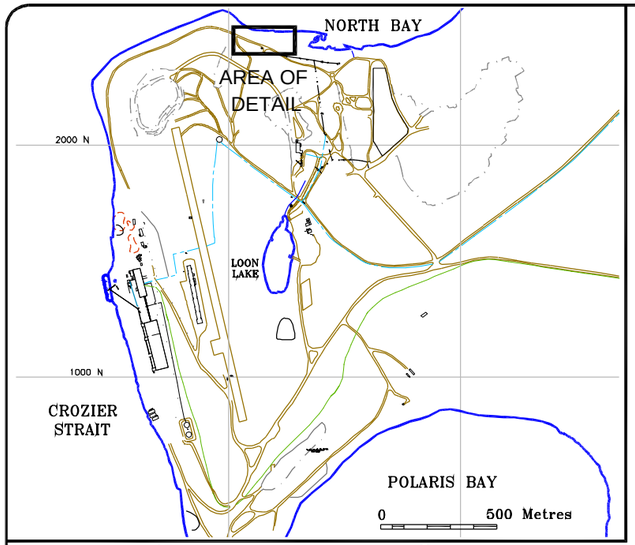
teckcominco

CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

NORTH PORTAL STOCKPILE CONDITIONS BEFORE REMEDIATION (DECEMBER 31, 2003)

Gartner Lee

Figure No. NP-22-1



N

0 5 10 20 30 Metres

SCALE 1:750

2003 CONFIRMATION SAMPLES

FLOOR SAMPLES

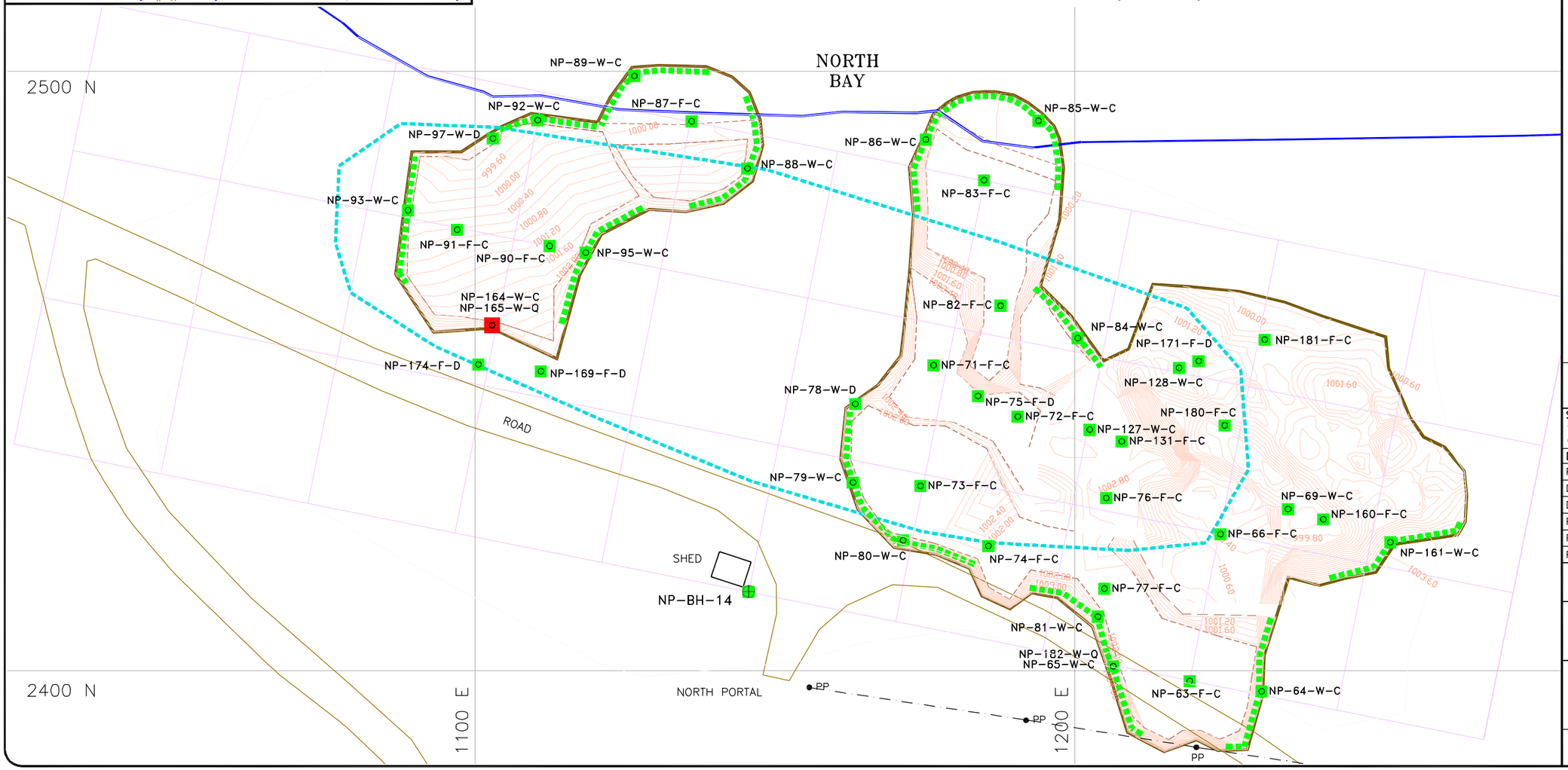
Sample ID	Lead (mg/kg)	Zinc (mg/kg)
NP-63-F-C	230	764
NP-66-F-C	400	1300
NP-71-F-C	344	708
NP-72-F-C	120	633
NP-73-F-C	168	703
NP-74-F-C	284	1710
NP-75-F-D	143	611
NP-76-F-C	114	756
NP-77-F-C	333	908
NP-82-F-C	211	443
NP-83-F-C	191	888
NP-87-F-C	1500	3520
NP-90-F-C	480	1820
NP-91-F-C	302	1590
NP-131-F-C	1550	6310
NP-160-F-C	353	3030
NP-169-F-D	1050	2990
NP-171-F-D	449	2240
NP-174-F-D	1330	5610
NP-180-F-C	97	844
NP-181-F-C	1090	8690

WALL SAMPLES

Sample ID	Lead (mg/kg)	Zinc (mg/kg)
NP-64-W-C	557	4740
NP-65-W-C	307	1740
NP-182-W-Q (Duplicate of NP-65-W-C)	613	2320
NP-69-W-C	1910	7100
NP-78-W-D	303	449
NP-79-W-C	759	389
NP-80-W-C	363	1820
NP-81-W-C	139	705
NP-84-W-C	1630	1720
NP-85-W-C	384	1340
NP-86-W-C	105	538
NP-88-W-C	462	1370
NP-89-W-C	444	2990
NP-92-W-C	149	566
NP-93-W-C	333	855
NP-95-W-C	106	722
NP-97-W-D	579	1170
NP-127-W-C	<100	333
NP-128-W-C	477	6240
NP-161-W-C	1240	9350
NP-164-W-C	1820	8600
NP-165-W-Q (Duplicate of NP-164-W-C)	2030	12100

RESULTS IN **RED** INDICATE SAMPLE CONTAINING
≥ 2000 mg/kg LEAD OR ≥ 10,000 mg/kg ZINC

NOTES:
<100 Less than detection limit
Lead, Zinc Lead or Zinc concentrations obtained from ALS analytical laboratory



LEGEND:

- LOCATION OF EXISTING BUILDING AND/OR FACILITY
- POWER LINE
- PP POWER POLE
- SHORE LINE
- ROADS
- EXCAVATION GRID
- CONTOURS – BASE OF EXCAVATION (m) NOTE: CONTOURS ARE APPROXIMATE AND ARE BASED ON TWO EXCAVATION SURFACES PROVIDED BY SNC LAVALIN
- TOP OR BOTTOM OF SLOPES FROM SNC LAVALIN SURVEY DATA
- AREA OF METAL CONCERN FROM 1999–2000 ENVIRONMENTAL SITE ASSESSMENT
- LIMIT OF 2003 EXCAVATION

2003 SAMPLES

- ○ CONFIRMATORY FLOOR OR WALL SAMPLE
- ⊕ NP–BH–14 CONFIRMATORY BOREHOLE SAMPLE

2003 SAMPLE NAMING CONVENTION

NP–95–F–C
- AREA
- SAMPLE ID
- 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
- LOCATION: F = FLOOR SAMPLE; I = INTERMEDIATE FLOOR SAMPLE; W = WALL SAMPLE

- SAMPLE CONTAINS LESS THAN 10,000 mg/kg ZINC
- SAMPLE CONTAINS LESS THAN 2,000 mg/kg LEAD
- AREA OF WALL COMPOSITE WALL SAMPLE CONTAINS LESS THAN 10,000 mg/kg ZINC OR 2,000 mg/kg LEAD
- SAMPLE CONTAINS GREATER THAN OR EQUAL TO 10,000 mg/kg ZINC
- SAMPLE CONTAINS GREATER THAN OR EQUAL TO 2,000 mg/kg LEAD

NOTE: THIS IS AREA 22 SHOWN ON FIGURE 1 "CONTAMINATED SOILS REMEDIATION PROGRESS PLAN, DECEMBER 31, 2003"

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

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teckcominco

CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

NORTH PORTAL STOCKPILE CONDITIONS AFTER REMEDIATION (DECEMBER 31, 2003)

Gartner Lee

Figure No. NP-22-2

Appendix I

Polaris Mine Operations Contaminated Soil Remediation Close Out Report: Exploration Stockpile and Shoreline North of Dock

Gartner Lee

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: Exploration Stockpile and Shoreline North of Dock

BACKGROUND

The exploration stockpile was located adjacent the shoreline north of the dock and to the west of the 1972 portal and is shown as Area 23 on Figure 1*: Contaminated Soils Remediation Progress Plan, December 31, 2003*. Waste rock from both the exploration phase and the pre-development phase of mining at Polaris was deposited in rock dumps near the portal. Ore was stockpiled in this area during the exploration phase prior to being shipped off site to provide bulk samples for metallurgical test work. During the development phase ore was stockpile at this location to provide a readily accessible ore source for the mill during the early production months.

Interviews were conducted during the 1999 and 2000 Environmental Site Assessment (ESA) with long term Polaris personnel indicate that the ore stockpiles were removed for milling by 1984. The historic ore piles were located in close proximity to the Firehall snow dump area used during mine operations. The ESA documented the presence of elevated metal concentrations in testpits and surface samples as shown on Figure ESP-23-1. Hydrocarbon contamination at depths of 0.3 m to 0.9 m was also identified in testpits excavated at the southeast of the exploration stockpile (FH6 and FH7).

Waste rock material from the underground mine comprises limestone shale. Geochemical testing of representative samples of limestone and shale waste rock was conducted in 1999 as part of the ESA performed by Gartner Lee Limited (GLL). The test results indicated these rock types are not acid generating and do not present a risk of metal leaching.

METHODOLOGY

Delineation

To direct field screening sampling of soil and excavation activities a 25 m x 25 m sampling grid was established in the area of suspected metals contamination identified in the 2000 ESA and the surface elevation surveyed by SNC Lavalin.

Delineation of the metals impacted area was accomplished through screening level sampling of the surface and subsurface material. Commencing July 16, 2003, GLL sampled near-surface soil to depths of up to 5cm in accordance with standard GLL and Teck Cominco Limited (TCL) procedures and protocols. The locations of delineation samples are shown on Figure ESP-23-1.

Samples were analysed on-site using a Niton portable X-Ray Fluorescence (XRF) elemental analyzer. Subsets of field 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 field screening sampling, GLL modified the boundaries of the area to be remediated and directed excavation.

The depth of metal contamination at the south end of the exploration stockpile area was investigated by advancing testpits with an excavator to allow for observation of subsurface soil conditions and the collection of samples at depth. The testpits were excavated to depths between 0.3 m and 1.2 m and samples were collected at 0.3 m intervals.

Excavation

Excavation of the exploration stockpile (ESP) and shoreline north of the dock commenced in late July 2003. Soil within the area delineated as metal contaminated was pushed into stockpiles using the D10 bulldozer and loaded out onto trucks with an excavator.

The contaminated soil was removed in layers ranging from 0.3 m to 1.2 m. Screening level sampling was undertaken after each layer was removed to redefine the remedial boundary of excavation and to direct the removal of discrete areas of residual metals contaminated soil. The depth of the excavation ranged between 0.3 m and 2.0 m within the exploration stockpile area. The limits of the excavation are shown on Figure ESP-23-2.

During excavation a berm was retained along the shoreline of the ESP to prevent the ocean from washing metal contaminated sediment into the marine environment. The removal of the shoreline

berm commenced in October 2003, once the sea ice had formed sufficiently to act as a sediment barrier.

Remediation of the hydrocarbon impacted area identified to the southwest corner exploration stockpile area is currently being addressed under the remediation of the firehall area.

Confirmation Sampling

Soil samples were collected at the excavation limits and submitted to ALS to verify the concentration of metals and additional excavation was undertaken in areas that did not meet the Soil Quality Remediation Objectives (SQROs). Composite samples were collected from 25 m x 25 m areas of the floor of the excavation and over a length of 25 m on the wall of the excavation. Upon receipt of the soil results that met the SQROs the final excavation limits were surveyed.

ANALYTICAL RESULTS

Analytical laboratory results for metals are summarized in Table ESP-23-1, along with the approved Polaris Mine SQRO for lead and zinc. A total of forty one (41) remediation confirmation samples were submitted from the area: twenty nine (29) composite floors, four (4) discrete floors, four (4) composite walls, two (2) discrete walls, and two (2) quality assurance quality control (QA/QC) samples. The soil quality results and the lateral limits of the excavation are shown in Figure ESP-23-2.

The metal remediation confirmation samples met the approved closure plan objectives for the contaminants of concern. 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. Minor exceedances were obtained from one confirmation composite floor sample, ESP-247-F-C, returned a lead concentration (2,820 mg/kg lead) above the SQROs. The other forty (40) confirmation samples had lead and zinc concentrations below the SQROs.

Total metal analyses were performed on five (5) randomly selected confirmation samples taken from the final floor of the excavation. Two samples, ESP-128-W-D, ESP-195-F-C, returned barium concentrations, greater than the generic Canadian Council of Ministers of Environment (CCME) Canadian Environmental Quality Guidelines (CEQG) for parkland land use of 500 mg/kg barium in soil. The lead and zinc concentrations in samples ESP-128-W-D and ESP-195-F-C met the SQROs (<100 mg/kg lead, 499 mg/kg zinc and 306 mg/kg lead, 1,570 mg/kg

zinc respectively). No further remedial excavation work is considered necessary to meet the approved closure plan objectives.

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 immobile nature of the barium encountered on site was also demonstrated in the 1999 ESA leachate analysis that returned barium concentrations at levels less than detection and it was therefore not identified as a contaminant of concern in the Polaris Mine ESA.

Quality Assurance and Quality Control (QA/QC)

Relative percent differences (RpDs) have been calculated and compiled in Table ESP-23-2 for twelve (12) on-site field screened duplicates, two (2) analytical laboratory duplicates, and five (5) analytical laboratory replicates for a total of nineteen (19) QA/QC samples.

Eighteen (18) of the sample results and their duplicate/replicate results returned acceptable RpDs, below the site specific remediation protocol of 50%. Some of the samples returned results below the practical quantitation limit in which case the RpD value has been identified as “na” (not applicable). One analytical laboratory sample, ESP-186-F-C and its replicate returned a zinc RpD of 59%, which above the objective. The variance between the sample and its replicate may be a result of sample heterogeneity or it may be attributed to the low level of zinc concentrations being analyzed with the sample and the calibration of the laboratory equipment for higher-level concentrations of zinc.

The QA/QC samples from the exploration stockpile area provide confidence that the remediation of the exploration stock area complies with the SQROs.

CONCLUSIONS

Based on confirmatory sampling consistent with good practice and the approved site specific sampling procedures and protocols, the remediation of the exploration stockpile 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

ORIGINAL COPY SIGNED AND STAMPED

Arlene Laudrum, P.Geol.
Remediation Supervisor, Polaris Mine Project

ORIGINAL COPY SIGNED

Karlette Tunaley, EIT
Field Scientist

AL:KT

ATTACHMENTS

Tables

Table ESP-23-1: Exploration Stockpile and Shoreline North of Dock Remediation Confirmation Soil Samples - Metals

Table ESP-23-2: Exploration Stockpile and Shoreline North of Dock Quality Assurance and Quality Control Remediation Soil Samples

Figures

Figure ESP-23-1: Exploration Stockpile and Shoreline North of Dock Conditions Before Remediation (December 31, 2003)

Figure ESP-23-2: Exploration Stockpile and Shoreline North of Dock Conditions After Remediation (December 31, 2003)

Table ESP-23-1. Exploration Stockpile and Shoreline North of Dock Remediation Confirmation Soil Samples - Metals

Gartner Lee		Location	Exploration Stockpile and Shoreline North of Dock											
		Sample ID	ESP-103-F-C	ESP-104-F-C	ESP-105-F-C	ESP-106-F-C	ESP-109-F-C*	ESP-110-F-C	ESP-114-F-C	ESP-115-F-C	ESP-120-F-D	ESP-124-W-C	ESP-125-W-C	ESP-126-W-D
		Date Sampled	4/8/2003	4/8/2003	4/8/2003	4/8/2003	4/8/2003	4/8/2003	4/8/2003	4/8/2003	4/8/2003	4/8/2003	4/8/2003	4/8/2003
		Field Screen Pb[c] (ppm)	285.66	328.58	804.73	1506.34	616.7	506.7	208.19	447.24	380.73	274.73	1066.33	362.41
		Field Screen Zn[c] (ppm)	1069.16	1043.82	3143.54	5223.84	4120.57	1994.05	598.35	2258.26	2387.01	990.75	5978.18	1547.92
Parameter	**Units**	**Federal CCME Guidelines**		Analytical Results										
		CEQG (PL)[a]	**SQRO[b]**											
Physical Tests														
pH		-	-	9	-	-	-	-	-	-	-	-	-	-
Total Metals														
Antimony T-Sb	mg/kg	20[d]	-	<20[e]	-	-	-	-	-	-	-	-	-	-
Arsenic T-As	mg/kg	12	-	<10	-	-	-	-	-	-	-	-	-	-
Barium T-Ba	mg/kg	500	-	398	-	-	-	-	-	-	-	-	-	-
Beryllium T-Be	mg/kg	4[d]	-	<1	-	-	-	-	-	-	-	-	-	-
Cadmium T-Cd	mg/kg	10	-	2	-	-	-	-	-	-	-	-	-	-
Chromium T-Cr	mg/kg	64	-	8	-	-	-	-	-	-	-	-	-	-
Cobalt T-Co	mg/kg	50[d]	-	<4	-	-	-	-	-	-	-	-	-	-
Copper T-Cu	mg/kg	63	-	7	-	-	-	-	-	-	-	-	-	-
Lead T-Pb	mg/kg	-	2000	194	164	1250	1530	527	778	192	287	163	101	520	146
Mercury T-Hg	mg/kg	7	-	<0.05	-	-	-	-	-	-	-	-	-	-	-
Molybdenum T-Mo	mg/kg	10[d]	-	<8	-	-	-	-	-	-	-	-	-	-	-
Nickel T-Ni	mg/kg	50	-	15	-	-	-	-	-	-	-	-	-	-	-
Selenium T-Se	mg/kg	1	-	<3[e]	-	-	-	-	-	-	-	-	-	-	-
Silver T-Ag	mg/kg	20[d]	-	<4	-	-	-	-	-	-	-	-	-	-	-
Tin T-Sn	mg/kg	50[d]	-	<10	-	-	-	-	-	-	-	-	-	-	-
Vanadium T-V	mg/kg	130	-	22	-	-	-	-	-	-	-	-	-	-	-
Zinc T-Zn	mg/kg	-	10000	839	467	6850	4410	2200	4680	521	3600	674	375	2550	519

Associated ALS Analytics files: T6394, T4327, T3582, T3279, T2886, T2587

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

na = No field screening result available

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 ESP-109-F-C is recorded incorrectly as ESP-109-Comp-F in ALS report T2587*

Table ESP-23-1. Exploration Stockpile and Shoreline North of Dock Remediation Confirmation Soil Samples - Metals

Gartner Lee		Location	Exploration Stockpile and Shoreline North of Dock											
		Sample ID	ESP-128-W-D*	ESP-129-F-D	ESP-133-I-C	ESP-135-I-C	ESP-136-I-C	ESP-137-I-C	ESP-138-I-C	ESP-139-I-C	ESP-140-I-C**	ESP-141-I-C	ESP-142-I-C	ESP-143-I-C
		Date Sampled	4/8/2003	7/28/2003	9/8/2003	9/8/2003	9/8/2003	9/8/2003	9/8/2003	9/8/2003	9/8/2003	9/8/2003	9/8/2003	9/8/2003
		Field Screen Pb[c] (ppm)	240.22	497.58	700	419.07	390.25	415.81	473	424.01	393.34	324.51	325.85	415.17
		Field Screen Zn[c] (ppm)	1231.01	2060.01	1787.57	1341.62	1188.88	1459.92	1362.37	1137.64	1252.45	768.96	905.02	1179.04
Parameter	**Units**	**Federal CCME Guidelines**		Analytical Results										
		CEQG (PL)[a]	**SQRO[b]**											
Physical Tests														
pH		-	-	9	-	-	-	-	-	9	-	-	-	-	9
Total Metals														
Antimony T-Sb	mg/kg	20[d]	-	<20[e]	-	-	-	-	-	<20[e]	-	-	-	-	<20[e]
Arsenic T-As	mg/kg	12	-	<10	-	-	-	-	-	<10	-	-	-	-	<10
Barium T-Ba	mg/kg	500	-	**565**	-	-	-	-	-	49	-	-	-	-	96
Beryllium T-Be	mg/kg	4[d]	-	<1	-	-	-	-	-	<1	-	-	-	-	<1
Cadmium T-Cd	mg/kg	10	-	<1	-	-	-	-	-	2	-	-	-	-	5
Chromium T-Cr	mg/kg	64	-	<4	-	-	-	-	-	<4	-	-	-	-	<4
Cobalt T-Co	mg/kg	50[d]	-	<4	-	-	-	-	-	<4	-	-	-	-	<4
Copper T-Cu	mg/kg	63	-	<2	-	-	-	-	-	<2	-	-	-	-	2
Lead T-Pb	mg/kg	-	2000	<100	<100	301	221	218	740	<200	265	785	<200	<200	511
Mercury T-Hg	mg/kg	7	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-	<0.05
Molybdenum T-Mo	mg/kg	10[d]	-	<8	-	-	-	-	-	<8	-	-	-	-	<8
Nickel T-Ni	mg/kg	50	-	<10	-	-	-	-	-	<10	-	-	-	-	<10
Selenium T-Se	mg/kg	1	-	<2[e]	-	-	-	-	-	<3[e]	-	-	-	-	<3[e]
Silver T-Ag	mg/kg	20[d]	-	<4	-	-	-	-	-	<4	-	-	-	-	<4
Tin T-Sn	mg/kg	50[d]	-	<10	-	-	-	-	-	<10	-	-	-	-	<10
Vanadium T-V	mg/kg	130	-	12	-	-	-	-	-	9	-	-	-	-	9
Zinc T-Zn	mg/kg	-	10000	499	1750	1300	819	786	1700	659	798	2770	464	906	1980

Associated ALS Analytics files: T6394, T4327, T3582, T3279, T2886, T2587

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

na = No field screening result available

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 ESP-128-W-D is recorded incorrectly as sample ESP-128-D in ALS report T2587*

*** Sample ESP-140-I-C is recorded incorrectly as sample ESP-140-I-D in ALS report T2886*

Table ESP-23-1. Exploration Stockpile and Shoreline North of Dock Remediation Confirmation Soil Samples - Metals

