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BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS.

RECORDS:

1962/33

GEOLOGY OF THE B.W. IRON CLAIM, HUNDRED OF WATERHOUSE, NORTHERN TERRITORY.

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SUMMARY

The B.W. Iron Claim lies in Sections 7 and 8 of the Hundred of Waterhouse, about 17 miles southwest of Batchelor. The area includes granite and a sequence of sedimentary rocks that strike northwest and are vertical or dip steeply to the south. They are overlain by a band of quartzite breccia. Costeans and pits have exposed several thin bands of hematite and one large lens approximately 65 feet wide and 120 feet long. A shaft sunk in this lens exposed solid hematite to a depth of 21 feet, where the lens is cut off by a flat-dipping fault.

No ore reserves are proved although the large lens may contain as much as 15,000 tons of hematite. Further exploration should include deepening of the shaft, drilling beneath the quartzite breccia, and costeaning some of the rubble-covered slopes to test for new hematite lenses.

INTRODUCTION

The B.W. Iron Claim is situated in sections 7 and 8 of the Hundred of Waterhouse, and is held by Mr. B.D. Brown, on behalf of the Anglo Pacific Trading Company (New Guinea) Limited. It can be reached by following an all-weather road from Batchelor to Banyan Homestead, and a bush track from there to the deposit. It is approximately seven miles from Batchelor to Banyan and a further ten miles to the deposit. A four-wheel drive vehicle would be able to reach the deposit during part of the wet season. The deposit is accessible to conventional vehicles during the dry season.

Several visits were made to the deposit between February and June, 1961. The present report is based on a plane table and alidade survey of an area of 2,000 feet by 1,000 feet around the deposit, carried out in May of this year.

EXISTING EXPLORATION WORK

A large amount of hematite rubble and a single outcrop of hematite first indicated the presence of a possible ore body. Samples taken by Mr. Brown from the outcrop showed that the hematite was sufficiently free from silica and other impurities for use as iron ore.

The first exploratory work was the digging of a costean along the hematite outcrop and some shallow pits to determine the areal extent of the deposit. Later costeaning with a bulldozer was done at random over a larger area, three pits were dug to a depth of about ten feet, and a shaft was sunk on the site of the original hematite outcrop to a depth of 23 feet.

GENERAL GEOLOGY

Lithology

The claim is in a sequence of sedimentary and metasedimentary rocks close to the southern contact of the Waterhouse Granite. Farthest away from the granite is a red, ferruginous sandstone that forms a ridge between the Little Finniss River and the Waterhouse Granite. The sandstone consists mostly of quartz grains in a hematite matrix, but along its northern edge a breccia consisting of quartz fragments in a hematite matrix crops out in places.

A zone of iron-rich slates is in contact with the ferruginous sandstone, and lies between it and the granite. This slate contains varying amounts of specular hematite, including some bands and lenses of nearly pure hematite. Most of these bands or lenses are only a few inches thick, but some are much larger; the largest so far found in this area is approximately 65 feet thick. One of the costeans also exposed a band of magnesite about four feet thick which is apparently conformable with the slate and is associated with a band of hematite.

Several outcrops of quartz or quartzite breccia lie north of the slates. The breccia is made up of poorly sorted angular fragments of quartz sandstone or quartzite in a quartz matrix or, less commonly, a hematite matrix. The largest fragments are several inches across. The breccia forms a low hill above the largest hematite lens.

Between the quartzite breccia and the granite there is a band of flaggy quartzite or quartz sandstone which consists of fine- to medium-grained rounded quartz grains in a siliceous matrix. It also includes some thin bands of quartz-rich slate. This quartzite does not make any prominent outcrops, and the boundary between it and the quartzite breccia could not be precisely located.

No other rocks crop out between the quartzite and the granite except for a few quartz veins along the contact. The contact is not sharp, but is a zone of migmatite several hundred feet wide. This migmatite contains a greater percentage of mafic minerals than the main mass of the granite. There are very few granite or migmatite outcrops so the boundary has been sketched in where the first granite boulders were found. Many quartz veins occur within the granite close to the boundary, but one quartz vein nearly 15 feet wide may be within the quartzite.

