

APPENDIX A

Section 15. Mineral Resources and Mineral Reserve Estimates

Underground Mining Detailed Calculations:

Doris Hinge Ground Support
Definition Drilling
Mobilization and Diesel Fuel
Underground Ore Trucking
Underground Waste Development
Personnel Logistics
Underground Mining Equipment
Monthly Rental Charges (Modified by HBJV)
Surface Services (Modified by HBJV)
Mineable Resources Summary
Open Pit Cut-Off Grade

Doris Hinge Ground Support

Ground Support	Assumption:	Back & shoulder will be bolted and screened		
		Walls spot bolted		
	Screen	1.8 x 3.0m weld mesh sheets (includes 0.6m mechanical anchor bolt to pin screen)		
	Bolts	1.8m length split set SS46		
	Installed costs	\$	45.00	per bolt
		\$	22.00	per m2 screen

Back	Area of back to screen:				
	Back area:				
	section	width (m)	avg width	length (m)	area (m2)
	15,300N	30			
			32.5	100	3,250
	15,400N	35			
			32.5	100	3,250
	15,500N	30			
			26.5	100	2,650
	15,600N	23			
			19	100	1,900
	15,700N	15			
			15	100	1,500
	15,800N	15			
				500	12,550 m2
	Total =				

Bolts required:				
SS46	pattern:	1.2	1.44 m2 per bolt	
		1.2	8,715 bolts required	

Ground support cost for back:

	units		unit cost	cost
Screening	12,550 m2		\$ 22.00	276,100
Bolting	8,715 each		\$ 45.00	392,188
Total back				\$ 668,288

Walls	Assumption:	Walls spot bolted		
		Split set 1.8m SS46		
		Pattern: 1.5 x 1.5m		

Area of wall to screen:				
strike length			500	
no. of walls			2	
height			10	
area			10,000	m2

Area per bolt		2.25		
Number of bolts		4,444	each	
Unit cost	\$	45.00		
Total walls	\$	200,000		

Hinge Ground Support Summary

		Area (m2)	Screen	No. bolts	Cost
Ground Support Summary	Costs:	Back	12,550	yes	8,715 \$ 668,288
		Walls	10,000	no	4,444 \$ 200,000
		Total			\$ 868,288
				Avg. per tonne	\$ 2.42

Surface Services

Definition Drilling

Definition	Cost estimate based on information from Advanced Drilling.																												
Drilling	Drilling requirements as per discussion with HBJV and sketches by K.Reipas																												
Hinge	Equipment: Kubota tractor mounted Gopher drill Coring with BQ thin wall Pattern: North area 15 x 10m South area 10 x 10m Drill factors from sketches of drill patterns: <table> <tr> <th>Area</th><th>Sections</th><th>Percent of ore</th><th>Ore Tonnage</th><th>Drill Factor tonnes per DDH meter</th><th>DDH meters</th></tr> <tr> <td>North</td><td>15,600N to 15,800N</td><td>25%</td><td>89,650</td><td>177</td><td>506</td></tr> <tr> <td>South</td><td>15,300N to 15,600N</td><td>75%</td><td>268,950</td><td>136</td><td>1,978</td></tr> <tr> <td colspan="5">Total DDH meters required</td><td>2,484</td></tr> </table>					Area	Sections	Percent of ore	Ore Tonnage	Drill Factor tonnes per DDH meter	DDH meters	North	15,600N to 15,800N	25%	89,650	177	506	South	15,300N to 15,600N	75%	268,950	136	1,978	Total DDH meters required					2,484
Area	Sections	Percent of ore	Ore Tonnage	Drill Factor tonnes per DDH meter	DDH meters																								
North	15,600N to 15,800N	25%	89,650	177	506																								
South	15,300N to 15,600N	75%	268,950	136	1,978																								
Total DDH meters required					2,484																								
	Mob. & demob.				15,000																								
	Coring \$ 42.25 per m				104,952																								
	Estimated standby charges @15%				15,743																								
	Acid test (every 20m at \$50 each)				6,210																								
	Total DDH costs for Doris Hinge				\$ 141,905																								

Definition Drilling Lakeshore & Central Estimated DDH meters required from cross sections:

Mining Shape	No. of holes	DDH meters
B	9	435
C	6	240
D	12	560
Total		1,235 m

Costs:	Coring \$ 42.25 per m	52,179
	Estimated standby charges @15%	7,827
	Acid test (every 20m at \$50 each)	3,088
	Total DDH costs for L & C	\$ 63,093

Definition Drilling Summary

Area	Meters	Costs
Doris Hinge	2,484	\$ 141,905
Lakeshore & Central	1,235	\$ 63,093
Totals	3,719 m	\$ 204,998
Average unit costs	\$ 55.12 per m	\$ 0.54 avg.per tonne