Gartner Lee		Location	Exploration Stockpile and Shoreline North of Dock											
		Sample ID	ESP-150-I-D*	ESP-151-I-D**	ESP-153-I-Q (duplicate of ESP-137-I-C)***	ESP-168-F-C	ESP-169-F-C	ESP-170-F-C	ESP-171-F-C	ESP-172-F-C	ESP-173-F-C	ESP-186-F-C****	ESP-195-F-C	ESP-196-W-C
		Date Sampled	9/8/2003	9/8/2003	10/8/2003	25/8/2003	25/8/2003	25/8/2003	25/8/2003	25/8/2003	25/8/2003	29/8/2003	19/09/2003	19/09/2003
		Field Screen Pb[c] (ppm)	468.37	350.07	495.91	2684.4	202.22	9207.62	3575.91	9387.91	3354.58	na	276.23	469.47
		Field Screen Zn[c] (ppm)	1450.99	866.05	1895.58	25161.48	1296.78	71470.59	26125.28	64278.2	20872.24	na	1347.23	2585.3
Parameter	**Units**	**Federal CCME Guidelines**		Analytical Results										
		CEQG (PL)[a]	**SQRO[b]**											
Physical Tests														
pH		-	-	-	-	-	-	-	-	-	-	-	8	-
Total Metals														
Antimony T-Sb	mg/kg	20[d]	-	-	-	-	-	-	-	-	-	-	<20[e]	-
Arsenic T-As	mg/kg	12	-	-	-	-	-	-	-	-	-	-	<10	-
Barium T-Ba	mg/kg	500	-	-	-	-	-	-	-	-	-	-	**1280**	-
Beryllium T-Be	mg/kg	4[d]	-	-	-	-	-	-	-	-	-	-	<1	-
Cadmium T-Cd	mg/kg	10	-	-	-	-	-	-	-	-	-	-	4	-
Chromium T-Cr	mg/kg	64	-	-	-	-	-	-	-	-	-	-	7	-
Cobalt T-Co	mg/kg	50[d]	-	-	-	-	-	-	-	-	-	-	<4	-
Copper T-Cu	mg/kg	63	-	-	-	-	-	-	-	-	-	-	7	-
Lead T-Pb	mg/kg	-	2000	312	<200	1510	256	514	254	345	97	246	143	306	674
Mercury T-Hg	mg/kg	7	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
Molybdenum T-Mo	mg/kg	10[d]	-	-	-	-	-	-	-	-	-	-	-	<8	-
Nickel T-Ni	mg/kg	50	-	-	-	-	-	-	-	-	-	-	-	13	-
Selenium T-Se	mg/kg	1	-	-	-	-	-	-	-	-	-	-	-	<4[e]	-
Silver T-Ag	mg/kg	20[d]	-	-	-	-	-	-	-	-	-	-	-	<4	-
Tin T-Sn	mg/kg	50[d]	-	-	-	-	-	-	-	-	-	-	-	<10	-
Vanadium T-V	mg/kg	130	-	-	-	-	-	-	-	-	-	-	-	24	-
Zinc T-Zn	mg/kg	-	10000	953	527	4130	614	1030	1350	1600	802	1090	719	1570	1520

Associated ALS Analytics files: T6394, T4327, T3582, T3279, T2886, T2587

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

na = No field screening result available

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 ESP-150-I-D is incorrectly recorded as ESP-150-I-C in ALS report T2886*

*** Sample ESP-151-I-D is incorrectly recorded as ESP-151-I-C in ALS report T2886*

**** Sample ESP-153-I-Q was recorded as ESP-153-I-C in ALS report T2886*

***** Sample ESP-186-F-C was incorrectly recorded as ESP-186-W-C in ALS report T3582*

Table ESP-23-1. Exploration Stockpile and Shoreline North of Dock Remediation Confirmation Soil Samples - Metals

Gartner Lee		Location		Exploration Stockpile and Shoreline North of Dock				
		Sample ID		ESP-197-W-C	ESP-198-F-Q (Duplicate of ESP 195-F-C)	ESP-245-F-C	ESP-246-F-C	ESP-247-F-C
		Date Sampled		19/09/2003	19/9/2003	4/11/2003	4/11/2003	4/11/2003
		Field Screen Pb[c] (ppm)		427.61	276.23	na	na	na
		Field Screen Zn[c] (ppm)		1455.17	1347.23	na	na	na
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	264	677	670	1090	***2820***
Mercury T-Hg	mg/kg	7	-	-	-	-	-	-
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	767	2440	5410	8250	3700

Associated ALS Analytics files: T6394, T4327, T3582, T3279, T2886, T2587

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

na = No field screening result available

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 ESP-23-2. Exploration Stockpile and Shoreline North of Dock Quality Assurance and Quality Control Remediation Soil Samples

Gartner Lee	Parameter	Pb		Zn		Total Pb			Total Zn		
	Relative Percent Difference (RpD)[a]	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											
ESP-5-I-D	ESP-255-I-Q	70	350	150	750	1346	1489	5.0	8890	9719	4.5
ESP-8-I-D	ESP-256-I-Q	70	350	150	750	1189	1140	2.1	6724	4502	19.8
ESP-17-I-D	ESP-257-I-Q	70	350	150	750	10085	10720	3.1	53793	54310	0.5
ESP-21-I-D	ESP-258-I-Q	70	350	150	750	18831	17590	3.4	101748	100336	0.7
ESP-24-I-D	ESP-259-I-Q	70	350	150	750	16199	17585	4.1	81551	85831	2.6
ESP-42-I-D	ESP-260-I-Q	70	350	150	750	1240	2269	29.3	8186	15745	31.6
ESP-45-I-D	ESP-261-I-Q	70	350	150	750	1605	1725	3.6	10958	9550	6.9
ESP-69-I-D	ESP-254-I-Q	70	350	150	750	3122	2538	10.3	28713	23305	10.4
ESP-137-I-C	ESP-153-I-Q	70	350	150	750	416	496	8.8	1460	1896	13.0
ESP-203-I-C	ESP-250-I-Q	70	350	150	750	6314	8684	15.8	58072	71141	10.1
ESP-204-I-D	ESP-251-I-Q	70	350	150	750	9334	9331	0.0	64902	65516	0.5
ESP-209-I-D	ESP-252-I-Q	70	350	150	750	5225	2923	28.3	107142	54187	32.8
Analytical Laboratory Duplicates											
ESP-137-I-C	ESP-153-I-Q	200	1000	4	20	740	1510	na	1700	4130	41.7
ESP-195-F-C	ESP-198-F-Q	100	500	2	10	306	677	na	1570	2440	21.7
Analytical Laboratory Replicates											
ESP-129-F-D	QC# 349325	100	500	2	10	<100	257	na	1750	1070	24
ESP-135-I-C	QC# 350294	200	1000	4	20	221	437	na	819	1940	41
ESP-169-F-C	QC# 351835	50	250	1	5	514	446	7	1030	770	14
ESP-186-F-C	QC# 352936	100	500	2	10	143	215	na	719	2770	**58.8**
ESP-195-F-C	QC# 356057	100	500	2	10	306	315	na	1570	1630	1.9

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)*

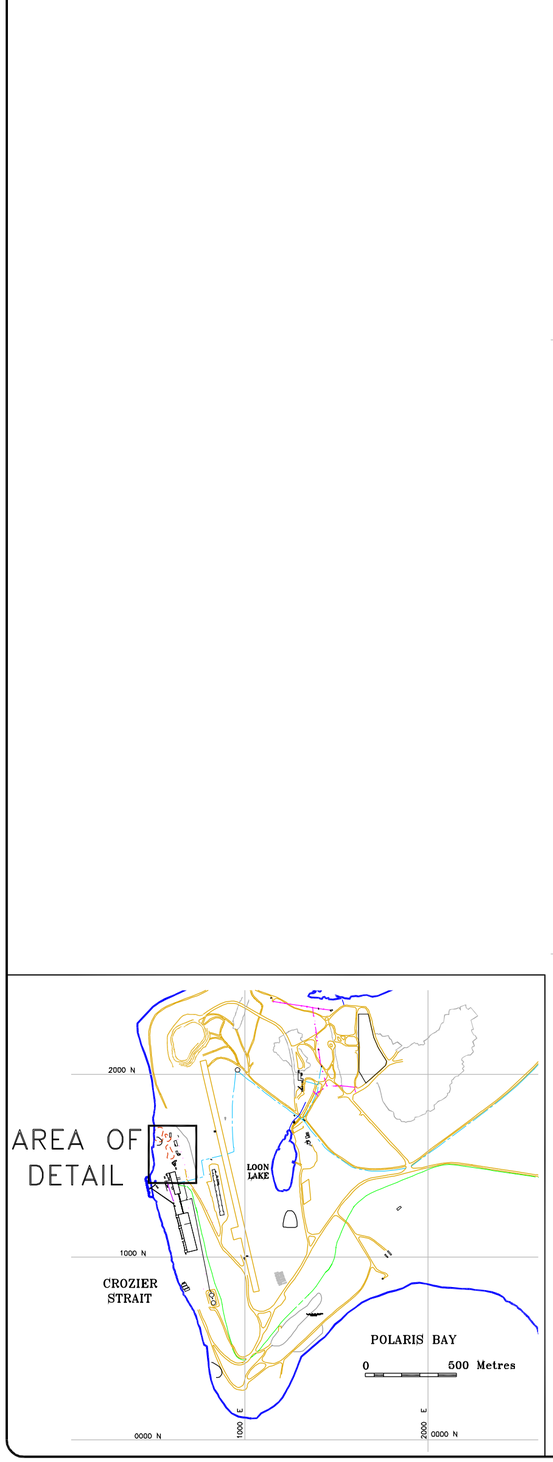
"na" = RpD value is not applicable because one or both results are less than the practical quantitation limit (PQL).

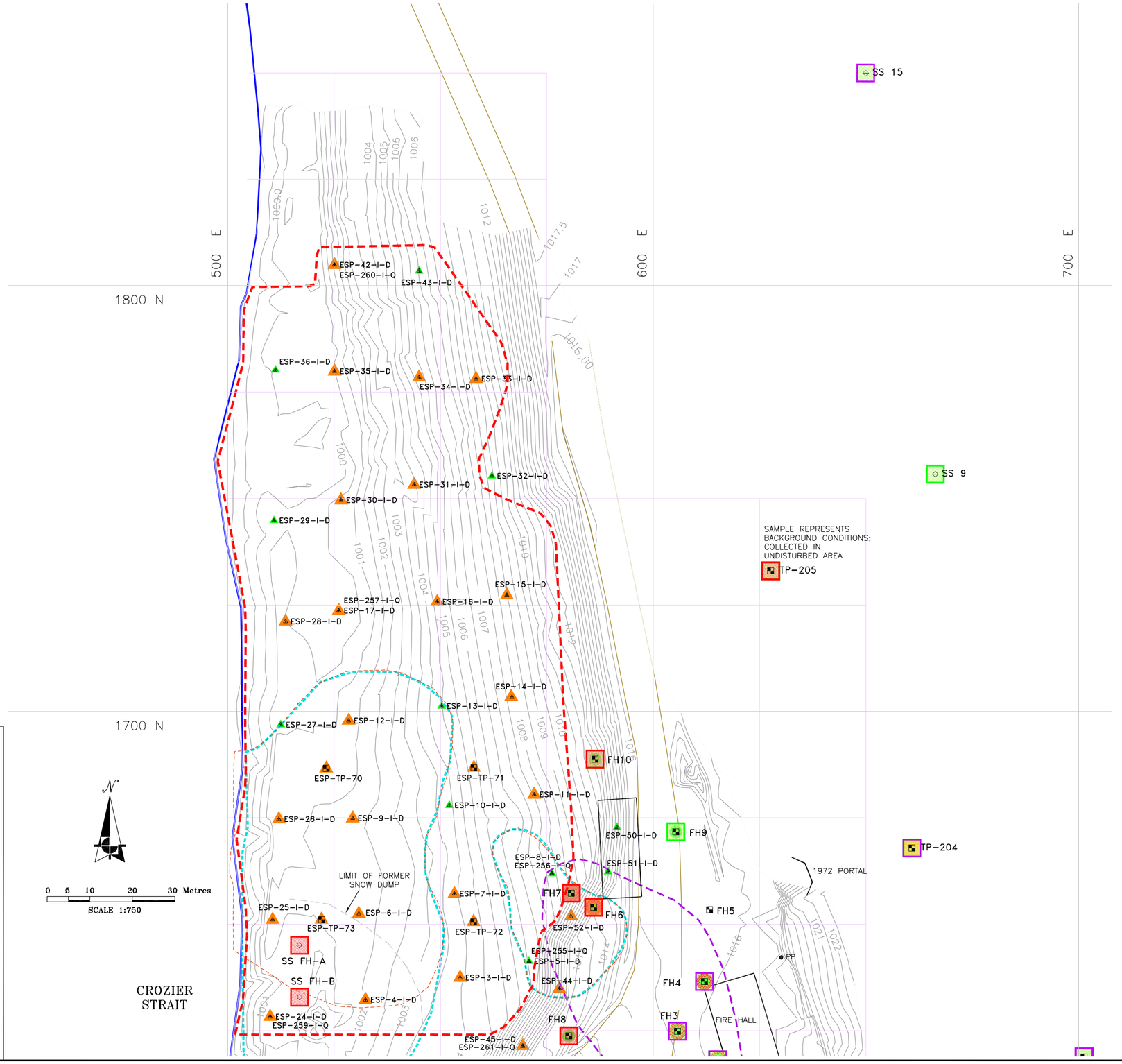
"-" = no result for given parameter

"<" = less than analytical method detection limit

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

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





LEGEND:

- LOCATION OF EXISTING BUILDING AND/OR FACILITY
- SHORE LINE
- ROADS
- LIMIT OF 2003 EXCAVATION
- EXCAVATION GRID
- GROUND CONTOURS BEFORE REMEDIATION (m)
- FORMER LOCATION OF ORE STOCKPILE
- LIMIT OF FORMER SNOW DUMP
- AREA OF CONCERN FOR HYDROCARBON CONTAMINATION FROM THE 1999–2000 ENVIRONMENTAL SITE ASSESSMENT (ESA)
- AREA OF CONCERN FOR METALS CONTAMINATION FROM THE 1999–2000 ENVIRONMENTAL SITE ASSESSMENT (ESA)
- PP — POWER POLE
- FH5 — TEST PIT – 1999 AND 2000 ENVIRONMENTAL SITE ASSESSMENTS
- SS 22 — SURFACE SAMPLE (1999/2000 ENVIRONMENTAL SITE ASSESSMENT)
- ESP-TP-70 — TEST PIT – 2003
- ESP-168-F-C — FIELD SCREENING SURFACE SAMPLE (2003)

ZINC CONCENTRATION IN SOILS (1999 & 2000 DATA)

- 0–1000 PPM
- 1000–5000 PPM
- 5000–10,000 PPM
- >10,000 PPM

LEAD CONCENTRATION IN SOILS (1999 & 2000 DATA)

- 0–1,000 PPM
- 1,000–2,000 PPM
- > 2,000 PPM

EPH CONCENTRATION IN SOILS (1999 & 2000 DATA)

- EPH 10–19 OR EPH 19–32 CONCENTRATION IN SOIL LESS THAN 1,000 mg/kg
- EPH 10–19 OR EPH 19–32 CONCENTRATION IN SOIL GREATER THAN OR EQUAL TO 1,000 mg/kg

2003 FIELD SCREENING RESULTS

- FIELD SCREENING RESULTS USING NITON XRF ANALYZER INDICATE LEAD CONCENTRATIONS IN SOIL ≥ 1,500 ppm AND/OR ZINC CONCENTRATIONS IN SOIL ≥ 8,500 ppm
- FIELD SCREENING RESULTS USING NITON XRF ANALYZER INDICATE LEAD CONCENTRATIONS IN SOIL < 1,500 ppm AND/OR ZINC CONCENTRATIONS IN SOIL < 8,500 ppm

NOTE:
THIS IS AREA 23 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:	23305-5D-04.DWG
REVISION:	0

teckcominco

CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

EXPLORATION STOCKPILE AND SHORELINE NORTH OF DOCK CONDITIONS BEFORE REMEDIATION (DECEMBER 31, 2003)

Gartner Lee

Figure No. ESP-23-1

2003 CONFIRMATION SAMPLES

FLOOR SAMPLES

Sample ID	Lead (mg/kg)	Zinc (mg/kg)
ESP-103-F-C	194	839
ESP-104-F-C	164	467
ESP-105-F-C	1250	6850
ESP-106-F-C	1530	4410
ESP-109-F-C	527	2200
ESP-110-F-C	778	4680
ESP-114-F-C	192	521
ESP-115-F-C	287	3600
ESP-120-F-D	163	674
ESP-129-F-D	<100	1750
ESP-133-I-C	301	1300
ESP-135-I-C	221	819
ESP-136-I-C	218	786
ESP-137-I-C	740	1700
ESP-153-I-Q (duplicate of ESP-137-I-C)	1510	4130
ESP-138-I-C	<200	659
ESP-139-I-C	265	798
ESP-140-I-C	785	2770
ESP-141-I-C	<200	464
ESP-142-I-C	<200	906
ESP-143-I-C	511	1980
ESP-150-I-D	312	953
ESP-151-I-D	<200	527
ESP-168-F-C	256	614
ESP-169-F-C	514	1030
ESP-170-F-C	254	1350
ESP-171-F-C	345	1600
ESP-172-F-C	97	802
ESP-173-F-C	246	1090
ESP-186-F-C	143	719
ESP-195-F-C	306	1570
ESP-198-F-Q (Duplicate of ESP-195-F-C)	677	2440
ESP-245-F-C	670	5410
ESP-246-F-C	1090	8250
ESP-247-F-C	2820	3700

WALL SAMPLES

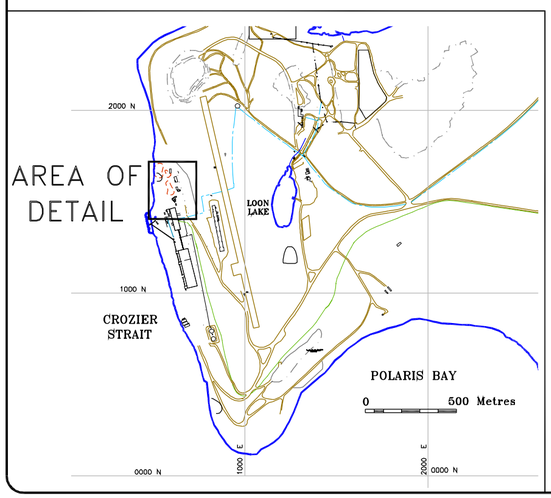
ESP-124-W-C	101	375
ESP-125-W-C	520	2550
ESP-126-W-D	146	519
ESP-128-W-D	<100	499
ESP-196-W-C	674	1520
ESP-197-W-C	264	767

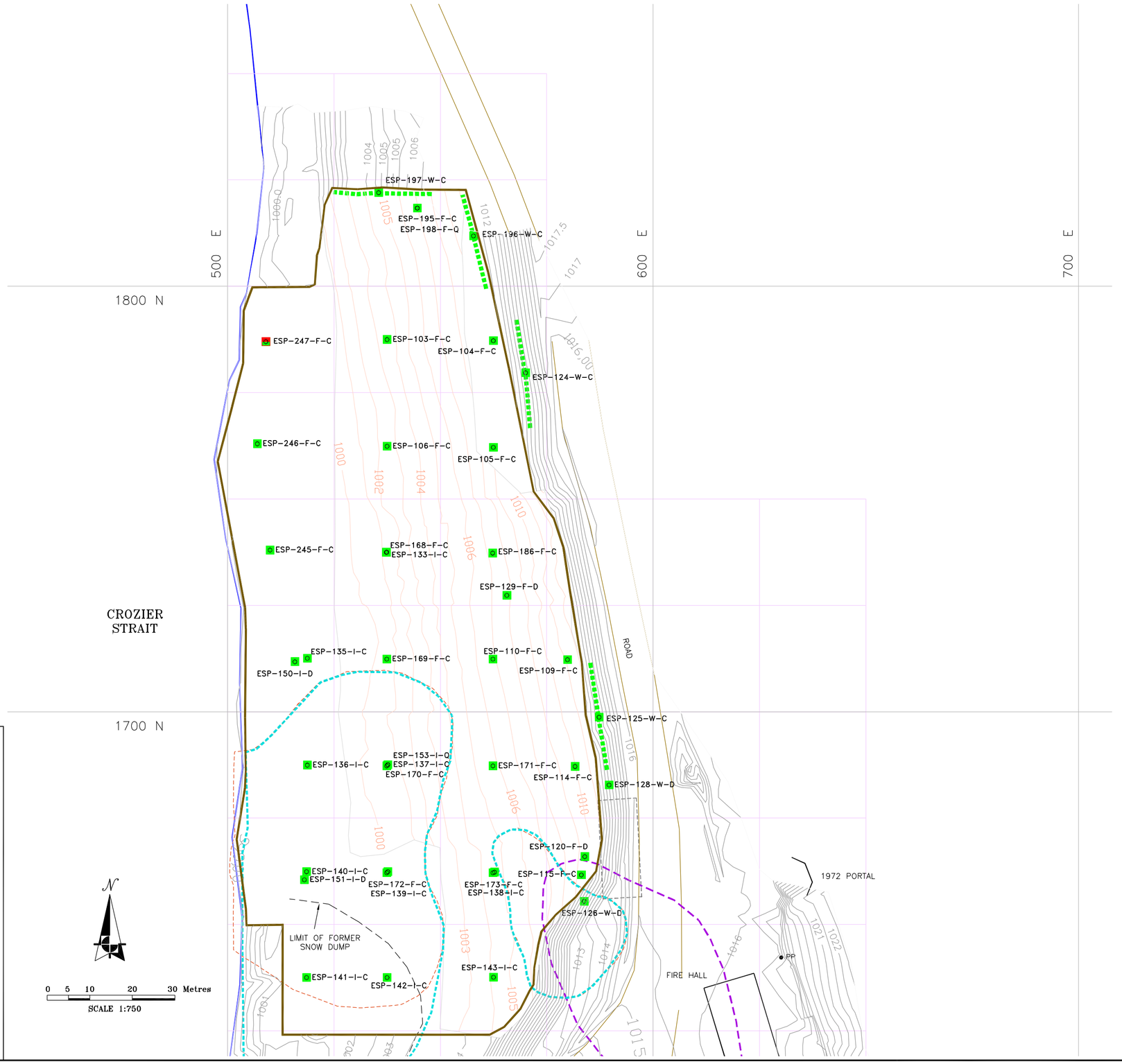
RESULTS IN **RED** INDICATE SAMPLE CONTAINING
≥ 2000 mg/kg LEAD OR ≥ 10,000 mg/kg ZINC

NOTES:

<100, <200 Less than detection limit

Lead, Zinc Lead or Zinc concentrations obtained from ALS analytical laboratory





LEGEND:

- LOCATION OF EXISTING BUILDING AND/OR FACILITY
- PP POWER POLE
- FORMER LOCATION OF BUILDINGS AND FACILITES (REMOVED)
- SHORE LINE
- ROADS
- EXCAVATION GRID
- CONTOURS – BASE OF EXCAVATION (m)
- GROUND CONTOURS (m) BASED ON SEPT. 2003 SURVEY
- FORMER LOCATION OF ORE STOCKPILE
- LIMIT OF FORMER SNOW DUMP
- LIMIT OF 2003 EXCAVATION
- AREA OF METAL CONCERN FROM 1999–2000 ENVIRONMENTAL SITE ASSESSMENT
- AREA OF HYDROCARBON CONCERN FROM 1999–2000 ENVIRONMENTAL SITE ASSESSMENT

2003 SAMPLES

- CONFIRMATORY FLOOR OR WALL SAMPLE

2003 SAMPLE NAMING CONVENTION

AREA – SAMPLE ID

ESP-109-F-C

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

LOCATION F= FLOOR SAMPLE
I= INTERMEDIATE FLOOR SAMPLE
W= WALL SAMPLE

- SAMPLE CONTAINS LESS THAN 10,000 mg/kg ZINC
- SAMPLE CONTAINS LESS THAN 2,000 mg/kg LEAD
- AREA OF WALL COMPOSITE WALL SAMPLE CONTAINS LESS THAN 10,000 mg/kg ZINC OR 2,000 mg/kg LEAD
- SAMPLE CONTAINS GREATER THAN OR EQUAL TO 10,000 mg/kg ZINC
- SAMPLE CONTAINS GREATER THAN OR EQUAL TO 2,000 mg/kg LEAD

NOTE:
THIS IS AREA 23 SHOWN ON FIGURE 1 "CONTAMINATED SOILS REMEDIATION PROGRESS PLAN, DECEMBER 31, 2003"

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

DRAWING INFORMATION:	
REVIEWED BY:	KT/AL
DRAWN BY:	CPW
DATE ISSUED:	13 FEBRUARY, 2004
PROJECT NUMBER:	23–305
FILE NAME:	23305–5D–03.DWG
REVISION:	0

teckcominco

CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

EXPLORATION STOCKPILE AND SHORELINE NORTH OF DOCK CONDITIONS AFTER REMEDIATION (DECEMBER 31, 2003)

Gartner Lee

Figure No. ESP-23-2

Appendix J

Polaris Mine Operations Contaminated Soil Remediation Close Out Report: 2002 Fuel Spill

Gartner Lee

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: 2002 Fuel Spill

BACKGROUND

On June 25, 2002, a fuel spill occurred at the Polaris Mine site, as a result of the discharge of standing water that was impacted with diesel fuel, from within the containment berm of the fuel tank farm. Residual hydrocarbon contaminated sediment remained present down gradient of the point of discharge following clean up efforts in 2002. The 2002 Fuel Spill is located down gradient of the fuel tank farm and it is shown as Area 24 on Figure 1: *Contaminated Soils Remediation Progress Plan, December 31, 2003*.

