Echo Bay Mines Ltd.
Lupin Operation

Reclamation Liability for the Lupin Mine

A Review of the Closure Cost Estimate Provided to the Nunavut Water Board by Brodie Consulting Ltd.

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Introduction

I would like to thank the Nunavut Water Board for this opportunity to respond to the Brodie Consulting Ltd. review of reclamation liability for the Lupin and Ulu properties. As stated at the public hearing in Kugluktuk, Echo Bay Mines believes that the current reclamation liability for Lupin is significantly lower than the $44.6M suggested in the Brodie Consulting Ltd. report.

Since the author of the Brodie Consulting Ltd. (BCL) report neither visited the Lupin site nor interviewed Lupin site personnel, he used as the foundation of his cost estimate a report prepared by Golder Associates Ltd. (GAL) titled *Closure Cost Estimate and Scoping of Mine Closure Issues, Lupin Mine, NWT.* The GAL report was commissioned by Echo Bay in 1997 and, as stated on page 3 of the report, was to be "an upper bound cost estimate that Echo Bay accounting could use to quantify potential closure costs." GAL estimated the reclamation liability to be $29.4M.

Echo Bay Mines Ltd. (EBML) has the experience of reclaiming five mines, including two mines in the Northwest Territories and three in the United States. Upon review of the GAL report, EBML identified several costs that either should not have been included or that were substantially higher than our experience has shown. Consequently, EBML prepared an internal cost estimate of the reclamation liability at Lupin. The EBML report estimated the reclamation liability to be $18.9M.

Because the BCL report relies on the GAL report as its base, this review will first identify costs in the GAL report that are excessive. Next, it will compare some estimated costs in the BCL report with known costs.

Excessive Costs Identified in the Golder Associates Ltd. Report

1. Esker Cover on Cell 4 of the Tailings Containment Area

Cost reduction of $3,988,696.

The GAL report includes the cost of placing a two metre cover of esker material on Cell 4, in anticipation of using Cell 4 for tailings storage sometime in the future. At present Cell 4 is used to hold water only, not tailings. EBML does not expect that Cell 4 will be contaminated. Required storage capacity will be achieved by raising internal dykes. Any closure cost estimate should be based on actual disturbances, not potential disturbances.

Appendix III, page 15 lists the total direct cost (excluding general expenses) for granular cover on the tailings containment area (TCA) at $13,907,278. Appendix III, page 13 lists the total volume of granular cover needed for the tailings containment area to be 2,877,900 m^3. Appendix III, page 13 lists the total volume of granular cover needed for Cell 4 to be 825,400 m^3. Therefore, the Golder report should be reduced by $ 3,988,696 to remove the direct costs of covering Cell 4.

$13,907,278 X (825,400 / 2,877,900) = $3,988,696.

2. Labour Costs Based on an Overtime Averaging Permit

Cost reduction 0f $3,129,126.

Appendix VI of the GAL report describes how hourly pay rates are calculated. The rates are based on Alberta union rates, plus a pay burden percentage, and a work week based on 40 hours straight time and 44 hours at double time (7 days @ 12 hours/day).

In reality, fly-in operations such as Lupin and Ekati work on a 2-week in and 2-week out rotation with an overtime averaging permit issued under authority of the *Labour Standards Act*. The permit requires that overtime be paid at the rate of one and one half times the employee's regular rate for hours worked in excess of 12 hours per day or 160 hours in four consecutive weeks. Attached to this document as Appendix I are the overtime averaging permits for Lupin employees and Nuna Logistics Ltd. employees, a contractor working on the Lupin site.

Below are three cost comparisons of the rates based on overtime after 40 hours and overtime after 160 hours.

