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**Geophysical Investigation of the
Burnt Shirt Anomaly 4 Area,
Tennant Creek 1967**



by

J. E. Haigh

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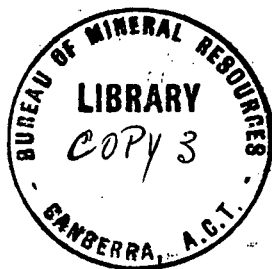


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GEOPHYSICAL INVESTIGATION OF THE
BURNT SHIRT ANOMALY 4 AREA,
TENNANT CREEK 1967

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J.E. Haigh



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SUMMARY

A ground magnetic survey was conducted over the Burnt Shirt Anomaly 4 area, Tennant Creek, N.T. Diamond drilling based on interpretation of the results proved successful in locating an ironstone body, but no significant gold values were detected.

1. INTRODUCTION

Early in 1967, the Mines Branch of the Northern Territory Administration drilled a diamond drill hole near Tennant Creek N.T. in an area known as the Burnt Shirt Anomaly 4 (Pl. 1). This hole (DDH1) was based on magnetic interpretation carried out by the then Resident Geologist at Tennant Creek. The hole failed to intersect any magnetic material. A short second hole (DDH2) was drilled to investigate a small outcropping magnetic boss and intersected a thin band of ironstone at a depth of 230 feet.

In August 1967, the author was requested to investigate the failure of the first drill hole. A glance at the existing magnetic data showed that the readings had been obtained on a very insensitive scale of the Sharpe MF1 fluxgate magnetometer with a limiting accuracy of 50 gamma, and were too inaccurate to permit satisfactory interpretation. The area was resurveyed using a McPhar M700 fluxgate magnetometer and on the basis of the results another drill hole (DDH3) was sited. This hole intersected massive ironstone at depth. A fourth hole (DDH4) was drilled on geological grounds to test if the small body intersected in DDH2 was connected with the main ironstone body. The drilling results are shown in section in Plate 3 and are useful for comparison with the interpretation of the magnetic data.

2. DISCUSSION OF RESULTS

The magnetic profiles are shown in Plate 2. No readings could be obtained on traverse 00 because of the drilling operations in progress. As a drilling recommendation was required immediately, DDH3 was sited by inspection only of the magnetic profiles. The target was given at a depth of 600 feet below 150S on traverse 100W.

Subsequently, a quantitative method of interpretation by curve-fitting was developed (Haigh, 1969) and was applied to the data. The results of interpretation by this method are shown in Plate 4. In general, the profiles are not strictly suitable for quantitative interpretation, and in particular profile 100W was found to be not amenable to the curve-fitting process. Hence the results of the interpretation should be treated with caution.

A regional gradient almost certainly exists in the area (traverse 100E shows this fairly clearly), and must be removed before any quantitative interpretation is attempted. On traverse 100E and 200W the gradients removed were 70 and 100 gamma per 1000 feet, respectively. The interpretation of traverse 100E gives a magnetized sphere at a depth of 620 feet below 235 South. On traverse 200W, the sphere is at 600 feet below 240 south.

If a susceptibility of 0.1 c.g.s. units is assumed, the radius of the sphere is approximately 250 feet in each case. Both interpretations show that the bulk of the magnetic body lies to the south of the ironstone intersected in DDH3 and DDH4 and that the target for DDH1 was too far south of the centre of the body. However, as the fit between observed and theoretical profiles is poor, these conclusions must be regarded as tentative. The interpretation could perhaps be tested by extending DDH1 a further 300 feet, but as no economic gold values were found in the assays of the ironstone intersections, further investigation of the body is probably not warranted.