The spill response measures undertaken and the results of an environmental investigation conducted by Gartner Lee Limited (GLL) are documented in the *2002 Fuel Spill Assessment, Polaris Mine, Nunavut,* dated November 2002. The results of a field investigation concluded that hydrocarbon contamination remained between the down slope boundary of a ditch on the west side of the road, the West Interceptor Ditch, and the low tide contour over a length of 40 meters, the "40 m Zone". The 2002 Fuel Spill Assessment concluded that residual impacted soil could be removed during the overall site remediation.

In 2003, the hydrocarbon impacts within the 40 m Zone appeared as discontinuous hydrocarbon stains within the beach sediment as shown on Figure SPL02-24-1. The residual impacted sediment was removed during the overall Site remediation in accordance with the approved *Polaris Mine Decommission and Remediation Plan*, March 2001.

METHODOLOGY

Excavation

On June 26, 2003, excavation of the 40 m Zone commenced between the low tide contour and the West Interceptor Ditch. At the time of excavation, the sea ice was frozen to the ocean floor. The ice conditions therefore, acted as a silt barrier between the excavation and the aquatic environment. To further minimize ocean sediment disturbance, excavation was undertaken at low tide.

Absorbent booms and pads were kept on site to mitigate any possible petroleum hydrocarbon seeps into the marine environment.

To direct the excavation of the hydrocarbon contaminated sediment, visual and olfactory indications were used, along with field screening measurements of the concentrations of organic vapours in sediment samples. The field screening measurements were obtained using a portable photo- ionization detector (PID) to measure the concentrations of organic vapours in the headspace of the sample bags. The limits of the excavation are shown on Figure SPL02-24-2. The material excavated was disposed of underground mine workings in accordance with regulatory approvals.

Confirmation Sampling

Discrete sediment samples were collected at 10 m intervals from within the excavation on July 11, 2003 and September 5, 2003 and sent to Aurora Laboratory Services Ltd. (ALS) of Vancouver, BC, to verify the presence and nature of the hydrocarbon compounds. Upon receipt of these results the area was backfilled in order to control erosion of the roadway.

ANALYTICAL RESULTS

The analytical laboratory results are summarized in Tables SPL02-24-1 and SPL02-24-2, along with the approved Polaris Mine soil quality remediation objectives (SQROs)[1] for hydrocarbons

[1] *Polaris Mine Decommission and Remediation Plan*, March 2001.

and the generic Canadian Environmental Quality Guidelines (CEQG) for hydrocarbons in marine sediment[2], respectively. A total of nine (9) discrete floor remediation confirmation soil samples were submitted for analyses. All samples returned hydrocarbon concentrations below the SQROs. Two (2) samples were analyzed for polycyclic aromatic hydrocarbons and both samples returned results below the generic CEQG probable effect levels for marine sediment. The sediment quality results and the lateral limits of the excavation are shown on Figure SPL02-24-2.

CONCLUSIONS

Based on confirmatory sampling, consistent with good practice and the approved site specific sampling procedures and protocols, the remediation of the 2002 Fuel Spill area has been completed to meet the Polaris Mine remedial targets, as documented in the approved *Polaris Mine Decommissioning and Remediation Plan*, March 2001 and the CEQG guidelines for marine sediment.

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

[2] *Canadian Environmental Quality Guidelines* (CEQG) for sediment, Canadian Council of Ministers of the Environment (CCME), Winnipeg MB, 1999.

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

ORIGINAL COPY SIGNED AND STAMPED

Arlene Laudrum, P.Geol.
Remediation Supervisor, Polaris Mine

AL:KT

ATTACHMENTS

Tables

Table SPL02-24-1: 2002 Fuel Spill Remediation Confirmation Soil Samples – Extractable Petroleum Hydrocarbon
Table SPL02-24-2: 2002 Fuel Spill Remediation Confirmation Soil Samples – Polycyclic Aromatic Hydrocarbon

Figures

Figure SPL02-24-1: 2002 Fuel Spill Conditions Before Remediation
Figure SPL02-24-2: 2002 Fuel Spill Conditions After Remediation

Table SPL 02-24-1. 2002 Fuel Spill Remediation Confirmation Sediment Samples - Hydrocarbons

Gartner Lee	Location	June 2002 Spill Zone								
	Sample ID	SPL02-2-F-D	SPL02-3-F-D	SPL02-4-F-D	SPL02-5-F-D	SPL02-6-F-D	SPL02-7-F-D	SPL02-8-F-D	SPL02-9-F-D	SPL02-10-F-D
	Date	7/12/2003	7/12/2003	7/12/2003	7/12/2003	9/5/2003	9/5/2003	9/5/2003	9/5/2003	9/5/2003
	Field Screen (ppm)[b]	20	25	45	25	-	-	-	-	-
Parameter	**Units**	**Polaris Mine SQROs[a]**	**Analytical Results**							
Extractable Hydrocarbons										
EPH (C_{10}-C_{19})[c]	mg/kg	1000 [d]	<200	<200	271	<200	<200	<200	<200	<200	<200
EPH (C_{19}-C_{32})[c]	mg/kg	1000 [d]	<200	<200	<200	<200	<200	<200	<200	<200	<200
LEPH (C_{10}-C_{19})[d]	mg/kg	1000	-	<200	-	-	-	-	<200	-	-
HEPH (C_{19}-C_{32})[d]	mg/kg	1000	-	<200	-	-	-	-	<200	-	-

Associated ALS Files : T1541, T4079

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

a) The Soil Quality Remediation Objective for the Polaris Mine Site is based on the Yukon Territorial Contaminated Sites Regulation (CSR) for Parkland 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 SPL 02-24-2. 2002 Spill Fuel Remedition Confirmation Sediment Samples - Polycyclic Aromatic Hydrocarbons

Gartner Lee	FEDERAL CEQG GUIDELINES		Sample Location	June 2002 Fuel Spill	
			Sample ID	SPL02-3-F-C	SPL02-8-F-D
	Marine Sediment		Date Sampled	7/12/2003	9/5/2003
	ISQG[b]	PEL[c]	Field Screen (ppm)[d]	25	-
Parameter			**Units**	**Analytical Results**	
Polycyclic Aromatic Hydrocarbons (PAHs)					
Acenaphthene	*0.00671*	0.0889	mg/kg	<0.04	<0.04
Acenaphthylene	*0.00587*	0.128	mg/kg	<0.05	<0.05
Anthracene	*0.0469*	0.245	mg/kg	<0.05	<0.05
Benz(a)anthracene	*0.0748*	0.693	mg/kg	<0.05	<0.05
Benzo(a)pyrene	*0.0888*	0.763	mg/kg	<0.05	<0.05
Benzo(b)fluoranthene	-	-	mg/kg	<0.05	<0.05
Benzo(g,h,i)perylene	-	-	mg/kg	<0.05	<0.05
Benzo(k)fluoranthene	-	-	mg/kg	<0.05	<0.05
Chrysene	*0.108*	0.846	mg/kg	<0.05	<0.05
Dibenz(a,h)anthracene	*0.00622*	0.135	mg/kg	<0.05	<0.05
Fluoranthene	*0.113*	11.494	mg/kg	<0.05	<0.05
Fluorene	*0.0212*	0.144	mg/kg	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	-	-	mg/kg	<0.05	<0.05
Naphthalene	*0.0346*	0.391	mg/kg	<0.05	<0.05
Phenanthrene	*0.0867*	0.544	mg/kg	<0.05	<0.05
Pyrene	*0.153*	1.398	mg/kg	<0.05	<0.05

Associated ALS files: T4079, T1541

BOLD Concentration greater than or equal the generic CEQG PEL for marine sediment

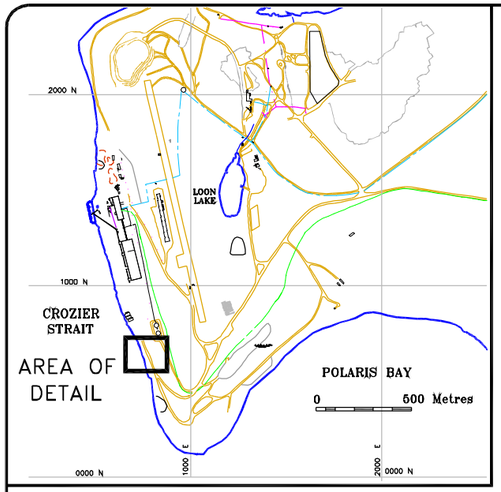
Notes:
< = Less than the detection limit indicated.
- = Analysis not conducted, or no guideline.

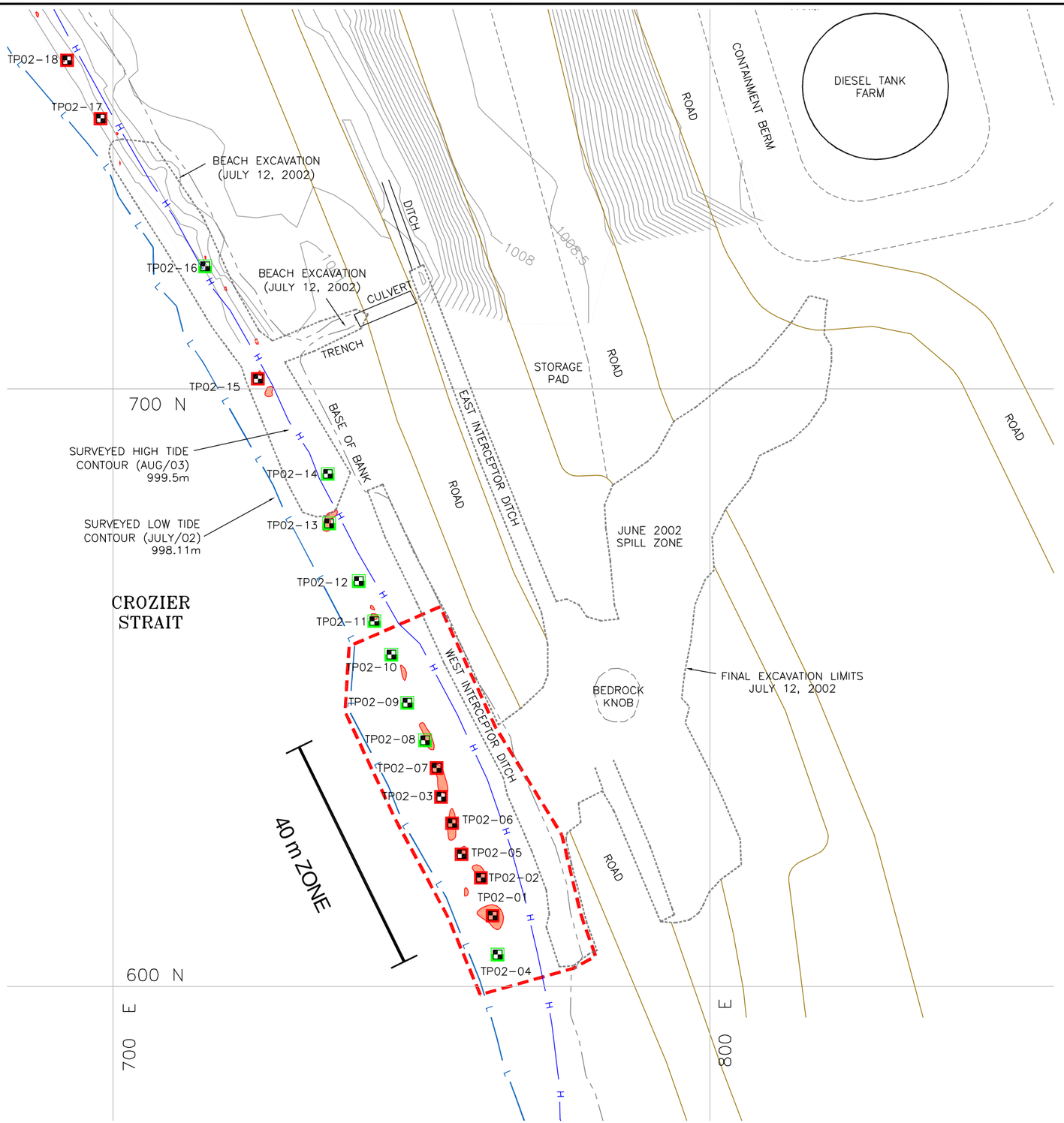
[a] CEQG - Canadian Environmental Quality Guidelines

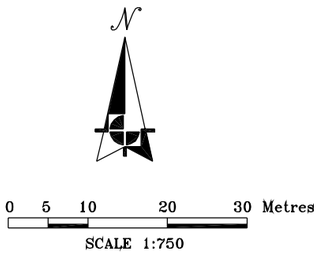
[b] *ISQG* - Interim Sediment Quality Guidelines (dry weight)

[c] **PEL** - Probable Effect Levels (dry weight)

[d] Field screening results are measured based on a 'dry headspace' method.







LEGEND:

- LOCATION OF EXISTING BUILDING AND/OR FACILITY
- ROADS
- GROUND CONTOURS BEFORE REMEDIATION (m)
- TOE OF SLOPE
- EDGE OF BERM/ROADWAY
- H — HIGH WATER MARK (SURVEYED AUGUST 2003)
- L — LOW WATER MARK (SURVEYED 19:50 h JULY 10, 2002)
- LIMIT OF 2003 EXCAVATION
- LIMIT OF 2002 EXCAVATION
- TP02-08 — TEST PIT – 2002 FUEL SPILL ASSESSMENT

2002 FUEL SPILL ASSESSMENT

- HYDROCARBON SURFACE STAINS (JULY 9, 2002)
- SEDIMENT ANALYTICAL RESULTS ARE LESS THAN THE POLARIS MINE SOIL REMEDIATION OBJECTIVES AND/OR CCME CEQG MARINE SEDIMENT QUALITY GUIDELINES FOR HYDROCARBONS.
- SEDIMENT ANALYTICAL RESULTS ARE GREATER THAN POLARIS MINE SOIL REMEDIATION OBJECTIVES AND/OR CCME CEQG MARINE SEDIMENT QUALITY GUIDELINES FOR HYDROCARBONS.

NOTE:
THIS IS AREA 24 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:	23305-5D-05.DWG
REVISION:	0

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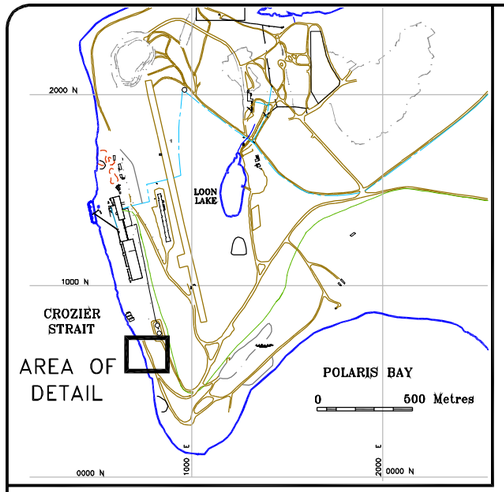
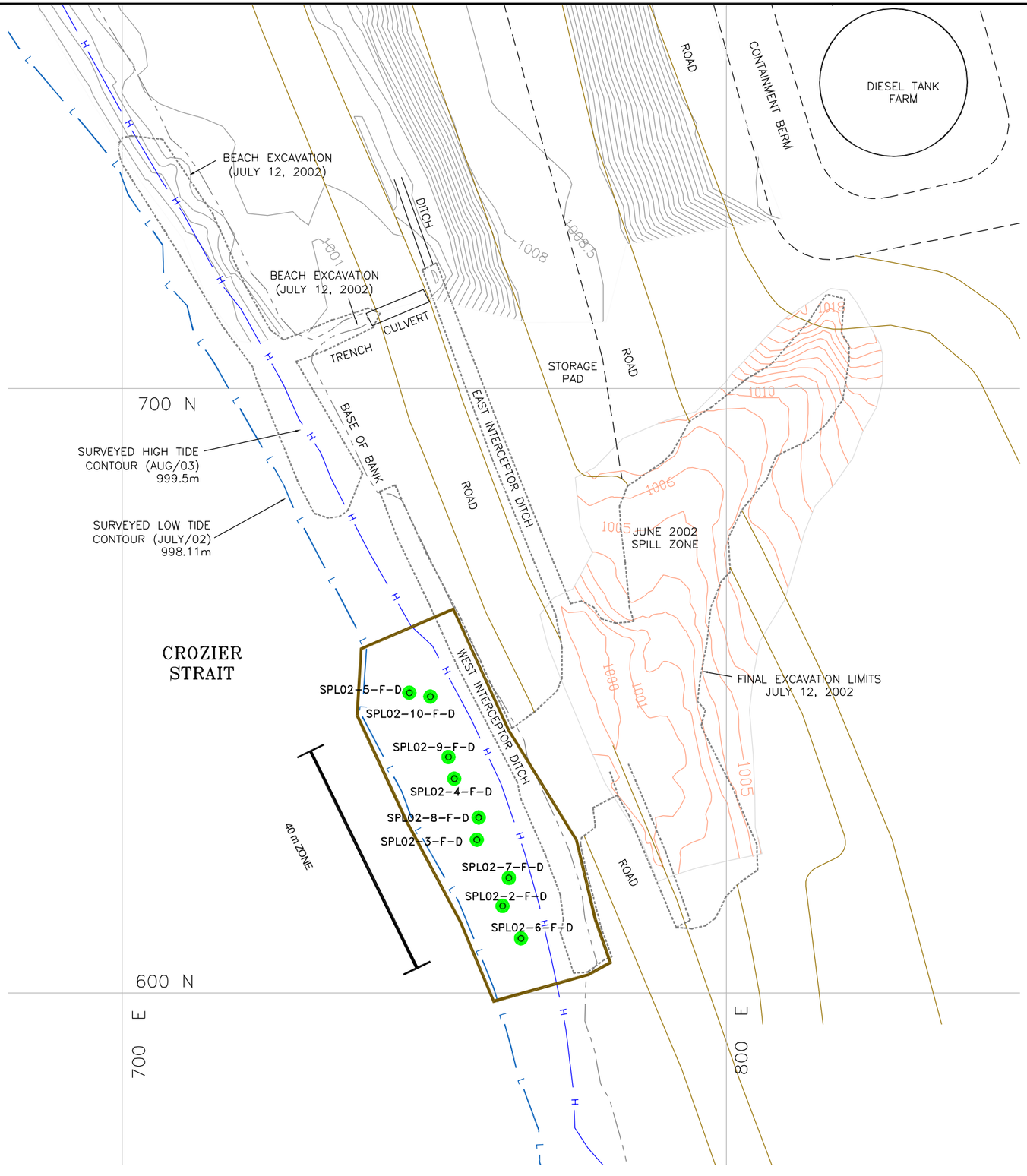
CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

2002 FUEL SPILL CONDITIONS BEFORE REMEDIATION (DECEMBER 31, 2003)

Gartner Lee

Figure No.
SPL02-24-1





0 5 10 20 30 Metres

SCALE 1:750

2003 CONFIRMATION SAMPLES

EXCAVATION FLOOR SAMPLES

Sample ID	EPH 10-19 (mg/kg)	EPH 19-32 (mg/kg)
SPL02-2-F-D	<200	<200
SPL02-3-F-D	<200	<200
SPL02-4-F-D	271	<200
SPL02-5-F-D	<200	<200
SPL02-6-F-D	<200	<200
SPL02-7-F-D	<200	<200
SPL02-8-F-D	<200	<200
SPL02-9-F-D	<200	<200
SPL02-10-F-D	<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:

- LOCATION OF EXISTING BUILDING AND/OR FACILITY
- ROADS
- LIMIT OF EXCAVATION SURVEY
- TOE OF SLOPE
- EDGE OF BERM/ROADWAY
- H — HIGH WATER MARK (SURVEYED AUGUST 2003)
- L — LOW WATER MARK (SURVEYED 19:50 h JULY 10, 2002)
- CONTOURS – BASE OF 2002 EXCAVATION (m)
- GROUND CONTOURS (m) BASED ON SEPT. 2003 SURVEY
- LIMIT OF 2003 EXCAVATION
- LIMIT OF 2002 EXCAVATION

2003 SAMPLES

- CONFIRMATORY FLOOR OR WALL SAMPLE

2003 SAMPLE NAMING CONVENTION

AREA — SAMPLE ID

SPL02-6-F-D

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

LOCATION
- F= FLOOR SAMPLE
- I= INTERMEDIATE FLOOR SAMPLE
- W= WALL SAMPLE

EPH10-19 / EPH19-32 — SOIL SAMPLE FROM EXCAVATION CONTAINS LESS THAN 1,000 mg/kg EPH 10-19 OR EPH 19-32

NOTE:

THIS IS AREA 24 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:	23305-5D-06.DWG
REVISION:	0

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CONTAMINATED SOIL REMEDIATION
2003 CLOSE OUT REPORT
POLARIS MINE, NUNAVUT

2002 FUEL SPILL CONDITIONS AFTER REMEDIATION (DECEMBER 31, 2003)

Gartner Lee

Figure No. SPL02-24-2

APPENDIX 3

UPDATE OF

DECOMMISSIONING AND RECLAMATION

SCHEDULE

POLARIS MINE - DECOMMISSIONING & RECLAMATION SCHEDULE

UPDATED AS OF December 31, 2003

ACTIVITY	Prior Periods	4th Qtr. 2003			1st Qtr. 2004			2nd Qtr. 2004			3rd Qtr. 2004			Percent Complete As Of Dec 31/03
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
CONTRACTOR MOBILIZATION														
Pre-mobilization Planning / Order Materials/Equip														
Ship to Site with Contractor Equipment														100%
Offload Ship														100%
Setup Warehousing/Laydown Area														100%
SETUP TEMPORARY FACILITIES														100%
DECOMMISSIONING UNDERGROUND														
Remove / Salvage Mine Equipment & Crusher	Cancelled													100%
Remove Refrigeration Plant														0%
Remove Surface Ventilation Fans														0%
Seal Mine Openings														0%
MILL / BARGE DEMOLITION														
Initial Cleanup of Barge by Teck Cominco														100%
Removal of Barge Services														98%
Transfer fuel to Tank Farm & Clean Hull														100%
Remove hazardous Materials / Wastes														100%
Remove / Salvage Process Equipment														100%
Demolish Internal Equipment														100%
Demolish Structure														100%
Remove Hydrocarbon/Metals Contaminated Soils														55%
Regrade Area Surounding Barge														25%
PRODUCT STORAGE BUILDING DEMOLITION														
Cleanup of Building / Remove Liquids from Equip.														100%
Demolish Exterior Conveyors														100%
Demolish Reclaim Conveyors														100%
Remove Cladding from Building														100%
Demolish Structure														100%
Demolish Foundations														98%
Remove Contaminated Soils (Building & Adj. Areas)														60%
Regrading Area														10%
SHIP LOADER / RECLAIM CONVEYOR DEMOL.														
Cleanup of Conveyor Areas/Remove Oils														100%
Demolish Conveyors														100%

