Lupin Mine, Nunavut
Phone (780) 890-7000
Fax (780) 890-8766

ECHO BAY MINES LTD.

9818 International Airport
Edmonton, Alberta
T5J 2T2

October 10, 2001

Our File: NWB1LUP0008 Annual01
Your File: Water Register
NWB1LUP0008

Executive Director
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU
X0B 1J0

Dear Sir:

RE: Echo Bay Mines Ltd., Lupin Gold Mine, Contwoyto Lake, NT.; Water Licence NWB1LUP0008; 2001 Annual Geotechnical Inspection

As required by Part D, Item 6(g) of Water Licence NWB1LUP0008, please find attached three copies the Report entitled "**2001 Geotechnical Inspection of Perimeter Tailings Dams; Lupin Mine, Nunavut"**.

The Geotechnical Inspection was carried out by Mr. James W. Cassie, M.Sc., P. Eng. with BGC Engineering Inc. of Calgary, Alberta on August 20th, 2001. An on-site "Project Memorandum" was issued to Echo Bay on August 21st, 2001. This memorandum summarized the initial findings of the inspection and was used as a basis for carrying out any required repairs noted prior to receiving the final report.

All required actions identified in the report have been addressed and are summarized in the attached table. Therefor, an implementation plan as requested within Item 6(g) is considered to have been completed within this report as there are no further items to be addressed.

Along with the physical inspection of the TCA, BGC Engineering Inc. also reviewed annual weather data (temperature, precipitation) and thermistor data which included the newer strings installed in 2000 within Dams 1a and 2. Please note the section on instrumentation within each dam summary.

.../2

Should you have any questions or comments regarding this report, please feel free to contact the undersigned at (780) 890-8794, Lupin.

Yours truly,

D. Hohnstein
Environmental Coordinator, Lupin

Attach.
2001 Geotechnical Inspection of Perimeter Dams; Lupin Mine, Nunavut

cc B. Danyluk
H. Ducasse
Mill Operations

2001 Annual Inspection of Tailings Dams - Maintenance Requirements

Location	Issue	Required Action	Date Completed	Additional Comments
Dam 1a	Longitudinal cracking and slumping adjacent to syphon pipes/access road.	Grade over cracks and flatten slope to prevent slumping.	Week of September 10, 2001.	Grading and filling in of cracks completed, however the slope could not be flattened as the ends of the syphon pipes would be covered.
Dam 1b	No Issues			
Dam 1c	Two erosional gullies	Backfill and grade	Week of September 10, 2001.	Fill placed and graded over
Dam 2	Very small amount of seepage noted (<1L/min)	Observe and monitor volume/sediment	Week of September 10, 2001.	Seepage noted was slightly more than the "wetting" of the soil. A depression was dug to allow water collection however the contained water froze prior to obtaining a sample. To be monitored in 2002.
Dam 3	Two erosional gullies near toe at south bend	Backfill and grade	Week of October 1, 2001.	Fill placed and graded over
	A 1m x 20m erosional gully parallel to the road	Backfill and grade	Week of October 1, 2001.	Fill placed and graded over; contouring to encourage runoff to flow away from this area
	Surface runoff pipes located at southern end of dam	remove pipes, grade and armour with oversize gravel	Week of October 1, 2001.	Area re-graded, geotextile placed in area and heavier esker material placed to prevent erosion
	Steep toe slope at northwestern end of dam; tension cracks	Flatten toe slope or apply riprap to the downstream slope	Week of October 1, 2001.	Some riprap applied to area and graded. Stayed away from the location near Boomerang Lake
Dam 4	Disturbed riprap from original construction activity and rutting on the crest	regrade to give consistent slope	Week of September 10, 2001.	A considerable amount of esker material was brought to location and graded to fill in ruts and provide consistent slope to the upstream crest
Dam 5	Two minor erosional gullies	Backfill and regrade	Week of September 10, 2001.	Fill placed and graded over. Additional erosion gullies repaired and the same time
Dam 6	Two minor, two significant erosional gullies at the toe of the dam	Backfill and regrade	Week of September 10, 2001.	Fill placed and graded over. Additional erosion gullies repaired and the same time
Other	Exposed liner on Kdam	Backfill and regrade	Week of September 10, 2001	Fill placed and graded over to cover exposed liner and fill erosion gullies identified in follow-up inspection
	Erosional scarp on upstream side of Jdam	Re-grade	monitor	This area is inaccessible due to location of tailings line; monitor for any further erosion

ECHO BAY MINES LTD.

2001 GEOTECHNICAL INSPECTION OF PERIMETER TAILINGS DAMS

LUPIN MINE
NUNAVUT

FINAL

PROJECT NO.: 0256-003-02
DATE: SEPTEMBER 26, 2001

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Project No. 0256-003-02
September 26, 2001

Mr. Dave Hohnstein
Echo Bay Mines Ltd.
Lupin Operation
9818 International Airport
Edmonton, Alberta
T5J 2T2

Re: Report on Annual Geotechnical Inspection of Perimeter Tailings Dams
Lupin Mine, Nunavut

Dear Dave:

Please find attached our final report on the annual geotechnical inspection of the perimeter tailings dams at Lupin Mine, which was carried out on August 20th, 2001.

Thank you to you and your staff for the hospitality shown during my site visit. If there are any questions regarding this report, please contact the undersigned at your convenience.

Yours truly,
BGC ENGINEERING INC.
per:

James W. Cassie, M.Sc., P.Eng.
Specialist Geotechnical Engineer
(direct line 403/250-5185 ext. 103)

encl.: Final Report
JWC/sf

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LIMITATIONS OF REPORT

This report was prepared by BGC Engineering Inc. (BGC) for Echo Bay Mines Ltd. The material in it reflects the judgment of BGC staff in light of the information available to BGC at the time of report preparation. Any use which a Third Party makes of this report, or any reliance on decisions to be based on it are the responsibility of such Third Parties. BGC Engineering Inc. accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this report.

As a mutual protection to our client, the public, and ourselves, all reports and drawings are submitted for the confidential information of our client for a specific project and authorization for use and / or publication of data, statements, conclusions or abstracts from or regarding our reports and drawings is reserved pending our written approval.

