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Baker Mine - Reserve Forecast

As a followup to my memorandum "Baker Mine Operating Options," 1982 March 15, I have completed a comparison of the Rascoe Reserve Forecast to the H.D. Kierans 19 Block ore model, used as the basis for the Baker Mine project. The objectives of this review were

(i) to better understand both the Kierans model and the Rascoe Forecast

(ii) to define 1980/81 dilution and ore value content experience

(iii) to confirm the suitability of the Rascoe Reserve forecast as a "planning model"

(iv) to decide the merit in reissuing my 1982 March 15 memorandum defining operating options.

including 1980/81 mining history

A sketch of the Rascoe Forecast was superimposed on a Kierans ^{19 block} model drawing, prepared by Baker Mine. This allowed all relevant ore volumes, i.e. 1980 production, 1981 production, Rascoe forecast, & cutoff exclusions, to be described in terms of the Kierans model blocks. This drawing is attached as Appendix A.

A comprehensive worksheet defining areas, sub-block tonnage, grades, and metal content was supplied by Jim Fawcett. This 19 page worksheet, not attached, was the basis of the Kierans model ^{19 block} reserve forecast for Baker Mine at;

103,239 tons @ .89% Zn, 11.6% Cu, 1.6% Ag

1980/81 Dilution & Value Content

The 1980 mining history is shown in green on Appendix A, and ^{the} total of the 19 block model sub-blocks mined was 6,832 tons with value content of 4,177 ounces gold and 97,662 ounces silver. Similarly, the 1981 history is shown in yellow, with sub-blocks totalling 10,854 tons with value content of 14,083 ounces of gold and 299,324 ounces of silver. The totals for 1980/81 combined mining history are:

17,686 tons @ 18,260 oz Au @ 396,986 oz Ag

The actual recorded production data for this same period was 29,957 tons of ore mined with the following values:

1981 recovered	8,955 oz Au	157,022 oz Ag
1981 tails	1,256	45,849
stockpile	4,700	84,600
total	14,911 oz Au	287,471 oz Ag

$$\text{Experienced Dilution} = \frac{29,957 - 17,686}{17,686} (100) = 69\%$$

$$\text{Experienced Value Content} = \frac{14,911}{18,260} (100) = 81.7\% \text{ Au}$$

$$\text{and,} = \frac{287,471}{396,986} (100) = 72.4\% \text{ Ag.}$$

This data confirms that the value content factor of 85% referred to in the Rose forecast was valid for gold, and may have been optimistic for silver. Also, the dilution factor of 67% is also confirmed. There is

some doubt, however, as to whether these factors should be used in estimating the mineable ore grade of remaining reserves.

Roscoe Forecast in terms of Kiern's blocks

Bob Roscoe used a traditional method of estimating the tonnage and the values within the blue shaded areas on the attached sketch #1. He also included the yellow dashed areas. He excluded all the red areas. His calculations generated the following reserve estimates:

55 level	22,540 tons	@ 1.24 oz/t Au, 23.45 oz/t Ag.
54 level	29,350 tons	@ 0.65 oz/t Au, 15.38 oz/t Ag.

Restating his estimates in terms of metal content

55 level	22,540 tons	27950 oz Au	528,563 oz Ag
54 level	29,350 tons	19078 oz Au	451,403 oz Ag
	51,890	47,028 (47148)	979,966 981,351

As previously discussed, these same areas were also described in terms of the Kiern's study sub-blocks. Worksheets were prepared for each area, with the following results:

55 level	19,529 tons	25,568 oz Au	520,435 oz Ag
54 level	26,141 tons	24,062 oz Au	651,253 oz Ag
	45,670	49,630	1,171,688

Not surprisingly, the two methods compare very well. The Roscoe forecast has higher tonnage, because it included the barren areas included by the Kiern's model, and lower values probably because of conservative averaging. These differences translate to, a 13.6% dilution factor, a 95% Au value content factor and an 84% Ag content factor.

A summary of the Roscoe forecast (sketch) in terms of the Kiern's model sub-block areas;

	tons	oz Au	oz Ag
Mined 1980	6832 (6.6%)	4,177 (4.5%)	97,662 (4.8%)
Mined 1981	10854 (10.5%)	14,083 (15.3%)	299,324 (14.8%)
55 level to mine	19529 (18.9%)	25,568 (27.8%)	520,435 (25.7%)
54 level to mine	26,141 (25.4%)	24,062 (26.1%)	651,253 (37.2%)
54 excluded	39,883 (38.6%)	24,211 (26.3%)	455,956 (22.5%)
	103,239 (100%)	92,101 (100%)	2,024,630 (100%)

A closer look at the 39,883 tons, excluded by the Roscoe estimate (The red area) subdivides it into three parts:

- (i) Bypassed: this is the sub-block area below the existing or planned stopes that have been Bypassed because of low grade, bad ground, etc. These areas are shown on the second attached sketch in orange.
- (ii) Cutoff: this included the sub-blocks below the 0.3 oz/ton gold equivalent.
- (iii) Judgement: this is the sub-block areas defined by Kiern's ^{as are} that in Bob Roscoe's judgement are very suspect. The drill hole data is too sparse to support Kiern's predictions.

	tons	oz Au	oz Ag
bypassed	10,254 (9.9%)	8,416 (9.1%)	194,572 (9.6%)
cutoff	4,787 (4.6%)	634 (0.7%)	11,681 (0.6%)
judgement	24,842 (24.1%)	15,161 (16.5%)	249,703 (12.3%)
	39,883 (38.6%)	24,211 (26.3%)	455,956 (22.5%)

The judgement exclusion, represents a significant metal value and have to be looked at again. In Bob Roscoe's opinion, it is risky to count on these values existing.

Kieran's Forecast

It is possible to develop a ^{second} forecast of reserves, using the ^{same} areas calculated to define the Pascoe forecast. The segments are essentially the same, except for the estimate of cutoff.

	tons	oz Au	oz Ag
Total Kierans cutoff	13,576	1765	26,887
mined 1980	- 2,998	- 349	- 4078
mined 1981	- 516	- 86	- 933
balance	10,062	1330	21876
cutoff in bypass	- 1,065	- 163	- 1876
balance	8,997	1167	20,000

Therefore,

Total Ore	103,239 (100%)	92101 (100%)	2,024,630 (100%)
less 1980	(6832) (6.6%)	(4177) (4.5%)	(97662) (4.8%)
less 1981	(10854) (10.5%)	(14083) (15.3%)	(299324) (14.8%)
less bypassed	(10254) (9.9%)	(8416) (9.1%)	(194572) (9.6%)
less cutoff	(8997) (8.7%)	(1167) (1.3%)	(20000) (1.0%)
TO MINE	66,302 (64.3%)	64,258 (69.8%)	1,413,072 (69.8%)
55 level	19,529	25,568	520,435
54 level	46,773	38,690	892,637

Adjusting for the 13.6% dilution, 95% Au content and 84% Ag content factors;

55 level	22,185	24,290	437,165
54 level	53,134	36,756	749,815
total	75,319	61,046	1,186,980

this second forecast is stated in comparable terms to the Pascoe forecast. A comparison of the two forecasts shows a difference of

23,429 tons 14,018 oz Au 207,014 oz Ag.

Question

The question facing us is :

Do we support the Rosee Reserve Forecast as our "best case" plan, until more production and development data is available to answer the exclusion question

or

Do we add on the 23,429 tons @ 14,018 oz Au and 207,014 oz Ag as "high risk" reserves and initiate a development plan to verify these values?

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WHL