Structure

The sedimentary and meta-sedimentary rocks strike generally northwest, and all of them except for the quartzite breccia dip either vertically or steeply to the southwest. The ferruginous sandstone is massive and competent and no minor folds have developed in it, but the attitude of the slate and of the flaggy quartzite varies considerably in individual outcrops and both rocks show many minor folds. In places the slate is tightly contorted and has been sheared along minor faults.

The quartzite breccia appears to be broadly conformable with the other sedimentary rocks. If this were so, however, the costean northeast of No. 6 station, which is at rightangles to the general strike, should extend from slate into quartzite breccia, whereas it actually exposes nothing but slate. The line of breccia outcrops extends in both directions from this costean, and there is no evidence in the costean of any fault which could have displaced the breccia. Since it is not exposed in the costean, the quartzite breccia must either have lensed out very sharply and left a gap of about 150 feet, or is lying unconformable over the slates.

Two explanations seem possible for the unconformable attitude of the breccia. It may be a depositional breccia resting unconformably on the other sedimentary rocks (as shown on regional geological maps of the area) and erosion has since removed all but a narrow band of it. However, it may be a tectonic breccia (see Figure 1), or a slump breccia.

Figure 1. Minor fold in quartzite breccia. Matrix is hematite.

In the southeast portion of the area mapped, an outcrop of quartzite occurs only about 200 feet northeast of the ferruginous sandstone, while 1,500 feet to the northwest the quartzite and sandstone are at least 500 feet apart. This one outcrop in the southeast portion of the area may be a remnant of the over-thrust block that was displaced towards the ferruginour sandstone.

Evidence of faulting is found in the shaft that was sunk in the solid hematite in the western part of the area. At a depth of 21 feet the hematite has been cut off abruptly, and below that depth the shaft is in an unconsolidated clayey material that is apparently fault gouge. Small angular fragments of hematite are found in the gouge, but the bottom of it was not reached. The contact between the overlying hematite and the fault gouge dips at a low angle to the south. Apparently

the quartzite was thrust over the incompetent slates, contorting them, and the fault plane dipped down beneath the lens of massive competent hematite. The upper block then continued to ride over the incompetent slates.

The extent of the probable fault and the amount of displacement along the fault are not known, and it is not possible to locate the trace of the fault plane on the surface.

IRON DEPOSITS

The iron deposits consist of bands and lenses of massive hematite and specularite within the tightly folded slates. The hematite contains from five to ten per cent silica, but has no other visible impurities. Veinlets and vugs in the solid hematite contain both specularite crystals and euhedral quartz crystals indicating that both iron and silica have been mobilized. This mobilization probably occurred during the period of folding and faulting which may have been penecontemporaneous with the intrusion of the Waterhouse Granite. The iron might have come originally from the granite, but it is probably derived from the sediments and has been concentrated into lenses and pods during mobilization.

The largest of the lenses found on the claim lies around the site of the first hematite outcrop found in the area, which is now the site of the shaft. A costean dug approximately at right angles to the general strike extends in both directions from the shaft, and exposes a width of about 65 feet of massive hematite. Another costean, dug about ten feet south of the first and at an angle of about 60° to it, exposes about 80 feet of massive hematite. A third costean, dug ten feet north of the first and at right angle to it exposes only slate, with some quartzite breccia boulders near the surface. A pit dug in this costean also failed to expose any solid hematite. A pit about 45 feet southeast of the shaft was dug in slate rubble, but did not reach bedrock. Another pit 210 feet from the shaft in the same direction reached bedrock, but exposed only minor bands of hematite. Three other pits which were dug in hematitic slate rubble, 120 feet west of the shaft, did not reach bedrock. A pit dug 265 feet northwest of the shaft went into slates without encountering any hematite.