1.0 INTRODUCTION

Lupin Mine, owned and operated by Echo Bay Mines Ltd., is located 285 km south-east of Kugluktuk and 400 km north-east of Yellowknife on Contwoyto Lake, as illustrated on Figure 1, at approximately 65°46'N and 111°14'W. Echo Bay's Nunavut Water Board's License (NWB1LUP0008) requires that the tailings containment area (TCA) be inspected annually by a qualified Geotechnical Engineer. As such, Mr. D. Hohnstein, Environmental Co-ordinator for Lupin Mine, requested that BGC Engineering Inc. (BGC) conduct an inspection of the tailings facility perimeter embankments. A proposal to conduct this inspection, dated June 20, 2001 was submitted and Requisition No. L48921 was issued to BGC on June 21, 2001.

This inspection and the preparation of a report are required in partial satisfaction of the Lupin Mine Water License obligations. Other conditions in the Water License that apply to the annual inspection are as follows:

- a freeboard limit of 1.0 m should be maintained at all times;
- seepage from the TCA be minimised;
- any seepage that occurs should be collected and returned immediately;
- any erosion of the facilities should be addressed immediately; and
- the inspection report should be forwarded to the Water Board within 60 days of the inspection date.

The objectives of the inspection are to visually assess the performance of the structures from a geotechnical perspective and to bring deficiencies and points of concern to Echo Bay's attention.

Previous annual inspection reports by Golder Associates Ltd. and BGC Engineering Inc. should be reviewed for observations and recommendations prior to 2001.

2.0 TAILINGS CONTAINMENT AREA OPERATION DESCRIPTION

As illustrated on Figure 2, tailings storage at Lupin Mine utilises a number of low embankments which are arranged to provide five cells for solids accumulation, some supernatant water storage within these cells, supernatant runoff storage accumulation (Pond 1), and an adjacent area (Pond 2) for transport water conditioning and staged release. In that none of the tailings water is recycled to the mill, aged water is typically transferred from Pond 2 to the environment once a year (usually beginning July 15). Following this discharge, tailings water is transferred from Pond 1 to Pond 2 for subsequent ageing, during the transfer water treatment chemicals are added, if required.

Lupin Mine went into care and maintenance mode in January, 1998 and remained at that status until December, 1999 when a decision was made to resume operations. Mill production resumed in April, 2000 with Cell 3 used for tailings placement. The following list details the water management operations for the TCA:

- Transfer of tailings water from Pond 1 to Pond 2, via the siphons over J-Dam, began on June 20, 2001. This transfer operation was completed on Aug. 19, 2001 with approximately 744,203 m^3 of water conveyed.

- An additional transfer of water took place from September 10 to 17, 2001 when approximately 208,022 m^3 were transferred. This transfer was completed to provide additional storage volume for next spring's runoff.

No discharge of water from Pond 2 to the environment will occur in 2001.

Table 1 summarises the water level elevations within the TCA, as provided by Echo Bay:

Table 1 Summary of Summer Water Levels Within TCA

Location	Aug. 8, 2001 Water Elevation (m)
Pond 1	484.365
Pond 2	480.188
Cell 5	484.313

Figures 3 and 4 provide a graphical representation of the 2000 and 2001 (to-date) monthly temperature and precipitation data, versus the long term mean values, which have been recorded since 1982. Figure 3 indicates that the 2000 temperature values were warmer than typical and the 2001 readings to-date appear to be typical, except for the month of January which was much warmer. Figure 4 illustrates that 2000 was significantly drier than average values while 2001 values were significantly wetter than average during the first portion of the year (except for June, 2001).

3.0 INSPECTION CONDITIONS AND APPROACH

3.1 General

Mr. Jim Cassie, P. Eng., conducted the inspection on August 20, 2001, commencing at about 10:30 a.m. and concluding later the same day. The temperature during the inspection was approximately 5^{o}C under partly cloudy to overcast, but generally clear, visual conditions. In the three weeks preceding the inspection (since Aug. 1st), approximately 29 mm of rain had fallen.

At the time of the inspection, tailings were being deposited on the southern side of Cell 3. Neither of the decant siphon pipes at J-dam (Pond 1 water into Pond 2) or Dam 1A (Pond 2 water discharge to the environment) were in use.

Each of the embankments was inspected on foot. A camera and Dictaphone were used to record pertinent observations concerning both the physical conditions and seepage. In general, the crest and upstream slope of a given embankment were inspected first, followed by inspection of the downstream slope by walking along the toe of the slope. The transcribed Dictaphone notes and photographs constitute the field record (the Field Memo which remains in the office of BGC) and provide the basis for this formal report. Before leaving the site, a summary memo regarding tailings area maintenance items was prepared and reviewed with Mr. Hugh Ducasse from Echo Bay; this memo is attached in Appendix 1

3.2 Instrumentation

Seacor Environmental Engineering Inc. previously installed four thermistor strings in Dam #4 in October 1995. In addition, BGC (2000)[1] outlines the installation details of an additional four thermistor cables in Dams 1A and 2. This data was reviewed by Mr. Cassie and summary comments are provided on the appropriate tables herein.

4.0 FINDINGS AND CONCLUSIONS

The results of the inspection of each of the structures are presented on the following pages in standardised format, complemented by a selection of site photographs. Refer to Figure 2 for the location of each structure. Specific maintenance requirements are documented on each of the individual sheets and again in the summary memo provided in Appendix 1.

In general, the inspection confirms that the perimeter embankments are in good condition. Minor longitudinal cracking and some minor erosional gullies are visible at the toe of some of the dams, but no concerns are expressed at the current time. One new, 20 m long erosional gulley was observed on the crest of Dam 3 and this should be backfilled.

At the current time, four thermistors are installed in Dams 1A and 2 and some recommended cables are still to be installed. Four cables are also monitored in Dam 4. Over the last year, the subsurface thermal regime has remained subzero with no signs of warming at depth. Continued vigilance with regards to thermistor monitoring should be undertaken, especially when summer pond levels are high. In addition, visual inspection of the downstream toe of these Pond 2 dams should be carried out to determine if any seepage is being initiated. Should the Pond 2 level rise such that water is impounded by Dams #1B and #1C, then visual inspection of the toe of these dams should also be initiated.

[1] BGC Engineering Inc. 2000. Thermistor Installation Program, Dam 1A, Dam 2, M Dam, Cell 1 and Esker, Lupin Mine, Nunavut. Report submitted to Echo Bay Mines Ltd., Project No. 0256-002-01, December 11, 2000, 7 pages plus figures and appendices.

DAM 1A

LOCATION: West side of Pond 2.

FUNCTION: Major perimeter closure for water retention; carries siphon pipes for water decant system.

LENGTH: +/- 250 m

MAX HEIGHT: +/- 8 m above d/s tundra.

