RB 33/54

DEPARTMENT OF MINES.

SOUTH AUSTRALIA.

GEOPHYSICAL REPORT 2/51

DM 871/50.

SCINTILLOMETER SURVEY

HOUGHTON - INGLEWOOD AREA

by

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Introduction.

A further zone of radio-active "Houghton Diorite" was revealed in a scintillometer survey of part sections 5406 and 5516 Hundred of Yatala. The region of radio-active high is located on the slope of a hill and is thought to consist of a zone of primary radio-active material on the upper slope with secondary derived material creating the effect downslope.

A number of post holes were made over the radio-active high zones in an attempt to measure the radio-activity of the basement rocks and this experiment afforded interesting results.

Technique.

Using the Halross Scintillometer model 939 the area was traversed at 50' intervals on the upper slopes and at 100' spacings on the lower slopes as a reconnaissance. Later the radio-active high zones were grided at 25' intervals and measured more accurately.

Results.

The area surveyed lies on the side of a high of reasonably steep grade. There are occasional outcrops of "Houghtonian Diorite" near the top of the hill but elsewhere the bedrock is covered by a mantle of soil.

It was known previously that counts of up to 400 per second could be obtained in chosen areas and this survey was carried out to find more accurately the position of these highs and provide radioactive contours for the area in question.

Further, a traverse along a road, which runs through the area, with the jeep mounted scintillometer revealed a sharp radio-active anomaly of several times background. This anomaly was considerably greater than the effect obtained with this instrument alongside the known radio-active zone near the Houghton cemetry.

As a result of the ground survey, an extensive radio-active "high" was found, extending from the upper slopes of the hill as far down as a valley, some 1000' to the east and having an average width of 100'.

This region of high counts is considered to consist of both primary and secondary material. The region of highest counts (400 per second and upwards) is thought roughly to correspond to "active bedrock" while the

lesser counts downslope are thought to be due to radio-active materials, derived from the active "bedrock" dissiminated in the top soil and distributed downhill due to soil creep and movement of soluble radio-active material in the ground water.

On the uppermost slopes counts of up to 600 per second were encountered in patches within a zone of counts of above 400 per second. This latter zone was found to be of considerable area, some 350 square yards. A small pit was dug on one area of 600 counts per second and at a depth of 18 inches from the surface the counts had built up to 2,500 per second.

From this primary zone material was shed mainly in an easterly direction but also slightly to the north. This gives rise to the E.N.E. trend of the radio-active contours. The shed zone with counts from above 200 per second downwards to 50 counts per second extends downhill some 800' to the east and 200' to the north. The area of counts above 100 per second with counts above 250 per second in patches extended approximately 300' below the primary zone while counts of above 50 per second persisted to the bottom of the slope.

Any directional tendencies the radio-active contours may have, with regard to orientation of mineral vein or ore body, are modified to such an extent by topographic effects to be unrecognisable.

In an endeavour to locate more accurately the position of the radio-active bedrock and also to prove a secondary origin or otherwise of the area of lesser counts, a number of post holes were sunk over the radio-active high zones. The probe of the scintillometer was lowered down these holes and readings at the bottom compared with counts at the surface. These holes were of an average depth of 18".

By lowering the probe down one of such holes, and hence enclosing it completely within a radio-active surface, the volume contributing to the total count would become approximately double the

volume to which the probe is exposed when lying on the surface. Some modification of the count obtained at the bottom of the hole would therefore be expected and on lowering the probe down holes where no increase in radio-activity downwards is expected i.e. homo genous soil, double the surface count at the bottom of the hole would be expected. This was found generally to be the case.

A number of holes were sunken below the presumed primary zone and generally approximately double readings were found at the bottom of the holes.

e.g. Station.	Reading at Surface.	Reading at Bottom of hole.
KL 14	350	600
L 14	350	610
LM 14	375	760
MN 14	140	350

Here no increase of radio-activity downward might suggest an absence of radio-active bedrock and a secondary origin of the material.

Three holes were dug in areas of presumed "primary radio-active material" and the following readings taken.

Station.	Reading at Surface.	Reading at Bottom of hole.
LM 13	410	1600
M 13	460	1600
M 14	530	1300

In this latter case the increase in radio-activity downwards could be interpreted as radio-active bedrock.

However this technique is still experimental and no definite conclusions can be made except that it promises to be a useful method in outlining degrees of radioactivity at shallow depth.

Recommendations.

It can be concluded that the area examined has some economic significance in that counts obtained are comparible with those found elsewhere in this area.

