

DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOPHYSICAL SECTION

VERTICAL FORCE MAGNETOMETER SURVEY

of the

VICTORIA HUT URANIUM PROSPECT

by

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SUMMARY

A magnetometer survey was conducted at the Victoria Hut Uranium Mine by the writer on the recommendation of D. King (Geologist) who considered that this method may be useful in locating possible detached eastward extensions of the main uraniferous lode (which may either be covered by alluvium or non outcropping in areas of extensive rock exposures) in virtue of its association with magnetite.

No results were obtained from the survey which could be related to undisclosed uraniferous lodes.

The writer recommends that the area be gridded with a ground scintillometer.

INTRODUCTION

A Watt's vertical force magnetometer was used by the writer on this survey.

Essentially the magnetometer consists of a magnetic system (two magnetized bars) attached to an aluminium cube which carries a knife edge, mirror, two lateral screws and a vertical sensitivity screw. Its inclination is measured by means of the mirror attached to the magnetometer system in conjunction with an autocollimation telescope system.

The magnetic system is contained in an aluminium case containing copper dampers, levels and a thermometer. The case is lined with cork to reduce temperature changes.

The instrument is attached to the tripod head and readings are taken with the balance in both east and west directions.

The sensitivity of the instrument was adjusted to 30.0 gammas per division at 20°C and the balance system adjusted so that it was horizontal in the area investigated. The levels were adjusted to minimize optical and magnetic errors.

The magnetometer readings were computed and presented on an isogam plan.

PREVIOUS GEOPHYSICAL WORK

This mine was located by R. Pitman (U.S.A.E.C. Geologist) and J. Johnston (Mines Department prospector) while prospecting in the area with a geiger counter.

Radiometric borelogging was carried out by the writer M. Parker and M. Miller, from time to time during the diamond drilling programme, to locate and compute the grade of the radioactive zones intersected by the drill holes at depth.

Aerial magnetometer surveying has been carried out in the area by the Bureau of Mineral Resources and the results presented on plan G 143-1 (Glenorchy).

GEOLOGY

A detailed geological plan of an area surrounding the Mount Victoria Uranium Mine was prepared by R. Pitman and also incorporated in the regional geological map of the Plumbago - Crocker Well area prepared by B. Campana.

Essentially the rocks comprise archaean metasediments which have been migmatized and granitized. Red and white granite masses, pegmatites and milky quartz reefs intrude the metasedimentary rocks.

The Mt. Victoria uraniferous deposit is a lode type of ore-body, and comprises four bodies of mineralized rock each of which strike east-west and dip to the south.

The uraniferous lode material consists of disseminated daviditic iron-titanium minerals in a matrix of medium grained biotite, albite and apatite.

The geology of this mine has been treated in detail in the report (NO. CW 38, GS 304) "Geological Report on Completion of Drilling at the Mount Victoria Uranium Prospect" by D. King and W. Peterson.

Additional geological mapping was carried out by the writer as an aid to the interpretation of the magnetic results.

METHODS USED

In the vicinity of the mine, the existing survey grid was utilized for the magnetometer field work, and beyond this area a grid, surveyed in by the writer, was used.

Vertical force magnetometer readings were taken along the north south traverses at intervals of 25 feet, the readings corrected for diurnal variations and sensitivity drift and an isogam plan prepared, (see plan No. 55 - 241) showing the variations in the vertical intensity of the earth's magnetic field in the area mapped.

In areas of high magnetic intensity the medium and large auxiliary magnets were used to determine the magnitudes of the anomalies.

RESULTS

An isogam plan was prepared to prevent the variations of the vertical force of the earth's magnetic field in the area gridded. A number of the magnetic anomalies occur in the area but the more intense anomalies occur in the south-western portion of the plan and are due to both natural and artificial causes.

(a) Anomalies due to natural causes

These are due to the iron content of the metasediments, the migmatites and the lode material.

The uraniferous lodes contain iron bearing minerals, however, the magnetic anomaly associated with the uraniferous lode is small compared with the anomalies associated with the masses of non uraniferous magnetite occurring in the metasediments and migmatites.

The small magnetitic anomalies associated with the metasediments, migmatites and granites away from the areas of concentrations of iron bearing material and minerals are quite normal features of igneous and metamorphic rocks which have been subjected to great horizontal and vertical variations and which have undergone a complex thermal and mechanical geological history. This produces rapid variations in magnetic polarization and magnetic susceptibility and consequently surface magnetic anomalies occur.

(b) Anomalies due to artificial causes

These are due to the presence of large amounts of scrap iron iron waterpiping, steel rails, ore trucks, and drill casing located in this area which have produced a strong artificial field which is most evident in the south westerly section of the plan.

INTERPRETATION

The purpose of this survey was to attempt to locate easterly extensions of the Mount Victoria uraniferous lodes which may be covered by alluvium or non outcropping in areas of extensive rock exposures.

Two types of anomalies were detected in the area, namely the natural and artificial magnetic anomalies.

No anomalies were located which could be related to eastern extensions of the Mt. Victoria Uranium lodes or to concealed uraniferous lodes in the area.

CONCLUSIONS AND RECOMMENDATIONS

No results were obtained which would aid in locating concealed or non outcropping uranium lodes.

The writer recommends that the area be gridded with a ground scintillometer in an attempt to locate radioactive highs over alluvium which may indicate underlying weathered uraniferous lodes.

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Plans accompanying Report.

SS. 241.

IAM:AGK
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LEGEND

- RED GRANITE
- WHITE LEUCO-GRANITE
- MIGMATITE
- PEGMATITE
- DAVIDITE ORE ZONE (LODE MATERIAL)
- METASEDIMENTS
- SERICITE SCHISTS
- MAGNETITE MINERALIZATION
- TRAVERTINE LIMESTONE CAPPING
- ALLUVIUM
- QUARTZ
- TRAVERSE LINES
- MAGNETIC CONTOURS

TO ACCOMPANY REPORT by G. MUMME 1955

S.A. DEPT. OF MINES

MT. VICTORIA MINE
MAGNETOMETER PLAN

Approved	Passed	Scale 40 FT TO 1 INCH
		55-241
		Fd
Director of Mines		Date 11-8-55