The lens around the shaft, therefore, cannot be much wider than 65 feet, and is probably less than 120 feet long, although the length cannot be determined until some of the shallow pits are extended to bedrock. The lens may continue beneath the quartzite breccia, but this breccia forms a steep hill above the possible extension of the lens, and it would require drilling to reach the level of the slates and any possible extension of the hematite.

The lens has a vertical dimension of 21 feet at the shaft, where the base is determined by faulting. A downwards continuation of the lens might be found to the north or northeast of the shaft - probably less than 300 feet away.

Hematite is exposed in two other costeans. In both the hematite occurs as conformable bands approximately six feet thick. Both bands dip steeply and strike approximately southeast - at right angles to the bearing of the costeans. There are no outcrops around these costeans, and the length of the bands is not known. The two exposures are about 250 feet apart. They might be two exposures of the same band, although this seems unlikely, since in one of the costeans the hematite is associated with a band of magnesite which is absent in the other. The origin of the magnesite is unknown, but it may have been derived from a thin lens of dolomite in the original sediments. No magnesite was found anywhere else in the area of the map.

No other large hematite bands were found in place in the area, although the rubble on the slopes over much of the area consists primarily of hematite and it seems likely that other bands of hematite remain to be discovered. However, it would only require a few small outcrops of hematite to supply all the hematite rubble found in the area.

No ore reserves can be regarded as having been proved to date in the area. A lens of 65 by 120 by 20 feet, which may be the approximate dimensions of the body in the vicinity of the shaft, would contain about 15,000 tons of ore.

FURTHER EXPLORATION

About 1,600 feet southeast of the shaft 33 shallow pits have been dug along a line that trends northeast. They are spaced about 15 feet apart. No outcrops were found in that area, but the rubble is made up primarily of hematite and the shallow pits have exposed some large cobbles of hematite. Mr. Brown has drilled short vertical holes in these shallow pits to test for possible lenses of hematite in the underlying rocks. Some of these have intersected hematite, but it is not known whether they were in bedrock or in large hematite boulders. Several costeans should be dug with a bulldozer in this area parallel to the line of pits to determine the extent of the hematite found in the drill holes.

