

T. S. Wilson, Esq.,
 Secretary,
 The Princess Royal Gold
 Mining Company No Liability,
ADELAIDE.

OPEN FILE

Dear Sir,

Pursuant to your request I have made an examination of surface and underground workings where accessible of the Black Angel and White Devil Leases. These mines are situated approximately 25 miles W.N.W. of Tennant Creek Post Office.

LEASES: There are four leases in the area under review and comprise the following

Black Angel	No. 29E	area	20	acres
Black Angel Extended	" 30E	"	20	"
White Devil West	" 12E	"	10	"
White Devil East	" 13E	"	10	"

WATER SUPPLY: A bore situated to the north of the mine is reported by test to have a flow of 12000 gallons per 24 hours which would be sufficient for a milling capacity of 40 tons per 24 hours. Fresh water for domestic purposes would have to be carted from Tennant Creek at a cost of £6 per 1000 gallons.

PREVIOUS PRODUCTION. The Black Angel Mine has been operated by gouging the known shoots of ore and practically no systematic mining has been carried out. Approximately 6671 tons of ore have been treated at the Government Battery for a return of 10:26 dwts. per ton by amalgamation and 3 to 4 dwts. per ton in tailings. Most of this ore has been extracted from a stope adjacent to No. 2 Shaft and open cuts, but this production cannot be taken as an average of the grade of ore remaining in situ as this can only be ascertained by systematic sampling and exploration. The White Devil lease has produced 378 tons of ore from an open cut adjacent to No. 9 Shaft which is 50 ft. deep and situated at the end of the most westerly Haematite outcrop on the lease, the head value being stated to be 10:6 dwts. per ton.

BLACK ANGEL WORKINGS: No. 1 Shaft which is the most western shaft has been sunk to a depth of 180 ft. Crosscutting has been carried out for approximately 20 ft. south and 10 ft. north and a drive from shaft about 10 ft. east, but no values are reported. This shaft is approximately 90 ft. from No. 2 Anomaly peg which the Geophysical Survey indicates as the position of a Haematite lense at approximately 200 ft. from surface. It is recommended that the shaft should be deepened to 220 ft. and a crosscut put out in a N.W. direction for 100 ft. towards No. 1 Anomaly to ascertain if the concealed Haematite Mass is associated with favourable lode material vide report of the Aerial Geologic and Geophysical Survey of Northern Australian made in 1936.

NO. 2 SHAFT. This shaft is the principal working shaft on the property and has recently been deepened to the 150 ft. horizon but workings are above 103 ft. level and consist of a crosscut 24 ft. north of shaft and 45 ft. south of shaft and driving has been carried out 45 ft. east and 55 ft. west from the crosscut, and values have been obtained in a winze 28 ft. below the horizon. Stoping has been carried out at 67 ft. level from which 5000 tons of ore have been gouged for an average value of 12:7 dwts. per ton. From information available it would appear that higher values were obtained from the favourable bedding planes which have built up the average grade to 12:7 dwts. per ton as the remaining values in the extremities of the stoped out area are said to vary from 4 dwts. to 9 dwts. per ton.

from shaft previous sampling gave an average value of 8.5 dwts. per ton over a length of approximately 25 ft. and in south crosscut at a distance of 15 ft. from shaft samples averaged 2.3 dwts. per ton

NO. 3 SHAFT. This is approximately 60 ft. S.E. of No. 2 Shaft and been sunk to a depth of 70 ft. At 50 ft. level an inclined stope N.W. gave assays as high as 29 dwts. per ton in all shoot slightly south of the main ore shoot worked from No. 2 shaft. Inspector of Mines' plan 30/5/49.

NO. 6 SHAFT. No. 6 shaft is approximately 280 ft. east of No. 5 Shaft and has recently been sunk to 100 ft. horizon. At 54 ft. level a drive has been extended for 160 ft. west. Samples taken over the whole length showing traces of gold, but at west face of drive is reported to show 3 dwts. gold per ton, and the drive 40 ft. east of shaft under open cut gave negative results. At approximately 40 ft. east of No. 6 shaft a small open cut is said to have produced recently 1000 tons of ore averaging 10 dwts. per ton. It is recommended that several crosscuts should be put out North from the drive on 54 ft. level to intersect the main shear zone as present drive appears to be too far south of fault line.

WHITE DEVIL LEASES. The White Devil Leases are conspicuous with the large haematite outcrops, the most eastern has a dimension of 300 ft. long by 8 ft. average width, but the eastern end is considerably of a larger dimension of 160 ft. by 20 ft. in width, the central outcrop 400 ft. long by 50 ft. wide and the western outcrop being 300' x 60' at Eastern end tapering off to about 15 ft. at the western end. No. 1 Anomaly peg is situated at N.W. end of the central outcrop and an excerpt from the Aerial Geological & Geophysical Survey of Northern Australia of 1936 states:

"No. 1 Anomaly (White Devil) of 8000 gammas is the strongest discovered at Tennant Creek. It indicates a large elongate body of ironstone probably coming to within 100 ft. of the surface, but giving no geological evidence of its presence. Within the immediate vicinity of the anomaly there are outcropping bodies of dense fine grained hematite with very little quartz noticeable."