Appendix VI, page 1 calculates the "Hourly Total" for a Boilermaker J/M as follows:

$$\frac{\{[\text{base pay rate} + (\text{base pay rate} \times \text{pay burden \%})] \times 40 \text{ hours}\} + \{[\text{base pay rate} + (\text{base pay rate} \times \text{pay burden \%})] \times 2 \times 44 \text{ hours}\}}{4}$$
$$84 \text{ Hours}$$

or:

$$\frac{\{[22.83 + (22.83 \times .428)] \times 40 \text{ hours}\} + \{[22.83 + (22.83 \times .428] \times 2 \times 44 \text{ hours}\}}{84 \text{ Hours}} = \$49.68/\text{hr}$$

Using the same base pay rate and pay burden percentage but calculated on an overtime averaging permit, the Hourly Total for a Boilermaker J/M becomes:

$$\frac{\{[22.83 + (22.83 \times .428)] \times 80 \text{ hours}\} + \{[22.83 + (22.83 \times .428)] \times 1.5 \times 4 \text{ hours}\}}{84 \text{ hours}} = \$33.37/\text{hr}$$

33.37 ÷ 49.68 = 0.6717

Appendix VI, page 1 calculates the "Hourly Total" for a Carpenter F/M as follows:

$$\frac{\{[25.84 + (25.84 \times .275)] \times 40 \text{ hours}\} + \{[25.84 + (25.84 \times .275] \times 2 \times 44 \text{ hours}\}}{84 \text{ Hours}} = \$50.20/\text{hr}$$

Using the same base pay rate and pay burden percentage but calculated on an overtime averaging permit, the Hourly Total for a Carpenter F/M becomes:

$$\frac{\{[25.84 + (25.84 \times .275)] \times 80 \text{ hours}\} + \{[25.84 + (25.84 \times .275)] \times 1.5 \times 4 \text{ hours}\}}{84 \text{ hours}} = \$33.73/\text{hr}$$

33.73 ÷ 50.20 = 0.6719

Appendix VI, page 1 calculates the "Hourly Total" for a Cement Mason G/F as follows:

$$\frac{\{[28.00 + (28.00 \times .262)] \times 40 \text{ hours}\} + \{[28.00 + (28.00 \times .262] \times 2 \times 44 \text{ hours}\}}{84 \text{ Hours}} = \$53.85/\text{hr}$$

Using the same base pay rate and pay burden percentage but calculated on an overtime averaging permit, the Hourly Total for a Cement Mason G/F becomes:

$$\frac{\{[28.00 + (28.00 \times .262)] \times 80 \text{ hours}\} + \{[28.00 + (28.00 \times .262)] \times 1.5 \times 4 \text{ hours}\}}{84 \text{ hours}} = \$36.17/\text{hr}$$

36.17 ÷ 53.85 = 0.6717

As can be seen from these three comparisons, using PCL wage rates but applying an overtime averaging permit reduces the Hourly Total by 32.8% (1.00 – 0.672).

Appendix VI, page 5 lists the Total Labour for reclamation at $10,449,992. The total labour assigned to the TCA (pages 1-3) is $13,172,670. Since the labour portion of Cell 4 has been removed above, it must be removed from the Total Labour to ensure an accurate reflection of the cost savings.

Total labour =	$13,172,670
Cell 4 labour = $13,172,670 X (825,400/2,877,900) =	$ (909,942)
Total Labour without Cell 4 =	$ 9,540,050

Since applying an overtime averaging permit is shown to reduce the Hourly Total by 32.8%, the labour in the GAL report should be reduced by $3,129,136.

$9,540,050 X .328 = $3,129,136.

3. Placing 1.75 m of esker cover on exposed tailings.

Cost reduction of $1,239,823.

In the submissions to the Nunavut Water Board, both EBML and DIAND concluded that a 1.75 m esker cover would be sufficient to keep the tailings in a permanently frozen state. Page 8, paragraph 4 of the DIAND submission states "The quality of the data is very good prior to the failure of two thermistors in 1998, and supports Echo Bay's prediction that a 1.75 m cover thickness of esker material may be adequate for closure of the TCA."