Equipment & Fuel to Mobilize

Procon's fuel	646,000	liters
Procon gear at	360	tonnes
Nuna's 1 million liters of diesel	1,000,000	liters
Nuna gear and facilities	4,180	tonnes
Fuel for generators	8,610,000	liters

Information from NTCL Northern Transportation Company Limited

Diesel Fuel Cost Estimate

Assumed rack price in Edmonton	\$	0.30	per liter
Differential to Hay River	\$	0.07	
Tariff: Hay River to Roberts Bay	\$	0.38	
Haulage to site	\$	0.05	
TOTAL	\$	0.80	per liter

1 liter of diesel is about 0.83 kg per Nuna
1 liter of diesel fuel is 1.8 pounds per NTCL
1 liter of diesel fuel is: 0.82 kg

Underground Trucking

Underground Mining Cost

UNDERGROUND ORE TRUCKING

Ore will be hauled from underground to a pit bottom transfer stockpile.

Procon has a 26 ton truck at Boston so this size of truck is assumed.

Assume truck loading (scoop time) is included in extraction cost.

Operating costs

Truck:	Tires	8 (18.00R25)	
	Fuel and lube	32 (275hp, \$0.95 per liter)	
	Maintenance parts	20 (field repair plus overhaul allowance)	
	Maintenance labour	16	
	Sub-total	\$	76 per operating hour
Operator:	Wages	23 per hr	
	Burden	40%	
	Bonus	9 per hr	
	Sub-total	\$	41 per operating hour

Total: \$ 117 per operating hour

Productivity:

Cycle: Hauling to pit bottom from Doris Hinge stope

Loaded		Grade	Speed	Loading time	5.00 min	
					Tramming time (loaded)	
1	250 m	12%	6.0 km/h	6.0 km/h	2.50 min	up grade in stope
2	150 m	15%	6.0 km/h	6.0 km/h	1.50 min	up ramp 150m to pit bottom
3	40 m	2%	6.0 km/h	6.0 km/h	0.40 min	within pit
4	0 m	1%	1.0 km/h	1.0 km/h	0.00 min	
5	0 m	1%	1.0 km/h	1.0 km/h	0.00 min	
6	0	1%	1.0 km/h	1.0 km/h	0.00 min	
Total One way		440			4.40 min	
				Dumping time	2.00 min	
Empty		Grade	Speed		Tramming time (loaded)	
6	0	-1%	1.0 km/h	1.0 km/h	0.00 min	
5	0	-1%	1.0 km/h	1.0 km/h	0.00 min	
4	0	-1%	1.0 km/h	1.0 km/h	0.00 min	
3	40	-2%	6.0 km/h	6.0 km/h	0.40 min	
2	150	-15%	10.0 km/h	10.0 km/h	0.90 min	
1	250	-12%	8.0 km/h	8.0 km/h	1.88 min	
Total One way		440			3.18 min	
			Fixed cycle time		7.0 min	
			Travel time		7.6 min	
			Traffic delay		1.0 min	
			Total cycle time		15.6 min	
			Loads per hour, assuming 50 minutes per hour		3.2 loads	
			Tonnes per load, assuming 90% fill factor		21.3 tonnes	
			Tonnes per hour		68 tonnes	
			Cost per hour	\$	117	
			Cost per tonne	\$	1.71 per tonne ore	

Underground Trucking

Cycle: Hauling to pit bottom from Lakeshore shape "C"					
Loaded				Loading time	5.00 min
		Grade	Speed	Tramming time (loaded)	
1	150 m	15%	6.0 km/h	1.50 min	up "C" access ramp
2	125 m	12%	6.0 km/h	1.25 min	up grade in Hinge stope
3	150 m	15%	6.0 km/h	1.50 min	up ramp 150m to pit bottom
4	40 m	2%	6.0 km/h	0.40 min	within pit
5	0 m	1%	1.0 km/h	0.00 min	
6	0	1%	1.0 km/h	0.00 min	
Total One way		465			4.65 min
				Dumping time	2.00 min
Empty				Tramming time (loaded)	
6	0	-1%	1.0 km/h	0.00 min	
5	0	-1%	1.0 km/h	0.00 min	
4	40	-2%	1.0 km/h	2.40 min	
3	150	-15%	10.0 km/h	0.90 min	
2	125	-12%	8.0 km/h	0.94 min	
1	150	-15%	10.0 km/h	0.90 min	
Total One way		465			5.14 min
				Fixed cycle time	7.0 min
				Travel time	9.8 min
				Traffic delay	1.0 min
				Total cycle time	17.8 min
Loads per hour, assuming 50 minutes per hour				2.8 loads	
Tonnes per load, assuming 90% fill factor				21.3 tonnes	
Tonnes per hour				60 tonnes	
Cost per hour				\$ 117	
Cost per tonne				\$ 1.96	per tonne ore