AS-BUILT ELEVATION: 486.1 m
(486.27 m by GPS kinematic survey)

CREST WIDTH AND CONDITION: 7 to 8 m; surfaced with esker material, but not travelled because of the siphons. One minor sinkhole noted on crest proximal to thermistor installation. No significant cracking evident; condition is good.

RIPRAP: Run of Mine rockfill; broadly graded; good condition.

BACKSLOPE: Approx. 1.5H:1V; variably armoured with cobbles and boulders; some runoff erosion rills present; no evidence of cracking.

TOE BERM: Minor longitudinal cracking and slumping still occurring at oversteepended toe, adjacent to decant pipes.

SEEPAGE: No evidence of seepage.

INSTRUMENTATION: Two thermistors, D1A-00-01 and -02, were installed on the upstream side of the crest, in November, 2000. D1A-00-01 shows a consistently subzero temperature profile down to a depth of approximately 20 m where the ground is at -4∀C. The depth of the active layer was 3 m in early August, 2001. Cable D1A-00-02, on the northern portion of the crest, shows again, a temperature profile that is subzero down to depth of 20 m below the crest. Active layer thaw by August 8, 2001 was approximately 3 m.

DAM 1A CONTINUED

MAINTENANCE RECOMMENDATIONS: Cracks on the downstream toe need to be graded over. Downstream toe side slope needs to be flattened to prevent recurrence of cracking.

CONCLUSIONS: The dam is in good condition with no evidence of seepage passing through or beneath the dam. Need to monitor downstream toe as Pond 2 level increases.

DAM 1B

LOCATION: West side of Pond 2.

FUNCTION: Minor perimeter closure for water retention; pond level is below dam base elevation thus currently functioning only as a road embankment.

LENGTH: +/- 200 m

MAX HEIGHT: +/- 2.5 m above d/s tundra.

AS-BUILT ELEVATION: 485.4 m
(485.83 m by GPS kinematic survey)

CREST WIDTH AND CONDITION: 5 to 6 m wide; surfaced with esker material so that this dam may also function as a roadway for access around the perimeter of the area. Crest condition is good.

RIPRAP: Run of Mine rockfill; variable sizes; undulating; disturbed in areas but in good condition overall.

BACKSLOPE: Approx. 1.5H:1V with some runoff erosion rills and a toe-of-slope roadway berm. No cracking observed.

SEEPAGE: No comment possible; no water head being retained by the structure.

MAINTENANCE RECOMMENDATIONS: None currently required.

CONCLUSIONS: The structure is in good condition; it should be monitored for seepage if Pond 2 rises sufficiently to place a water head against the dam.

DAM 1C

LOCATION: West side of Pond 2.

FUNCTION: Minor perimeter closure for water retention: currently retaining no water other than small puddles. Currently functioning only as a road embankment.

LENGTH: +/- 230 m

MAX HEIGHT: +/- 2.0 m above d/s tundra.

AS-BUILT ELEVATION: 485.3 m
(485.88 m by GPS kinematic survey)

CREST WIDTH AND CONDITION: +/- 9 m wide; surfaced with esker material, so that this dam may also function as a roadway, although the downstream toe roadway appears more commonly used. Crest condition is good; slight settlement trough formed at the contact with the upstream riprap.

RIPRAP: Run of Mine rockfill; overall condition satisfactory.

BACKSLOPE: Approx. 3H:1V, smooth slope. Minor longitudinal cracking noted along the toe of the access road berm. Two minor erosional gullies also noted at the toe of the road berm.

SEEPAGE: No comment possible; no water currently being retained by the structure.

MAINTENANCE RECOMMENDATIONS: Backfill and grade over the two erosional gullies on the downstream side of the access road berm.

CONCLUSIONS: The structure is in good condition; it should be monitored for seepage if Pond 2 rises sufficiently to place a water head against the dam.

DAM 2

LOCATION: North end of Pond 2.

FUNCTION: Major perimeter closure for water retention; natural pond downstream of the dam.

LENGTH: +/- 350 m

MAX HEIGHT: +/- 5.5 m above d/s tundra.

AS-BUILT ELEVATION: 485.6 m
(486.30 m by GPS kinematic survey)

CREST WIDTH AND CONDITION: Approx. 6 m; surfaced with esker material and used as the primary traffic route. There is a toe-of-slope berm roadway along the north-east portion of the dam. Crest condition is good; no cracking is evident. Small settlement trough formed on the crest near south abutment.

RIPRAP: Run of Mine rock forms convex-upward, gently-sloped upstream face; slight erosional scarp being formed at higher water level; good condition.

BACKSLOPE: Approx. 1.5H:1V with some runoff erosion rills. Minor longitudinal cracking noted at the toe of the access road berm

SEEPAGE: One small seepage discharge point again noted at the toe of the north-east abutment. In 1998, a survey shot of same seepage discharge point indicated that the point was higher in elevation than the upstream pond level. Monitor seepage discharge for any increase in quantity and presence of sediment within the water.

INSTRUMENTATION: Cables D2-00-02 and -03 were installed on the upstream side of the crest in November, 2000. D2-00-02, on the north end of the dam, shows a subzero temperature regime to 20 m depth below the crest. At the depth, the temperature varies slightly from -4.5∀to -4.2∀C. D2-00-03, situated in the middle of the dam, again displays subzero temperature that range from -3.5∀to -3.3∀C at 20 m depth.

DAM 2 CONTINUED

MAINTENANCE RECOMMENDATIONS: Continue to monitor north abutment toe for seepage quantity.

CONCLUSIONS: The dam is in satisfactory condition.

DAM 3

LOCATION: East end of now-covered tailings storage area, east of Cells 1 and 2.

FUNCTION: Minor perimeter closure for tailings retention; Boomerang Lake downstream of the dam. The dam retains tailings covered with an esker material cap, thickened in 1995 by one meter using esker material.

LENGTH: +/- 600 m

MAX HEIGHT: +/- 2.5 m above d/s tundra.

AS-BUILT ELEVATION: 488.4 m
(no new GPS elevation determined)

CREST WIDTH AND CONDITION: Approx. 8 m; surfaced with esker material. Crest condition is good and no cracking is evident. Two erosional gullies formed in the southern portion of the top of the dam. Erosional gulley, one metre wide by approximately 20 m long, just south of the bend in the dam, needs to be backfilled.

RIPRAP: Inside slope buried with tailings.