The GAL report is based on a 2.0 m cover of esker material. Appendix III, page 15 lists the direct cost for granular cover (excluding general expenses) as $13,907,278. Since the cost of not covering Cell 4 has already been taken into account in item 1 above, it must removed from the total cost of granular cover. The total direct cost of granular cover for the TCA minus the cost to cover Cell 4 is $ 9,918,582.

$13, 907,278 – [$13,907,278 X (825,400/2,877,900)] = $ 9,918,582.

The total direct cost of $ 9,918,582 assumes an esker cover of 2.0 m. As stated above, a cover of 1.75 m has maintained the tailings in a permanently frozen state. Therefore, the cost of granular cover should be reduced accordingly. The GAL report should be reduced by $1,239,823.

$9,918,582 – [$9,918,582 X (1.75/2.0)] = $8,678,759

$9,918,582 - $8,678,759 = $1,239,823.

4. Cost Reductions in the General Expense category.

Cost reduction of $1,553,282.

The General Expense in the GAL report is based on a 14 month reclamation period over three seasons (Appendix IV, page 1). The assumption is that esker can only be moved during a three month season and a total of 8.5 months would be needed to cover the TCA (Appendix IV, page 1). The demolition work would be done in the first year in an 8 month period (Appendix IV, page 1).

It has been presented above that Cell 4 need not be covered and that the rest of the TCA needs only 1.75 m cover, not 2.0m. As such, the time needed to place the esker should be reduced.

Total granular cover in GAL report:	2,877,900 m^3
Minus the cover for Cell 4:	- 825,400 m^3
Granular cover less Cell 4:	2,052,500 m^3

Minus difference in 1.75 vs. 2.0:

2,052,500 – [2,052,500 X (1.75/2.0)] =	- 256,563 m^3

Total granular cover needed for 1.75 m cover = 1,795,937 m^3

If 2,877,900 m^3 required 8.5 months to place then 1,795,937 m^3 should take 5.3 months.

8.5 X (1,795,937/2,877,900) = 5.3

The GAL report lists the Total General Expense Appendix V, page 44 as $7,248,344.

The assumption of 14 months to do the reclamation can now be reduced to 11 months (one 8-month season and one 3-month season). Accordingly, the General Expense should be reduced by $1,553,282.

$7,248,651 – [$7,248,651 X (11/14)] = $1,553,282.

Comparison of Estimated Costs in the Brodie Consulting Ltd. Report and Known Costs

5. Inflation Adjustment

Cost reduction of $2,511,935.

The BCL report estimates the inflation cost to be $3,333,181 based on the GAL closure cost estimate and the assumption of a 4% per annum inflation rate for the past three years. Above I have shown how the GAL closure cost estimate should be reduced by approximately $9,911,000 from the original estimate of $29,346,000. In addition and as noted in both the BCL and GAL reports, the GAL estimate should be reduced by a further $144,000 because of reclamation work that has been completed since the initial GAL report was done. This reduces the amount that the inflation calculation should be based on to $19,291,000.

GAL estimate =	$29,346,000
Cost reductions as explained above =	$ (9,911,000)
Cost reductions for completed work =	$ (144,000)
Reduced GAL estimate =	$19,291,000

Statistics Canada has published the Consumer Price Index for the past five years on its website, a printout of which is attached as Appendix II. The “All Items” CPI for 1997 –

1999 was 1.6%, 0.9%, and 1.7% respectively. Since this is historical data it should be used to determine the cost of inflation, not the estimated 4%. The actual cost of inflation for 1997 to 1999 was $821,245 instead of the $3,333,181 in the BCL report, resulting in a cost reduction of $2,511,935.

BCL inflation estimate =	$3,333,181
Actual inflation ($19,291,000 X 1.016 X 1.009 X 1.017) - $19,291.000 =	$ (821,245)
Cost reduction from BCL estimate =	**$2,511,935**

6. Winter Road Construction

Cost reduction of $4,538,000.

