TREASURE MINE - HATCHES CREEK

(Condensed Report)

C.J. SULLIVAN

Records 35/1951.

SUMMARY.

On the Treasure and Lost Ruby leases, Hatches Creek, a vein-system filling a fault has been traced over a length of 650 ft. and has been mined fairly continuously to a depth of approximately 100 ft. over a length of 500 ft. In this section of the deposit, the average width of quartz present is estimated to be 2.2 feet.

No thorough sampling of the deposit has been undertaken and, indeed, this is very difficult unless numerous regular openings are available. It is quite common at Hatches Creek to drive for 10 to 40 feet in barren quartz and then to obtain 2 to 10 tons of wolfram in a small "patch".

However, the mine has been perhaps the most consistent producer at Hatches Creek for many years and the information available showing wolframite produced from measured quantities of ore, indicates that the overall grade may be approximately 4 per cent, wolframite or 2.6 per cent WO3.

A block containing 1,800 to 2,000 tons of ore is partly developed between the 147 ft. and 100 ft. levels, and, on the basis of production records from above the 100 ft. level and from the 147 ft. level, it is estimated that this block may contain 80 to 90 tons of wolframite. Some additional ore, which may not exceed 2,000 tons, may also be available above the 147 ft. level, but it has not been tested by driving.

It is considered that there is every reason to expect that the deposit will continue in depth and the present information suggests that between the 150 ft. and 250 ft. horizons, there may be approximately 8,000 tons of quartz containing approximately 320 tons of standard wolframite.

INTRODUCTION

The Treasure Mine, Hatches Creek, is believed to have been discovered in 1914 and has been one of the most consistent producers to the present time. The mine is on leases 31F and 30F, known as the Treasure and Lost Ruby leases, respectively. Early production records are not available, but it is believed that the total output exceeds 100 tons of wolframite concentrate.

The mine was under the control of the Commonwealth Government during the period May, 1942, to February, 1944, during which time, development rather than production was undertaken. Output during this time was 500 tons of ore which yielded an average of 3.83 per cent. WO3. Most of this ore was won from the stope above the 100ft. level and from the drive at the 100 ft. level (Plate 2).

Production since the cessation of Government operations has been approximately as follows:-

Year		Wolfram. conc.
1944 and 1945	—	11 tons
Year ended June 30th 1946	—	7 tons
" " " " 1947	—	6.2 tons
" " " " 1948	—	5.5 tons
" " " " 1949	—	6.5 tons
" " " " 1950	—	3.5 tons

Production is reported to have increased in 1951, but

the official figures are not yet available.

ECONOMIC GEOLOGY.

Ore Type.

The ore bodies worked on the Treasure Mine are quartz reefs 12 inches to 50 inches in thickness, containing wolframite and some biotite. No scheelite or bismuth minerals have been noted and copper minerals are found only very occasionally. The workings have not yet penetrated below the zone of oxidation but the lack of voids, the low limonite content and the lack of bismuth, copper and molybdenum in the oxidized ore suggest that the primary ore is low in sulphide content and is unlikely to present difficult treatment problems.

Reefs and Workings.

The most important reefs and workings are shown on Plate 1. Additional minor veins occur in the leases, but could be profitably worked only to shallow depths. The most productive veins are known respectively as the Main Reef and No.2 Vein. The main reef extends in a north-south direction over a distance of approximately 650 feet and dips to the westward at angles of 65 to 85 degrees. It has been worked more or less continuously over a length of 500 feet. No. 2 vein varies from 6 inches to 12 inches in width and is not considered further in this report.

At the 100 ft. level from the main shaft the Government extended a drive 200 feet in length and obtained payable ore through out this length. At the southern end of this drive a bed of shale is intersected by a fault and these conditions cause the ground to be heavy; mining was discontinued at this point. At the present time (July, 1951) a considerable portion of this drive is mullocked up as shown on Plate 2.

Since 1944, the main shaft has been extended to a depth of 155 feet; at the 147 ft. level the lode has been driven for 240 feet north of the shaft and 25 feet south of the shaft. A winze, 81 ft. north of the centre of the main shaft, connects the 100 ft. and 147 ft. levels. The southern end of the drive at the 147 ft. level exposed a fault which dips at 45 degrees to the north and is believed to be the fault intersected at the southern end of the 100 ft. level, (Plate 2). The southern drive at the 147 ft. level was discontinued because it was thought that the same bad ground would be found at this point as was encountered at the southern end of the 100 ft. drive. However, as shown on the longitudinal section (Plate 2) the bad ground found at the 100 ft. level is partly due to the presence of the shale and this is not present at the southern end of the 147 ft. level. It is believed that this fault will throw the reef westward going south and that ore will continue beyond the fault. The southern limit of the main shoot is likely to be found where the bed of shale is reached. The exact position of this shale band is not known because of the lack of knowledge as to the throw of the fault.

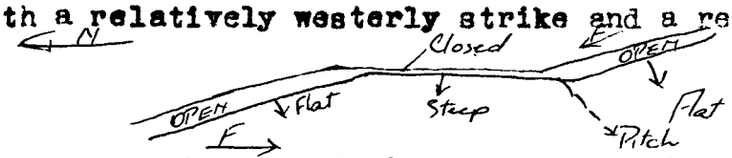
From the study of the available openings, where careful measurements have been made, it is estimated that the average total width of quartz present in the main reef system is 2.2 feet. As shown by the mapping at the 147 ft. level, the lode channel itself may vary from 1 to 10 feet in width and, in mining, a considerable proportion of barren rock must be broken in addition to the quartz.

