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PRELIMINARY NOTES

ON

AEROMAGNETIC SURVEY - PERMIT 2.

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NORTHERN TERRITORY
GEOLOGICAL SURVEY

Re 59/2

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I L L U S T R A T I O N S.

SHEET 1. - PORT KEATS AND KEEP RIVER AREA
AEROMAGNETIC SURVEY FLIGHT PLAN.

Scale 1 inch = 16 miles.

SHEET 2. - AEROMAGNETIC ANOMALY
WEST OF CAPE FORD.

Scale 1 inch = 2 miles.

SHEET 3. - AEROMAGNETIC ANOMALY
EAST OF HYLAND BAY.

Scale 1 inch = 2 miles.

INTRODUCTION :

The Bureau of Mineral Resources completed an aeromagnetic survey of Keep River and Port Keats area during the year 1958. The aeromagnetic measurements were obtained from their records.

The detail results plotted on 2 miles to 1 inch of this area have not been completed. An auxiliary slow moving (scale 1 inch = 16 miles) magnetic profile was also run, and this was used to obtain the major anomalies which were then studied on the detailed results. The following remarks were obtained after an examination of slow moving record. It is believed that this auxiliary profile will indicate any major magnetic disturbance in the basin.

RESULTS :

The aeromagnetic profile indicates :-

1. No magnetic disturbance due to the presence of granite or Proterozoic sandstone.
2. A general decrease in magnetic value from the east to the west.
3. Three areas of magnetic disturbance.

The presence of Proterozoic sandstone or granite at the edge of the Port Keats Basin had no effect on the magnetometer. It was to be expected that the sandstone would give no anomaly. It was thought however, that granite at, or close, to the surface would be indicated by a sharp gradient profile. This was not observed, therefore, it is thought that the granite in this region has not a sufficiently high magnetic susceptibility to cause an anomaly.

A general decrease on the magnetic anomaly was observed towards the west. This could be accounted for by the normal gradient, (regional magnetic gradient).

The three areas of magnetic disturbance are indicated on Sheet 1. The magnetic disturbance in Area E lies mostly over Proterozoic basement. A small outcrop of gabbro was indicated on the geological map. It is thought that this disturbance is due to the presence of gabbro at, or close, to the surface. The second area of disturbance lies in Area D east of Tree Point. The presence of gabbro is indicated at the surface east of this anomaly. Perhaps the anomaly is caused by intrusion of gabbro within the

Proterozoic basement. A smooth magnetic anomaly is found in Area F west of Cape Ford. The smoothness of this anomaly (Figure 3) seems to indicate a considerable depth of sedimentary rocks.

DEPTH :

The anomaly in Area E is either at, or very close, to the surface as indicated by gradients. The anomaly in Area D could be caused by intrusives from the surface to a depth of about 5,000 feet. The anomaly in Area F could be at a depth of 10,000 feet. All these depths are dependent upon the shape of structure assumed and are to be regarded as approximations.

CORRELATION - GRAVITY AND AEROMAGNETIC :

The gravity map of Port Keats Basin clearly indicates the extent of the basin. The comparison between gravity and aeromagnetic indicates :-

1. The large gravity high at the mouth of the Victoria River is not evident on the aeromagnetic map.
2. The deepest sections of the basin do not show up on the aeromagnetic map.
3. A correspondence between gravity highs in the Ivanhoe area, east of Port Keats Mission, and a residual high of Cape Ford with areas of magnetic disturbance.
4. A granite ridge west of Daly River (represented by a gravity high) does not occur on magnetometer profiles.

As there was no variation of magnetic anomaly over basement sections 1, 3 and 4 can be explained. The gravity high in the Victoria River area could be a granite high (due to the size of the gravitational anomaly). There seems a definite correspondence of a series of gravity highs with the aeromagnetic. This could be explained by these areas having high density intrusives. The disturbance in Area D seems to be displaced from the gabbro marked upon the geological map which roughly coincides with a gravity high. The gravity control in this area is small. An aeromagnetic closure roughly corresponds with a photogeological structure noted north of the Moyle River. Besides this aeromagnetic anomaly approximately coinciding with observed geological trend lines, there are two other broad anomalies. One lies south

of Tree Point and the other is situated in Hyland Bay. A study of the gravitational map indicates that these two anomalies must exist as residuals. A definite swing in the -5 contour does exist in the vicinity of Tree Point. A residual gravity anomaly roughly coincides with an aeromagnetic anomaly west of Cape Ford. The greatest aeromagnetic anomaly value lies to the north of the gravitational anomaly.

CONCLUSION :

The aeromagnetic survey indicates that basement rocks in the Port Keats area have very low magnetic susceptibility. Three areas of magnetic disturbance are recorded and are caused by a high magnetic susceptible intrusive. The relationship of these disturbances to any sub-surface geological structure is not known.