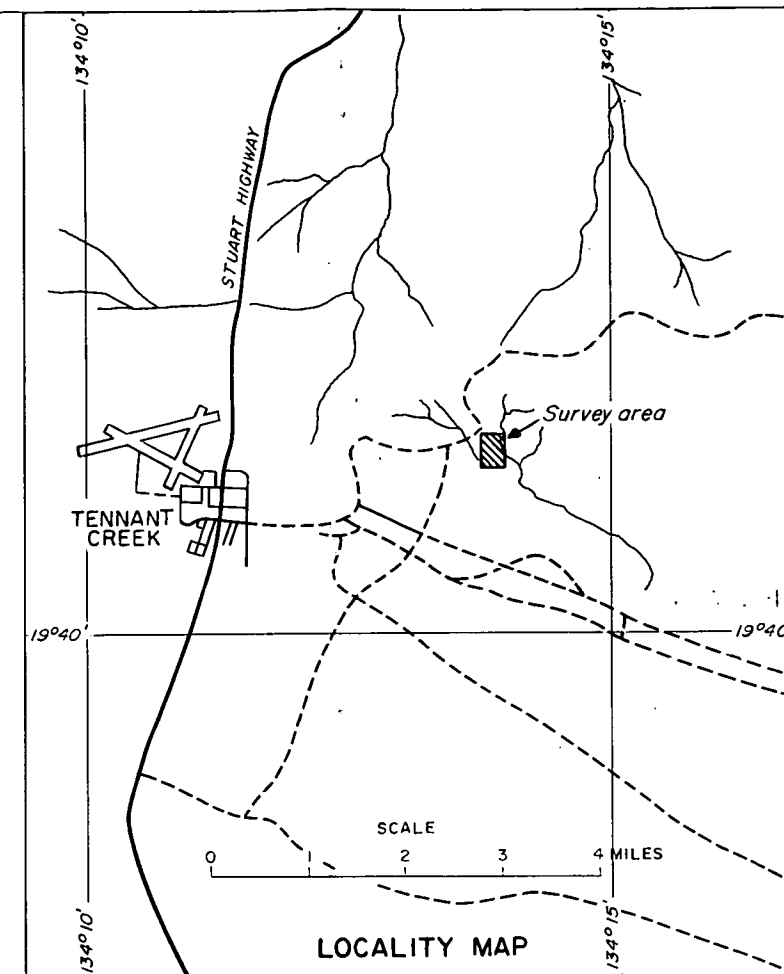
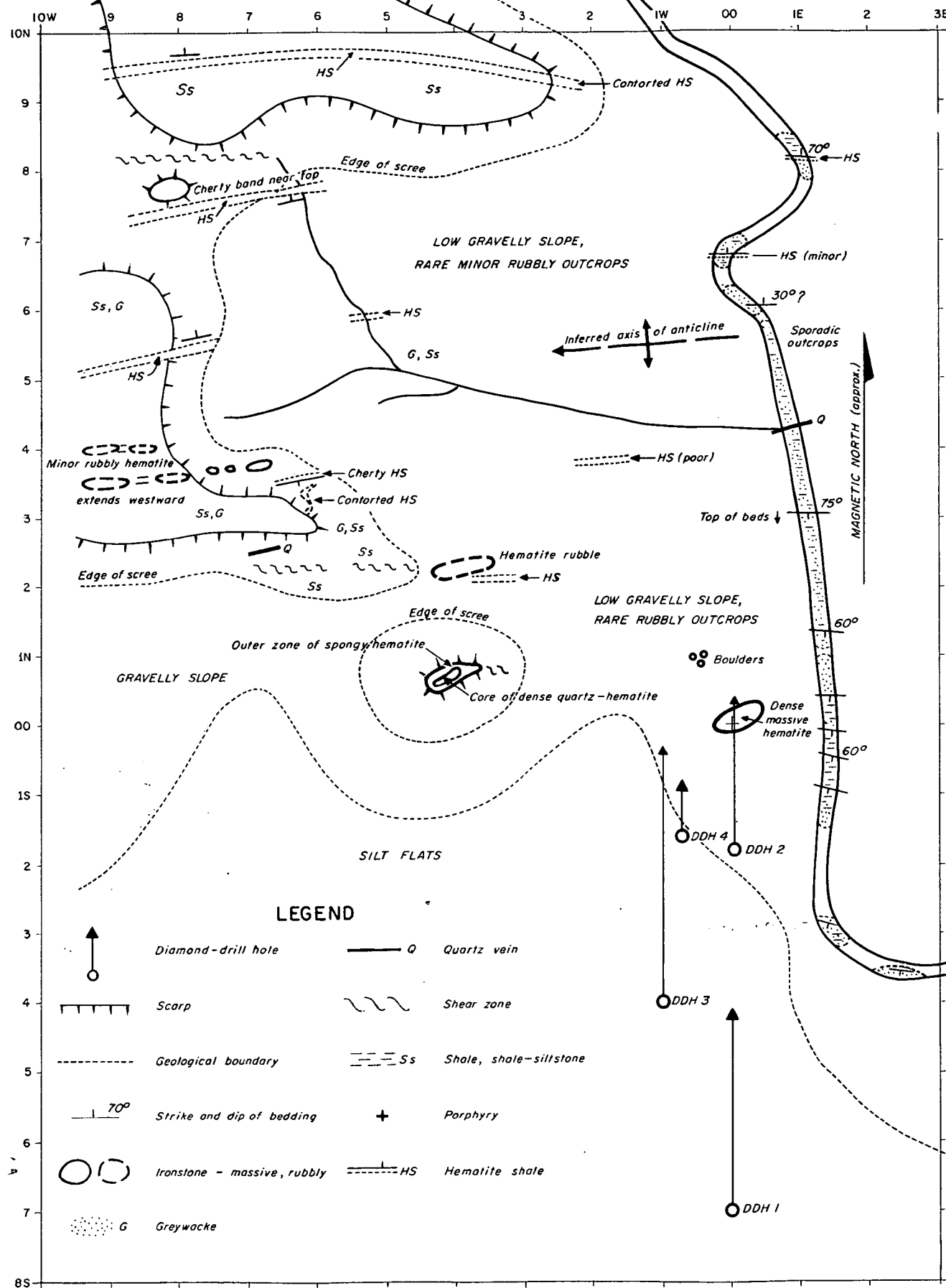
3. CONCLUSIONS