The BCL report estimates the cost to build and maintain the winter road for one heavy use year to be $4,700,000 and for two light use years to be $1,788,000. The estimate of $4.7M is taken from page 28 of the GAL report as the cost to open and maintain the 1996/97 winter road. As noted in the GAL report, all road users share in the cost of opening and maintaining the winter road. The $4.7M cost was equally shared by all of the road users based on a per ton kilometer charge – it was not the cost that EBML paid.

With the development of the BHP Ekati mine and the soon-to-be Diavik mine, it is most likely that these mines will still be operating when the final reclamation work begins at Lupin. As a result, the cost of the winter road will again be shared by all users.

Lupin's share in the winter road costs for the 1999/2000 winter road was $1.3M. This was for a heavy use year. As stated in point 4 above, two winter road seasons will be needed to complete the reclamation – one heavy use season and one light use season. EBML cost history indicates that the cost for the heavy use season should be approximately $1.3M. The cost for the light use season will be less and has been estimated to be half of a heavy use season, or $650,000. Attached to this document as Appendix III is a description of the 1999/2000 winter road costs for Lupin.

Based on Lupin's cost history, the BCL report should be reduced by $4,538,000.

BCL winter road estimate ($4,700,000 + $1,788,000) =	$ 6,488,000
Lupin historical cost for a heavy use winter road =	$(1,300,000)
Lupin estimated cost for a light use winter road =	$ (650,000)
Cost reduction =	**$4,538,000**

7. Cost Reductions in the Fuel Delivery Expense

Cost Reduction of $623,785

Appendix II, page 1 of the GAL report estimates the amount of fuel needed to complete the reclamation to be 6,305,000 litres. The BCL report estimates the total cost of fuel delivery to be $1,235,370. However, the actual cost of fuel delivery to Lupin on the 1999/2000 winter road was $0.097/L. At that rate, the cost to deliver the required fuel

would be $611,585. Appendix II of this document explains the fuel delivery costs for this past winter road.

The BCL cost estimate should be reduced by $623,785.

$1,235,370 – (6,305,000 X $0.097) = $623,785

Conclusion

Only the more significant, readily measured cost reductions to the GAL and BCL reports have been outlined above. There are several other particulars in the GAL and BCL reports where cost reductions are expected but have not been addressed in this report because of a lack of historical or known costs. For example, the GAL report estimates the cost for the management of petroleum contaminated soils at $9.14/$m^3$ while the BCL report estimates the cost to be $50.00/$m^3$, a difference of more than 500%. The BCL report then adds an additional 5,000m^3, or $250,000, to allow for the management of other contaminated soil that may be present. In this example, the difference between the GAL estimate and the BCL estimate is notable at $1.5M. However, available methods of treatment indicate the cost of soil remediation should be less than the GAL estimate.

Another example where EBML believes the BCL report has overestimated the reclamation expense is in the allowance of $191,292 for the removal and disposal of hazardous material. Hazardous waste has been regularly removed from the Lupin site as a matter of course and EBML intends to continue this practice. During final reclamation, all hazardous waste generated in the decontamination of equipment will be removed from the site. However, the cost should be considerably less than the amount indicated in the BCL report because the small amount anticipated.

This report has summarized some real cost reductions that should be taken into account in evaluating the Lupin mine closure cost estimates prepared by Brodie Consulting Ltd.

Respectfully submitted,

Original signed by

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Lupin Operation

Appendix I

Overtime Averaging Permits

- Lupin employees working a 2&2 rotation at 11 hours/day
- Lupin employees working a 2&2 rotation at 12 hours/day
- Nuna Logistics employees working a 2&2 rotation at 11 hours/day
- Nuna Logistics employees working a 3&1rotation at 11 hours/day

Appendix II

Statistics Canada Consumer Price Index

Appendix III

Echo Bay Mine Ltd. internal memo on winter road costs.