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Rept. Bk. No. 56/49
G.S. No. 2557
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DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY

GEOPHYSICAL SECTION

ADDITIONAL GEOPHYSICAL INVESTIGATION IN THE STURT RIVER AREA

by

J. C. Benlow
Geophysical Assistant

27th February, 1963

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ABSTRACT:

Additional electromagnetic work was carried out in the Sturt Gorge area following the recommendations of J.E. Webb (see report G.S. No. 2416). A limited induced polarization survey over a number of anomalous EM conductive areas did not indicate the presence of mineralisation in significant quantities.

INTRODUCTION:

During December, 1962, a continuation of an electromagnetic survey initially conducted by J.E. Webb was carried out in the vicinity of Sturt Gorge. Extensions were made to lines A and B, and new lines E, F, P, Q, R and S were also surveyed. Single set-up resistivity/I.P. traverses were run over the more significant conductors on lines B, C, D and Q. The author wishes to thank J. Quelch who assisted with the surveys.

EQUIPMENT AND PROCEDURE:

Previous work in the area indicated that the shallowest extremity of any existing mineralization would probably be narrow and occur at or near surface. This consideration led to the taking of the EM readings at 25' intervals with 25' coil separation. With the same consideration in mind, an electrode separation of 100' was used throughout the I.P. survey. Although the shallowest I.P. readings are obtained at a theoretical depth equal to the electrode separation, mineralization in any significant amount at or near surface would produce a marked response at that theoretical

depth. Frequency effects were measured between 0.3 and 3 c.p.s., and the resistivity values were computed in ohm-metres. Although terrain variations are normally of very little consequence in I.P. work, the severe topography of Sturt Gorge was taken into account at the plotting stage in the computations.

DISCUSSION OF RESULTS:

The EM map, included with this report, is a composite plan of all electromagnetic work to date. The overall picture suggested by these results is that the area surveyed consists of a number of well-defined conductors varying in width and conductivity (fair to poor). They are in the main scattered, and appear to have little apparent continuity from line to line. An exception to this would be the conductors centered on lines A and B, whose similarity of plotted curves suggests that a continuation might exist in this area. An I.P. traverse across this conductor on line B revealed metal factors in the order of 60, a disappointing value in view of the magnitude of the EM response. A similar traverse across the conductor on line Q also produced unencouraging results, although slightly higher metal factors were recorded in a low resistivity area.

Again, the results obtained on lines C and D show even less promise.

CONCLUSIONS AND RECOMMENDATIONS:

As no appreciable I.P. anomaly was observed in the area, it is concluded that the EM effects must be largely due to conductive material other than sulphide mineralisation or graphite. It is suggested that saline conditions are present in the vicinity of these conductors, accounting for the greater part of the EM anomalies. It is further suggested that the unusually low resistivities encountered on lines B and Q may to some measure be a result of this salinity. No appreciable frequency effect was measured in these areas, indicating the

absence of mineralisation in significant quantities. Assuming that the non-conductive sphalerite mineralization may be associated with other conductive mineralization (e.g. pyrite), then the apparent absence of this conductive mineralization would indicate the absence of sphalerite. The geophysical investigation was based on this assumption of association as sphalerite itself is notably lacking in measurable physical properties. Accordingly, in view of the poor geophysical results obtained, it appears that no significant mineralization exists in the area. Unless subsequent geologic reasons are produced to suggest that commercial quantities of sphalerite may exist independently of other mineralization it is recommended that no further work be carried out in the area.

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27/2/63