



**NORTHERN GOLD NL**

**PINE CREEK GOLD MINING OPERATION  
LEASE EVALUATION**

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*August 2004*

## Table of Contents

<b>Pine Creek Gold Mining Operation: - Lease Evaluation.....</b>	<b>3</b>
1.1 SUMMARY .....	3
1.2 SUMMARY REVIEW BY OPTIMISED PIT/ PROSPECT .....	4
1.2.1 Czarina .....	4
1.2.2 North Gandys .....	5
1.2.3 Enterprise .....	6
1.2.4 International.....	7
1.2.5 Coxs .....	8
1.2.6 Henry George – Kohinoor.....	9
1.3 SUMMARY: OPTIMISATION RESULTS .....	10
1.4 SUMMARY: VOLUME REPORTS .....	11

## Tables Listing

Table 1: The Resource Estimate contained within the optimized pit shells, assuming processing at the Union Reefs plant with a \$2.00/t haulage cost.....	3
Table 2: Summarising the Pit Optimisation of the OBM's Applying a \$2.00 Haulage Cost to the Union Reefs Mill.....	10
Table 3: Summarising the Pit Optimisations of the OBM's Applying a \$7.00 Haulage Cost to the Brocks Creek Mill.....	10
Table 4: Optimised Pit Shell Volumes: \$2 Haulage, 30g/t Au top-cut.....	11
Table 5: Optimised Pit Shell Volumes: \$7 Haulage, 30g/t Au top-cut.....	11

## Pine Creek Gold Mining Operation: - Lease Evaluation

- Work for Northern Gold on behalf of the Burnside Joint Venture.
- Assess the remaining gold potential that exists at the Pine Creek Gold Mining Operations. Review of the mined pits; Czarina, Enterprise, North and South Gandys, International and prospects of Coxs and the Henry George - Kohinoor line of lode.
- Work carried out:
  - Interpretation, wire framing
  - Block modeling
  - Pit optimisation
  - Drilling proposals
  - Reporting

### 1.1 SUMMARY

Initial work carried out on the Pine Creek Gold Mining Operations has shown that a viable resource remains. Open pit potential exists at Czarina, North Gandys, Enterprise, International, Coxs and along the Henry George – Kohinoor line-of-lode. The classifications of all resources are in the **Inferred Category**.

*Table 1: The **Resource Estimate** contained within the optimized pit shells, assuming processing at the Union Reefs plant with a \$2.00/t haulage cost.*

Pit	Tonnes	Grade	Ounces
<b>Czarina</b>	1,502,276	2.13	102,988
<b>Coxs</b>	377,384	1.82	22,080
<b>Enterprise</b>	1,394,982	2.65	119,040
<b>Gandys</b>	159,726	2.85	14,613
<b>International</b>	854,813	1.93	53,179
<b>Kohinoor</b>	190,627	3.30	20,253
<b>Total</b>	<b>4,479,808</b>	<b>2.31</b>	<b>332,154</b>

**300,000** ounces of recoverable gold at 90% mill recovery is contained within the optimised pits at a Strip Ratio of **4.34:1**. In this review the practicality of mining pit cut backs has not been addressed. It is expected that most significant impact of mine design on the final available resource will occur at the Enterprise and International pits.

Drilling is required to confirm the optimised pit shell base and upgrading the Resource Classification to Indicated/Measured Status.

- A total of 10,000 metres of RC drilling is proposed to confirm optimised pit shells associated with Czarina, North Gandys and Enterprise. Total cost of approximately \$710,000.
- Drilling of International, Coxs and Henry George – Kohinoor will be considered based on the success of the initial drill program.

Underground potential may exist at North and South Gandys, and possibly Enterprise. Additional drilling would be required to prove up an underground resource. The resource optimised on the southern leases is as six discreet pits shells, the best targeted along the Henry George shear.

## **1.2 SUMMARY REVIEW BY OPTIMISED PIT/ PROSPECT**

### **1.2.1 Czarina**

- Low risk factor. 1.5Mt @ 2.13g/t Au. Strip Ratio of 3.24:1. Optimised as two discreet pit shells.
  - Czarina (1.37Mt @ 2.13g/t Au) oxide ore was previously mined and the pit was backfilled. Broad zone of mineralisation, up to 30 metre floor width with a strike continuity of +350 metres. Review of grade control plans indicate poor continuity of high-grade gold zones but tending to be dispersed through out the mineralised zone.