POLARIS MINE - DECOMMISSIONING & RECLAMATION SCHEDULE

UPDATED AS OF December 31, 2003

ACTIVITY	Prior Periods	4th Qtr. 2003			1st Qtr. 2004			2nd Qtr. 2004			3rd Qtr. 2004			Percent Complete As Of Dec 31/03
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
DOCK DECOMMISSIONING														
Inspect / Remove Glycols from Freeze Pipes														100%
Remove Metals Contaminated Soils														95%
Remove Cells 1 & 2														75%
Remove Cells 3 & 4														75%
Removal of Temporary Dock														0%
Shoreline Recontouring														70%
Berm Removal														65%
Grade New Beach to Final Profiles														25%
TAILINGS SYSTEM DEMOLITION														
Final Cleanup of Thickener (by Operations)														100%
Flush Tails Lines														100%
Salvage Equipment														100%
Remove hazardous Materials / Wastes														100%
Remove Tails Line / Return Line														80%
Demolish Equipment														100%
Demolish Structure														100%
Remove Foundations														100%
Remove Contaminated Soils														100%
Regrading														100%
Final Cleanup of Area														95%
GARROW LAKE / DAM DECOMMISSIONING														
Drawdown Lake														100%
Removal of Centre Section of Dam														75%
Creek Channel Construction														0%
Final Grading / Armouring of Dam Remnants														0%
CRF PLANT DEMOLITION														
Final Cleanup of Plant														100%
Remove hazardous Materials / Wastes														100%
Demolish Plant Equipment														100%
Demolish Buildings														100%
Site Grading (Plant & Surrounding Area)														100%

POLARIS MINE - DECOMMISSIONING & RECLAMATION SCHEDULE

UPDATED AS OF December 31, 2003

ACTIVITY	Prior Periods	4th Qtr. 2003			1st Qtr. 2004			2nd Qtr. 2004			3rd Qtr. 2004			Percent Complete As Of Dec 31/03
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
ACCOMODATIONS COMPLEX DEMOLITION														
Establish Temporary Offices / Building Services														100%
Use Accomodations Complex														75%
Establish Temporary Camp Accomodations														0%
Use Temporary Camp														0%
Remove hazardous Materials / Wastes														0%
Demolish Buildings														0%
Regrade Area														0%
Remove Temporary Camp														0%
FUEL STORAGE (TANK FARM) DEMOLITION														
Use with Temporary Modifications														100%
Transfer Fuel to Temporary Storage														0%
Cleaning of Tanks / Piping														60%
Demolish Tanks / Piping														0%
Cleanup of Berm & Liner														0%
Site Grading														0%
BLADDER AREA CONTAMINATED SOILS														
Cleanup of Hydrocarbon Soils														100%
Area Grading														100%
MISC. BUILDING DEMOLITION														
Exploration Quonset Huts														100%
Core Shack (Atco Trailer)														100%
Emergency Shelter at North Portal														0%
Steam Wash Bay & Tire Shop (relocated in 3rd Qtr)														50%
Generator Building														0%
Bent Horn Building														0%
Dock Office Trailer														0%
Airstrip Storage Hut														0%
Fresh Water Pump House														0%
Frsh Water Tank & Shed														0%
Carpenter Shop (used as temp. warehouse)														0%
Shipping Containers (Sea Cans - more to move on-going)														50%
Foldaways by Temporary Dock (3)														0%
Firehall														0%

POLARIS MINE - DECOMMISSIONING & RECLAMATION SCHEDULE

UPDATED AS OF December 31, 2003

ACTIVITY	Prior Periods	4th Qtr. 2003			1st Qtr. 2004			2nd Qtr. 2004			3rd Qtr. 2004			Percent Complete As Of Dec 31/03
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
OPERATIONAL LANDFILL CLOSURE														
Reclocate Construction Landfill														100%
Hauling Landfill Cover Cap Material														98%
LRD QUARRY Landfill														
Cut Notch into Quarry / Construct Haul Road														100%
Installation of Thermistor Pipe Stands														100%
Placing debris in Quarry														80%
Grading of Notch to Match Cap														75%
Placement of Cap and Final Grading														0%
Installation of Thermistors (pipes installed)														20%
MISC. SITE RECLAMATION & EARTHWORKS														
Reduction in spare parts/supplies by TCML														100%
Ship Mill Process Chemicals South for Sale/Recycle														100%
Site Cleanup of scrap material during operations														100%
Regrading North 40 Area														80%
Grading of Reclamation Landfill Area														90%
Road Closure / Culvert Removals/Runway														15%
DEMOBILIZE FROM SITE														
Prepare Equipment / Supplies for shipping from site														5%
Prepare Residual Chemicals / Wastes for shipping														85%
Last Ship from Polaris														0%

APPENDIX 4

UPDATE OF ESTIMATED

MINE DECOMMISSIONING, RECLAMATION

AND

MONITORING COSTS

POLARIS MINE DECOMMISSIONING, RECLAMATION AND MONITORING COST ESTIMATE
4th QUARTER 2003 UPDATE

	BUDGET		DEC 31, 2003 CLAIMED TO DATE		FORECAST FINAL PROJECT COST		COST VARIANCES		COMMENTS
	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	
DEMOLITION & RECLAMATION (BARE COSTS)									
MINE EQUIPMENT REMOVAL									
Hazardous Materials Removal	35,845		853		17,613		-18,232		
Mine Refrigeration Plant	145,525		14,281		30,671		-114,854		
Mobile & Mine Equipment	2,919		12,981		46,306		43,387		
Remove Salvaged Mine Equipment	20,754		3,983		16,153		-4,601		
Misc Sub Contract Costs	45,957		23,297		23,297		-22,660		
		$ 251,000		$ 55,395		$ 134,040		$ (116,960)	Demolition costs are proving to be less expensive than budget in general for the project
MINE ACCESS SEALING									
Seal Mine Portals	60,000		464		92,384		32,384		
		$ 60,000		$ 464		$ 92,384		$ 32,384	
CONCENTRATOR BUILDING									
Miscellaneous Materials	22,092				-		-22,092		
Mill Equipment Clean-Up - Fuels	16,398				-		-16,398		
Mill Equipment Clean-Up	99,900		40,613		40,613		-59,287		
Hazardous Materials Removal	151,117		94,553		102,725		-48,392		
Barge Demolition	608,592		441,028		445,574		-163,018		
Misc Process Equipment Demolition & Removal	197,432		183,317		183,317		-14,115		
Misc Sub Contract Costs	88,469		83,992		88,444		-25		
		$ 1,184,000		$ 843,503		$ 860,673		$ (323,327)	Demolition has taken less manpower than expected. Effective demolition contractor.
CONCENTRATE STORAGE STRUCTURE & EQUIPMENT									
Concentrate Storage Equipment Clean-Up	26,117		1,905		1,905		-24,212		
Conveyors	67,600		8,421		8,421		-59,179		
Concentrate Storage Structure & Equipment	555,283		224,423		101,034		-454,249		
		$ 649,000		$ 234,749		$ 111,360		$ (537,640)	Demolition has taken less manpower than expected. Effective demolition contractor.
SHIP LOADER & CONVEYOR									
Conveyors	50,000		24,592		24,592		-25,408		
		$ 50,000		$ 24,592		$ 24,592		$ (25,408)	
DOCK & SHORELINE									
Dock & Shoreline Reclamation	869,000		288,597		1,013,301		144,301		
		$ 869,000		$ 288,597		$ 1,013,301		$ 144,301	Handling of contamianted soils is taking more time than expected due to productivity and increased quantities.
THICKENER & TAILINGS LINES									
Hazardous Materials Removal	22,577		16,452		16,452		-6,125		
Tailings Thickener	377,423		93,633		107,179		-270,244		
		$ 400,000		$ 110,085		$ 123,631		$ (276,369)	Demolition has taken less manpower than expected. Effective demolition contractor.
GARROW LAKE									
Garrow Lake Siphons & Lake Drawdown	120,391		195,965		195,965		75,574		
Dam/Spillway Modifications	95,467		175,411		348,820		253,353		
Escalation Allowance	3,142				-		-3,142		
		$ 219,000		$ 371,376		$ 544,785		$ 325,785	Design drawings have identified work not included in budget. Siphoning of the lake required more siphons and maintenance that forecast. Initial excavation of dam is more
CRF PLANT STRUCTURE & EQUIPMENT									
CRF Plant Equipment Clean-Up	7,002		1,040		1,040		-5,962		
CRF Plant Equipment Removal	17,533		9,406		9,406		-8,127		
CRF Plant Buildings Demolition	130,455		23,497		23,497		-106,958		
Misc Sub Contract Costs	11,010		46,766		48,990		37,980		
		$ 166,000		$ 80,709		$ 82,933		$ (83,067)	Demolition has taken less manpower than expected. Effective demolition contractor.
ACCOMMODATION COMPLEX STRUCTURE & EQUIPMENT									
Accommodation Complex Building Demolition	249,000		10,211		210,360		-38,640		
		$ 249,000		$ 10,211		$ 210,360		$ (38,640)	
FUEL STORAGE & HANDLING EQUIPMENT									
Miscellaneous Materials	3,681		2,531		2,531		-1,150		
Purge & Decommission Fuel Tanks	53,404		293,828		365,149		311,745		
Hazardous Materials Removal	50,645		235,782		277,701		227,056		
Fuel Pumping & Distribution Systems	87,270				156,390		69,120		
		$ 195,000		$ 532,141		$ 801,771		$ 606,771	Evacuation and cleaning of tanks has cost much more than expected to date. Work being done by a specialized contractor.
BUILDINGS & CONTAINERS									
Miscellaneous Materials	1,323				-		-1,323		
Misc Warehouse / Shipping Equipment	1,221		3,292		3,292		2,071		
Misc Buildings Demolition	250,456		35,398		251,956		1,500		
		$ 253,000		$ 38,690		$ 255,248		$ 2,248	
MISC CONTRACTOR LABOUR									
Unallocated Labour	133,000		61,059		61,059		-71,941		
		$ 133,000		$ 61,059		$ 61,059		$ (71,941)	Costs for this code are being experienced in other areas instead of here.
GENERAL SITE GRADING									
Hazardous Materials Removal	44,719		21,622		184,473		139,754		
General Site Grading & Reclamation	7,129		215,760		307,552		300,423		
Escalation Allowance	4,152				-		-4,152		
		$ 56,000		$ 237,382		$ 492,025		$ 436,025	Ongoing road maintenance is much greater than budgeted. No scope change

POLARIS MINE DECOMMISSIONING, RECLAMATION AND MONITORING COST ESTIMATE
4th QUARTER 2003 UPDATE

	BUDGET		DEC 31, 2003 CLAIMED TO DATE		FORECAST FINAL PROJECT COST		COST VARIANCES		COMMENTS
	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	
LANDFILL RECLAMATION									
Landfill Reclamation	432,000		807,804		886,544		454,544		
		$ 432,000		$ 807,804		$ 886,544		$ 454,544	Scope of work has not changed. Underbudgeted unit costs here.
CONTAMINATED SOILS - CLEANUP									
Metals & Hydrocarbon Contaminated Soils Cleanup & Disposa	366,623		1,135,061		1,696,023		1,329,400		
Hydrocarbon Contaminated Soils (By Polaris)	6,097		13,131		13,131		7,034		
Metals Contaminated Soils (By Polaris)	173,605		52,382		52,382		-121,223		
U/G Handling & Disposal Of Contaminated Soils	48,675		435,455		659,993		611,318		
		$ 595,000		$ 1,636,029		$ 2,421,529		$ 1,826,529	Volumes of contaminated soils have substantially increased from budget
QUARRIES & MINE SURFACE RECLAMATION (EARTHWORK)									
Backfill & Re-Contouring	263,000		179,158		502,127		239,127		
		$ 263,000		$ 179,158		$ 502,127		$ 239,127	General site contouring is taking more labour than expected. Was a hard item to quantify for budget purposes as it is a subjective item (i.e. no quantities to base
MISC. DEMOLITION & CLEAN-UP									
Misc Unallocated Clean-Up / Demo	380,000		41,483		41,405		-338,595		
		$ 380,000		$ 41,483		$ 41,405		$ (338,595)	Demolition has been proceeding much better than planned.
EQUIPMENT PURCHASE/RENTAL									
Contractor Equipment Rental	5,274,900		3,370,804		5,037,786		-237,114		
Contractor Misc Equipment Purchase	719,407		432,906		432,906		-286,501		
Escalation Allowance	59,693				-		-59,693		
		$ 6,054,000		$ 3,803,710		$ 5,470,692		$ (583,308)	Obtained better unit rates for equipment rental than budgeted and have had to purchase less other equipment than anticipated (i.e. made better use of surplus mine equipment
MISC. SERVICES & SUPPLIES									
Misc Purchased Materials / Supplies	235,333		166,943		166,943		-68,390		than planned)
Escalation Allowance	19,667				-		-19,667		
		$ 255,000		$ 166,943		$ 166,943		$ (88,057)	
FUEL									
Fuel Supply	3,294,536		4,216,186		4,216,186		921,650		
Fuel Taxes (Heating & Power Generation)	68,677				99,727		31,050		
Fuel Taxes (Equipment)	467,343		412,415		677,493		210,150		
Escalation Allowance	157,444				-		-157,444		
		$ 3,988,000		$ 4,628,601		$ 4,993,406		$ 1,005,406	Increased soils quantities are resulting in increase fuel usage
MAINTENANCE OF EQUIPMENT & FACILITIES									
Mobile Equip Maintenance	1,296,759		4,590,733		5,645,832		4,349,073		
Building Maintenance	506,923		1,519,163		2,233,674		1,726,751		
Escalation Allowance	101,318				-		-101,318		
		$ 1,905,000		$ 6,109,896		$ 7,879,506		$ 5,974,506	Single biggest variance due to a combination of underestimating cost per hour of maintenance plus additional quantity of contaminated soils means equipment is used
PRE - PURCHASED EQUIPMENT (BY COMINCO)									
Construction Equipment - Purchase (By Owner)	541,000		541,271		541,271		271		more and later into the fall which is hard on the equipment.
		$ 541,000		$ 541,271		$ 541,271		$ 271	
CONTRACTOR'S FIELD SUPPORT & SUPPLIES									
TRANSPORTATION (SHIPPING)									
Packing & Preparation	85,326		60,035		70,035		-15,291		
Shipping Costs	948,661		1,583,252		2,343,952		1,395,291		
Escalation Allowance	78,013				-		-78,013		
		$ 1,112,000		$ 1,643,287		$ 2,413,987		$ 1,301,987	Transportation unit costs are higher than budgeted as well as increased quantities due
CONTRACTOR MOB, DEMOB & SUPERVISION									to additional soils volumes (increased parts / supplies required to be shipped)
Contractor Mob/Demob	61,883		99,988		233,463		171,580		
Contractor Supervisory/Admin Personnel	2,127,339		2,432,983		3,787,759		1,660,420		
Safety Services & Supplies	36,000		272,192		356,848		320,848		
Misc Temporary Services / Modifications	223,824		930,603		1,359,454		1,135,630		
Escalation Allowance	13,954				-		-13,954		
		$ 2,463,000		$ 3,735,766		$ 5,737,524		$ 3,274,524	Additional soils quantities require additional manpower and supervision. Contractor is
MISC. SERVICES & SUPPLIES									also using more supervisors than would in the south for supvervising crews.
Communications & TV	374,000		105,302		196,235		-177,765		
Escalation Allowance	31,000				-		-31,000		
		$ 405,000		$ 105,302		$ 196,235		$ (208,765)	Anticipated higher communication costs than being experienced.
ACCOMODATIONS									
Catering	1,487,166		1,468,033		2,154,395		667,229		
Escalation Allowance	122,834				-		-122,834		
		$ 1,610,000		$ 1,468,033		$ 2,154,395		$ 544,395	Increased manpower levels have increased catering/housekeeping costs.
TRAVEL & PERSONNEL									
Travel (Airfares & Expenses)	1,552,881		2,691,525		4,381,247		2,828,366		
Travel Premium - Revised Rotation Schedule	1,072,773				-		-1,072,773		
Misc Personnel Transport	72,274		168,527		246,505		174,231		Unit costs for air travel has increase beyond normal escalation rates, poor weather has
Escalation Allowance	575,072				-		-575,072		added to layover costs and increase crew levels has increased the number of
		$ 3,273,000		$ 2,860,052		$ 4,627,752		$ 1,354,752	passengers traveling.

POLARIS MINE DECOMMISSIONING, RECLAMATION AND MONITORING COST ESTIMATE
4th QUARTER 2003 UPDATE

	BUDGET		DEC 31, 2003 CLAIMED TO DATE		FORECAST FINAL PROJECT COST		COST VARIANCES		COMMENTS
	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	
CONTRACTOR INDIRECTS									
HO MOB & DEMOB SUPPORT									
Mob & Demob	1,912,000		1,526,300		1,912,376		376		
		$ 1,912,000		$ 1,526,300		$ 1,912,376		$ 376	
CONTRACTOR MANAGEMENT SUPPORT									
Personnel	3,928,932		2,391,496		3,928,932		0		
Safety & First Aid Personnel to Provide Overlap	184,068		111,792		183,644		-424		
		$ 4,113,000		$ 2,503,288		$ 4,112,576		$ (424)	
OTHER CONTRACTOR INDIRECTS									
Contractor's General Indirects	4,952,000		4,435,584		5,121,490		169,490		
		$ 4,952,000		$ 4,435,584		$ 5,121,490		$ 169,490	Contractors offsite costs increasing due to increased work load on site.
ENGINEERING / PROJECT MANAGEMENT									
ENVIRONMENTAL SITE ASSESMENT									
Environmental Consultants - Site Assesment	275,787		300,113		318,777		42,990		
Site Assessment - Unallocated	207,874		105,263		191,524		-16,350		
Escalation Allowance	2,339				-		-2,339		
		$ 486,000		$ 405,376		$ 510,301		$ 24,301	
CLOSURE PLAN									
Environmental Consultants - Closure Plan	415,772		372,272		372,272		-43,500		
Escalation Allowance	2,228				-		-2,228		
		$ 418,000		$ 372,272		$ 372,272		$ (45,728)	
ENGINEERING / SPECIAL CONSULTANTS									
Design Consultants - Dock / Loadoul	1,316		1,413		1,413		97		
Design Consultants - Tailings / Garrow Lake	3,520		3,515		3,515		-5		
Design Consultants - Dock / Loadoul	79,684		65,354		79,994		310		
Design Consultants - Tailings / Garrow Lake	54,780		45,328		45,328		-9,452		
Sitework & Demolition Procedures - Design Services	18,300		14,465		55,400		37,100		
Escalation Allowance	2,400				-		-2,400		
		$ 160,000		$ 130,075		$ 185,650		$ 25,650	
PROJECT MANAGEMENT CONSULTANT (HO STAFF)									
Project Management - Salaries	411,069		866,433		1,093,738		682,669		
Project Management - Reimb Expenses	100,000		58,182		82,378		-17,622		
Escalation Allowance	31,931				-		-31,931		
		$ 543,000		$ 924,615		$ 1,176,116		$ 633,116	Complexities in dealing with contractor has increase work load of project manager.
CONSTRUCTION MANAGEMENT (FIELD STAFF)									
Construction Management - Salaries	2,142,878		1,160,877		1,746,990		-395,888		
Escalation Allowance	179,122				-		-179,122		
		$ 2,322,000		$ 1,160,877		$ 1,746,990		$ (575,010)	On site environmental personnel have helped reduce personnel requirements here.
ENVIRONMENTAL TESTING AND SAMPLING									
Environmental Reclamation Supervision - Staff	337,123		330,866		668,060		330,937		
Escalation Allowance	29,550				-		-29,550		
Environmental Reclamation Supervision - Testing	330,000		103,895		239,060		-90,940		
Additional Sampling and Consultant Services (MMER)	0		165,670		396,192		396,192		
Escalation Allowance	26,327				-		-26,327		
		$ 723,000		$ 600,431		$ 1,303,312		$ 580,312	Are using higher personnel levels due to increased soild quantities.
OWNER'S COSTS									
SALARIES & EXPENSES									
Teck Cominco HO Proj Mgmnt (Staff Lab)	374,631		353,762		563,132		188,501		
Teck Cominco HO Proj Mgmnt (Misc Material & Exp)	199,149		136,732		178,333		-20,816		
Escalation Allowance	34,220				-		-34,220		
		$ 608,000		$ 490,494		$ 741,465		$ 133,465	Work loads for proejct personnel have been higher than expected.
OVERHEAD / HO SUPPORT									
Land Leases, Licences	175,000		96,949		237,603		62,603		
Miscellaneous Permits	45,000		11,118		14,222		-30,778		
Insurance	445,900		91,332		174,310		-271,590		
Property Taxes	495,000		119,705		495,000		0		
Home Office General Admin (Labour & Exp)	722,384		16,150		30,000		-692,384		
Public Relations	74,292		58,718		74,292		0		
Legal	57,540		48,021		68,431		10,891		
Escalation Allowance	168,560				-		-168,560		
Misc Owner's Overhead	6,324		13,882		13,882		7,558		
		$ 2,190,000		$ 455,875		$ 1,107,740		$ (1,082,260)	Home office support has been less than anticpated. Offset somewhat by project management personnel
GENERAL ADMIN									
Closure Management - Polaris Personnel	54,000				-		-54,000		
Escalation Allowance	2,880				-		-2,880		
Closure Wrap Up	5,120		34,327		45,667		40,547		
		$ 62,000		$ 34,327		$ 45,667		$ (16,333)	

POLARIS MINE DECOMMISSIONING, RECLAMATION AND MONITORING COST ESTIMATE
4th QUARTER 2003 UPDATE

	BUDGET		DEC 31, 2003 CLAIMED TO DATE		FORECAST FINAL PROJECT COST		COST VARIANCES		COMMENTS
	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	
POST RECLAMATION COSTS (2005 - 2011)									
SITE MONITORING AND HOLDING COSTS									
Annual Post Closure Environmental Monitoring (2005 to 2011)	510,000		-		510,000		0		
Final Sampling Program, Data Evaluation and Reporting in 2011	160,000		-		160,000		0		
Land Lease/Licence costs from 2005 to 2011	126,000		-		126,000		0		
Property Taxes - 2005 to 2011	70,000		-		70,000		0		
Escalation Allowance	135,000		-		135,000		0		
		$ 1,001,000		$ -		$ 1,001,000		$ -	
UNALLOCATED									
Uncoded Forecast Cost Adjustments (Net)	-		(310)		133,272		133,272		
		$ -		$ (310)		$ 133,272		$ 133,272	These costs will be distributed as the job proceeds.
TOTAL DECOMMISSIONING / RECLAMATION & MONITORING COSTS		**$ 47,500,000**		**$ 43,655,492**		**$ 62,311,705**		**$ 14,811,705**	

APPENDIX 5

RECORD OF DEBRIS PLACED

INTO

LITTLE RED DOG QUARRY LANDFILL

PLACEMENT OF DEBRIS INTO LRD QUARRY LANDFILL

4th QUARTER, 2003

DRAWING OF WASTE PLACEMENT

Very little debris was placed into Little Red Dog Quarry Landfill (LRDQL) during the quarter. Demolition of the Concentrate Storage Shed and Barge were completed in the previous quarter. The attached drawing indicates the areas where debris was placed to the end of the year. The locations represent the final placement locations and not temporary staging areas. The drawing also includes locations of debris placed prior to the beginning of the quarter where the debris was placed at the same elevation in the quarry.