BACKSLOPE: Variable in inclination; locally meets the shoreline of Boomerang Lake. Old cracking indicated where the dam intersects the lake shoreline, probably indicative of over-steepening.

SEEPAGE: None observed.

MAINTENANCE RECOMMENDATIONS: Replace the four small diameter steel pipes that serve as a culvert on the southern end of the crest. Replace with a properly graded swale, appropriately armoured to drain surface runoff. Backfill and grade over the two erosional gullies situated along the toe and 20 m depression near the curve. Flatten the backslope along Boomerang Lake for the northwest part of the dam.

CONCLUSIONS: The dam is in good condition.

DAM 4

LOCATION: South end of Cell 4 for K Dam sub-pond.

FUNCTION: Perimeter closure for water retention at present; natural pond downstream of the dam at its west end.

LENGTH: +/- 900 m

MAX HEIGHT: +/- 6 m above u/s native ground elevation.

AS-BUILT ELEVATION: 489.2 m
(489.59 m by GPS kinematic survey)

CREST WIDTH AND CONDITION: Slight settlement trough formed at the contact of the crest and the upstream rip rap material. Approximately 12 m wide crest width in good condition, no cracks found.

RIPRAP: Run of Mine rockfill in generally good condition on upstream slope. Some construction machinery/dozer activity on the upstream side has disturbed the overall slope of the rip rap.

BACKSLOPE: Esker sand; slope steeper in upper portion and flattens in the lower portion, approximately 2H:1V. Geogrid exposed in places. Some minor cracks parallel the contours in the lower portion of the slope (seen previously and not of concern), adjacent to the steep toe.

SEEPAGE: No apparent seepage but the head of water across the dam is relatively low. Temporary cofferdams, which were on the downstream side of dam, have been graded along the toe; the west end cofferdam remains. After pumping of the toe berm pond was undertaken, seepage into pond was coming from downstream lake side, not from the upstream side of the dam.

INSTRUMENTATION: Four thermistors are currently monitored in Dam 4. Based on this data, the depth of the active layer is approximately 3 m in the dam section. Temperatures at depth below the embankment vary from a low of -4.8∀C to a high of -2.4∀based on the last year of readings. No indications of warming at depth.

DAM 4 CONTINUED

MAINTENANCE RECOMMENDATIONS: Repair disturbed rip rap on the upstream side and investigate if underlying liner has been disturbed as well.

CONCLUSIONS: The dam is in good condition and is functioning without apparent seepage. Any plan for significantly increasing the pond water level should include considerations for beach placement in view of its contribution to potential seepage mitigation.

DAM 5

LOCATION: Southeast corner of Cell 3, just northwest of Dam 4.

FUNCTION: Minor perimeter closure intended for future tails and water retention; currently functioning as a road embankment.

LENGTH: +/- 250 m

MAX HEIGHT: +/- 1.5 m above d/s tundra.

AS-BUILT ELEVATION: 490.8 m
(491.54 m by GPS kinematic survey)

CREST WIDTH AND CONDITION: Approximately 8 meters wide and esker surfaced so that the dam may also function as roadway. Crest is in good condition with no evidence of cracking.

RIPRAP: Angular rockfill, maximum particle size from 20 to 30 cm, has been placed on the upstream face. Approximate slope of 3H:1V and in good condition.

BACKSLOPE: About 1.5 to 2H:1V with till and esker sand. Two minor erosional gullies noted at the toe.

SEEPAGE: No comment possible; no water head being retained by the structure.

MAINTENANCE RECOMMENDATIONS: Backfill and grade over the two minor erosional gullies at the toe.

CONCLUSIONS: The dam is in good condition and should be inspected for seepage when pond levels place a water head against it.

DAM 6

LOCATION: West side of Cell 3 retaining tailings placed behind K-dam.

FUNCTION: Minor perimeter closure. Retaining some tailings beach and local ponded water.

LENGTH: +/- 300 m

MAX HEIGHT: +/- 2.5 m above d/s tundra.

AS-BUILT ELEVATION: 489.5 m
(490.25 m by GPS kinematic survey)

CREST WIDTH AND CONDITION: Approximately 10 m wide and esker surfaced so that dam may also function as a roadway. Crest in good condition, no cracking evident. Slight settlement trough formed at the contact with the upstream shell.

RIPRAP: Run of mine rockfill in good condition on upstream slope; slightly steeper in southern portion.

BACKSLOPE: About 2H:1V with till and esker sand; no evidence of previously indicated cracking. Two minor and two significant erosional gullies situated at the toe.

SEEPAGE: No seepage observed.

MAINTENANCE RECOMMENDATIONS: Backfill and grade over the erosional gullies at the toe.

CONCLUSIONS: The dam is in good condition.

5.0 CLOSURE

We trust the above meets your present requirements and we thank Echo Bay Mines Ltd., for the opportunity to be of service at Lupin Mine. If you have any questions or require additional information, please contact the undersigned.