Ore Localization.

The main lode occupies a well defined fault fissure. Striae on the walls of the fissure suggest that movement has been largely horizontal and that the eastern wall has moved northward relative to the western wall. This is partly confirmed at the 100 ft. level where it was found that the shale-andesite contact in the vicinity of the 1340N (Plate 1) had been offset approximately

7 feet, the eastern side of the fissure having moved northward. It is likely that the displacement is everywhere small.

Ore tends to occur in the sections of the fissure with a relatively westerly strike and a relatively flat dip:-



The relatively open parts of the fissure, now filled with ore, pitch to the southward an angle of approximately 70 degrees.

The type of opening formed has been influenced by the type of rock intersected. The andesitic rock occupying the northern portion of the property gives a good clean fracture. The walls of the fissure are well defined and there has been no collapse under pressure. The best ore-shoots occur in this section. The slate which was intersected in the south drive at the 100 ft. level in the vicinity of 1340 N, is an incompetent rock: the walls of the fissure have partly collapsed and there has not been sufficient space for the emplacement of a large reef. The latter is usually relatively narrow and is discontinuous. As shown on Plate 2, the shale band tends to limit the ore available in the main stope above the 100 ft. level. South of the shale, is a soft, biotitic rock, probably a lamprophyre, which is almost as incompetent as the shale. The fissure traversing this rock is blocked in places by pieces of country and the reef is discontinuous and patchy. These conditions continue to the band of quartzite occurring about 1200 N. This rock has not given a single open fissure, but rather, a set of irregular cracks filled with quartz stringers. The quartzite has an unfavourable influence on the reef in the south drive from No. 4 shaft (plate 2) and on the reef in the bottom of the shaft at 1180 N. South of the quartzite, a well defined reef, 18 to 24 inches in width fills a fissure in the favourable andesitic rock. However, two shafts sunk to test this vein have exposed only low-grade ore.

Ore Reserves

In the present calculations it is assumed that ore reserves exist only to the north of the bed of shale shown on Plate 2. Some ore has been found to the south of the quartzite bed and also between the shale and the quartzite, but past production from these sections of the mine has been small. However, if high prices continue, some production could probably be obtained from these areas.

In considering the main sections of the deposit, which lie to the north or the shale bed, the following are the most important points:

(1) Most of the ore has been removed from the ground above the 100 ft. level from the Main Shaft. The Government workings at the 100 ft. level and in the stope above the 100 ft. level averaged 3.83 per cent. WO_3, (recovery) for 500 tons of ore mined. The stope was in one of the richest sections of the deposit but the ore was mined by shrinkage-stoping and there was a dilution factor of, probably, 20 per cent.

(2) The drive at the 147 ft. level is reported to have produced 16 tons of wolfram concentrate which is believed to have averaged 65 per cent. WO_3. On the estimated tonnage of quartz removed from this drive, the reefs would have averaged approximately 3.1 per cent. WO_3.

The writer has no personal knowledge of the amount of wolfram that was won from this drive, but the statement by the owner that 16 tons were won be-

cross checked with several independe... The official records of production show tha... mine produced 28.7 tons of concentrate between June, 1946, and June, 1950, and judging from the periods during which the development was carried out, it is believed that most of this production came from sinking the main shaft from the 100 ft. level to the 155 ft. level, from sinking the winze from the 100 ft. level to the 147 ft. level and from the drive at the 147 ft. level. A considerable amount of concentrate has also been obtained from the drive in the period June, 1950 to June 1951. It therefore seems reasonable to accept the figure of 16 tons for production from the drive and for the limited amount of stoping which has been undertaken from this drive.

(3) There is not a great deal of wolfram showing in the winze from the 100 ft. level to 147 ft. level, but as shown in the plan (Plate 1) it is evident that the winze was sunk in the hanging wall of the main lode system at the 100 ft. level and it continues in hanging wall country for appoximately 20 ft. below this level. There appears to be no good reason to believe that ore does not continue between the 100 ft. level and 147 ft. level and it is estimated that the block of ore between the present drive at the 147 ft. level and the 100 ft. level may contain 80 to 90 tons of wolframite.

Some ore undoubtedly exists to the north of the 100 ft. level where a further 130 ft. of driving is warranted. To the south of the 147 ft. level a further 70 ft. of driving might be in payable ore.

(4) As shown in the mapping at the 147 ft. level and as indicated by the production of wolfram at that level, there is no fall in the width or grade of the lode at this horizon.

Judging from the mineralogical and structural characteristics of the deposit, there appears to be no reason to suspect that the lode will not continue down for a further 200 to 400ft. It is relevant that the Treasure vein-system, although indistinct in places owing to changes or rock types, has been traced for more than 1,000 ft. along the strike. In view of these facts it is considered probable that the ore extends to the 250 ft. level, as indicated on Plate 2. On the basis of the observations made at the 147 ft. level and in the various openings in the other section of the mine, it is estimated that there possibly exists in the main reef system between the 150 and 250 ft. levels, 8,000 tons of quartz containing approximately 4 per cent. wolframite - a total of approximately 320 tons of standard wolframite.

sgd. C.J. SULLIVAN

CANBERRA A.C.T.

25th July, 1951.