The drawing represents the Third Lift (L3) of debris in the quarry. This lift is being placed into Bench 6 of Little Red Dog Quarry Landfill ('LRDQL'). The drawing indicates Blue for the debris placed in the 4th Quarter. The red colour is the position at the end of the 3rd Quarter as previously submitted. Each area is dated, for example 'L3 – 2003 – 12' represents Lift 3, for the month of December, 2003.

While there was very little debris placed during the quarter efforts to reduce the sizes of previously placed hull sections resulted in debris being cut off and spread out over the remained of Lift 3.

RECORD OF WASTE SOURCE/VOLUME & TYPE

Following the placement drawings are records from each month showing the source of the debris, where it was hauled to, the quantity and the type of debris. As previously stated, little debris was land filled during the quarter.

VERIFICATION OF HYDROCARBON REMOVAL

There was no equipment that required hydrocarbon removal during the period.

PHOTOGRAPHIC RECORD

As specified in the Closure Plan, a photographic record of debris placement is being maintained. Attached to this appendix are pictures of typical debris being placed in LRDQL. As there was little debris placed into LRDQL during the quarter, fewer pictures were taken than in the previous two quarters. Lack of light prevented pictures from being taken in December.

BORROW

RAMP

HAUL ROAD INTO PIT

998
Tripod

Thermistor Pipe
w/ Waste Rock Column

L3-2003-09

L3-2003-12

RAMP

Bench 7 @ 1011.0m

Bench 6 @ 1018.5m

Bench 5 @ 1026.0m

Bench 4 @ 1033.5m

Bench 3 @ 1041.0m

Bench 2 @ 1048.5m

Bench 1 @ 1056.0m

Bench A @ 1063.5m

WMLRD2002

BSAS

550 E 575 E 600 E 625 E 650 E 675 E 700 E 725 E 750 E 775 E 800 E 825 E 850 E 875 E 900 E

2275 N 2250 N 2225 N 2200 N 2175 N 2150 N 2125 N 2100 N 2075 N

POLARIS PROJECT

teckcominco

LRD Quarry – LIFT 03

Demolition Debris Placement

DRAWN BY:	SCALE:	DATE:	DWG #:
TSF	1:1000	DEC–2003	

POLARIS MINE DEBRIS DISPOSAL IN LITTLE RED DOG QUARRY LANDFILL - 4th QUARTER 2003

Date	Origin Location	Disposal Location	Material	Quantity (m3)
1-Oct-03	Storage building	L.R.D.	Steel	12
8-Oct-03	Dock	L.R.D.	Steel	30
16-Oct-03	Shoreline	L.R.D.	Steel	15
17-Oct-03	North Portal	L.R.D.	Steel	10
19-Oct-03	Barge	L.R.D.	Steel	13
6-Nov-03	North Portal	L.R.D.	Wood / Wallboard	10
13-Nov-03	Storage building	L.R.D.	Steel	160
15-Nov-03	Burn Pit	L.R.D.	Wood / Wallboard	10


2003 10 01 16:27


2003 10 17


2003 10 23 11:47


2003 10 27 12:48


2003 11 01


2000 01 01 00:20


2000 01 02 02:25

APPENDIX 6

RECORD OF PLACEMENT OF

METALS / HYDROCARBON CONTAMINATED SOILS

UNDERGROUND IN THE MINE

POLARIS MINE

4TH QUARTER, 2003 CONTAMINATED SOILS VOLUMES UPDATE

Due to increasing quantities of contaminated soils being discovered as remedial activities progressed, late in the fall of 2003 TCL directed GLL to conduct additional assessment of remaining soils contamination. This was necessary to confirm project scheduling and to assess whether there was adequate storage capacity within the mine for disposal of the remaining contaminated soils to be remediated. A drilling program was undertaken to obtain this information. In addition, remedial excavations that were underway provided information on zones of contamination as well as confirming boundaries of contamination. GLL also reviewed other existing assessment data in conjunction with the new information collected to update their evaluation of contaminated soils volumes. This review resulted identification of increased quantities of contaminated soils and the submission of TCL's letter to the NWB and INAC (dated December 19, 2003) requesting authorization to store metals contaminated soils in LRDQL, and to store the increased quantities of hydrocarbon contamination into the underground mine workings.

In response to an earlier request to store increased quantities of hydrocarbon contaminated soils in the underground mine workings, approval was received from the NWB and INAC (dated December 23, 2003). The approval contained a requirement to update the following information to the end of the 3rd Quarter, 2003 in a table:

- The original volumes of contaminated materials identified in the DRP
- The quantities of soils disposed of to date.
- The predicted volume of soils yet to be disposed of.
- The volume of the mine workings filled with contaminated soils to date and,
- The usable volume of the mine remaining available.

The two attached tables (Table 1 and Table 2) provide the above requested information. The information was updated to the end of December 2003 to make the information more current.

Table 1 lists the original estimates of quantities of contaminated soils as presented in the Decommissioning and Reclamation Plan (DRP), the volumes excavated to-date, and the forecast volume of contaminated soils remaining to be remediated. The volumes of contaminated soils presented in the DRP were limited to areas where assessments had been completed to a degree that GLL felt they had sufficient information to estimate a quantity. There were a number of areas where contaminated soils were known to exist but assessments had not been completed (i.e. sufficiently to propose the quantities) at the time the DRP was issued. This information was contained in the DRP. In Table 1 these areas are noted as 'TBA'. All of the volumes listed in Table 1 are 'in-situ' volumes. The forecast volumes of contaminated soils remaining to be excavated are considered to be

‘conservative’ values and TCL expects that actual volumes will be less than the quantities presented. As TCL has had to request increases in the volumes authorized previously, TCL wanted to ensure that current forecasts represent the ‘worst case’ and that the likelihood of exceeding these volumes was remote.

Table 2 presents the forecast volumes of soils to be remediated in both ‘in-situ’ volumess and in ‘loose’ volumes. The volumes to be disposed of are best represented as ‘loose’ volumes when comparing them to the available volume remaining in the underground mine workings. It should also be noted that the total space available in the mine was reduced by 25% to reflect that full utilization of the space is not practical.

TABLE 1
POLARIS MINE - CONTAMINATED SOILS QUARTERLY FORECAST
AS OF DECEMBER 31, 2003

Contaminated Soil Locations	DRP Forecast Volumes To Be Excavated (m^3 in-situ volume)		[3]Estimated Volumes Excavated To Date (m^3 in-situ volume)		Forecast Volumes Remaining To Be Excavated (m^3 in-situ volume)		[4]Total Volumes Contaminated Soils (m^3 in-situ volume)	
	Hydrocarbons	Metals	Hydrocarbons	Metals	Hydrocarbons	Metals	Hydrocarbons	Metals
Acommodations Complex	500	-	-	-	2,400	-	2,400	-
Concentrat Storage Shed Area	Note 1	Note 1	-	24,314	-	17,000	-	41,314
East of Concentrate Shed	-	-	-	34,038	-	5,000	-	39,038
Foldaways and Lube Storage Pad	2,000	-	-	-	25,000	2,000	25,000	2,000
Snow Dumps	-	3,500	-	3,541	-	10,000	-	13,541
Firehall Area	2,000	-	1,485	-	5,000	5,000	6,485	5,000
[5]Dock Cells	-	-	12,210	-	200	-	12,410	-
North Shore and Barge Area	20,000	85,000	28,314	30,827	45,000	5,000	73,314	35,827
CRF Plant Area	100	-	40	-	-	-	40	-
Exploration Stockpile Area		TBA	-	11,028	-	-	-	11,028
Fuel Bladder Storage Area	12,000	-	12,513	-	-	-	12,513	-
June 2002 Fuel Spill	Note 2	-	4,080	-	-	-	4,080	-
Old Crusher	-	TBA	-	1,079	-	-	-	1,079
North Portal Pb Ore Storage Area	-	TBA	-	11,352	-	-	-	11,352
Quonset Huts	TBA	-	-	-	-	-	-	-
Tails Thickener Area / Tailings Lines	TBA	3,000	-	2,183	-	-	-	2,183
Miscellaneous	-	-	628	110	-	-	628	110
TOTALS	36,600	91,500	59,270	118,472	77,600	44,000	136,870	162,472
TOTAL CONTAMINANTS		**128,100**		**177,742**		**121,600**		**299,342**

Notes:

Note 1 - DRP estimated metals contaminated soils in the Concentrate Storage Area and the Barge area together as one quantity.

Note 2 - this fuel spill ocurred after the DRP was issued so there was not estimate for it.

Note 3 - the term 'Estimated' is used because until work is completed in an area, data is based on truck counts' which is based on truck drivers correctly reporting the number of loads and assumptions on average load capacities are required. Once work in an area has been completed, a detailed survey is conducted to accurately determine final volumes excavated.

Note 4 - Forecast volumes estimated are based on 'worst' case estimates rather than on a 'most' likely basis to be conservative for planning purposes.

Note 5 - Metals contaminated soils removed from the dock were recorded with soils from the 'North Shore and Barge Area' volumes.

Abreviations:

DRP - Decommissioning and Reclamation Plan

TBA - Areas identified in the DRP as being contaminated but no estimate of volumes were made as investigations were not complete.

LRDQL - Little Red Dog Quarry Landfill

TABLE 2

POLARIS MINE - CONTAMINATED SOILS FORECAST AS OF DECEMBER 31, 2003

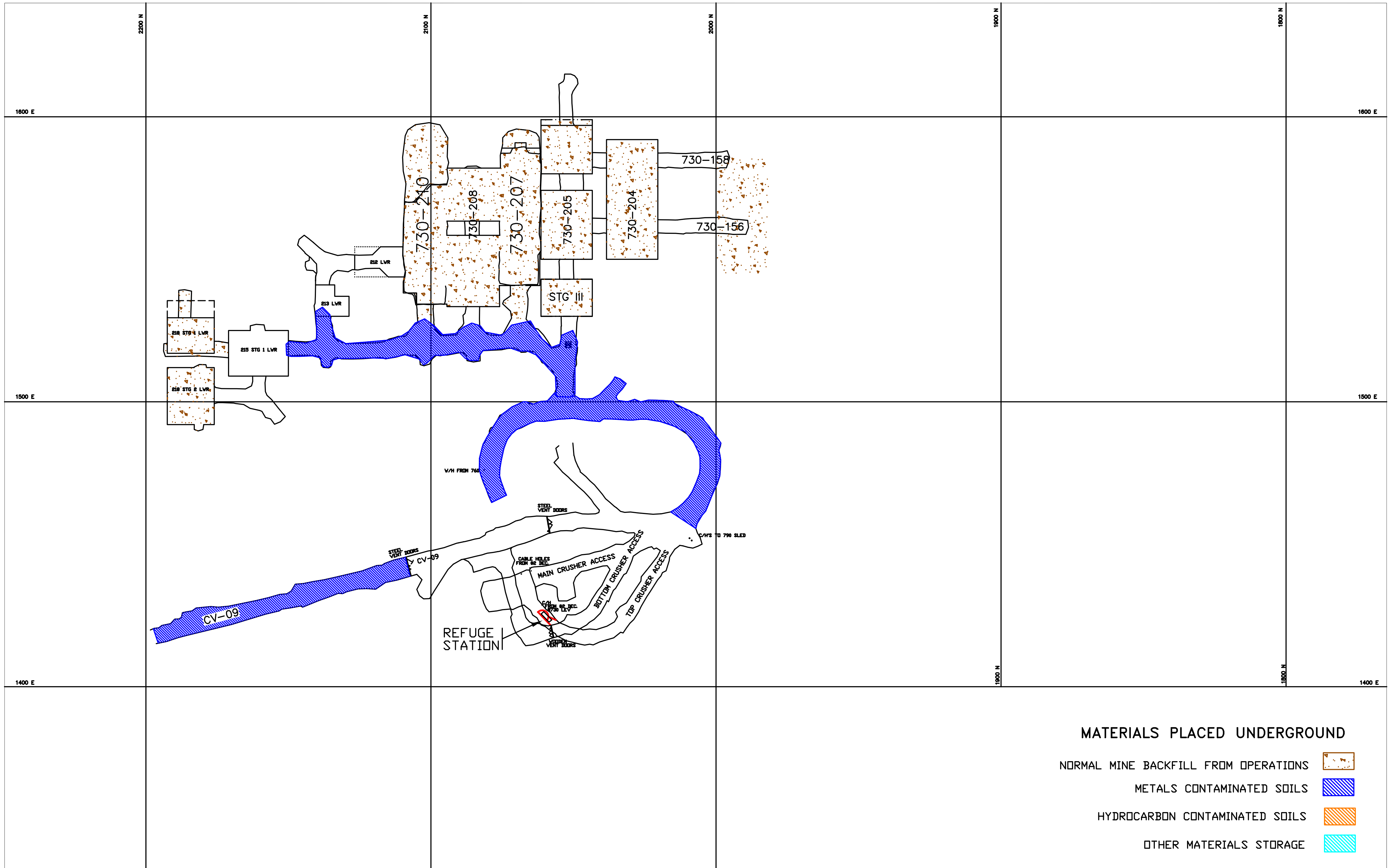
	Forecast Volume Remaining To Be Excavated (m^3 in-situ volume)		Forecast Volumes Remaining To Be Excavated [1] (m^3 loose volume)		Temporary Stockpiles To Be Disposed (m^3 loose volume)	DISPOSAL VOLUMES (m^3 loose volume)			
						LRDQL		UNDERGROUND	
Date	Hydrocarbons	Metals	Hydrocarbons	Metals	Metals	**USED**	**[2] REMAINING**	**USED**	**[3] REMAINING**
31-Dec-03	77,600	44,000	93,120	52,800	30,000	-	215,000	177,290	128,000

Notes:

1 - Used 20% swell factor from in-situ volume to loose volume

2 - Approximate space remaining to fill LRDQL to the top of Bench 5. If required additional volume is available in LRDQL

3 - Used 75% of void space available in mine to adjust for filling efficiencies

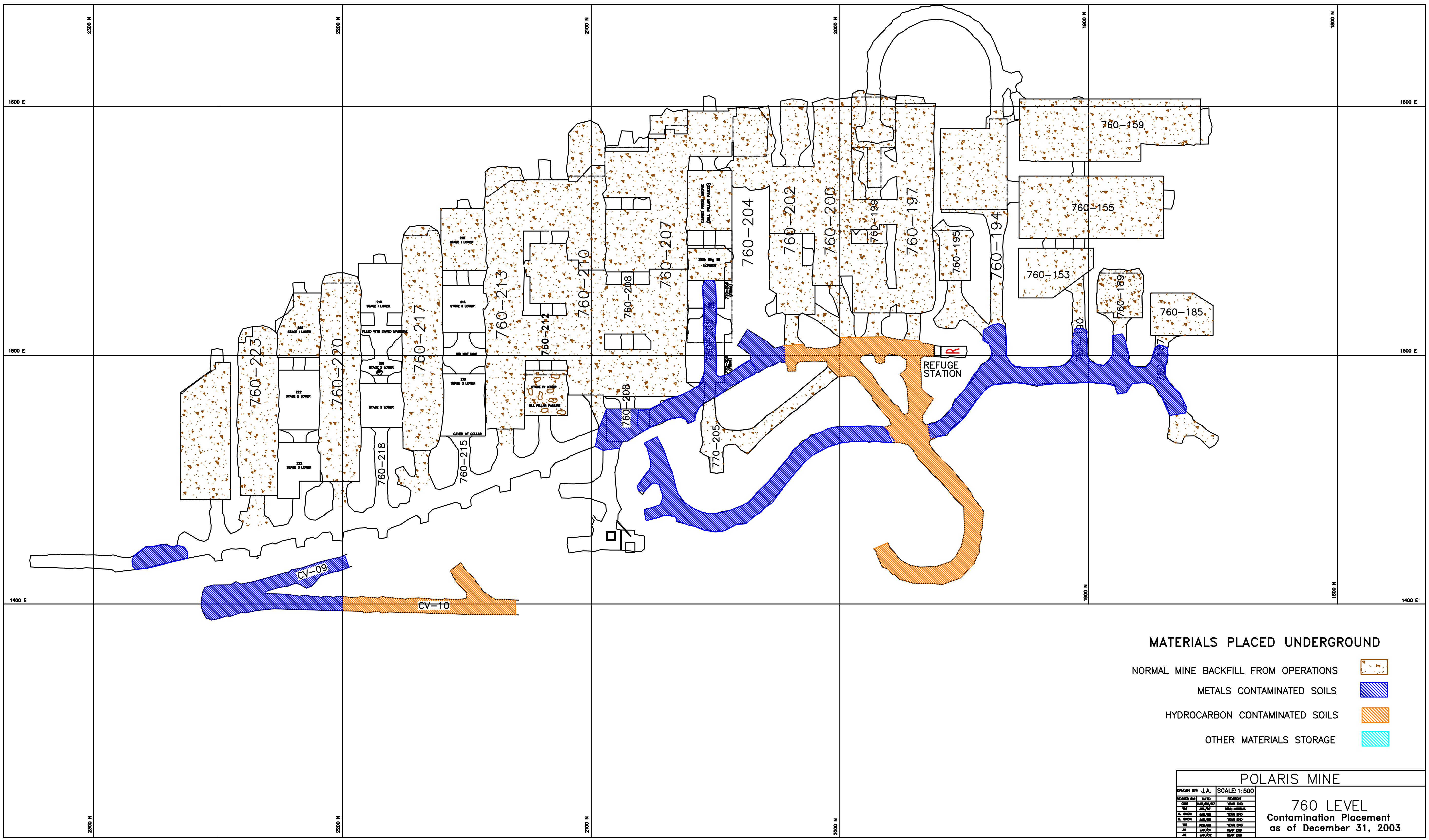

2200 N
2100 N
2000 N
1900 N
1800 N
1600 E
1500 E
1400 E
730-210
730-208
730-207
730-205
730-204
730-158
730-156
STG III
CV-09
CV-09
STEEL VENT DOORS
CABLE HOLES FROM 92 DEC.
MAIN CRUSHER ACCESS
BOTTOM CRUSHER ACCESS
TOP CRUSHER ACCESS
REFUGE STATION
MATERIALS PLACED UNDERGROUND
NORMAL MINE BACKFILL FROM OPERATIONS
METALS CONTAMINATED SOILS
HYDROCARBON CONTAMINATED SOILS
OTHER MATERIALS STORAGE

POLARIS MINE

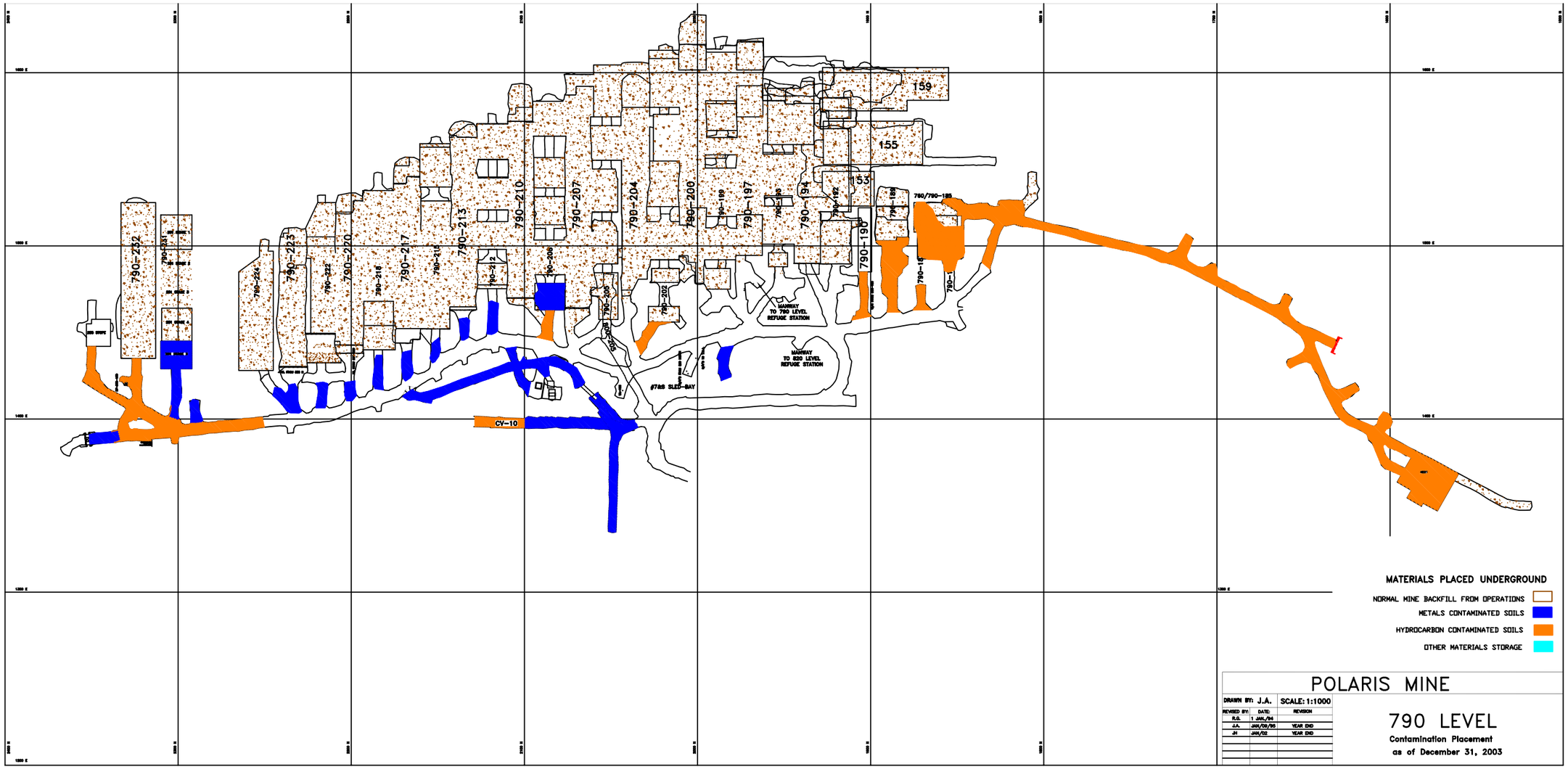
DRAWN BY: J.A. SCALE: 1:500

730 LEVEL

Contamination Placement as of December 31, 2003



1600 E
1500 E
1400 E
2300 N
2200 N
2100 N
2000 N
1900 N
1800 N
760-159
760-155
760-153
760-185
760-189
760-195
760-194
760-197
760-199
760-200
760-202
760-204
760-207
760-208
760-210
760-212
760-213
760-217
760-220
760-223
760-218
760-215
770-205
REFUGE STATION
CV-09
CV-10
MATERIALS PLACED UNDERGROUND
NORMAL MINE BACKFILL FROM OPERATIONS
METALS CONTAMINATED SOILS
HYDROCARBON CONTAMINATED SOILS
OTHER MATERIALS STORAGE
POLARIS MINE
DRAWN BY: J.A.
SCALE: 1:500
760 LEVEL
Contamination Placement
as of December 31, 2003



MATERIALS PLACED UNDERGROUND

- NORMAL MINE BACKFILL FROM OPERATIONS
- METALS CONTAMINATED SOILS
- HYDROCARBON CONTAMINATED SOILS
- OTHER MATERIALS STORAGE