Respectfully submitted,

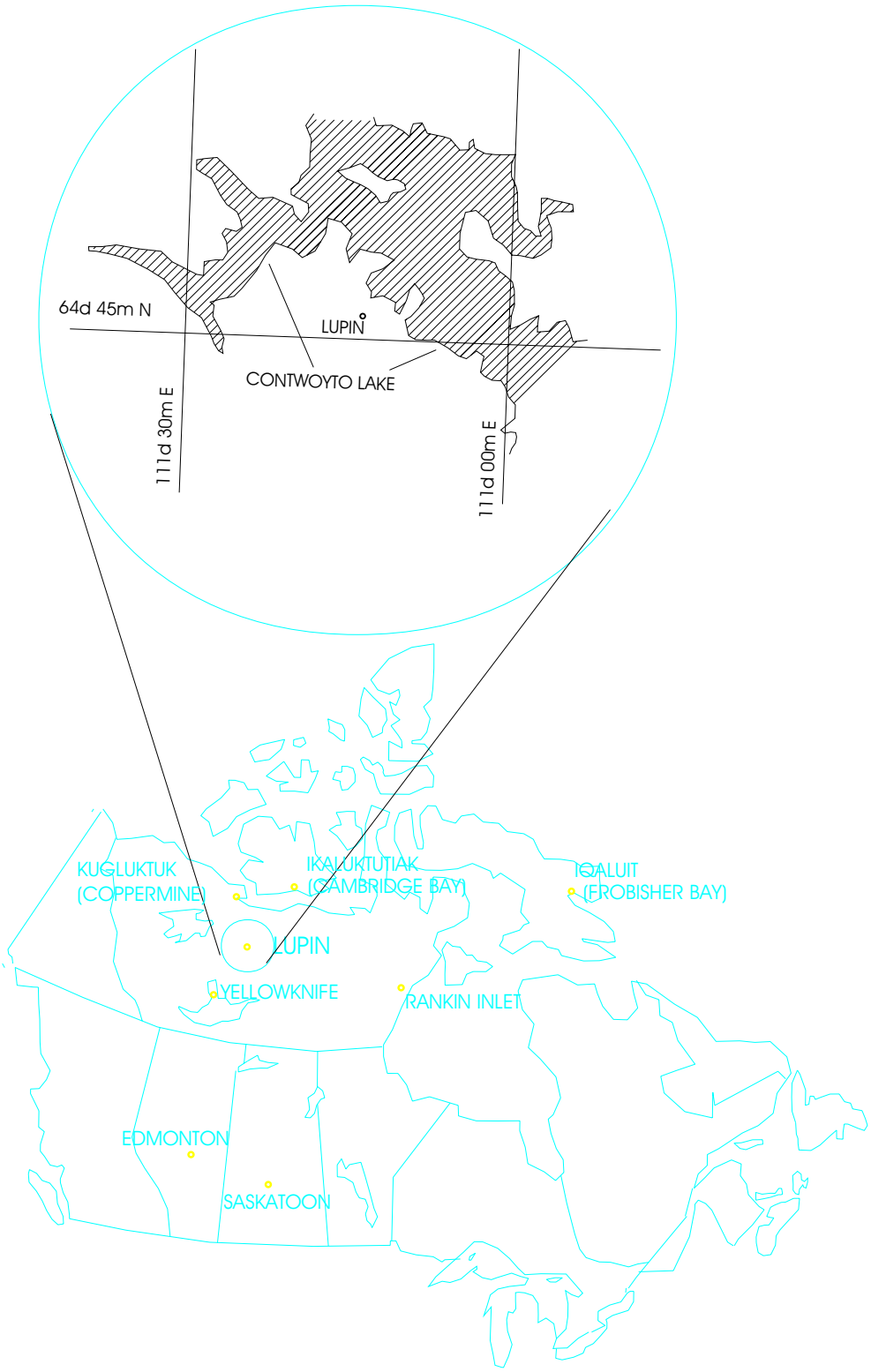
BGC ENGINEERING INC.

per: Reviewed by:

James W. Cassie, M.Sc., P.Eng.
Specialist Geotechnical Engineer

H. Holger Hartmaier, M.Eng., P.Eng.
Senior Geotechnical Engineer

FIGURES



SCALE: As shown	DESIGNED: JWC
DATE: Sept. 2001	CHECKED: JWC
DRAWN: SLF	APPROVED: JWC

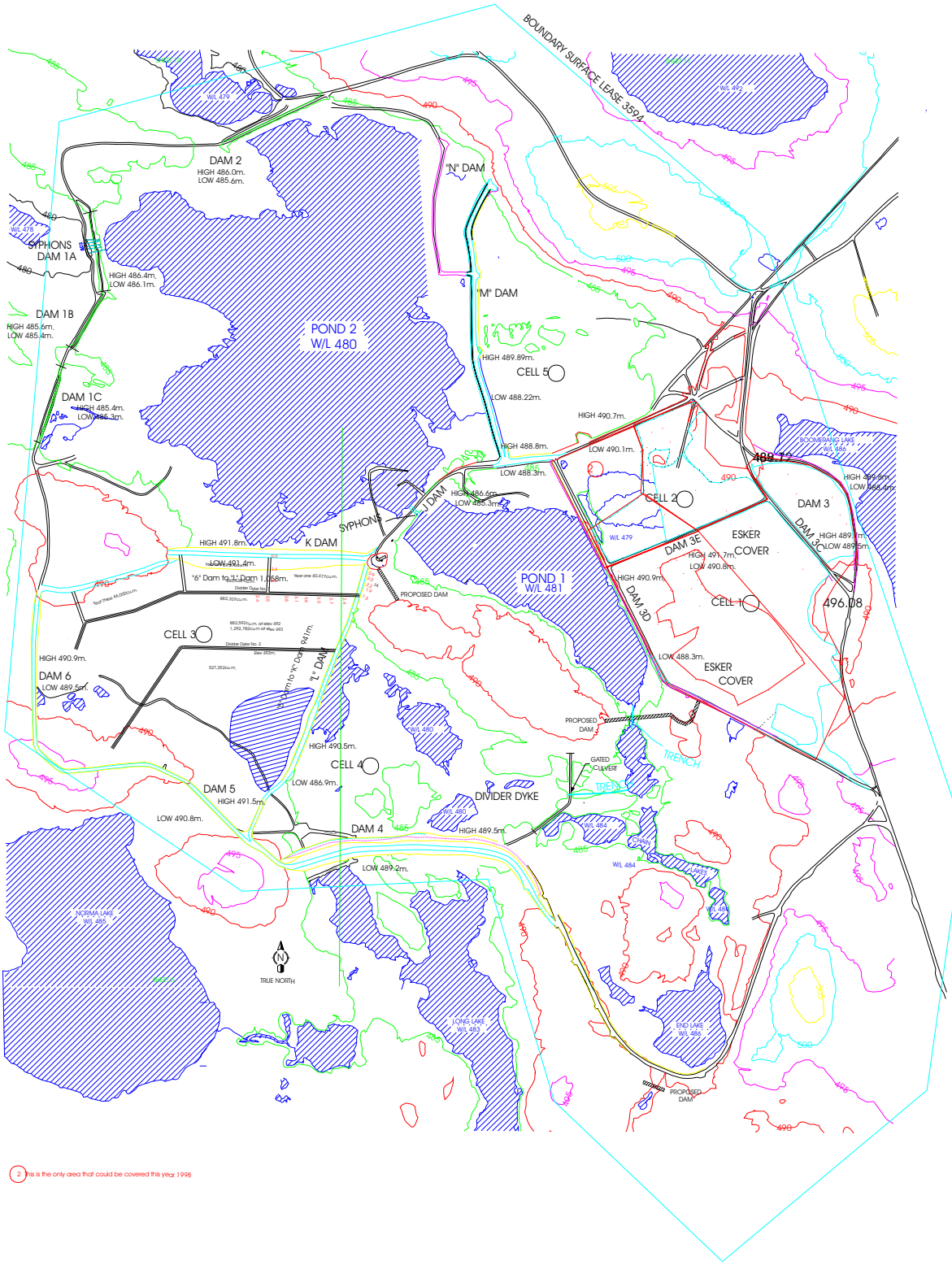
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY
Calgary, AB Phone (403) 250-5185

PROJECT:
Annual Inspection of Perimeter Tailings Dams

TITLE:
Lupin Mine Location Map

CLIENT: ECHO BAY MINES LTD.