"No. 2 Anomaly (Black Angel) of 5000 gammas is also elongated and is on the Western extension of the axis of the No. 1 Anomaly. The axis of the Anomalies is parallel and not far distant from the line of outcropping ironstone in the vicinity. The body responsible probably comes to within 200 ft. of the surface."

"It is considered that the survey results on this area are extremely important as they reveal possibilities of ironstone bodies at sufficient depth to make the area a likely proposition for major operations."

The only workings of any magnitude in Haematite and Quartz carried out by the original ~~xxxx~~ prospectors are situated at No. 9 shaft which is 40 ft. to 50 ft. deep, at this horizon driving has been carried out for 27 ft. east and 15 ft. west, the width worked being 7 ft. Production from this shaft and open cut is said to have been 372 tons for an average head value of 10.6 dwts. per ton (vide Inspector of Mines Report 30/5/49) and at 40 ft. east of No. 9 shaft a pot hole 20' x 6' x 4' is reported to value 3.2 dwts. to 8 dwts. per ton.

There are numerous small shafts and potholes sunk principally on the southern side of the hematite outcrops in mudstone which are said to have shown good prospects, but no systematic surface exploration has been undertaken.

has been sunk to a depth of 12 ft. which is said to have produced specimen stone, but as no exploratory work has been undertaken in this immediate area and no mullock dump is remaining it would appear that 20 to 30 tons of material has been sent to the Battery for a return of 10 ozs. per ton. It is quite possible that this gold came from some extraneous source.

WHITE DEVIL: RECOMMENDATION. In view of the importance of the statement made by the Aerial Geological and Geophysical Survey of Northern Australia, it is strongly recommended that a shaft should be sunk at or near No. 1 Anomaly peg to a depth of 100 ft. and crosscutting undertaken for 50 ft. North and South from the horizon, in an endeavour to ascertain if favourable bedding planes exist in the locality. Systematic sampling of workings at No. 9 shaft should be undertaken and exploratory work carried out at greater depths east of No. 9 shaft in the mudstone bed south of the massive outcrops of hematite.

BLACK ANGEL: RECOMMENDATIONS: Sampling: The ore produced from the Black Angel has been obtained by the usual local method of gouging and little systematic mining has been undertaken. In order to get a clear picture of the gold occurrence it is recommended that in the first place a systematic campaign of sampling be undertaken in the present workings by taking 4 ft. x 4 in. channel cuts in all drives, crosscuts and stopes where accessible in order to estimate the ore still remaining in situ: at present it is impossible to calculate the positive or probable ore remaining without this work being undertaken. To carry out sampling satisfactorily it will be necessary to instal a sample crusher to reduce all channel samples to minus 1/4" before the bulk sample is quartered down for assay. If this work is carried out conscientiously the values obtained should approximate (in a medium grade mine) very closely the results from milling bulk parcels of ore. If desired, a check on channel sampling can be made by milling at the Government Battery of ore from significant localities.

DEVELOPMENT: No. 1 Shaft should be deepened 40 ft. and a crosscut put out approximately 100 ft. in a north westerly direction to intercept the ironstone body as indicated by No. 2 Anomaly.

No. 2 Shaft should be sunk to 200 ft. horizon where future development should be carried out in north westerly direction to locate main shaft zone.

No. 6 Shaft. The area west of No. 6 shaft has not shown any significant values, but it is stated that loaming has given colour on surface and that the large costeens at western end of this section are reported to have shown values on the north end of costeens. Crosscutting north from west drive No. 6 shaft on 54 ft. horizon should be undertaken to locate main shear zone.

Although 6671 tons of ore has been mined for a recovery of 10.26 dwts. per ton by amalgamation and 3-4 dwts. per ton in tailings, this ore has been principally obtained by gouging adjacent to No. 2 shaft and there is no guarantee that further substantial tonnages are available until exhaustive development and prospecting work has been carried out.

Any ore developed and mined during this period can be realised as an offset against development expenditure, but until such time as payable positive ore can be blocked out the installation of the Company's own treatment plant is not justified. The proposition is essentially one for exploration and the development programme recommended will occupy a period of approximately 12 months and should be carried out for an expenditure not exceeding £10,000.

SUMMARY: The development of the Black Angel known ore bodies is warranted to prove their extension at depth and should be carried out as envisaged in this report.

Yours faithfully,

CHAS. E. BLACKETT (Consulting Mining Engineer)