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OPEN FILE
The Bull Pup Mine, lies in an area known as the Last Hope alluvials, approximately 30 miles North-West of Tennant Creek.

The mine is situated on a small fault in the crestal region of a small anticline. The leasee has completed extensive development work, single-handed, but has returned only twenty tons of ore which yielded 5½ ounces of gold.

The underground workings were mapped, and the ironstones and quartz leaders were sampled. Nil gold and copper was reported.

Although the lack of good assay values, and unfavourable lithologies are not encouraging, it is recommended that some ground magnetometer traverses, combined with geochemical sampling be carried out.
The Bull Pup Mine is situated approximately 30 miles from Tennant Creek on a true bearing of 315° from the Post Office. The lease is reached by travelling along the bitumen road to the Orlando mine, and thence by bush track for 15 miles in a Westerly direction.

The mine lies within an area known as the Last Hope alluvials (Moonlight Rock-hole), and is situated ½ mile East of the Last Hope mine.

A reconnaissance geological survey was made of the mine workings at the request of the lessee, Mr. Stolges.

Mr. Stolges' interest in this area was at first encouraged by his finding an "alluvial" sample containing approximately 20 ounces/per ton of gold, (J. Edwards, Battery Manager, pers. comm.). At the time of writing, the only crushing he returned, consisted of 20.7 tons of ore which yielded 5 ounces 6 dwts of gold.
J. Ivanac (Bull. 22, pp. 19-20) states that the Ashburton Sandstones (Tomkinson Creek Beds) conformably overlie the Warramunga sediments, and to predate the Tennant Creek mineralisation.

Dunnet and Harding (Record 1965/168 pp. 38) are of the opinion that the Tomkinson Creek beds rest with angular unconformity upon the granites and sediments of the Warramunga group.

Approximately two miles North-West of the Last Hope Mine, a Mines Branch drill hole on the Explorer 27 prospect, drilled through a series of fine grained siliceous phyllites. W.S. Yesman (Resident Geologist, Tennant Creek, 1964/5) concluded that this represented a transitional zone between the Warramunga and Tomkinson Creek Beds.

The Tomkinson Creek beds predominantly strike East-West, but towards the Western part of the Marion Ross 1 mile sheet (123500E, 2566500N), the strike trend changes to a North-South direction with gentle Westerly dips. Here the contact between the Warramunga — striking predominately East-West, and the Tomkinson Creek Beds is a near right angle unconformity. Further East, detailed mapping has revealed that the Southern margin of the Tomkinson Creek beds lies adjacent to different stratigraphic members within the Warramunga group. It is the writer's opinion therefore that the Warramunga Group/Tomkinson Creek Group contact is unconformable.

The Tomkinson Creek Beds are folded about East-West axes which plunge gently East. The predominant dips are steep.

A transcurrent slip fault strikes 095° (T) just North of the Last Hope mine. This fault post-dates the folding and here represents the Tomkinson Creek/Warramunga contact.

A North East trending lineament, possibly a fault, appears to displace this contact fault by a quarter of a mile, and passes through the Explorer 27 and 36 areas of high magnetic
relief. The Explorer 27 prospect was drilled by the Mines Branch, July 1965, to explore at depth the extent of a possible mineralised zone, indicated in outcrop by a gossanous limonite capping.

The Tomkinson Creek beds are predominantly arenaceous in character, composed of clean sandstones and quartzites; whereas the Warramunga sediments are mainly fine-grained argillites and phyllites.
Plates 3 and 4, show details of the underground workings.

The three shafts are sunk almost along the line of a small fault in the crestal region of a small antclinal fold, which pitches gently East.

The fault plunges steeply to the North, and is characterised by sheared, kaolinised and silicified sediment.

The dominant lithology is sandstone with occasional shale horizons, and kaolinised shear bands.

The gold is associated with hydrothermally introduced ironstone and quartz stringers, branching off from the fault line, which appears to have acted as an infiltration channel. The "seams" are between 6" and 18" thick, and generally fade a few feet either side of the fault line. The ironstones are crumbly and well weathered, and carry only trace values of gold.

To the West, there is a 120', westerly inclined drive (25°). From a small Northerly cross cut, the leases obtained 20.7 tons of ore, yielding 5½ ounces of gold. The gold was associated with a quartz lancer.

The sandstones are fine/medium grained, often cut by thin quartz veins. Dips average between 20° and 50°.
CONCLUSIONS

It is thought that large payable quantities of ore will not be found for the following reasons:

1) the limited size (6"-18") of the ironstone and quartz lenses, combined with their tendency to fade either side of the fault line,

2) sandstone is not usually a favourable host rock to mineralisation in the Tennant Creek field.

If however, the lessee continues development work on the mine, a more detailed geological survey is recommended, with a ground magnetic and geochemical sampling programme.

The structure within the mine is not fully understood, but it appears that the intrusive veins may be related to the more extensive ore-bodies farther South in the Explorer 5 area. On this basis, these stringers represent the outer limits reached by a large hydrothermally introduced ore-body.

REFERENCES

Dunnet and Harding. B.M.R. Record 1965/168
Ivanac, J. Bull. B.M.R. No.22.

(B.A. TAPP) Resident Geologist
24/10/66.
LEGEND

Hayward Creek Beds
(Quest, Gravels, Congl.)

Warramunga Beds
(Siltstones, Tuffaceous silt.)

Gossan

Outcrop Boundaries

Faults

PHOTO. GEOLOGICAL INTERPRETATION
BULL PUP AREA

SCALE 1 : 82,750
PLAN OF WORKINGS - 78 FT. LEVEL

BULL PUP MINE
NORTHERN TERRITORY

SCALE: 1" = 40'

COMPiled BY THE RESIDENT GEOLOGICAL SECTION; DRAWn BY MINES BRANCH DRAUGHTING OFFICE, DARWIN, N.T. NOV. 1966.
CROSS CUTS DEVELOPED EITHER SIDE OF FAULT FOLLOWING THIN IRONSTONE AND QUARTZ STRINGERS.

LONGITUDINAL SECTION OF WORKINGS

BULL PUP MINE

NORTHERN TERRITORY

SCALE 1' = 40'

Compiled by Resident Geological Section; Drawn by Mines Branch Draughting Office, Darwin, Nov. 1966.