Diamond drilling based on preliminary interpretation of the magnetic data from the Burnt Shirt Anomaly 4 area succeeded in locating an ironstone body at a depth of 600 - 800 feet, but no economic gold values were detected in the ironstone intersections.

The subsequent quantitative interpretation indicates that the main bulk of the body is to the south of the intersections, but the degree of fit of the data is poor, and the interpretation should be treated with caution.

4. REFERENCE

HAIGH, J.E., 1969 - Standard curves for the magnetic anomalies due to spheres. Bur. Miner. Resour. Aust. Bull. No. 119. (in press).



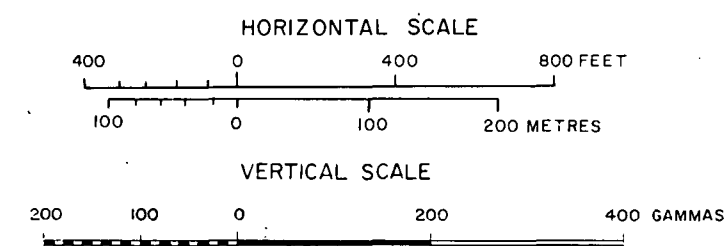
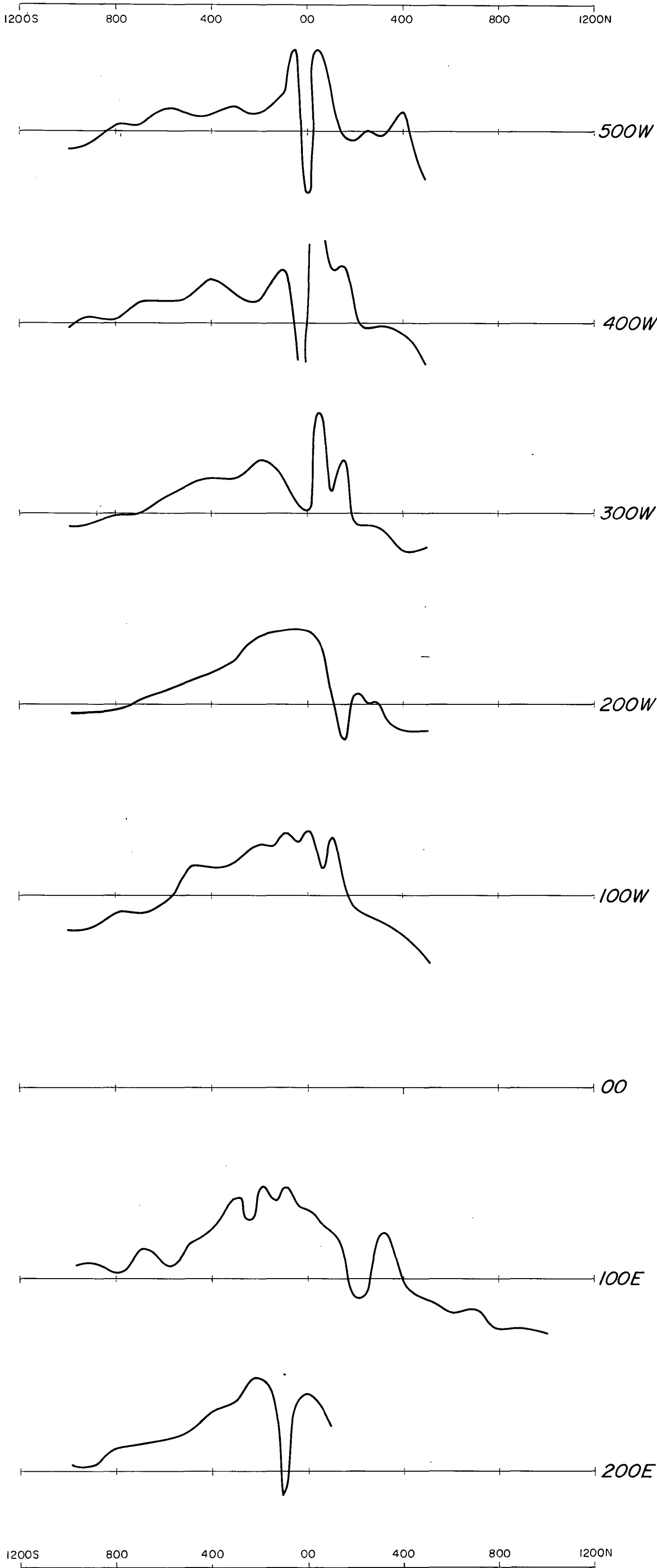
TENNANT CREEK NT, 1967