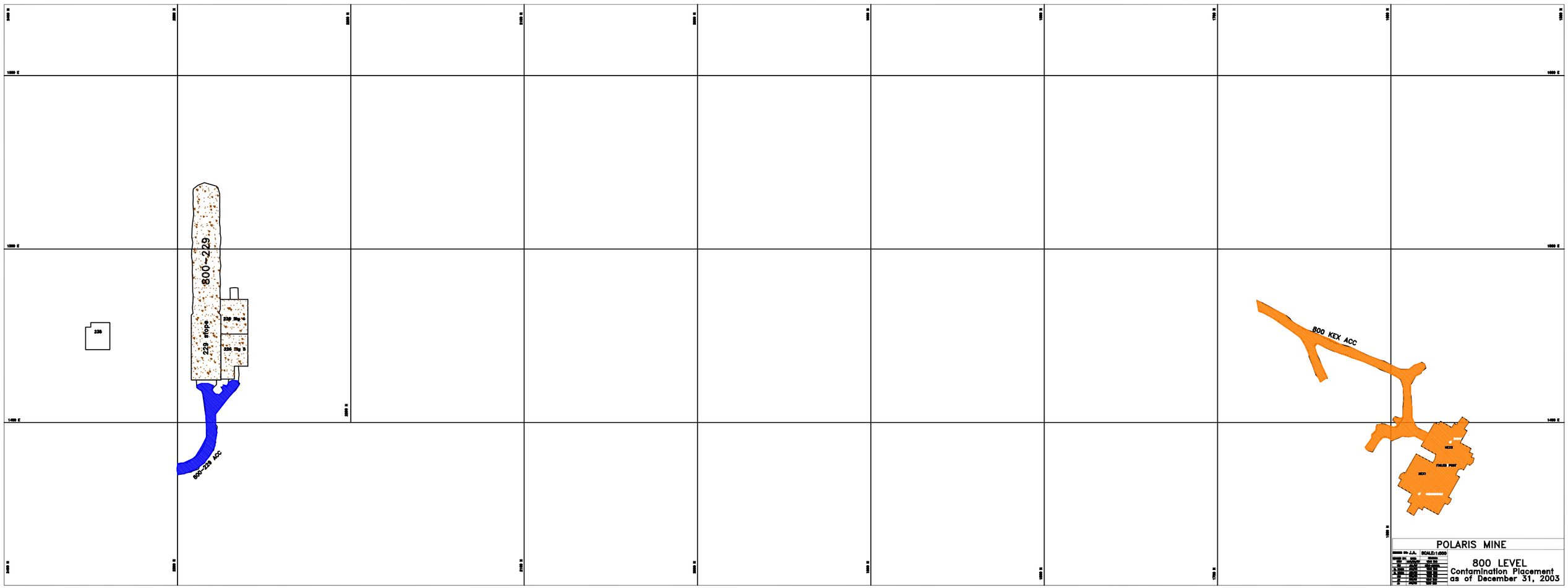
POLARIS MINE

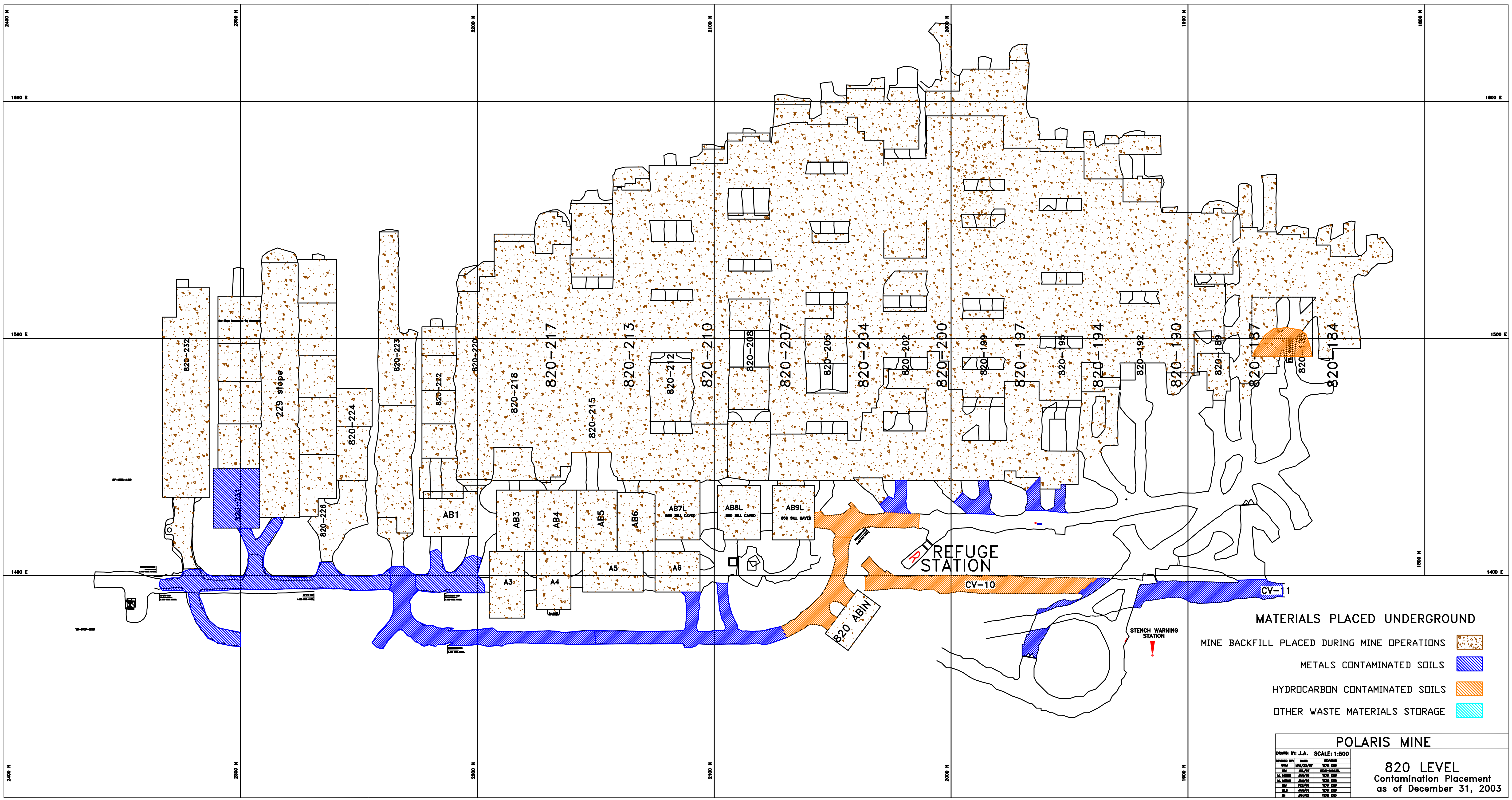
DRAWN BY: J.A. | SCALE: 1:1000

REVISED BY:	DATE:	REVISION
R.G.	1 JAN./94	
J.A.	JAN/09/95	YEAR END
JH	JAN/02	YEAR END

790 LEVEL

Contamination Placement
as of December 31, 2003


800-229
229 Stope
229 Slip 4
229 Slip 5
235
800-229 ACC
800 KEX ACC
MCC
FINLAY PORT
MCC
POLARIS MINE
SCALE:1:200
800 LEVEL
Contamination Placement
as of December 31, 2003


MATERIALS PLACED UNDERGROUND
MINE BACKFILL PLACED DURING MINE OPERATIONS
METALS CONTAMINATED SOILS
HYDROCARBON CONTAMINATED SOILS
OTHER WASTE MATERIALS STORAGE
POLARIS MINE
SCALE: 1:500
820 LEVEL
Contamination Placement
as of December 31, 2003
REFUGE STATION
STENCH WARNING STATION
CV-10
CV-11
820 ABIN
229 stope
820-232
820-224
820-226
820-223
820-222
820-220
820-218
820-217
820-215
820-213
820-212
820-210
820-208
820-207
820-205
820-204
820-202
820-200
820-199
820-197
820-195
820-194
820-192
820-190
820-189
820-187
820-184
AB1
AB3
AB4
AB5
AB6
AB7L
AB8L
AB9L
A3
A4
A5
A6

2000 N
1900 N
1800 N
1700 N
1600 E
1500 E
1400 E

850/820–187
850/820–185
850/820–184
825–181
825–152
825–150
825–185
825–176
825–172
C/H FROM 850
CV–11
CV–12

MATERIALS PLACED UNDERGROUND

MINE BACKFILL PLACED DURING MINE OPERATIONS

METALS CONTAMINATED SOILS

HYDROCARBON CONTAMINATED SOILS

OTHER WASTE MATERIALS STORAGE

POLARIS MINE

DRAWN BY: J.A.

REVISED BY:	DATE:	REVISION
JA	FEB/24/94	YEAR END
JA	JAN/16/95	YEAR END
TBU	JUL/97	SEMI-ANNUAL
M. NIXON	JAN/98	YEAR END
TBU	FEB/00	YEAR END
WLB	JAN/01	YEAR END
JH	JAN/02	YEAR END

825 SUBLEVEL
Contamination Placement
as of December 31, 2003

850 NORTH LEVEL

MATERIALS PLACED UNDERGROUND

MINE BACKFILL PLACED DURING MINE OPERATIONS

METALS CONTAMINATED SOILS

HYDROCARBON CONTAMINATED SOILS

OTHER WASTE MATERIALS STORAGE

POLARIS MINE

850 LEVEL SOUTH

Contamination Placement

as of December 31, 2003

Mak Parts
Pump
Compressor
Hydraulic Pack

880–145
880–142
880–141
880–139
880–137
880–135
880 DUMP
135 Stg 1
135 Stg 2
135 Stg 3
125 Stg 3'
125W
680–124W

NP–231
NP–229
NP–227
NP–142
NP–140

880–223
880–220
880–217
880–213
880–210
880–207
880–204
880–200
880–197
880–194
880–190
880–187
880–184
880–181
880–178

AB1
AB2
AB3
AB4
AB5
AB6
AB7
AB8
AB9
AB10
AB11
AB12
AB13
AB14
AB15
AB16
AB17
AB19
AB20

A STOPE
A/B UNDERCUT
B STOPE
B/C UNDERCUT

105–7
105–6

Tires, Steel & Pallets
Tailings Lines

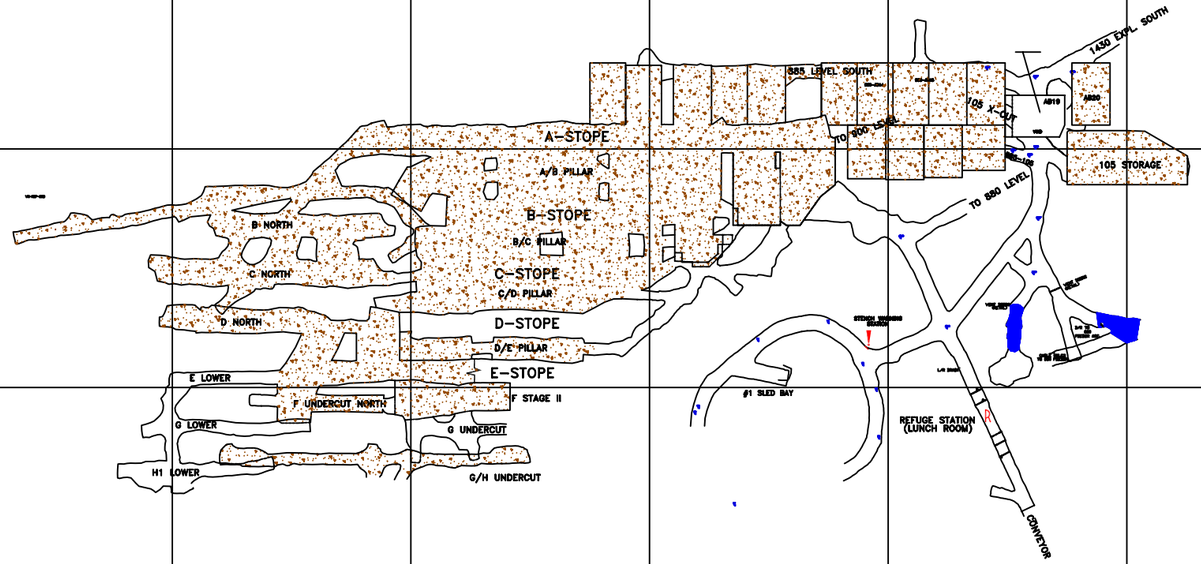
SLED–BAY
LADDER UP TO REFUGE STATION
REFUGE STATION NEXT RIGHT

MATERIALS PLACED UNDERGROUND

MINE BACKFILL PLACED DURING MINE OPERATIONS
METALS CONTAMINATED SOILS
HYDROCARBON CONTAMINATED SOILS
OTHER WASTE MATERIALS STORAGE

POLARIS MINE

880 LEVEL SOUTH
Contamination Placement
as of December 31, 2003



MATERIALS PLACED UNDERGROUND

- MINE BACKFILL PLACED DURING MINE OPERATIONS
- METALS CONTAMINATED SOILS
- HYDROCARBON CONTAMINATED SOILS
- OTHER WASTE MATERIALS STORAGE

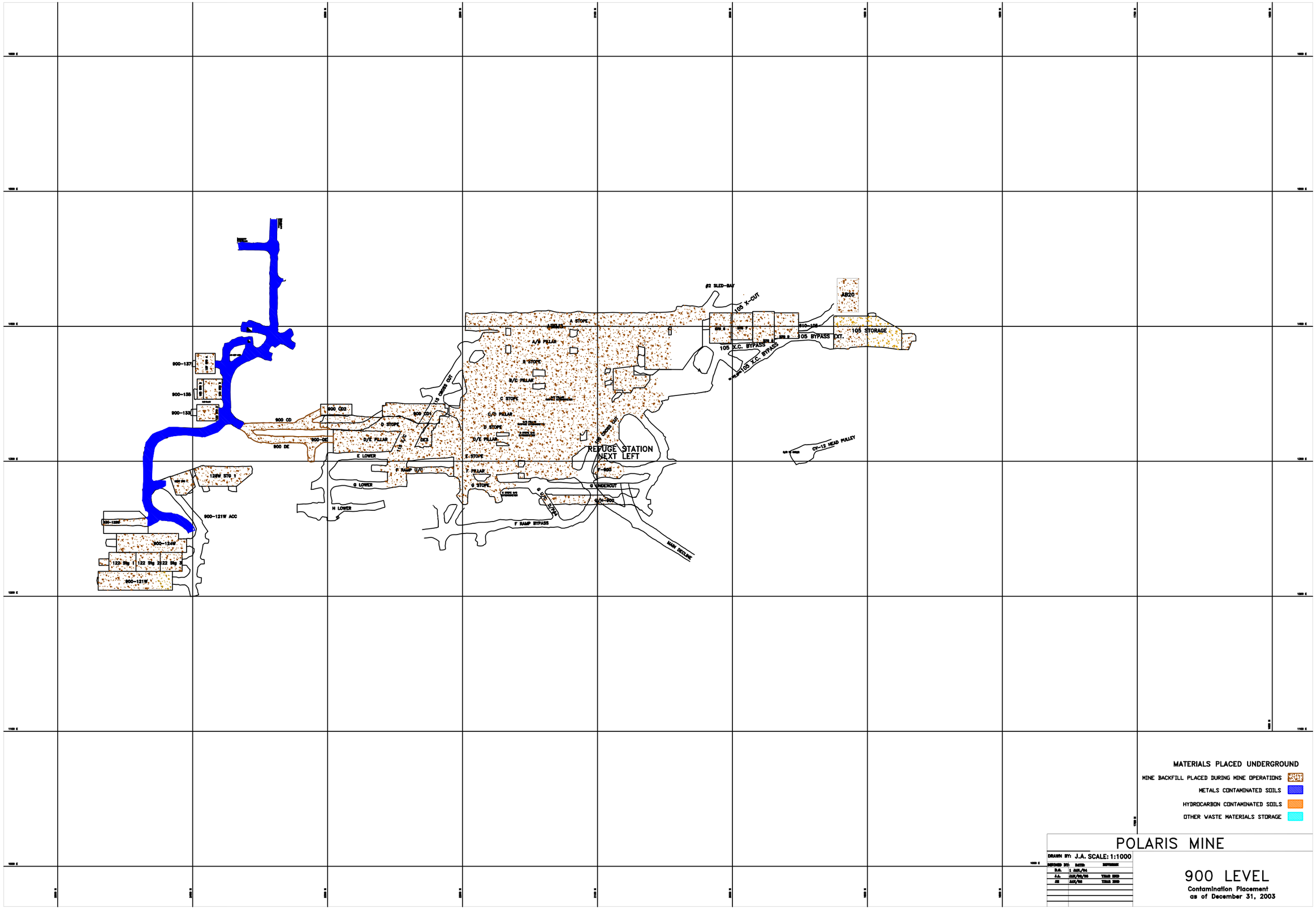
POLARIS MINE

DRAWN BY: J.A. | SCALE:1:1000

REVISED BY:	DATED	REVISION
R.G.	1 JAN./04	
J.A.	JAN./31/05	YEAR END

885 LEVEL

Contamination Placement as of December 31, 2003



MATERIALS PLACED UNDERGROUND

- MINE BACKFILL PLACED DURING MINE OPERATIONS
- METALS CONTAMINATED SOILS
- HYDROCARBON CONTAMINATED SOILS
- OTHER WASTE MATERIALS STORAGE

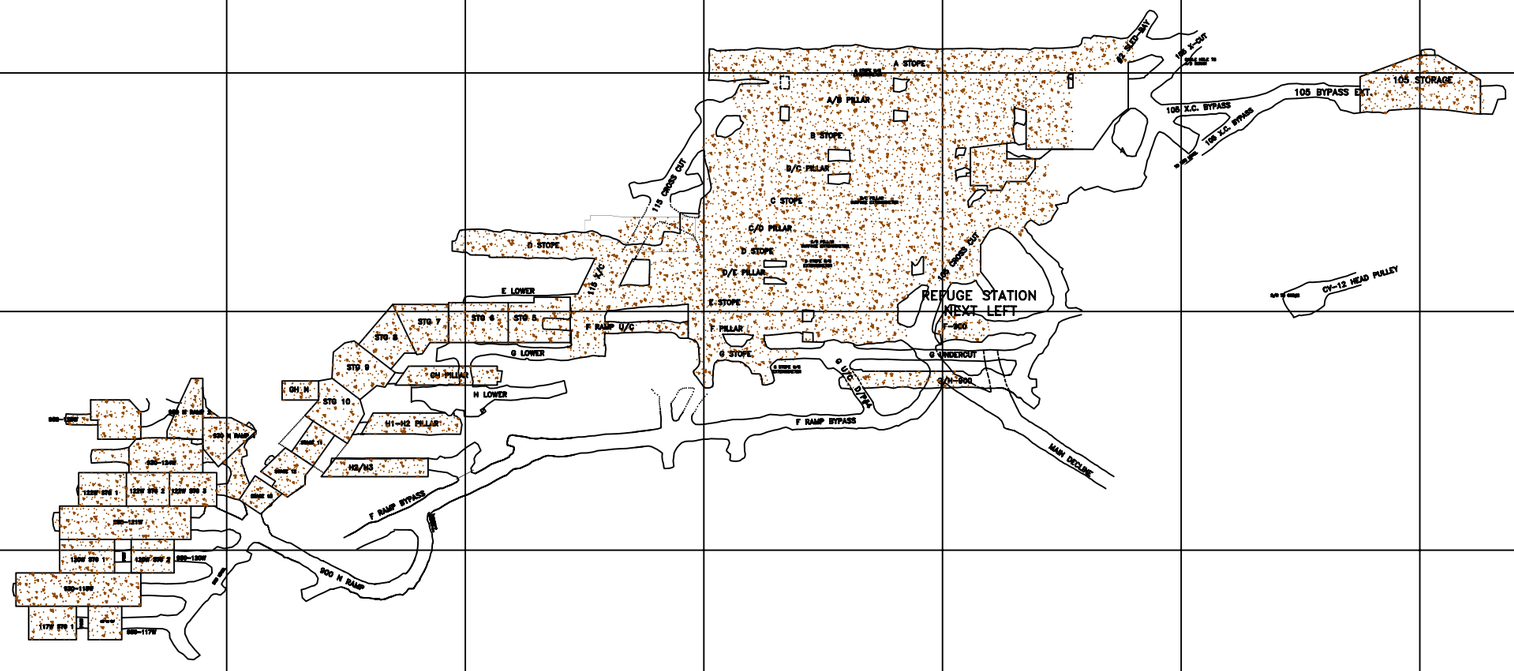
POLARIS MINE

DRAWN BY: J.A. SCALE: 1:1000

REVISED BY	DATED	REFERENCE
D.S.	1 JAN/96	
J.A.	JAN/96/98	YEAR END
JH	JAN/98	YEAR END

900 LEVEL

Contamination Placement
as of December 31, 2003



MATERIALS PLACED UNDERGROUND

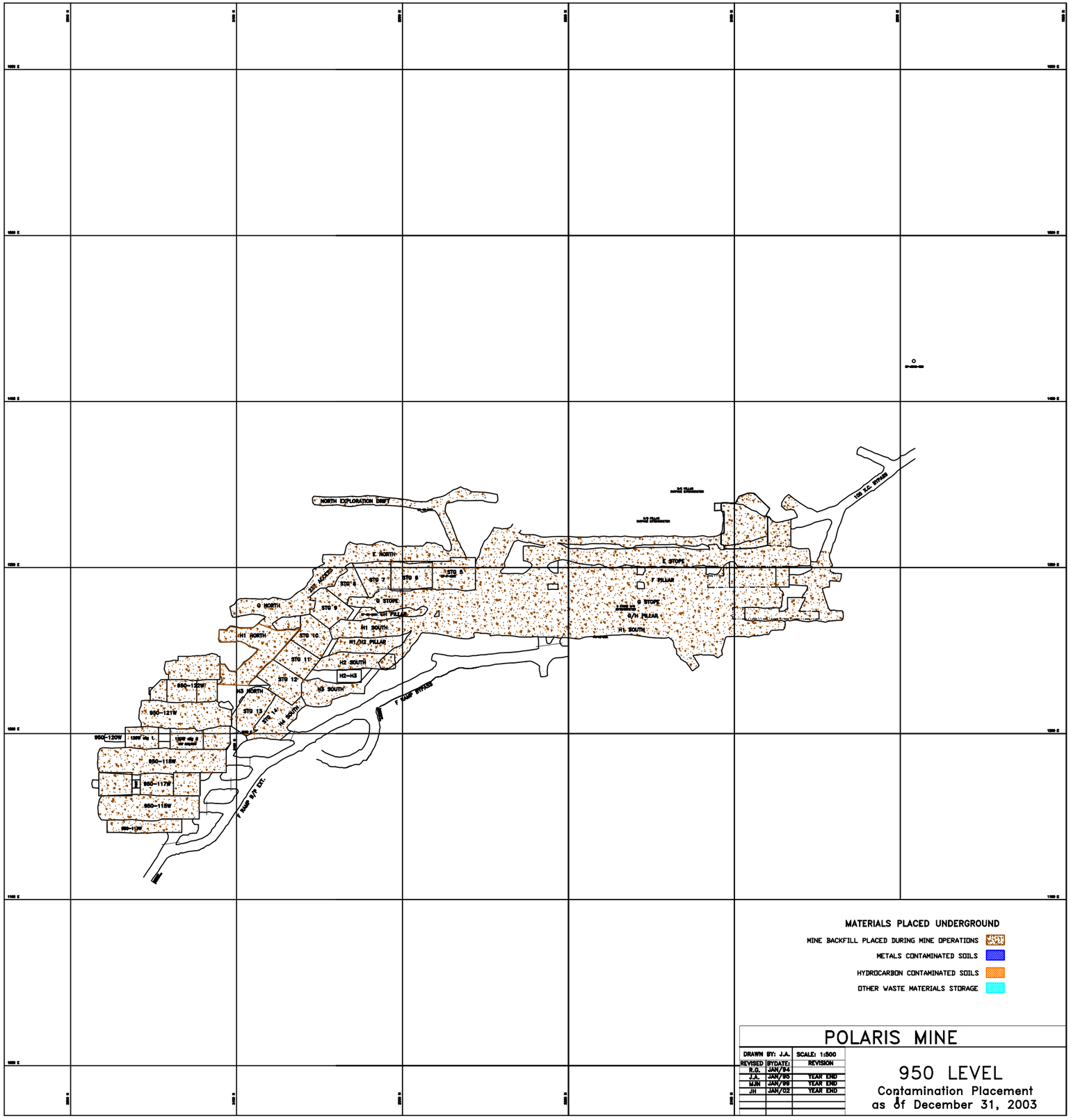
MINE BACKFILL PLACED DURING MINE OPERATIONS ▨
METALS CONTAMINATED SOILS ▨
HYDROCARBON CONTAMINATED SOILS ▨
OTHER WASTE MATERIALS STORAGE ▨

POLARIS MINE

DRAWN BY: J.A.