- South Czarina (105Kt @ 1.86g/t Au) takes in the viewing area. Not mined although the second Stuart Highway diversion may cut through the northern end.
- 2,700 metres of RC drilling is proposed to confirm the optimised pit shell in two stages. Previous drilling tested the oxide horizon at 25 metre section spacing and at depth on a 50 metre section spacing. The proposed drilling is designed to close the section spacing to 25 metres along the \$550 optimised pit shell extent. Approximately six holes are planned (stage 2) to confirm South Czarina.
- No significant ore loss/increased dilution is expected at Czarina due to the mined and backfilled pit.

### **1.2.2 North Gandys**

- High risk pit as ore is at the base of the optimised pit shell, targeting a high-grade shoot developed along the axial plane of a southerly plunging anticline. 160Kt @ 2.85g/t Au in pit shell. High Strip Ratio; 10.84:1. Would not expect to gain much ore as the pit is developed down to the main ore shoot.
- Currently drilled on 50 metre spacing, require too close to 25 metres to confirm pit base. 2300 metres RC drilling proposed.
- Review of South Gandy grade control drilling indicates a broad mineralised zone with a definite high-grade core. Grade control results of the last flitch mined indicate 9,000t at 4.95g/t Au at a 1 gram cut-off on a 2.5m flitch or 3,600t/vm.
- May be able to develop as an underground operation once pit complete.
- Previously mined and backfilled, optimised pit is to south, only portion backfill required to be moved.

- Optimisations did not pull a pit down on South Gandy but may be reviewed as an underground target. Additional drilling of the high-grade core may also change the economics allowing additional open pit mining. South Gandy was mined and allowed to flood. The conditions of the existing pit should be carried out as further mining may be practical without a major cutback required.

### 1.2.3 Enterprise

- 1.4Mt @ 2.65g/t Au in two optimised pit shell. Moderate Strip Ratio; 4.95:1. The bulk of the ore is below the Enterprise pit floor. The south end of Enterprise is approximately 140 metres deep. The second optimised pit targets a poorly drilled and defined resource south of the pit which was known as South Enterprise.
  - 1.23Mt @ 2.61g/t Au identified below the Enterprise pit floor with an overall Strip Ratio of 4.65:1.
    - Rated as a high risk pit as the majority of the ore is below the base of the mined Enterprise pit south of 11500N. The ore targeted is developed along axial plane of a southerly plunging anticline and the down-dip extension of the western limb. 130 vertical metres of waste has to be stripped before accessing any significant ore. Drilling information is very sparse below the pit floor.
    - Between 11500N and 11850N an interpreted ore zone targeted is associated with a steeply dipping fault, also below the pit floor. This zone may prove impractical to mine as the width of the cut-back would have increased to mine safely. Optimisations infer 210Kt @ 2.63g/t and a Strip ratio of 3.54:1. Would require additional drilling to prove up. The northern extent of Enterprise may have been partially backfilled.
    - The pit is presently filled with water.

- 164Kt @ 2.96g/t Au with a Strip Ratio of 7.84:1 is optimised at South Enterprise.
  - South of Enterprise pit.
  - Occurs from natural surface. The optimised pit is a 85 metre deep circular pit (180 metre diameter). To design an economical pit for such a tight shell may significantly decrease the optimised tonnes.
  - Poorly drilled resource.
    - Mineralisation is developed along the southern strike extent of the main Enterprise fault zone. Interpreted and wire-framed as a series of discreet mineralized pods. According to Tony Morgan (early Chief Mine Geologist at the Pine Creek operations) the continuity of these upper mineralized zones are generally more erratic and discontinuous.
- A total of 5,230 metres of RC drilling is proposed, 4,000 metres below the Enterprise pit and 1,230 metres at South Enterprise.

#### **1.2.4 International**

- Moderate to high risk pit. 855Kt @ 1.93g/t Au contained within an optimised pit shell with a Strip Ratio of 3.78:1. Would have to be mined at a low cut-off grade.
- Oxide has been mined and the pit was backfilled. Has a shallow oxide profile.
- Optimised as three shells, expect to incur combination of increased dilution and ore loss because of irregular profile of final mined pit in chasing oxide.