Underground Trucking Summary

Area	Tonnes	One way distance (m)	Cycle time (min)	Cost per tonne
Doris Hinge	358,600	440	15.6	\$ 1.71
Lakeshore & Central	21,500	465	17.8	\$ 1.96
Total	380,100			\$ 1.73
				avg per tonne

Underground Mining Cost **WASTE DEVELOPMENT for MINE ACCESS**

Doris
Hinge
Portal

- A portal must be collared at the bottom of the completed open pit.
The work that is anticipated is:
- regrading and levelling of the collar area
- extra ground support of collar
- set up generator
- set up of vent fan and ducting
- set up air compressor and piping
- some type of small structure may be needed to house generator and compressor

The cost estimate for this work is estimated to be equivalent to 4 rounds of normal advance:

Portal cost = 4 rounds x 3.3m x \$3,000/m = \$ 39,600 L.S.

Doris
Hinge

Cost and Tonnes of waste

Item	Length (m)	Width (m)	Height (m)	Density (t/m3)	Waste Tonnes (t)	Unit Cost (\$/m)	Cost (\$)	
Access ramp	150	5	4	2.9	8,700	3000	450,000	ramp from pit bottom
Main vent raise	60	2.4	2.4	2.9	1,002	2000	120,000	includes ladders and landings
Second vent raise	60	2.4	2.4	2.9	1,002	1500	90,000	to reduce aux. vent requirements
Raise access drifts	14	2.4	2.4	2.9	234	1500	21,000	
Totals	284 m				10,938 waste t	\$	681,000	

Lakeshore
& Central

Cost and Tonnes of waste

Item	Length (m)	Width (m)	Height (m)	Density (t/m3)	Waste Tonnes (t)	Unit Cost (\$/m)	Cost (\$)
"B" Access ramp	140	3.500	4.000	2.9	5,684	2,500	350,000
"B" Cross cut	15	3.500	4.000	2.9	609	2,500	37,500
"C" Access ramp	150	3.500	4.000	2.9	6,090	2,500	375,000
"D" Access drift	110	3.500	4.000	2.9	4,466	2,500	275,000
Totals	415 m				16,849 waste t	\$	1,037,500

Summary
of waste
development

	Waste tonnes	Waste dev.'t cost
Grand totals	27,800	\$ 1,719,000
		\$ 4.52 per tonne ore

Underground Mining Cost LOGISTICS

Underground Mining Personnel

Turn around costs: Yellowknife to Edmonton

Personnel on site	20
Schedule	3 weeks in 3 weeks out

Every 3 weeks there is a crew change

3 weeks of production is	12,600 tonnes
Air fare estimate (Nuna)	\$ 1,050.00 return ticket
No. of employees	20
Total cost	\$ 21,000
Cost per tonne	\$ 1.67 per tonne ore
L.O.M. cost	\$ 633,500

Underground Mining Cost EQUIPMENT

Mining
Equipment

The estimated underground mining equipment list is shown below:

Underground Mining Equipment

Unit Description	Unit Cost CDN\$ (000's)	Doris Hinge	Lakeshore & Central	
Development				
Diamond Drill	250	1		definition drilling
Development jumbo 2 boom	650	0.5		access development
2 Yard Scoop	300	0.5		development in narrow veins
6 Yard Scoop	600	1		development, remuck waste
Scissor Lift	250	1		scaling, bolting development
Production				
Production Drill 62mm	500		1	production drilling
Production jumbo 3 boom	650	0.5		drifting, slashing, benching
2 Yard Scoop	300	0.5		narrow stopes
6 Yard Scoop	600	1		production mucking
High Reach Bolting Rig (boom/basket)	500	1		ground control, loading powder, pillar recovery
30 Tonne Truck	600	1		truck ore and waste
Services				
2 Yard Scoop/Forklift	300	1		nipper
Boom Truck	250	1		mechanics
Supervisor Euggy	50	1		supervision, maintenance
Surface Pick Up	40	2		engineering, geology, contractor
Crew van	50	1		mining crews
Support				
Air compressor	n/a	2		
Diesel electric generator	n/a	1		
Ventilation fans	n/a	4		
Anfo loaders	n/a	4		
Sub-Total Cost CDN\$ (000's)		4,480	500	
Freight and Insurance to site	20%	896	100	
ESTIMATED TOTAL COST CDN\$ (000's)				
		6,000		

Monthly Rental Charges

Monthly Rentals		Monthly rent
	74 man camp and dry	48,900
	5 person office	1,600
	communications	15,000
	fuel storage	15,700
	fold away shop	18,400
	Monthly total	\$ 99,600
Electric power	Generators for mill, shop, camp, u/g	\$ 46,600
	plus fuel per month	300,000 liter/mo