REVISED BY:	DATE:	REVISION
R.G.	1 JAN./94	
J.A.	JAN/09/95	YEAR END
JH	JAN/03	YEAR END

930 LEVEL
Contamination Placement
as of December 31, 2003



MATERIALS PLACED UNDERGROUND

MINE BACKFILL PLACED DURING MINE OPERATIONS	▨
METALS CONTAMINATED SOILS	▨
HYDROCARBON CONTAMINATED SOILS	▨
OTHER WASTE MATERIALS STORAGE	▨

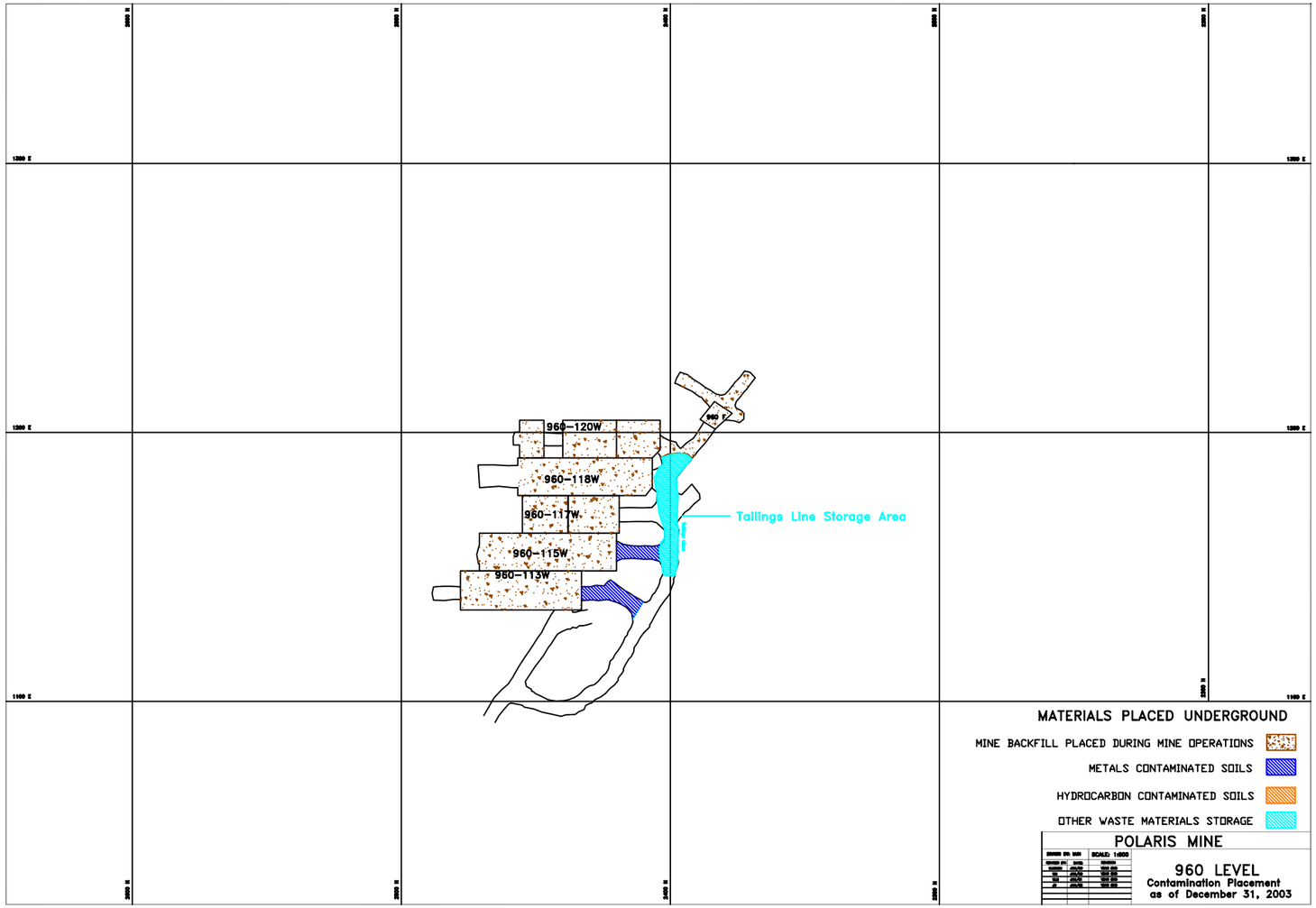
POLARIS MINE

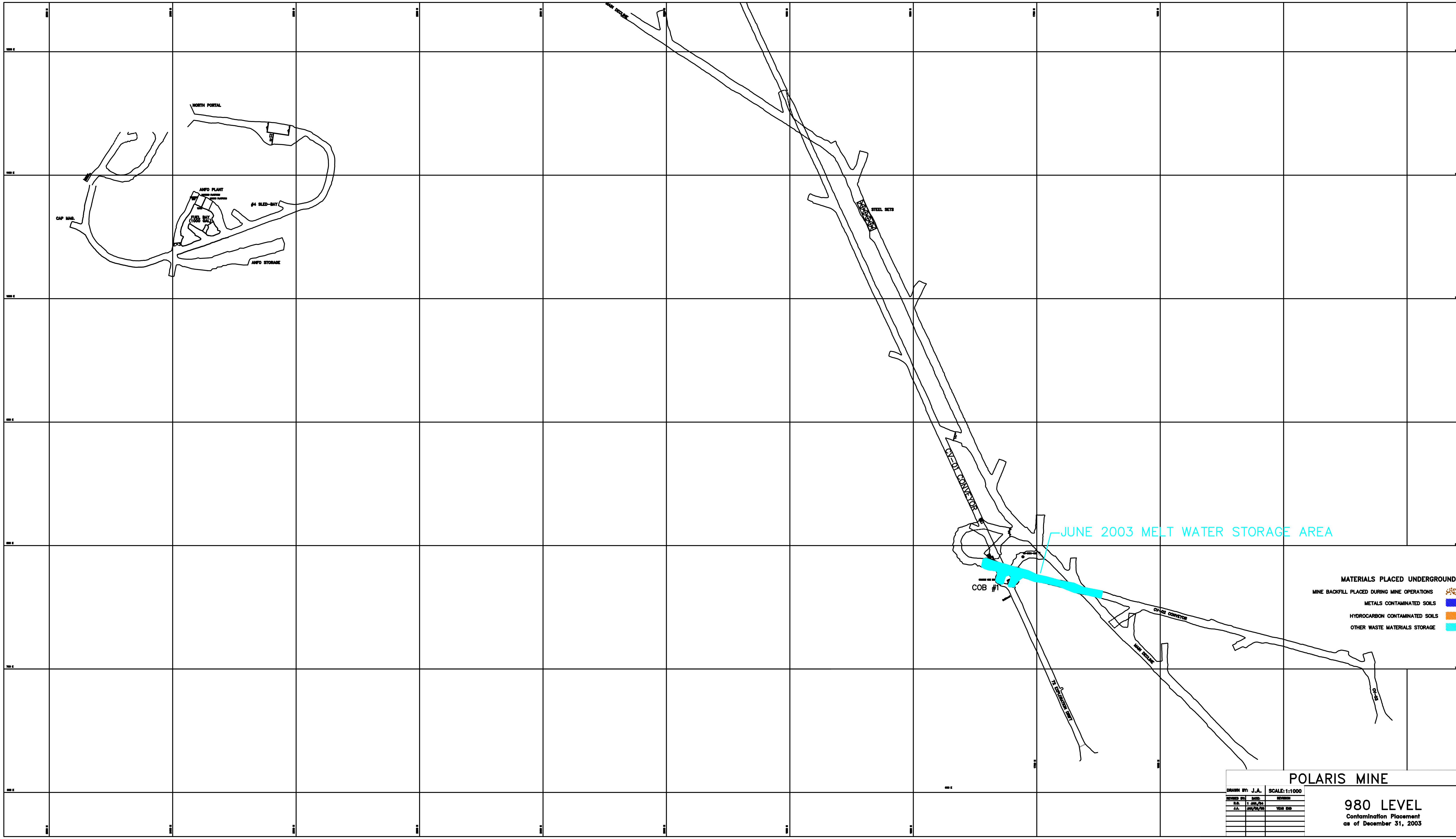
DRAWN BY: J.A.
SCALE: 1:500

REVISED	BYDATE:	REVISION
R.G.	JAN/94	
J.A.	JAN/95	YEAR END
MJN	JAN/99	YEAR END
JH	JAN/02	YEAR END

950 LEVEL

Contamination Placement
as of December 31, 2003


960-120W
960-118W
960-117W
960-115W
960-113W
960 L
Tailings Line Storage Area
MATERIALS PLACED UNDERGROUND
MINE BACKFILL PLACED DURING MINE OPERATIONS
METALS CONTAMINATED SOILS
HYDROCARBON CONTAMINATED SOILS
OTHER WASTE MATERIALS STORAGE
POLARIS MINE
960 LEVEL
Contamination Placement
as of December 31, 2003


NORTH PORTAL
ANFO PLANT
CAP MAG.
FUEL BAY
(1000 GAL)
#4 SLED-BAY
ANFO STORAGE
STEEL SETS
CV-01 CONVEYOR
JUNE 2003 MELT WATER STORAGE AREA
COB #1
CV-02 CONVEYOR
MAIN DECLINE
MATERIALS PLACED UNDERGROUND
MINE BACKFILL PLACED DURING MINE OPERATIONS
METALS CONTAMINATED SOILS
HYDROCARBON CONTAMINATED SOILS
OTHER WASTE MATERIALS STORAGE
POLARIS MINE
DRAWN BY: J.A.
SCALE: 1:1000
REVISED BY: DATE: REVISION
R.G. 1 JAN./94
J.A. JAN/09/98 YEAR END
980 LEVEL
Contamination Placement
as of December 31, 2003

APPENDIX 7

SUMMARY OF

EFFLUENT MONITORING

AND

EFFLUENT CHARACTERIZATION

Bruce J. Donald
Reclamation Manager

January 26, 2003

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

Attention: Peter Blackall, Regional Director of Environmental Protection

Dear Sir;

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

Despite having a designated discharge location for effluent identified under Section 9 of the MMER, there was no discharge from the Garrow Lake Tailings Impoundment Area during the period October 1, 2003 to December 31, 2003. Only the 3rd Quarter had discharge to report. While there is no data to report other than that there was no effluent discharge, I have completed the monitoring report as required by the regulations and have attached it to this letter.

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

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

Yours truly,

Bruce Donald

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

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

POLARIS MINE – MMER MONITORING REPORT

4th QUARTER 2003

APPENDIX A

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

APPENDIX B

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

APPENDIX C

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

APPENDIX D

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

APPENDIX A

Reporting Requirements for Reference Method EPS 1/RM/13

Section 8.1.1 Effluent

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

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

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

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

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

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

Section 8.1.2 Test Facilities and Conditions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Section 8.1.3 Results

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

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

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

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

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

APPENDIX B

Reporting Requirements for Reference Method EPS 1/RM/14

Section 8.1.1 Effluent

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

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

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

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

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

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

Section 8.1.2 Test Facilities and Conditions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Section 8.1.3 Results

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

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

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

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

APPENDIX C

2003 4th QUARTER MMER REPORT

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

CONCENTRATIONS OF EFFLUENT FOR MMER SCHEDULE 4 SAMPLED WEEKLY

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

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

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

MONTHLY MEAN CONCENTRATIONS OF EFFLUENT FOR MMER SCHEDULE 4

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

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

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

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

MASS LOADING OF DELETERIOUS SUBSTANCE FOR EACH DAY SAMPLED

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

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

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

MASS LOADING PER CALENDAR MONTH FOR EACH DELETERIOUS SUBSTANCE

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

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

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

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

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

APPENDIX D

RESULTS OF EFFLUENT CHARACTERIZATION

AS PER PARAGRAPH 15(1)(a)

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

POLARIS MINE – MMER MONITORING REPORT

REVISED 3rd QUARTER 2003

APPENDIX A

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

APPENDIX B

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

APPENDIX C

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

APPENDIX D

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

APPENDIX E

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

APPENDIX F (Mass Loadings)

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

APPENDIX G

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

APPENDIX A

96-h Acute Rainbow Trout Toxicity Test

Reporting Requirements for Reference Method EPS 1/RM/13

Section 8.1.1 Effluent

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

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

iii. Type of sample
   - Final effluent water

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

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

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

Section 8.1.2 Test Facilities and Conditions

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

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

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

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

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

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

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

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

Reporting Requirements for Reference Method EPS 1/RM/13

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

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

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

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

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

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

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

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

Section 8.1.3 Results

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

Reporting Requirements for Reference Method EPS 1/RM/13

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

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

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

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

APPENDIX B

72-h Acute *Daphnia magna* Toxicity Test

Reporting Requirements for Reference Method EPS 1/RM/14

Section 8.1.1 Effluent

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

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

iii. Type of sample
   - Final effluent water

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

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

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

Section 8.1.2 Test Facilities and Conditions

i. Test type & method
   - 48-hour *Daphnia magna* LC_{50}

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

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

iv. Species of test organism
   - *Daphnia magna*

v. Date and time for start of definitive test
   - Test 1: Saturday August 2, 2003 - 2:00 PM
   - Test 2: Friday August 22, 2003 - 3:30 PM
   - Test 3: Friday September 19, 2003 - 3:15 PM

vi. Person(s) performing the test and verifying the results
   - Andy Diewald and May Lee

vii. pH, temperature, dissolved oxygen, and conductivity of unadjusted, undiluted effluent
   - Test 1: pH - 7.5, T - 21.0°C, DO - 8.7mg/L, C - 4100µmhos/cm
   - Test 2: pH - 7.8, T - 20.0°C, DO - 8.9mg/L, C - 9280µmhos/cm
   - Test 3: pH - 8.0, T - 19.5°C, DO - 8.7mg/L, C - 11330µmhos/cm

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

Reporting Requirements for Reference Method EPS 1/RM/14

ix. Indication of any adjustment of hardness of effluent sample
- Test 1: No hardness adjustment
- Test 2: No hardness adjustment
- Test 3: No hardness adjustment

x. Indication of any aeration of sample
- Test 1: No pre-aeration adjustment
- Test 2: No pre-aeration adjustment
- Test 3: 25-50 mL/min/L for 10mins

xi. Concentrations and volumes tested
- Concentrations (% effluent volume / total volume) tested and total volumes used were:
- Control (0%) - 200 mL
- 6.25% - 200 mL
- 12.5% - 200 mL
- 25% - 200 mL
- 50% - 200 mL
- 100% - 200 mL
- Salinity Control - 200 mL

xii. Measurements of dissolved oxygen, pH and temperature
- Test 1: DO: 8.3 - 8.7 mg/L, pH: 7.5 - 7.9, T: 20.0 - 21.0 °C
- Test 2: DO: 8.4 - 9.0 mg/L, pH: 7.6 - 8.1, T: 20.0 - 20.5 °C
- Test 3: DO: 8.3 - 9.1 mg/L, pH: 7.6 - 8.1, T: 19.5 - 21.0 °C

xiii. Estimates of time to first brood, average number of neonates per brood, and percent mortality during the seven-day period prior to the test
- Test 1: 9 days to brood, >15 neonates/brood, 4.6% mortality in 7d prior to test
- Test 2: 9 days to brood, >19.9 neonates/brood, 10.0% mortality in 7d prior to test
- Test 3: 8 days to brood, >26.3 neonates/brood, 5.5% mortality in 7d prior to test

xiv. Number of neonates per test vessel and milliliters of solution per daphnid
- Methods for all tests and dilution series were the same:
- 10 neonates per vessel
- 200 mL of solution per daphnid

Section 8.1.3 Results

i. Number of dead and/or immobile daphnids in each test solution including controls
- Results were the same for Test 1, Test 2, and Test 3, except where noted
- Control (0%) - 0 dead / immobile (test 1&2), 1 dead (test 3)
- 6.25% - 0 dead / immobile
- 12.5% - 0 dead / immobile
- 25% - 0 dead / immobile
- 50% - 0 dead / immobile
- 100% - 0 dead / immobile (test 1&2), 1 dead (test 3)
- Salinity Control - 0 dead / immobile

ii. For single-concentration test the number of daphnids dead in each of three replicate effluent solutions and in each of three replicate control solutions at end of test. Also report the mean value.
- Single concentration test was not conducted, dilution series tests were conducted

Reporting Requirements for Reference Method EPS 1/RM/14

iii. Estimate of 48-h LC50 and 95% confidence limits in multi-concentration tests, 48-h EC50 for immobilization and 95% confidence limits, indication of statistical method on which results are based.
- Test 1: 48-h LC_{50} = > 100% effluent
- Test 2: 48-h LC_{50} = > 100% effluent
- Test 3: 48-h LC_{50} = > 100% effluent

iv. Most recent 48-h LC50 for reference toxicant test(s), reference chemical(s), date test initiated, historic geometric mean LC50 and warning limits.
- Reference toxicity tests for Toxicant: Zinc
- Test 1: (Aug-7-03) 96-h LC_{50} = 453µg/L Zinc, 95% CL = 377-544µg/L
- Test 2: (Aug-7-03) 96-h LC_{50} = 453µg/L Zinc, 95% CL = 377-544µg/L
- Test 3: (Sep-23-03) 96-h LC_{50} = 429µg/L Zinc, 95% CL = 355-518µg/L

APPENDIX C

7-d Topsmelt Growth and Survival Toxicity Test

Reporting Requirements for Reference Method EPA/600/R-95/136

Effluent Sample

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

ii. Date & time of sampling
   - Samples for yearly sublethal toxicity testing were collected:
     Wednesday August 20, 2003 - 12:30 AM

iii. Type of sample
   - Final effluent water

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

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

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

Test Organisms Imported from External Supplier

i. Species of test organism
   - Topsmelt (*Atherinops affinis*)

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

iii. Source of test species
   - Aquatic Bio Systems (ABS), Fort Collins, Colorado

iv. Date test species acquired on
   - August 21, 2003

v. Indications of deviations from EC guidance on the importation of test organisms
   - No deviations from EC requirements

vi. Percent mortality of fish in 24-hour period preceding the test
   - <10% mortality

vii. Age at start of test
   - 10 days post-hatch

viii. Unusual appearance, behaviour, or treatment of larvae before their use in the test
   - Nothing unusual, no excessive crowding of larvae, larvae appear healthy, disease-free, stress free,

ix. Confirmation that larvae are actively feeding and swimbladders are not inflated
   - Larvae actively feeding and swimbladders not inflated

x. Confirmation that temperature change was <3°C and dissolved oxygen was maintained at >6mg/L during transport
   - Temperature change was <2°C and dissolved oxygen supersaturated mg/L during transport

xi. Test organism acclimation rate at the testing laboratory
   - Holding water conditions upon arrival were DO=supersaturated, pH=7.3, T=22°C
   - Organisms were acclimated slowly overnight
   - Addition of EVS lab seawater at intervals of 30 – 60min to reach acceptable conditions
   - Organisms were acclimated to DO=8mg/L, salinity=28ppt,T=20°C

Reporting Requirements for Reference Method EPA/600/R-95/136

Test Facilities and Conditions

i. Test type & method
   - 7-day Topsmelt (*Atherinops affinis*) Survival and Growth Toxicity Test
   - Static renewal
   - Sample water was renewed daily
   - Reference Method - EPA/600/R-95/136 (EPAW 95-EPA West Coast)

ii. Indications of deviations from requirements in Sections 11 of Method EPA/600/R-95/136 (EPAW 95-EPA West Coast)
   - No deviations from requirements
   - Salinity controls were run
   - Sample water salinity was 5.3ppt

iii. Date and time for start of definitive test
   - Friday August 22, 2003 - 5:00 PM

iv. Test vessel description
   - 600mL beaker

v. Person(s) performing the test and verifying the results
   - Kevin Goodearle, Julianna Kalocai, Sioe Lie Kwee, Rachel DeWynter, Edmund Canaria, and Armando Tang

vi. pH, temperature, dissolved oxygen, and conductivity of unadjusted, undiluted effluent
   - pH - 7.9, T - 20.0°C, DO - 11.0mg/L, C - 9570µmhos/cm, (salinity - 5.3 ppt)

vii. Confirmation that no adjustment of sample or solution pH occurred
   - No pH adjustment

viii. Indication of aeration of test solutions before introduction of fish
   - Pre-aeration at 6.5mL/min/L for 30mins due to supersaturation of sample with O_2 when sample was heated to 20°C
   - DO was reduced from 11.0mg/L to 7.8 mg/L

ix. Indication that EC guidance document for salinity adjustment was followed
   - No deviations from EC guidance document on preparation of hypersaline brine
   - HSB prepared from natural seawater concentrated to 90ppt (by freezing/refreezing to remove frozen layer and concentrate salts)
   - No deviations from EC guidance document for salinity adjustment of sample
   - HSB was added to samples to salinity adjust them from 5.3ppt to 30ppt

x. Type and source of control/dilution water
   - UV-sterilized, 0.45µm-filtered natural seawater from the Vancouver Aquarium

xi. Concentrations and volumes tested
   - Concentrations (% effluent volume / total volume) tested and total volumes used were:
   - Control (0%) - 200 mL
   - Salinity Control (0%) - 200 mL
   - 4.5% - 200mL
   - 9.0% - 200mL
   - 18.1% - 200mL
   - 36.2% - 200mL
   - 72.3% - 200mL

xii. Number of replicated per concentration
   - 5 replicates per concentration

xiii. Number of organisms added to each test vessel
   - 5 fish per vessel

xiv. Manner and rate of exchange of test solutions
   - Daily renewal

Reporting Requirements for Reference Method EPA/600/R-95/136

xv. Measurements of dissolved oxygen, pH and temperature
- DO: 6.6 - 7.8 mg/L, pH: 7.7 - 8.2, T: 19.0 - 20.0 °C, salinity: 29 - 31 ppt

Results

i. Number and % of mortalities of fish in each test solution
- Totals from all 5 replicates are presented:
- Control (0%) - 1/25 = 4%
- Salinity Control - 0/25 = 0%
- 4.5% - 0/25 = 0%
- 9.0% - 0/25 = 0%
- 18.1% - 0/25 = 0%
- 36.2% - 0/25 = 0%
- 72.3% - 1/25 = 4%

ii. Average dry weight per original fish in test vessel
- Means from all 5 replicates are presented:
- Control (0%) - 1.18 mg
- Salinity Control - 1.14 mg
- 4.5% - 1.13 mg
- 9.0% - 1.32 mg
- 18.1% - 1.09 mg
- 36.2% - 1.11 mg
- 72.3% - 1.14 mg

iii. Estimate of 7-d LC_{50} (95% CL)
- 7-d LC_{50} concentration > 72.3% effluent (highest concentration tested due to dilution for salinity adjustment)
- Quantal statistic methods not applicable

iv. Estimate of 7-d IC_{25} (95% CL) for growth
- 7-d IC_{25} concentration > 72.3% effluent (highest concentration tested due to dilution for salinity adjustment)
- Quantal statistic methods not applicable

v. Current reference toxicity tests (95% CL) for 7-d LC_{50} for survival and 7-d IC_{50} for growth
- Reference toxicity tests for Toxicant: Copper
- Test conducted on August 22, 2003, same day as effluent test
- Reference toxicant test was conducted on the same batch of externally supplied topsmelt used in the effluent test and under the same experimental conditions as the effluent test
- 7-d LC_{50} survival = 122mg/L Cu, 95% CL = 111-135mg/L
- 7-d IC_{50} growth = 122mg/L Cu, 95% CL = 106-132mg/L

vi. Reference toxicity warning limits (+/- SD) for 7-d LC_{50} for survival and 7-d IC_{50} for growth
- Reference toxicity tests for Toxicant: Copper
- 7-d LC_{50} survival = 139 ± 63mg/L Cu,
- 7-d IC_{50} growth = 136 ± 52mg/L Cu