- Broad low grade mineralised pit. According to Simon Mottram (Pine Creek Operations mine geologist) grade reconciliation reflected the mining cut-off grade, reconciliations decreased as the cut-off grade increased. From the exploration data poor continuity of high-grades along strike and dip exists, would require grade control data to confirm. Again according to Simon Mottram the fresh ore was the hardest ores mined from any of the pits.
- No drilling proposed but would require minimum if project goes ahead.

### **1.2.5 Coxs**

- Low to moderate risk pit 377Kt @ 1.82g/t Au with an optimised strip ratio of 3.63:1.
- Major concern would be the town (Pine Creek) water storage and purification facilities which are nearby.
- Broad low-grade mineralisation. Never mined.
- High-grade hits dispersed throughout, no real continuity demonstrated.
- Shallow oxide profile.
- Drilled on 25 metre section spacing.
- Battery Shear and Bashi Bazouk prospects are included in the Coxs OBM but feature as gouges in the optimisation. Review the OBM (interpretation) of these two prospects, may make a slight improvement on the available resource.
- No drilling proposed at Coxs but would require minimum if project goes ahead. Some additional drilling of the Battery Shear and Bashi Bazouk may upgrade these prospects but they are not expected to be significant resources.

### 1.2.6 Henry George – Kohinoor

- Moderate to high risk due to wide spaced drill sections, 40 metre but up to 80 metre section spacing. 190Kt @ 3.30g/t Au is contained within seven discreet pit shell of the optimized model. The optimised strip ratio is 6.83:1.
- A shallow resource, only historical mining carried out. Workings are extensive along the strike extent. Good grades are indicated from surface.
- Interpreted mineralised zones vary from narrow veined to broad shear zones of ~10m width. Main zones of mineralisation associated with the west dipping limb of an anticline and along the axial plane of the anticline. Appear to be stacked lenses.
- At Jensens, mineralisation appears to be associated with the east dipping limb of an anticline.
- High-grade intersections on regular interval along the strike extent; 8 metres @ 10g, 6 metres @ 16g, 6 metres @ 23g, 16 metres @ 23g, 6 metres @ 11g, 16 metres @ 7g, 16 metres @ 5g and 6 metres @ 6g. Close spaced drilling is required to test the continuity in both strike and dip of the high-grade mineralisation.
- Of all the prospects reviewed this area appears to have the most upside in that with favorable drilling results the near surface resource could increase significantly.

### 1.3 SUMMARY: OPTIMISATION RESULTS

Table 2: Summarising the Pit Optimisation of the OBM's Applying a \$2.00 Haulage Cost to the Union Reefs Mill.

Pit optimisations \$2 Haulage (30g top-cut)								
Pit	Tonnes Waste	Tonnes Ore	Cost Waste	Value Ore	LG profit	SR	Pit depth	From - To RL
Gandys	1,735,872	154,635	\$ 2,643,876	\$ 4,012,006	\$ 1,368,133	11.23	105	1250 - 1145
Enterprise	6,980,673	1,339,029	\$12,615,261	\$30,527,382	\$17,912,138	5.21	175	1225 - 1050
Czarina	5,082,801	1,282,390	\$ 7,844,801	\$20,968,056	\$13,123,259	3.96	105	1225 -1120
International	3,447,406	640,528	\$ 5,403,970	\$ 9,639,094	\$ 4,235,124	5.38	85	1235 – 1150
Coxs	1,512,873	234,787	\$ 2,370,112	\$3,614,962	\$1,244,853	6.44	120	1240 – 1120
Kohinoor	1,328,148	164,365	\$2,031,755	\$6,262,877	\$4,231,125	8.08	70	1250 – 1180
<b>Totals</b>	<b>20,087,773</b>	<b>3,815,734</b>	<b>\$32,909,775</b>	<b>\$75,024,377</b>	<b>\$42,114,632</b>	<b>5.26</b>		

Table 3: Summarising the Pit Optimisations of the OBM's Applying a \$7.00 Haulage Cost to the Brocks Creek Mill.