PROJECT No.	DWG No.	REV.
0256-003-02	Figure 1	0.



(2) this is the only area that could be covered this year 1998

AS A MUTUAL PROTECTION TO OUR CLIENT, THE PUBLIC AND OURSELVES, ALL REPORTS AND DRAWINGS ARE SUBMITTED FOR

REV.	DATE	REVISION	DRAWN	CHECKED	APPROVED

SCALE:	N/A
DATE:	SEPT. 2001
DRAWN:	SLF
DESIGNED:	JWC
CHECKED:	JWC
APPROVED:	JWC

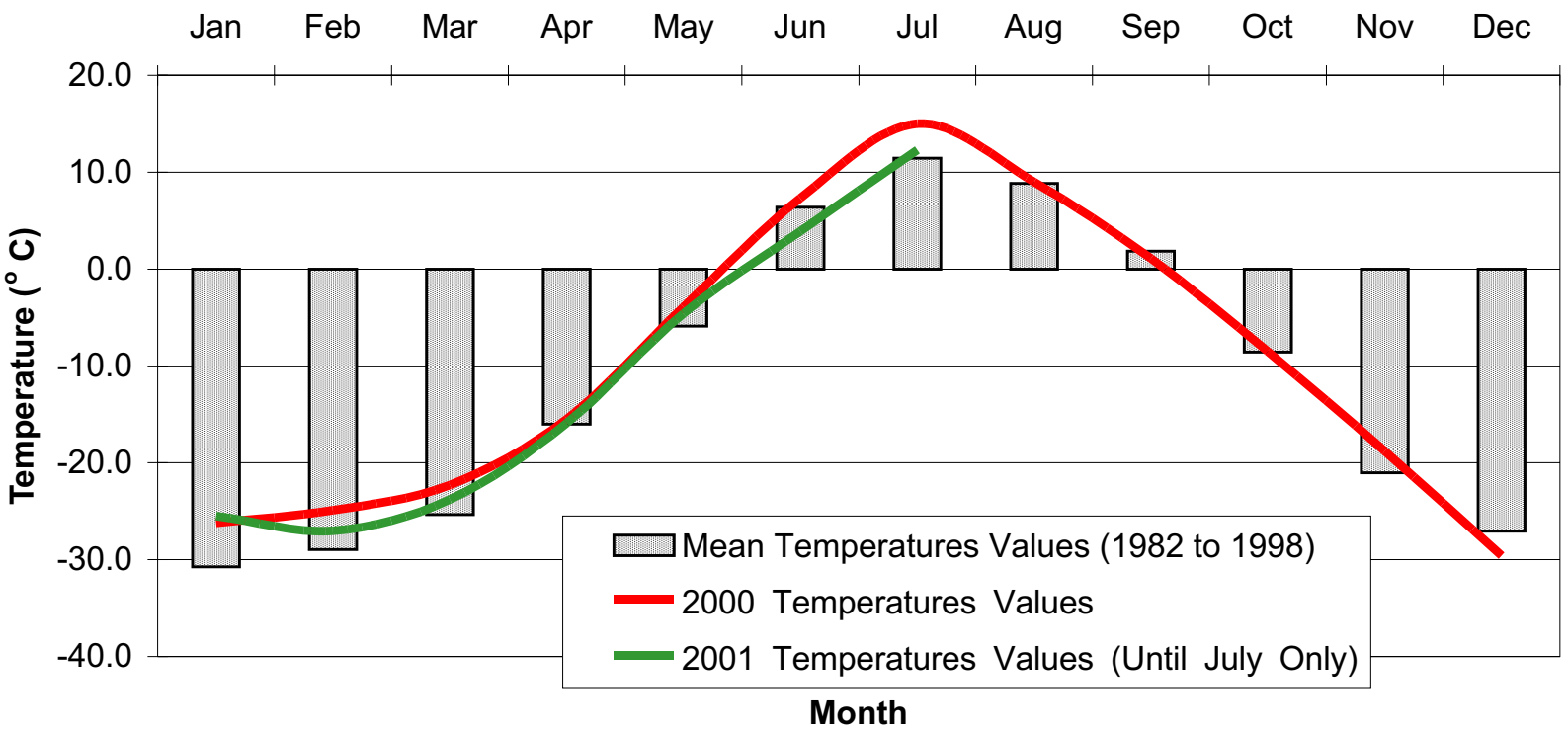
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY
Calgary, AB Phone (403) 250-5185

CLIENT: ECHO BAY MINES LTD.

PROJECT: Annual Inspection of Perimeter Tailings

TITLE: Tailings Containment Area Plan

PROJECT No.	FIGURE. No.	REV.
0256-003-02	Figure 2	0.