Surface Services											
Surface Services	In this service cost category, the cost model includes:										
	1 - Crew transportation on site 2 - Electricity cost 3 - Mine air heating 4 - Diesel fuel price adjustments 5 - Mine dry, yard maintenance, waste handling										
Crew transportation	1 Crew transportation A van will be needed to transport crew from mine to camp Assume there are 8 operating hours per day on the van(s). Operating cost of \$20 per hour to cover parts, tires, fuel Also some operating time on pick up trucks for engineering and geology personnel.										
	hrs/day	cost/hr	cost								
Van	8	\$ 20	\$ 160.00 per day								
Pick up	6	\$ 15	\$ 90.00								
			\$ 0.42 per tonne								
Electricity	2 Electricity The mines electricity cost is included in the cost estimate as follows: Power demand is estimated (by others) at: <table> <tr> <td>Mill</td><td>1.3</td></tr> <tr> <td>Camp</td><td>0.5</td></tr> <tr> <td>Underground</td><td>0.5</td></tr> <tr> <td>Total</td><td>2.3</td></tr> </table>			Mill	1.3	Camp	0.5	Underground	0.5	Total	2.3
Mill	1.3										
Camp	0.5										
Underground	0.5										
Total	2.3										
	The cost estimate includes	\$ 46,600	per month generator rentals								
	Fuel for generators	300,000	liters per month								
	Fuel cost at: \$ 0.80	\$ 240,000	per month								
	Total power costs per month =	\$ 286,600	per month								
	Portion attributed to underground	\$ 62,304	per month								
	equivalent	\$ 3.46	per tonne								
	<u>Note:</u> This cost is not included in surface services. It is part of generator rental and overall diesel fuel costs shown.										
	3 Mine air heating The mine air will not be heated.										
	4 - Diesel fuel price adjustments Contractors cost already incorporates project fuel price assumption										
	5 Nuna will capture the mine dry cost. Nuna will include road maintenance.										
Surface waste handling	There is a cost to estimate for taking development waste from underground and disposing of it on surface.										
	Quantity of development waste:	27,800	tonnes waste								
	Assumed surface handling cost	\$ 3.00	per tonne waste								
	Total cost	\$ 83,400	over project								
		\$ 0.22	per tonne ore								
Surface Services Summary											
Summary		Cost/tonne									
	Crew transportation	\$ 0.42									
	Electricity: Included elsewhere										
	Waste handling	\$ 0.22									
	Total	\$ 0.64									

HOPE BAY - Doris North Trial Operation
Mineable Resources Summary

OPEN PIT

	Mineable Resource		Includes		Approx Mining Rate TPD
	tonnes	g/t Au	dilution	recovery	
Doris Hinge Pit	82,500	12.1	10%	95%	915

UNDERGROUND

	Mineable Resource		Includes		Approx Mining Rate TPD
	tonnes	g/t Au	dilution	recovery	
Doris Hinge U/G	358,600	19.9	26%	95%	600
Lake & Cent Veins	21,500	19.4	16%	95%	300

TOTAL 462,600 18.5

Hope Bay Cut-Off Grade

Gold price: \$US

Exchange rate:

Gold price: \$Canadian

Estimated costs:

Mining

Milling

Gen. & Admin.

Total ore costs (excludes \$4.50 mining)

Mill recovery

Mill feed grade required

Hinge Open Pit

\$ 275.00 US\$/ounce

0.65

\$ 423.08 CDN\$/ounce

\$ 13.60 CDN\$/gram

CDN\$/tonne
2.00
24.00
25.00
\$ 51.00

extra amount for ore
mining selectivity

95%

3.95 grams Au/tonne

APPENDIX B
Nuna Logistics Cost Estimate

January 17, 2002

Mr. Brian Labadie
Senior VP Operations
Miramar Mining Corporation
311 West First Street
North Vancouver, B.C.
V7M 1B5

and

Mr. Maritz Rykaart
Senior Engineer
SRK Consulting
Suite 800, 580 Hornby Street
Vancouver, B.C.
V6C 3B6

Dear Sirs:

RE: HOPE BAY PROJECT OPEN PIT MINING AND CONSTRUCTION COST ESTIMATE

Nuna Logistics Limited is pleased to submit three copies of our estimate for mining and earthworks construction at the Hope Bay Project Doris Hinge site.

The Executive Summary contained in the proposal describes our approach to startup and development of the open pit.

Nuna Logistics is available to present and discuss this proposal at your convenience. Doug Fossen, a mining consultant to Nuna Logistics, was instrumental in the preparation of the cost estimate.

Thank you for the opportunity to submit our proposal. Please contact me at 604-682-4667 if you have any questions.

Respectfully submitted,

NUNA LOGISTICS LIMITED

Courtland Smith, P.Eng.
Vice President
CS/jaz