BURNT SHIRT AREA

ANOMALY No. 4

LOCALITY MAP AND GEOLOGY

TO ACCOMPANY RECORD 1970-104



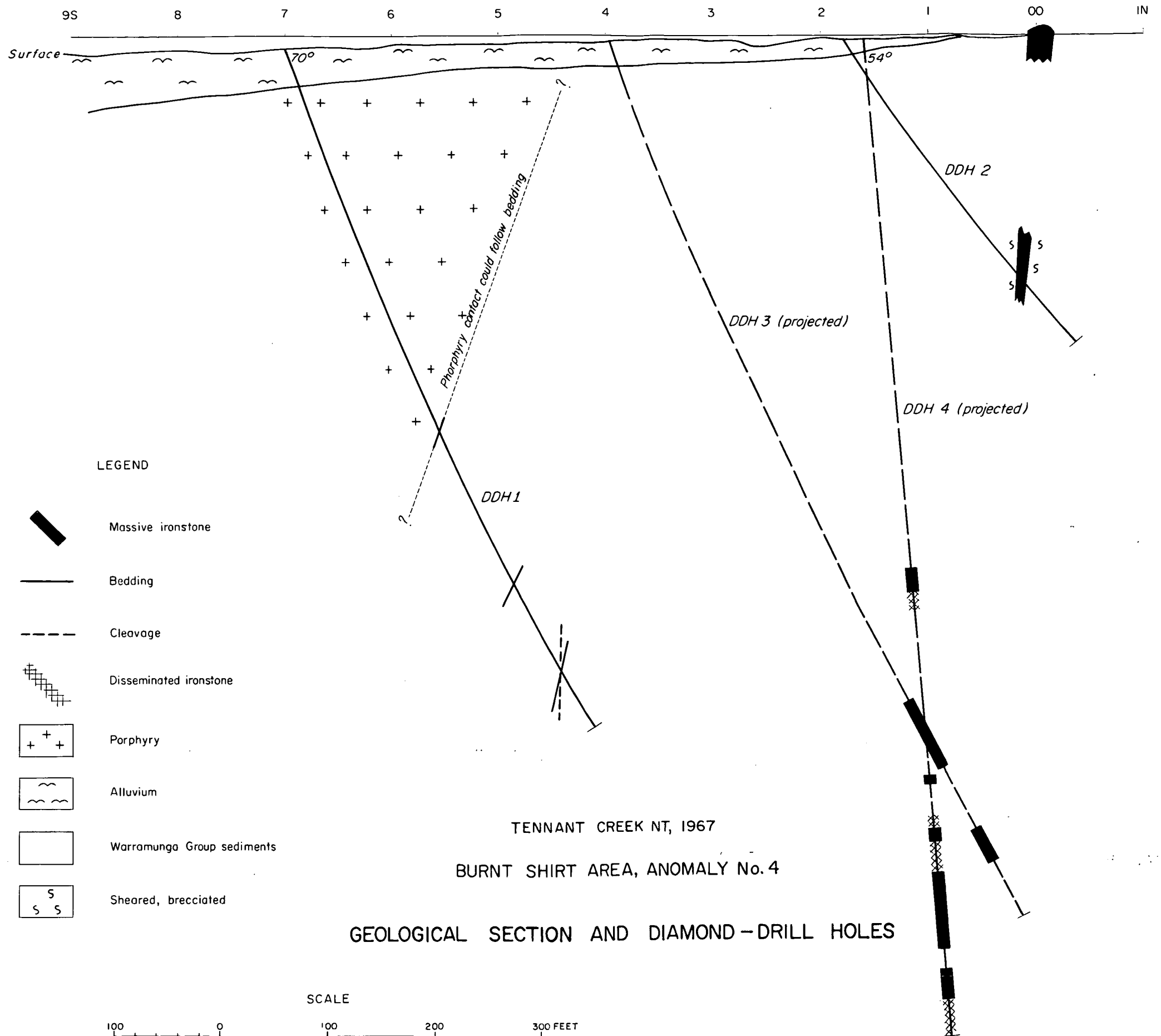
Distance between traverses is not to scale