APPENDIX D

92-h Echinoderm Fertilization Test

Reporting Requirements for Reference Method EPS1/RM/27-EC 92 (Sperm Cell)

Effluent Sample

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

ii. Date & time of sampling
   - Samples for yearly sublethal toxicity testing were collected:
     Wednesday August 20, 2003 - 12:30 AM

iii. Type of sample
   - Final effluent water

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

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

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

Test Organisms

i. Species of test organism
   - Sandollar Echinoid (*Dendraster excentricus*)

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

iii. Source of test species
   - M-REP, Escondido, California
   - All adults providing gametes are from the same population and source
   - Gametes are spawned in-house at EVS

iv. Date test species acquired on
   - August 22, 2003

v. Holding time and conditions for adults
   - Adults received at the testing laboratory the day of the test, shipped overnight

vi. Indications of deviations from EC guidance on the importation of test organisms
   - No deviations from EC requirements

vii. Weekly percent mortality of adults being held over 7d preceding test
   - <2% per day over the 7 days preceding the test

viii. Age of test organisms
   - < 4 hours after spawning

ix. Unusual appearance, behaviour, or treatment of adults or gametes before test start
   - Organisms appear healthy

Test Facilities and Conditions

i. Test type & method
   - Echinoderm (*Dendraster excentricus*) Fertilization Toxicity Test
   - Static
   - Reference Method – EPS/1/RM/27 with 1997 amendments

ii. Test duration
   - 10:10 min (10min sperm + 10min sperm & egg)

iii. Date and time for start of definitive test

Reporting Requirements for Reference Method EPS1/RM/27-EC 92 (Sperm Cell)

- Friday August 22, 2003 - 5:00 PM

iv. Test vessel description
- 16 x 125mm test tubes

v. Person(s) performing the test and verifying the results
- Kevin Goodearle, Julianna Kalocai, Sioe Lie Kwee, Rachel DeWynter, Edmund Canaria, and Armando Tang

vi. Indication of rate and duration of pre-aeration of test solutions before initiation of test
- No pre-aeration

vii. Confirmation that no adjustment of sample or solution pH occurred
- No pH adjustment

viii. Procedure for sample filtration
- No sample filtration

ix. Procedure for preparation of hypersaline brine (HSB) as per EC guidance document on salinity adjustment – July 1997
- No deviations from EC guidance for salinity adjustment

x. Procedure for salinity adjustment as per EC guidance document on salinity adjustment – July 1997
- No deviations from EC guidance for salinity adjustment
- Salinity adjusted from 5ppt to 29ppt

xi. Type and source of control/dilution water
- UV-sterilized, 0.45µm-filtered natural seawater from the Vancouver Aquarium

xii. Concentrations and volumes tested
- Concentrations (% effluent volume / total volume) tested and total volumes used were:
- Control (0%) - 10mL
- Salinity Control (0%) - 10mL
- 4.6% - 10mL
- 9.1% - 10mL
- 18.2% - 10mL
- 36.5% - 10mL
- 73.0% - 10mL

xiii. Number of replicated per concentration
- 4 replicates per treatment concentration

xiv. Number of organisms per container
- 2000 eggs per 10mL vessel

xv. Measurements of pH and dissolved oxygen in sample water before use
- pH - 8.3, DO - 8.4mg/L

xvi. Measurements of pH, temperature, dissolved oxygen, and salinity during test
- pH - 7.9-8.4, T - 15.0-15.5°C, DO - 8.1-8.4mg/L, salinity - 29ppt

Results

i. Number and % of fertilized eggs in each test concentration
- (Number is equal to percent since totals were 100)
- Control (0%): #F = 51, 50, 52, 54 #UF = 49, 50, 49, 46
- Salinity Control: #F = 51, 52, 50, 51 #UF = 49, 48, 50, 49
- 4.6%: #F = 35, 40, 29, 45 #UF = 65, 60, 71, 55
- 9.1%: #F = 36, 28, 33, 25 #UF = 64, 72, 67, 75
- 18.2%: #F = 22, 24, 18, 20 #UF = 78, 78, 82, 80
- 36.5%: #F = 12, 8, 7, 10 #UF = 88, 92, 93, 90
- 73.0%: #F = 1, 0, 2, 0 #UF = 99, 100, 98, 100

Reporting Requirements for Reference Method EPS1/RM/27-EC 92 (Sperm Cell)

ii. Estimate of IC_{25} (95% CL) for fertilization success
- IC_{25} concentration = 3.8 (1.1 - 7.2)% v/v effluent
- Quantal statistic method = log linear interpolation

iii. Current reference toxicity tests (95% CL) for IC_{50} for fertilization
- Reference toxicity tests for Toxicant: Sodium Dodecyl Sulfate
- Test conducted on August 22, 2003, same day as effluent test
- Reference test conducted under same conditions
- IC_{50} for fertilization = 1.3mg/L SDS, 95% CL = 1.1-1.5mg/L

APPENDIX E

7-d Sublethal *Champia* (Algae) Toxicity Test

Reporting Requirements for Reference Method EPA/600/4-91/003 Method 1009.0

Effluent Sample

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

ii. Date & time of sampling
   - Samples for yearly sublethal toxicity testing were collected:
     Wednesday August 20, 2003 - 12:30 AM

iii. Type of sample
   - Final effluent water

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

v. Sampling method
   - Water was collected from at least 15cm below the surface using a water pump with silicon tubing
   - Water was collected from the upstream direction
   - The pump was flushed with site water for at least one minute prior to sample collection
   - 1 x 4L sample bottles were filled

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

vii. Temperature of water upon receipt at lab
   - 13°C

Test Organisms

i. Species of test organism
   - Algae (*Champia parvula*)

ii. Name and city of testing laboratory
   - Saskatchewan Research Council [SRC], Saskatoon, SK

iii. Source of test species
   - Sexually mature male and female branches
   - Obtained from USEPA, Hatfield Marine Science Center, Newport Oregon, 1995
   - Appear in good health
   - Females have trichogynes, males have sori with spermatia

Test Facilities and Conditions

i. Test type & method
   - *Champia parvula* sexual reproduction test
   - Static, non-renewal
   - 2-day exposure, followed by 5-7 day recovery period for cystocarp development
   - Reference Method - EPA/600/4-91/003, Method 1009.0

ii. Date and time for start of definitive test
   - Friday August 22, 2003 – 10:00 AM

iii. Test vessel description
   - 270mL transparent polystyrene cups with polystyrene lids

iv. Person(s) performing the test and verifying the results
   - Mary Moody

v. Indication of pre-aeration of test solutions
   - No pre-aeration

vi. Confirmation that no pH adjustment of sample or solution occurred
   - No pH adjustment

Reporting Requirements for Reference Method EPA/600/4-91/003 Method 1009.0

vii. Indication that EC guidance document for salinity adjustment was followed
- No deviations from EC guidance document on preparation of hypersaline brine
- HSB prepared from natural seawater at 90ppt
- No deviations from EC guidance document for salinity adjustment of sample
- Salinity adjustment: 642mL effluent + 258mL HSB + 9mL test nutrient solution
- Salinity of samples adjusted from 5ppt to 30ppt

viii. Type and source of control/dilution water
- Natural seawater collected at the Pacific Environmental Center, Environment Canada, North Vancouver, BC
- Filtered to 0.2µm and autoclaved prior to use
- Salinity adjusted as per EC guidance document to 30ppt with HSB from the same source

ix. Concentrations and volumes of test solutions
- Concentrations (% effluent volume / total volume) tested and total volumes used were:
- Control (Natural Seawater) (0%) - 100mL, 4.5cm depth
- Salinity Control Brine (0%) - 100mL, 4.5cm depth
- 4.5% - 100mL, 4.5cm depth
- 8.9% - 100mL, 4.5cm depth
- 17.8% - 100mL, 4.5cm depth
- 35.6% - 100mL, 4.5cm depth
- 71.3% - 100mL, 4.5cm depth

x. Number of replicated per concentration
- 3 replicates per concentration

xi. Number of organisms per test chamber
- 5 female branches + 2 male branches per chamber

xii. Measurements of pH, temperature, dissolved oxygen, and salinity of sample before use
- pH - 7.93, T - 23.5°C, DO - 9.4mg/L, salinity - 5ppt

xiii. Measurements of pH, temperature, dissolved oxygen, and salinity of sample during test
- DO: 7.8 - 8.0 mg/L, pH: 7.74 - 8.98, T: 23°C, salinity: 30ppt

Results

i. Number and % mortality of female plants after recovery in each test solution
- Totals from all 3 replicates are presented:
- Control (0%): 0 (0%) mortality
- Salinity Control (0%): 0 (0%) mortality
- 4.5%: 0 (0%) mortality
- 8.9%: 0 (0%) mortality
- 17.8%: 0 (0%) mortality
- 35.6%: 0 (0%) mortality
- 71.3%: 0 (0%) mortality

ii. Mean number of cystocarps per plant in each test concentration
- Control (0%): 57.4; 49.6; 44.2
- Salinity Control (0%): 66.4; 44.0; 45.2
- 4.5%: 52.2; 51.4; 57.4
- 8.9%: 61.2; 63.6; 41.2
- 17.8%: 30.4; 34.4; 18.6
- 35.6%: 6.6; 6.0; 7.6
- 71.3%: 0.0; 2.4; 1.4

Reporting Requirements for Reference Method EPA/600/4-91/003 Method 1009.0

iii. Estimate of IC_{25} (95% CL) for cystocarp development
- IC_{25} concentration = 13.6 (9.0-16.0)% effluent v/v
- Quantal statistic method was linear interpolation

iv. Current reference toxicity tests (95% CL) for IC_{50} for cystocarp development
- Reference toxicity tests for Toxicant: Sodium Dodecyl Sulfate
- Test conducted on July 29, 2003, within 30 days of effluent test
- Reference toxicant test was conducted under the same experimental conditions as the effluent test
- IC_{50} cystocarp development = 1.19mg/L SDS, 95% CL = 1.14-1.23mg/L

v. Reference toxicity warning limits (+/- 2SD) for IC_{50} for cystocarp development
- Reference toxicity tests for Toxicant: SDS
- 7-d IC_{50} growth = 1.47 (1.17-1.84) mg/L SDS

APPENDIX F

Effluent Metals Concentrations and Loadings

2003 3rd QUARTER MMER REPORT

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

CONCENTRATIONS OF EFFLUENT FOR MMER SCHEDULE 4 SAMPLED WEEKLY

Sample Taken During The Week of	Date Sample Taken	DELETERIOUS SUBSTANCE (mg/L)[1]								pH[1]	Collection Method
		Arsenic	Copper	Cyanide	Lead	Nickel	Zinc	TSS	Radium 226[1]		
07-Jul-03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]
14-Jul-03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]
21-Jul-03	25-Jul-03	*0.000*	0.001	*0.005*	0.008	0.001	0.048	*3.0*	*0.005*	7.77	Water Pump
28-Jul-03	30-Jul-03	*0.000*	0.001	*0.005*	0.003	0.001	0.063	*3.0*	*0.005*	7.84	Water Pump
04-Aug-03	05-Aug-03	*0.001*	0.001	*0.005*	0.001	0.001	0.089	*3.0*	*0.005*	7.85	Water Pump
11-Aug-03	12-Aug-03	*0.001*	0.001	*0.005*	0.001	0.003	0.151	*3.0*	*0.005*	7.94	Water Pump
18-Aug-03	19-Aug-03	*0.001*	0.001	*0.005*	0.000	0.003	0.146	8.0	*0.005*	8.1	Water Pump
25-Aug-03	26-Aug-03	*0.001*	0.001	*0.005*	0.001	0.003	0.160	*3.0*	*0.005*	7.96	Water Pump
01-Sep-03	02-Sep-03	*0.000*	0.001	*0.005*	0.003	0.003	0.150	10.0	*0.005*	8.06	Water Pump
08-Sep-03	09-Sep-03	*0.002*	0.001	*0.005*	0.001	0.003	0.158	11.0	0.010	7.94	Water Pump
15-Sep-03	16-Sep-03	*0.001*	0.001	-	0.000	0.004	0.186	5.0	*0.005*	7.96	Water Pump
22-Sep-03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]
29-Sep-03	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]	na[2]

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

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

Concentrations in red italics were set to the detection limit

MONTHLY MEAN CONCENTRATIONS OF EFFLUENT FOR MMER SCHEDULE 4

MONTH OF	MONTHLY MEAN CONCENTRATION[1] OF DELETERIOUS SUBSTANCE[2]							
	Arsenic	Copper	Cyanide	Lead	Nickel	Zinc	TSS	Radium 226
July/03	0.000	0.001	0.005	0.006	0.001	0.055	3.00	0.005
August/03	0.001	0.001	0.005	0.001	0.002	0.137	4.25	0.005
September/03	0.001	0.001	0.005	0.002	0.003	0.165	8.67	0.007

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

Note[2] - Monthly Mean Concentrations - the MEAN value of the concentrations measured in all water samples collected during each month when a deleterious substance is deposited.

MASS LOADING OF DELETERIOUS SUBSTANCE FOR EACH DAY SAMPLED

Sample Taken During The Week of	Date Sample Taken	DAILY MASS LOADING OF DELETERIOUS SUBSTANCE (kg/day)[1]								Average Daily Flow Rate (m^3/day)
		Arsenic	Copper	Cyanide	Lead	Nickel	Zinc	TSS	Radium 226[1]	
07-Jul-03	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]
14-Jul-03	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]
21-Jul-03	25-Jul-03	0.004	0.044	0.181	0.286	0.046	1.730	108.4	180,615	36,123
28-Jul-03	30-Jul-03	0.026	0.037	0.321	0.205	0.074	4.015	192.7	321,225	64,245
04-Aug-03	05-Aug-03	0.038	0.052	0.384	0.064	0.110	6.843	230.2	383,590	76,718
11-Aug-03	12-Aug-03	0.089	0.081	0.443	0.110	0.227	13.388	266.0	443,310	88,662
18-Aug-03	19-Aug-03	0.097	0.094	0.484	0.045	0.257	14.141	774.9	484,295	96,859
25-Aug-03	26-Aug-03	0.113	0.102	0.566	0.129	0.295	18.100	339.4	565,610	113,122
01-Sep-03	02-Sep-03	0.021	0.094	0.525	0.350	0.288	15.762	1050.8	525,415	105,083
08-Sep-03	09-Sep-03	0.195	0.105	0.489	0.114	0.285	15.441	1075.0	977,270	97,727
15-Sep-03	16-Sep-03	0.080	0.079	-	0.037	0.291	14.817	398.3	398,305	79,661
22-Sep-03	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]
29-Sep-03	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]	na[3]

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

Note[2] - Flow Rate must be taken at the same time as samples are effluent qualtity samples are taken

Note [3] - "na" refers to no effluent discharge to sample

MASS LOADING PER CALENDAR MONTH FOR EACH DELETERIOUS SUBSTANCE

CALENDAR MONTH OF	MASS LOADING[1] FOR DELETERIOUS SUBSTANCE (kg/month)[2]								Average Weekly Flow Rate[3] (m^3/week)	Total Monthly Volume[4] (m^3/month)
	Arsenic	Copper	Cyanide	Lead	Nickel	Zinc	TSS	Radium 226[2]		
July/03	0.45	1.25	7.78	7.62	1.85	89	4,667	7,778,520	351,288	1,555,704
August/03	2.61	2.55	14.55	2.69	6.89	407	12,480	14,545,239	656,882	2,909,048
September/03	2.96	2.77	15.21	5.01	8.64	460	25,241	19,009,900	659,099	2,824,710

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

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

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

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

APPENDIX G

Results of Effluent Characterization

RESULTS OF EFFLUENT CHARACTERIZATION

AS PER PARAGRAPH 15(1)(a)

Nine effluent samples were collected on a weekly basis during the 3rd Quarter of 2003 beginning on July 25, 2003 and ceasing on September 16, 2003. Three of the nine samples were "monthly" samples and analysed for a wider suite of elements, as per the guidance document. Monthly loadings of metals to Garrow Bay were calculated based on average weekly discharge volumes from Garrow Lake to Garrow Bay via the creek outflow.

No holding times were missed for any of the water chemistry of toxicity testing samples.

Water samples for acute and sublethal toxicity testing were collected using a pump system from about 20 m downstream of the dam on Garrow Lake, within the main flow of the creek. Acute Lethality Testing was conducted during three months (July, August, and September) during the quarter. There were no adverse effects observed for either the 96-hr Rainbow Trout toxicity test, or the 48-hr *Daphnia magna* toxicity test. LC_{50} values were >100% effluent for both species in all testing events.

Sublethal Toxicity Testing was conducted once during August 2003. As this is considered a marine discharge, marine species were used for sublethal testing following brine adjustment of the brackish effluent (as per test protocols). Testing for fish (7-d Topsmelt growth and survival) and invertebrates (Sand dollar) was conducted at EVS Environment Consultants, Vancouver, while algae (48-h *Champia*) testing was undertaken by the Saskatchewan Research Council, Saskatoon.

There were no effects observed in the Topsmelt Survival and Growth Test at 100% effluent v/v.

Sublethal effects were observed for the echinoid and algal tests and concentrations less than 100% effluent v/v. In the echinoid *(Dendraster excentricus)* fertilization test (EVS Consultants), the LOAEL was 4.6% v/v effluent, the IC_{25} was 3.8% v/v, and the IC_{50} was 13.0% v/v. In the *Champia parvula* sexual reproduction test (Saskatchewan Research Council) the LOAEL was 17.8% v/v effluent, the IC_{25} 13.6% v/v, and the IC_{50} was 18.8% v/v.

Zinc was the primary contaminant of potential concern (COPC) identified in mine effluent and is the only metal to consistently exceed BC Ambient Water Quality Guidelines (BC AWQG) in effluent. During the 9 week discharge period, effluent zinc concentration averaged 128 ± 49µg/L (range 48 – 186µg/L), which is well below the MMER effluent limit of 500µg/L. The BC AWQG is 10µg/L. On August 19, 2003, when the sublethal samples were collected, the concentration of Zn in the effluent was 146µg/L. Converting the echinoid test endpoints into Zn concentrations results in a Lowest Observed Adverse Effect Level (LOAEL) of 6.7µg/L Zinc, an IC_{25} of 5.5µg/L, and an IC_{50} of 19.0µg/L. Reference toxicity tests of zinc on *Dendraster* fertilization give mean EC_{50} concentrations of 8.5-60µg/L (Dinnel et al. 1983). The concentration of zinc in the effluent that corresponds to the IC_{50} (i.e., 19.0µg/L) is within the effects range reported in reference *Dendraster* fertilization tests. Thus the echinoid test is quite sensitive to zinc, with the LOAEL being less than the BC AWQG concentration.

Endpoints for the *Champia* test in terms of zinc concentrations were 26.0µg/L Zn (LOAEL), 19.9µg/L (IC_{25}), and 27.4µg/L (IC_{50}). The reference IC_{25} endpoint for zinc in the *Champia* test performed in-house at SRC was 27µg/L (95% confidence limits 16-42µg/L). This reference concentration is very similar to zinc concentrations in the mine effluent at the toxicity endpoints observed in the *Champia* test. *Champia* also appears to be sensitive to zinc concentrations at or below the BC AWQG.

Given the similarity between zinc concentrations in the effluent samples and the effects concentrations of zinc in reference tests, it is likely that zinc is responsible for the sublethal effects observed in both the *Dendraster* and *Champia* tests.

Reference: Dinnel, P.A., Q.J. Stober, J.M. Link, M.W. Letourneau, W.E. Roberts, S.P. Felton, and R.E. Nakatan. 1983. Methodology and Validation of a Sperm Cell Toxicity Test for Testing Toxic Substances in Marine Waters. Final Report, FRI-UW-8306, Fisheries Research Inst., School of Fisheries, University of Washington, Seattle, WA :208. Source: EPA EcoTox database.

APPENDIX 8

EMERGENCY SPILL RESPONSE TRAINING

SNC·LAVALIN
Engineers & Constructors

Spill Training

Formal spill training commenced in April after the contingency plan was finalized. The first session was held on April 20 2003.

Session One:
Attendance: P Newham
A Aubry
P Simms
B Power
E Roy
J Laverne
E Weidhaas
This was classroom training involving the inspection of containment berms, and the importance of carrying absorbent pads in all equipment.

Training Session Two :
This was classroom training involving the use of the zoom boom and the boats. This was conducted on June 8/03

Attendance:
P Simms
J Bonia
J Halle
J Laverne
JSingleton
E Roy
B Power

Training Session Three :
Training date July 24/03
This training was more in depth. as the fuel ship MV ARCTIC was arriving with 4.7 million liters of P50 diesel fuel. The training involved the placement of the boats. There was a ramp constructed to have easy access to remove the zoom boom. The zoom boom was put in place , and different scenarios were discussed.
The off loading of fuel procedure was discussed with the E.R.T. and recommendations, requested were addressed with written procedures. Absorbent sheets were made available and the use discussed with the team. PPE was discussed with all personnel involved.
A action plan was put in place and followed.
Attendance:
V Rice
J Singleton
S Lemieux
J Halle
R Parsons
B Power
J Jones

Training Session Four :

Training date was Oct 19/03and Dec 15/03
This was classroom training and the areas discussed were all fuel storage areas, the fuel line used daily to accommodations and the tank farm. The location of the spill kits and the location of the absorbent pads. The seasonal diversities and adverse weather conditions were discussed and how to respond.

Attendance:
P Newham
Jim Bonia
R Peroli
V Rice
R Langlois
J Jones
R Parsons
B Power

Additional Dialogue On Prevention

The importance of spill prevention and emergency response is a frequently discussed topic during daily FLRA meetings. All equipment operators are required to carry absorbent pads in their equipment in case of hydraulic leaks.

The location of spill containers is well communicated on site. Audits are conducted weekly on the contents of the containers and ordered as required.

Fuel transfers are done daily and pipelines and tank monitored during transfer.

All tanks and equipment are monitored when being fuelled

Ed Weidhaas
Safety Coordinator

APPENDIX 9

WORKERS' COMPENSATION BOARD

APPROVAL OF

MINE PORTAL SEAL DESIGN

WORKERS' COMPENSATION BOARD
Northwest Territories and Nunavut

xc	SNC - Transmittal
	Circ.
Re	RID ILL RIH

October 16, 2003

FAX (867) 253 6862

Mr J. Knapp
Manager
Teck Cominco Metals Ltd.
Polaris Reclamation Project
P.O. Box 188, Resolute Bay,
NU X0A 0V0

Dear Mr. Knapp:

Re: Polaris Mine Closure – Portal Plug Design

Thank you for your letter dated October 1, 2003 and the attached design drawings No. 23307-0 and No. 23307-1 Re: Portal Plug Design.

I have reviewed the document and found it meet or exceed all the requirements pursuant to section 17.03 of the Mine Health and Safety Regulations. I hereby grant Teck Cominco Metals Ltd. the approval of the design as presented to seal off all portal openings at Polaris.

Yours truly

Sylvester Wong, P.Eng.
Chief Inspector of Mines

APPENDIX 10

ELECTRONIC VERSION OF

4th QUARTER 2003

RECLAMATION REPORT

(PDF VERSION)