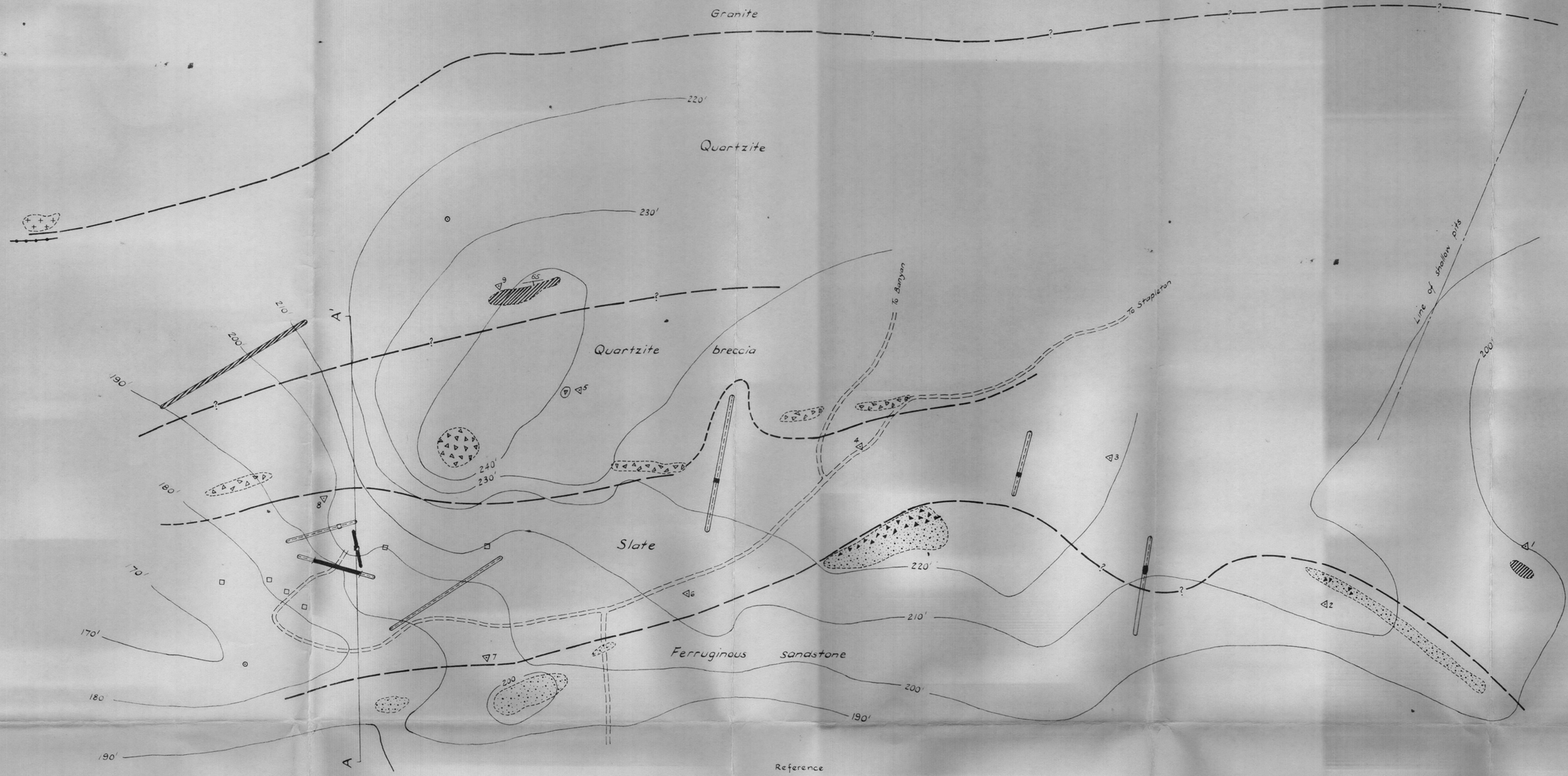
Drilling will be required to test for possible hematite deposits in the slates underlying the quartzite breccia. The breccia may be as much as 20 feet thick, but is not likely to exceed that figure, and in most places will be considerably less.

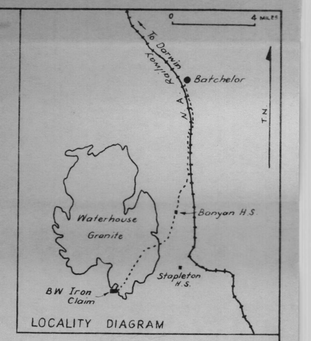
The existing shaft should also be deepened until solid rock is re-encountered, in case the displacement on the fault has been less than the dimensions of the hematite lens.

Plate 1

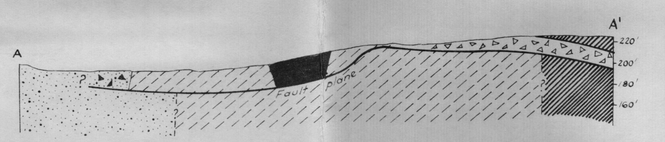
GEOLOGY OF BW IRON CLAIM

P.G. DUNN





LOCALITY DIAGRAM



DIAGRAMMATIC CROSS SECTION

Reference

- Solid hematite
- Granite
- Quartzite
- Slate
- Ferruginous sandstone
- Quartzite breccia
- Quartzite breccia with ferruginous matrix
- Quartz vein
- Geological boundary
- Shaft
- Pit
- Costean
- Plane table station
- Lease peg
- 210 Contour
- Vehicle track
- A — Line of cross section
- 65 Strike and dip of strata

Scale

100 0 100 200 FT.

Contour interval 10 ft.
Assumed datum 200 ft. at A'

Resident Geologist's Office, Darwin
Bureau of Mineral Resources June 1961

To accompany Record No. 1962/33

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