Pit optimisations \$7 Haulage (30g top-cut)								
Pit	Tonnes Waste	Tonnes Ore	Cost Waste	Value Ore	LG profit	SR	Pit depth	From - To RL
Gandys	1,284,741	99,947	\$ 1,946,132	\$ 2,664,960	\$ 718,830	12.85	87.5	1250 - 162.5
Enterprise	4,834,919	978,124	\$ 8,694,958	\$20,070,604	\$12,070,604	4.94	170	1225 - 1055
Czarina	3,590,228	784,331	\$ 5,490,389	\$13,169,267	\$ 7,678,879	4.58	100	1225 - 1125
International	2,414,798	285,923	\$ 3,776,401	\$ 5,634,508	\$ 1,858,108	8.45	80	1235 - 1155
Coxs	288,734	39,549	\$ 433,316	\$ 954,307	\$ 520,994	7.30	42.5	1245-1202.5
Kohinoor	1,210,710	127,222	\$1,846,956	\$5,237,311	\$3,480,359	9.52	67.5	1250-182.5
<b>Totals</b>	<b>13,624,130</b>	<b>2,315,096</b>	<b>\$22,188,152</b>	<b>\$48,515,895</b>	<b>\$26,327,744</b>	<b>5.88</b>		

## 1.4 SUMMARY: VOLUME REPORTS

Tables 4 and 5 are the summary volume reports generated on the material contained within the optimised pit shell assuming a \$2.00/t and \$7.00/t ore cartage cost. The ore reported uses a lower cell value cut-off of 1g/t Au. A 30g/t Au top-cut is applied to the ore block models.

Table 4: Optimised Pit Shell Volumes: \$2 Haulage, 30g/t Au top-cut

Pit/Deposit	ORE +1g/t Au				WASTE		SR
	BCM	Tonnes	Grade	Ounces	BCM	Tonnes	
<b>Gandys</b>	60,015	159,726	2.85	14,613	697,350	1,730,781	<b>10.84</b>
<b>Enterprise</b>	519,709	1,394,982	2.65	119,040	2,622,897	6,924,721	<b>4.96</b>
<b>Czarina</b>	562,921	1,502,276	2.13	102,988	2,048,753	4,862,915	<b>3.24</b>
<b>Internatioal</b>	319,281	854,813	1.93	53,179	1,423,608	3,233,121	<b>3.78</b>
<b>Coxs</b>	141,131	377,384	1.82	22,080	516,215	1,370,276	<b>3.63</b>
<b>Kohinoor</b>	75,656	190,627	3.30	20,253	520,324	1,301,885	<b>6.83</b>
<b>Total</b>	<b>1,678,713</b>	<b>4,479,808</b>	<b>2.31</b>	<b>332,154</b>	<b>7,829,147</b>	<b>19,423,699</b>	<b>4.34</b>

Note: waste includes 0.5g/t to 1.0gt Au mineralisation (779,845t @0.81g/t Au, 20,267oz gold)

Table 5: Optimised Pit Shell Volumes: \$7 Haulage, 30g/t Au top-cut

Pit/Deposit	ORE +1g/t Au				WASTE		SR
	BCM	Tonnes	Grade	Ounces	BCM	Tonnes	
<b>Gandys</b>	41,182	109,804	3.09	10,906	507,833	1,274,885	<b>11.61</b>
<b>Enterprise</b>	377,099	1,011,664	2.88	93,628	4,801,379	4,801,379	<b>4.75</b>
<b>Czarina</b>	408,660	1,089,876	2.27	79,443	1,419,807	3,284,683	<b>3.01</b>
<b>Internatioal</b>	195,781	523,451	2.11	35,432	965,035	2,177,269	<b>4.16</b>
<b>Coxs</b>	28,454	75,355	2.21	5,361	95,738	252,929	<b>3.36</b>
<b>Kohinoor</b>	66,468	167,284	3.50	18,823	468,034	1,170,648	<b>7.00</b>
<b>Total</b>	<b>1,117,644</b>	<b>2,977,434</b>	<b>2.54</b>	<b>243,593</b>	<b>5,276,801</b>	<b>12,961,793</b>	<b>4.35</b>

Note: waste includes 0.5g/t to 1.0gt Au mineralisation (396,529t @ 0.81g/t Au, 10280 oz gold)