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Notes on the Iron King Mine,  
Norsemand, W.A.

by

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Mineral Resources Survey Branch.

NOTES ON THE IRON KING MINE,  
NORSEMAN, WESTERN AUSTRALIA.

(Report No. 1945/29)

On the 8th instant, we perused the files submitted by Mr. K.M. Fraser, Executive Officer, Superphosphate Industry Committee, in connection with pyrite in the Iron King mine, Norseman, Western Australia, and particularly the reports contained therein. The statements in this short report are based entirely upon the information supplied by those reports. The reports were not accompanied by plans and this placed us at a great disadvantage as regards the mine workings, and particularly as regards the position of the main vertical shaft in relation to the pyrite lode and the other workings.

It would appear that Norseman Gold Mines, N.L., made contracts with superphosphate companies in Western Australia, for crushed pyritic ore and pyritic concentrates at prices of 42/2 per ton and 66/- per ton respectively. Subsequently they stated that their costs were higher than anticipated. In order to maintain the supplies of pyrite to the superphosphate companies, the Superphosphate Industry Committee in 1944 made a grant of £10,000, and approved of the payment of a subsidy at the rate of 1/6 per ton for crushed ore and 15/- for concentrates. Norseman Gold Mines, N.L., claimed a subsidy of 10/- and 23/- respectively. The Sub-Committee of the Superphosphate Industry Committee consider that the best results could not be obtained from the mine without (1) long-term contract so that Norseman Gold Mines, N.L., could introduce the most efficient method of producing pyrite and (2) a knowledge of the quantity of pyrite available in the Iron King mine so that long-term contracts could be made with the superphosphate companies. In pursuance of this, the Department of Mines of Western Australia was asked to undertake a geological survey of the mine and to advise as to the best scheme for testing the ore reserves in the mine. The recommendations for testing include (1) the sinking of six winzes from the No.4 Level to a depth of approximately 120 feet at an estimated cost of £7,620 and (2) the drilling from the surface of six diamond holes of a total length of 4,000 feet.

It seems to us that if it is required to obtain pyrite ore from the mine at the present rate of 6,000 tons per month (or 72,000 per annum), the most important factor is the necessity for immediate development work to prove further ore reserves and to enable ore to be mined. Mr. Ellis states in his report of the 9th May, that ore reserves above the No.4 level are approximately 86,000 tons of which approximately 60,000 tons can be mined. At the present monthly rate of mining, these reserves would last for only ten months and, therefore, up till March, 1946. With regard to the proposed and development campaign, we have to comment as follows -

(1) The sinking of six winzes would, according to Mr. Ellis' estimation, occupy a period of 7½ months. As this work has presumably not been commenced, it is unlikely that it would be completed before February, 1946. The mine would then be in the state of having practically no ore above the No.4 level and having only six winzes below that level. Ore could not be efficiently and cheaply mined from the six winzes and it would, therefore, be essential to commence development work from the main shaft. The latter has already been sunk to a depth of 100 feet below the No.4 level and a plat has been cut.

(2) Surface diamond drilling. There is no time available to carry out diamond drilling in advance of development to prove the ore between No.4 Level and the proposed No.5 Level, because, as stated above, it is necessary to be in a position by March, 1946, to mine developed ore below the No.4 Level. It is, therefore,

considered that no good purpose, from the point of view of the Superphosphate Industry Committee, would be served by carrying out diamond drilling at the present time.

It seems to us that the Sub-Committee should not attempt (and particularly at the present time) to prove the quantity of ore reserves in the Iron King mine in order to arrange long-term contracts for pyrite with the superphosphate companies, but rather that it should determine approximately how long it is likely to be interested in the subsidising of pyrite from the Iron King mine. In view of the prices which Norseman Gold Mines, N.L., claim are necessary in order to make their pyrite venture a profitable one, it is quite likely that when the Commonwealth subsidy is withdrawn, the superphosphate companies would not continue to use the pyrite at that price, because it would probably be cheaper for them to use imported sulphur once more. It is estimated that the Sub-Committee will be interested in subsidising the pyrite production until the end of the war and for such longer period as will enable normal shipping to be achieved. On this estimation, the Sub-Committee might, therefore, be interested until the end of 1947.

A testing and development campaign to prove ore for that period is much different from one required to prove ore for long-term contracts. It is, therefore, suggested that at present testing and development campaigns should be restricted to providing ore until the end of 1947. If, in addition to this, the Sub-Committee desires to prove ore sufficient for a longer period, then adequate testing and development could be carried out between now and the end of 1947.

It is, therefore, recommended that -

(1) Driving should be conducted at the northern and southern faces of the Nos. 3 and 4 levels where they are in ore of sufficient width and grade for profitable mining. Such development should be carried out immediately as far as manpower permits.

(2) That the six winzes should not be sunk, but that the necessary cross-cut should be driven to the pyrite body from the bottom of the main shaft at the No.5 level and that driving both north and south on the orebody should be carried out at that level. The driving would test the orebody and prove reserves just as efficiently as would the six winzes. It has already been pointed out that such driving would be necessary even if the six winzes were sunk. The driving would enable ore to be mined from the No.5 level  $7\frac{1}{2}$  months in advance of the time at which it could be mined if the winzes were sunk. Moreover, the cross-cutting and driving would cost little more than the cost of the winzes, and the expense of sinking the latter would be saved.

There is, however, the question of whether the sinking of some or all of the six winzes might accelerate the preparations for stoping the ore if sunk at the same time as the crosscutting and driving were being done. Thus it might be desirable to sink two winzes, one north and one south of the main shaft so that they would be completed at about the same time as the drives reach the same points and thus permit ore to be stoped as soon as possible. This procedure would save the time necessary to put up rises from the drives. This question is, however, dependent on the mining policy and the company (Norseman Gold Mines) should be consulted.

Driving on the No.5 level would probably prove an amount of ore ranging from 100,000 up to 144,000 tons, depending upon the proportion of the ore that would have to be left for pillars, etc. This amount would be sufficient to provide ore until the end of 1947.

Assuming from Mr. Ellis' report that the ore has a length of 1,200 feet and an average width of 10 feet, it will be necessary to mine each year a block of the above dimensions and with a depth of 60 to 86 feet. Assuming that the ore will extend to 800 feet (this

in depth (this is pure assumption and it is not known to what depth the body will extend) and that 80 feet will be required to provide each year's supply of ore, then the mine would have a life of 5 to 6 years.

On the financial side, it is suggested that the following factors are important:

- (a) The determination of the amount of capital invested in the pyrite project by Norseman Gold Mines, N.L.
- (b) A close investigation to determine the actual cost of production of the pyrite. It is understood that this investigation is in progress. In this connection, it is desired to point out, as has already been done by previous investigators, that it would be preferable ultimately to convert the costs from the basis of ton of ore or concentrate to the basis of ton of contained sulphur.
- (c) The Sub-Committee should allow sufficient provision for amortization and profit when considering the costs of producing pyrite and an equitable price for same. This applies particularly if the project is to be considered as a short-term one, such as would be the case if carried on until the end of 1947.

(P.B. Nye.)  
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CANBERRA.  
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