REV.	DATE	REVISION	DRAWN	CHECKED	APPROVED

SCALE: N/A
DATE: SEPT. 2001
DRAWN: SLF
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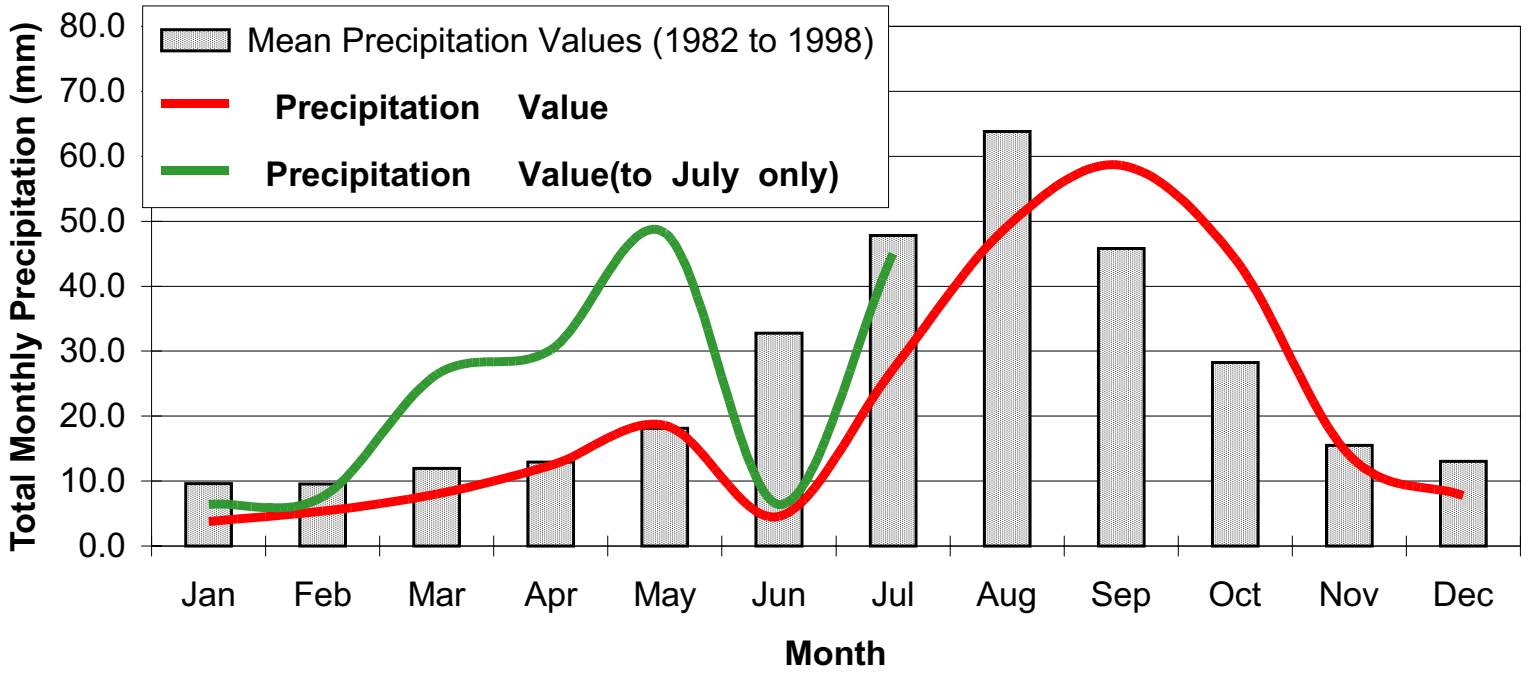
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY
Calgary, AB Phone (403) 250-5185

CLIENT ECHO BAY MINES LTD.

PROJECT: Annual Inspection of Perimeter Tailings Dams

TITLE: Comparison of Monthly Temperature Means to 2000 & 2001

PROJECT No.	FIGURE. No.	REV.
0256-003-02	Figure 3	0.



REV.	DATE	REVISION	DRAWN	CHECKED	APPROVED

SCALE: N/A
DATE: SEPT. 2001
DRAWN: SLF
DESIGNED: JWC
CHECKED: JWC
APPROVED: JWC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY
Calgary, AB Phone (403) 250-5185

CLIENT ECHO BAY MINES LTD.

PROJECT: Annual Inspection of Perimeter Tailings Dam

TITLE: Comparison of Monthly Precipitation Means to 2000 & 2001

PROJECT No.	FIGURE. No.	REV.
0256-003-02	Figure 4	0.

View of the crest on the upstream of Dam #1A looking north. There are no signs of cracking, deformation, or erosion except for one minor sinkhole.

View of the overall slope situated on the riprap side of the dam.

View of some cracking near the toe..

View looking back along the toe and the backslope of Dam 1A. No signs of seepage, settlement or erosional concerns other the minor cracking were noted.

REV.	DATE	REVISION	DRAWN	CHECKED	APPROVED

SCALE: N/A
DATE: SEPT. 2001
DRAWN: SLF
DESIGNED: JWC
CHECKED: JWC
APPROVED: JWC

BGC ENGINEERING INC.
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Calgary, AB Phone (403) 250-5185

CLIENT ECHO BAY MINES LTD.

PROJECT: Annual Inspection of Perimeter Tailings Dams

TITLE: Dam 1A Inspection Photos

PROJECT No.: 0256-003-02

FIGURE. No.: Figure 5

REV.: 0.

View of the crest on the upstream side of this dam. The crest is somewhat well travelled with the tire marks still visible. As previously noted, the upstream side is somewhat undulating.

Shows another view of the crest of the Dam 1B. It should be noted that the dam does not retain any water.

View of a thin erosional gully located on the downstream side of Dam 1B. This erosional gully is located about 30 meters south of the north abutment of this dam. The erosional gully is some 3 centimetres wide.

Another view of the downstream side of Dam 1B. There are no changes with the condition of Dam 1B and it appears to be in satisfactory condition.

REV.	DATE	REVISION	DRAWN	CHECKED	APPROVED

SCALE: N/A
DATE: SEPT. 2001
DRAWN: SLF
DESIGNED: JWC
CHECKED: JWC
APPROVED: JWC

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AN APPLIED EARTH SCIENCES COMPANY
Calgary, AB Phone (403) 250-5185

CLIENT ECHO BAY MINES LTD.

PROJECT: Annual Inspection of Perimeter Tailings Dams

TITLE: Dam 1B Inspection Photos

PROJECT No.: 0256-003-02

FIGURE. No.: Figure 6

REV.: 0.

View of the upstream side and crest of Dam 1C looking towards the south. The crest is relatively well travelled as is the small access road on the downstream side.

View taken along the access road berm and along the toe towards the south. No signs of seepage at the downstream toe were noted.

SCALE: As shown	DESIGNED: JWC
DATE: Sept. 2001	CHECKED: JWC
DRAWN: SLF	APPROVED: JWC

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PROJECT: Annual Inspection of Perimeter Tailings Dams

TITLE: Dam 1C Inspection Photos

CLIENT: ECHO BAY MINES LTD.

PROJECT No.	DWG No.	REV.
0256-003-02	Figure 7	0.

View of the upstream side of this dam. As previously noted, there is a small scarp formed at the contact of the light brown to the grey material.

Another view of the riprap on the upstream side of the dam.

View of some minor crest edge cracking located along the downstream edge of the access berm.

Shows the small pond and seepage discharge which is occurring over towards the north abutment of Dam #2. There has been a seep going on here for the last few years.

REV.	DATE	REVISION	DRAWN	CHECKED	APPROVED

SCALE: N/A
DATE: SEPT. 2001
DRAWN: SLF
DESIGNED: JWC
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PROJECT: Annual Inspection of Perimeter Tailings Dams

TITLE: Dam 2 Inspection Photos

PROJECT No.: 0256-00302

FIGURE. No.: Figure 8

REV.: 0.