TENNANT CREEK N.T. 1967
BURNT SHIRT ANOMALY 4









PROFILES OF VERTICAL MAGNETIC INTENSITY

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PLATE 2



LEGEND

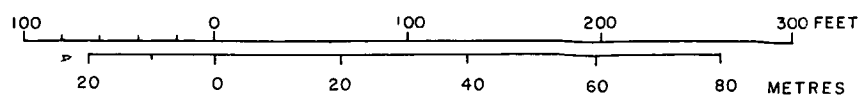
-  Massive ironstone
-  Bedding
-  Cleavage
-  Disseminated ironstone
-  Porphyry
-  Alluvium
-  Warramunga Group sediments
-  Sheared, brecciated

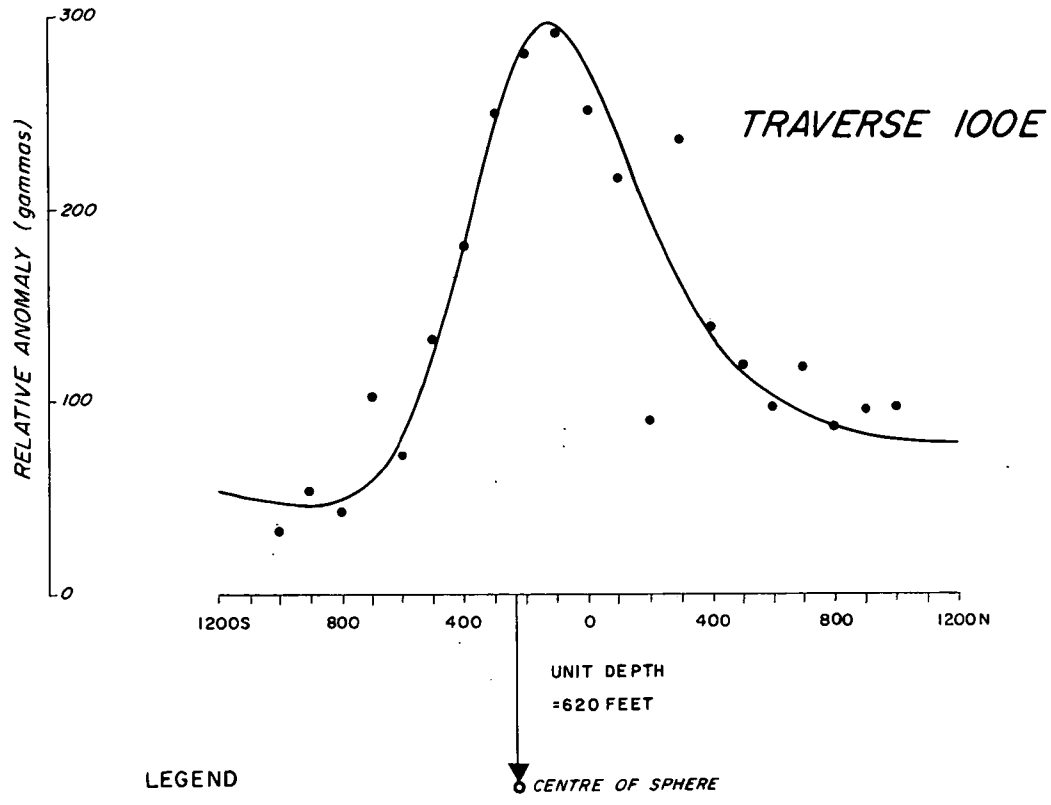
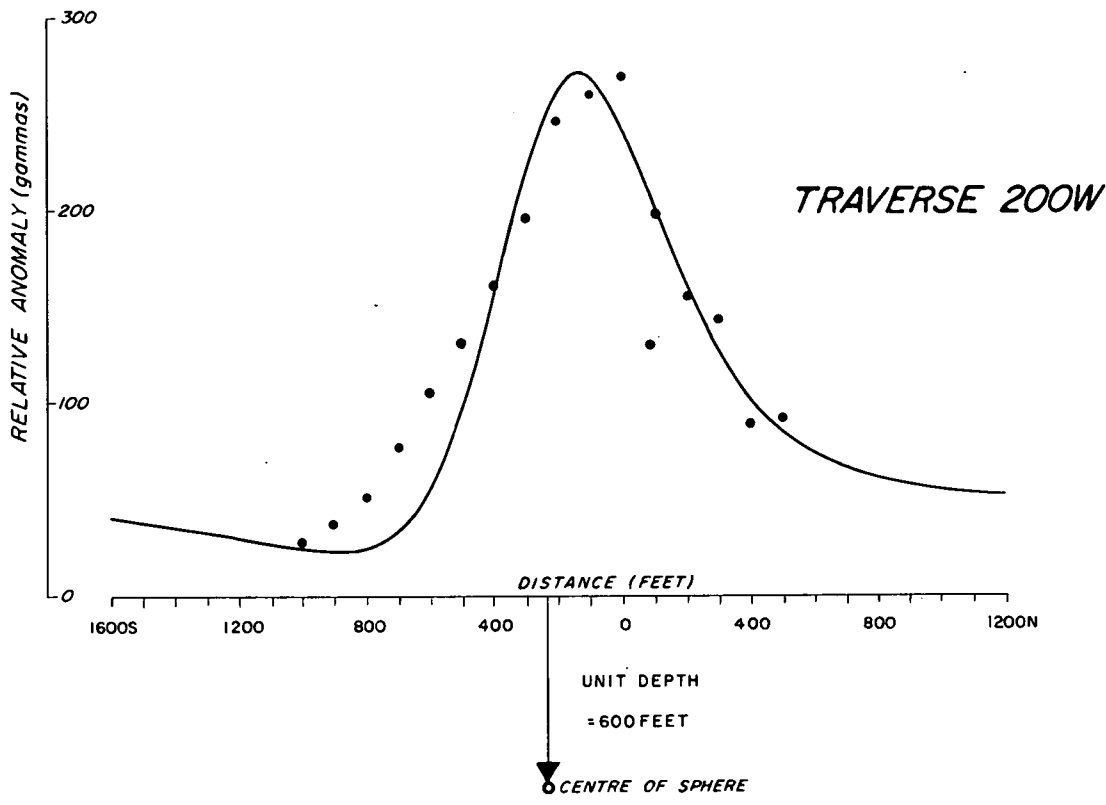
TENNANT CREEK NT, 1967

BURNT SHIRT AREA, ANOMALY No. 4

GEOLOGICAL SECTION AND DIAMOND-DRILL HOLES

SCALE





LEGEND

- Observed field data corrected for "regional" gradient of $7\gamma/100$ feet for Traverse 200W & $10\gamma/100$ feet for Traverse 100E

Theoretical profile for a uniform sphere: Inclination 50°

TENNANT CREEK N.T. 1967
BURNT SHIRT ANOMALY No.4
QUANTITATIVE INTERPRETATIONS

Tennant Creek, 1967. Burnt Shirt anomaly 4