GEOLOGICAL SURVEY AND SAMPLING AT
THE PERSEVERENCE MINE, TENNANT CREEK

Summary

A geological survey and sampling at the Perseverence Mine was undertaken at the request of the lessees, Messrs K. Shirley and C. Strong of Tennant Creek. The lessees have been mining and treating bismuth ore on a small scale at the Jubilee Mine and the survey at the Perseverence Mine was made to establish further reserves of bismuth ore.

The investigations, carried out on 26.10.62, revealed that the bismuth ore is of a patchy nature in brecciated zones within massive siliceous hematite and development work is not yet sufficient for an estimate of ore reserves to be made. However, four samples of bismuth bearing ironstone were taken and assay results range from 0.62% to 5.45% Bi. The samples were also assayed for gold but the highest value was only 0.5 dwt/ton.

Accompanying this report are a sketch map of the area around the mine and of the underground workings, together with a list of assay results.

Introduction

The Perseverence Mine lies at a distance of 20 miles to the east of Tennant Creek and is best reached by way of the Peko, Kia-Ora, Renate and Gold Mile Mines. It is situated on a low, broad hill about one mile east of the ridge containing the quartz-hematite lodes of the Golden Mile area.

General Geology

In the vicinity of the mine, the only outcrops consist of quartz-hematite bodies, containing kaolin and, rarely, bismuth while the rest of the area is soil covered. At a distance of 100 yards to the north, and on the northern edge of the hill there are outcrops of sediments of the Warramunga
Group. These rocks, consisting here of sandstone, mudstone and hematite shale, have been folded and available evidence indicates that the folding pitches to the east-north-east at an angle of 25°. The sketch map shows that the strike of the ironstone bodies is also to the east-north-east. In the shaft, at a depth of 25 ft. from the surface, a contact between iron impregnated, brecciated mudstone and massive quartz-hematite pitches to the west. Relic bedding at the top and bottom of the shaft, strikes approximately north-south and dips to the west at 25°. Although complete evidence is lacking, it is suggested that the ironstone bodies have been emplaced in the crestal region of a west pitching fold. Reversal of pitch is also present in the area.

Economic Geology

Reference to the official records listed in Bulletin 22 of the Bureau of Mineral Resources, by J. Ivanac, 1954, Vol. 1 p.1, shows that 192.34 ozs of dollyed gold were won from the Mine up to June 1952. There has been no further work at the mine in recent years.

In the present investigations, the workings were mapped and, it will be seen from the sketch plan, that these are of very limited extent.

The walls of the shaft are timbered to a depth of 14 ft., below which are exposures of iron impregnated, brecciated mudstone. At a depth of 25 ft. from the surface and underlying the brecciated mudstone is a body of massive quartz hematite. The sharply defined contact strikes at 330°, dipping 25° in a westerly direction. It is apparent that the workings at the 25 ft. level were made to test the hanging wall contact zone.

Near the bottom of the shaft, in the vicinity of the small chamber at the 48 ft. level, occurrences of bismuth carbonate in the ironstone become noticeable. The bismuth ore has a white spotted appearance in irregular brecciated zones.
within the well-jointed, massive quartz-hematite. The largest of the zones measures 6 ft. by 4 ft. in the eastern wall of the shaft.

Four samples of the ore were taken and assay results showed a range in values from 0.62% to 5.45% Bi. and from Nil to 0.5 dwts of gold/ton.

In addition a grab sample taken from the dump by the lessees was assayed and found to contain 4.43% Bi.

Conclusions and Recommendations

The assay results show that fairly rich bismuth ore is present.

However, further development work is necessary before any estimate of ore reserves can be attempted and, as the bismuth occurrences are apparently small and patchy, it will be necessary to control development with test holes by long hole drilling in advance of driving or cross-cutting.

J. BARCLAY
Resident Geologist

22.11.62
### PERSEVERENCE MINE - LIST OF ASSAY RESULTS

<table>
<thead>
<tr>
<th>Sample Number</th>
<th>Bismuth (% Bi)</th>
<th>Gold (dwt/ton)</th>
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<tbody>
<tr>
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<td>0.5</td>
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<tr>
<td>2</td>
<td>1.15</td>
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<tr>
<td>3</td>
<td>5.45</td>
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<tr>
<td>4</td>
<td>0.62</td>
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