Also it might be suggested that probing to shallow depths with either a scintillometer head or Geiger probe in other areas where soil cover complicates geological impressions could assist in obtaining the correct impression.

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WHK:EAK
19.3.52.

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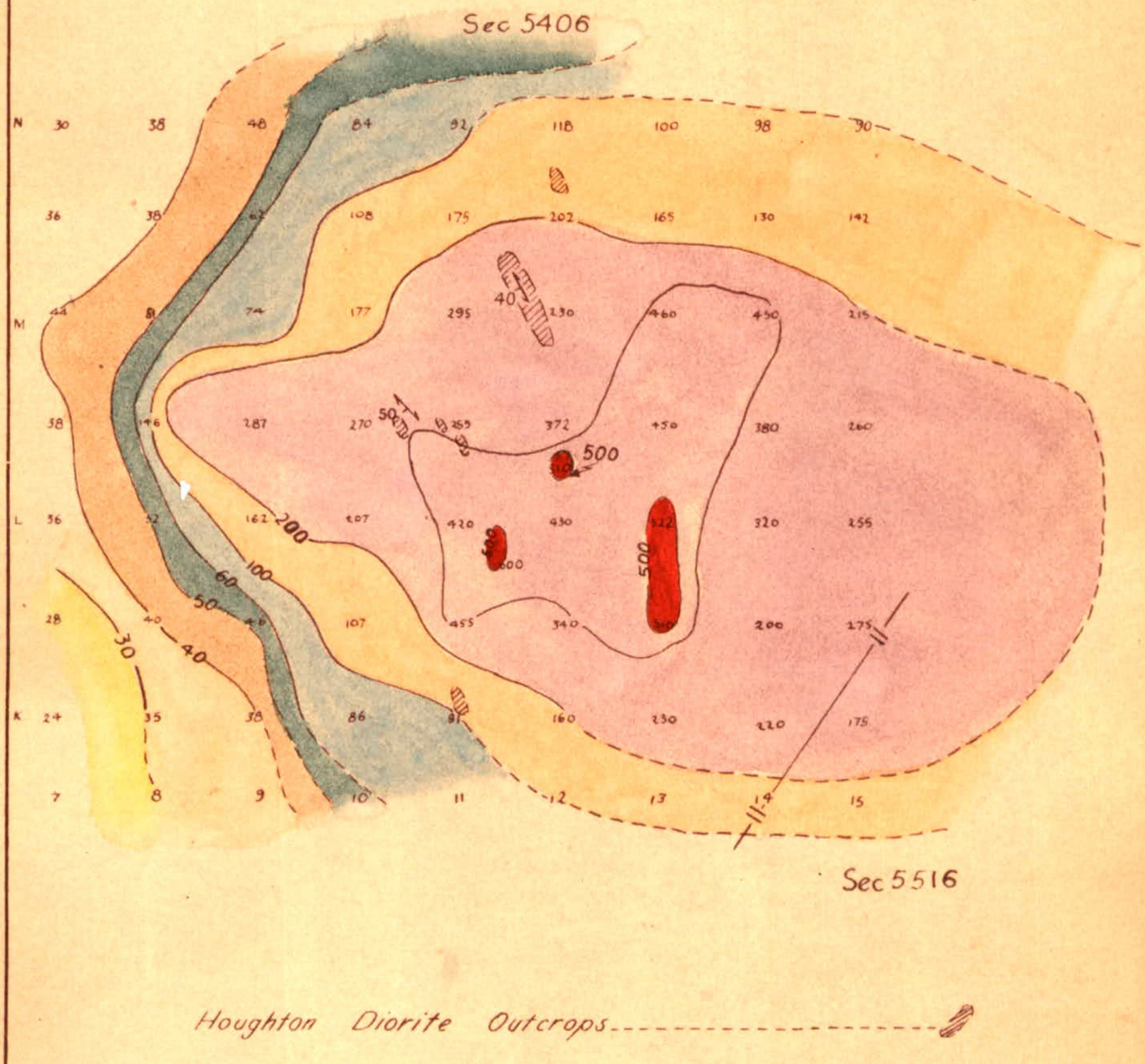

Houghton Diorite Outcrops

To Accompany Plan US 53

S. A. DEPT. OF MINES

Approved	Passed	Drn	HOUGHTON - INGLEWOOD AREA	D.M.	Scale 40ft to 1inch
		Tcd D.G.R	SCINTILLOMETER SURVEY	Req.	US 97
		Ckd.	Secs 5516 & 5406		
Director	C.D.	Exd.	Hd. Yatala.		Date 22 4 52