Shows four small diameter pipes that have been placed in a previously noted erosional gully. A properly constructed swale should be located here instead.

Shows an erosional gully approximately 1 metre wide by perhaps 0.4 metres deep in the foreground of this photo.

Shows a depression formed approximately 8 metres back from the crest edge for Dam 3. This depression is approximately 1 to 1.2 metres wide and extends over a distance of some probably 20 metres. This erosional gully should be back filled.

Shows some cracking located at the toe which runs in a discontinuous manner for perhaps 20 to 30 metres.

REV.	DATE	REVISION	DRAWN	CHECKED	APPROVED

SCALE: N/A
DATE: SEPT. 2001
DRAWN: SLF
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PROJECT: Annual Inspection of Perimeter Tailings Dams

TITLE: Dam 3 Inspection Photos

PROJECT No.: 0256-003-02

FIGURE. No.: Figure 9

REV.: 0.

View taken from the waterline on the upstream side of the dam. This distance from waterline to the crest is approximately 3 metres.

Shows a close up of the area where the seepage discharge is incoming from the downstream side.

View of the disturbed area on the upstream side of the Dam 4. As can be seen, some of the light brown sandy material is sticking through where the dark grey riprap has been disturbed.

REV.	DATE	REVISION	DRAWN	CHECKED	APPROVED

SCALE: N/A
DATE: SEPT. 2001
DRAWN: SLF
DESIGNED: JWC
CHECKED: JWC
APPROVED: JWC

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PROJECT: Annual Inspection of Perimeter Tailings Dams

TITLE: Dam 4 Inspection Photos

PROJECT No.: 0256-003-02

FIGURE. No.: Figure 10

REV.: 0.

View of the crest and upstream side of this dam. As can be seen, the crest is relatively well travelled and there are no signs of cracking or deformation within the dam embankment.

Shows a shallow erosional gully located some 20 metres east of the west abutment of this dam, located at the toe.

SCALE: As shown	DESIGNED: JWC
DATE: Sept. 2001	CHECKED: JWC
DRAWN: SLF	APPROVED: JWC

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PROJECT: Annual Inspection of Perimeter Tailings Dams

TITLE: Dam 5 Inspection Photos

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PROJECT No.	DWG No.	REV.
0256-003-02	Figure 11	0.

Shows a view of the upstream side of the dam up to its southern abutment.

Shows an erosional gully situated at the toe of Dam 6. This gully is located approximately some 20 metres south of the north abutment. This gully is approximately 1 metre wide by approximately 0.5 metres deep.

SCALE: As shown	DESIGNED: JWC
DATE: Sept. 2001	CHECKED: JWC
DRAWN: SLF	APPROVED: JWC

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PROJECT: Annual Inspection of Perimeter Tailings Dams

TITLE: Dam 6 Inspection Photos

CLIENT: ECHO BAY MINES LTD.

PROJECT No.	DWG No.	REV.
0256-003-02	Figure 12	0.

APPENDIX 1

SITE INSPECTION MEMO

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY
#1170 - 840 7th Avenue S.W., Calgary, Alberta, Canada. T2P 3G2
Phone (403) 250-5185 Fax (403) 250-5330

PROJECT MEMORANDUM

To:	**Echo Bay Mines Ltd.**	**Fax No.:**	**n/a**
Attention:	**Mr. Hugh Ducasse**	**CC:**	**none**
From:	**Mr. Jim Cassie, P.Eng.**	**Date:**	**August 21, 2001**
Subject:	**2001 Annual Inspection of Tailings Dams – Maintenance Requirements**		
No. of Pages (including this page): 3 Pages		**Project No:**	**0256-003-01**

The following provides some comments on required maintenance, following my inspection of the tailings dams on the August 20th, 2001. This work should be undertaken in the near future before snowfall occurs to prevent potential further damage from occurring.

External Dams

Dam 1A

- Some longitudinal cracking and slumping is still occurring adjacent to the erosional gullies previously formed adjacent to the siphon pipes at the downstream access road berm. Cracks need to be graded over and the downstream side slope should be flattened to prevent further slumping from occurring.

Dam 1B

- No maintenance suggested.

Dam 1C

- Two minor erosional gullies, situated along the toe of the access road berm, should be backfilled and graded over.

Dam 2

- Very small amount (<1 l/min) of seepage observed again at the toe of the north abutment. Surveying of the seepage point elevation two years indicated it was higher than the upstream pond level. Continue to monitor seepage for any increases in quantity and to observe if seepage water contains any sediment.

Dam 3

- Two erosional gullies have been formed near the toe, south of the bend in the dam. These should be backfilled and graded to prevent surface runoff concentration.
- There exists a one metre wide by 20 m long erosional gully that exists some 8 m west of the toe, near the bend in the dam. This depression should be backfilled and the surface properly graded.
- The four small diameter steel pipes, situated near the southern portion of Dam 3 and serving as a culvert for water flow, should be replaced with a properly graded and armoured swale to control the flow of surface water.
- Flatten toe slope or apply some riprap to the downstream slope along the northwestern portion of the dam (where Dam 3 contacts Boomerang Lake), where tension cracks are currently located.

Dam 4

- Dozer /construction activity on the upstream side has disturbed the rip rap placement, exposing the underlying sand at some locations. In addition, some rutting in the crest has occurred, near the contact with the upstream shell material. Consideration should be given to regrading the materials to an overall consistent slope to prevent the concentration of surface runoff.

Dam 5

- Two minor erosional gullies at the toe should be backfilled and graded.

Dam 6

- Two minor and two significant erosional gullies at the toe should be backfilled and graded.

Internal Dams

J-Dam

- High water level has resulted in erosion of the upstream face of the dam. The vertical scarp created is quite extensive and consideration should be given to regrading or protecting these eroded faces.

K-Dam

- One exposed portion of the liner, on the upstream side, should be backfilled over to prevent further potential damage.
- Significant erosional scarps have formed at the toe of the downstream slope, due to the previous and current water levels of Pond #2. Regrading of this eroded toe and/or placement of protective rip rap should be undertaken to prevent further erosion leading to progressive slumping of the face.

Dam 3D

- Rockfill material placed on the southwest side of Dam 3D has undergone some deformation as manifested by longitudinal cracks in the rockfill. Regrade and/or monitor situation for further settlement.

Respectfully submitted,
BGC Engineering Inc.
per:

J.W. Cassie, M.Sc., P.Eng.
Specialist Geotechnical Engineer