

AEROMAGNETIC SURVEY OF THE MURRAY BASIN

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ABSTRACT

An aeromagnetic survey of the Murray River Basin was conducted in September and October of 1956 by the World Wide Aerial Surveys (Aust) Pty. Ltd. for Frome-Broken Hill Pty. Ltd. for the purpose of outlining the shape of the Basin and determining an approximation of the depths to igneous basement therein.

The operational procedures, instrumentation profile positioning, magnetic data reduction, explanation of the several plates and interpretation of the results, are discussed in the body of the report.

It is concluded that a large portion of the present concession held by Frome-Broken Hill Co. Pty. Ltd. consists of a shallow veneer of sediments.

It is recommended that some consideration be given to acquiring exploration permits in New South Wales in the area northeast of the present concession.

Appendices are attached wherein are contained the least square adjustment of the base network of magnetic profiles, a graph of the effect of the aeroplane's heading on the magnetometer and an explanation of the distribution of the magnetic records, maps and files used for the compilation of the magnetic data.

OPERATIONS:

The airborne magnetometer survey (flying phase) began on September 6, 1956 and was concluded on October 11, 1956. Licensing and airplane inspection difficulties delayed in the initiation of the survey approximately four weeks. Instrumental breakdowns, faulty navigation requiring reflights, adverse weather and an inadequate airplane protracted the survey from an estimated fifteen (15) days of continuous productive flying to five weeks of intermittent flights.

The contract was executed on a more or less "turnkey" basis excepting for the tracking of the plane and the reduction of the data. The Contractor provided a flight crew of four, including a pilot, a navigator, an instrument (magnetometer) operator and a photographer. An additional man, at the Contractors expense, was assigned the task of processing the film after each flight. He was further charged with providing Frome with contact prints of the 70 millimeter film exposed along each profile. However, it proved more expeditious to use the developed negatives, so little or no recourse was made to

those positive prints which the Contractor provided.

The Contractor provided an assistant to plot the plane's traverses but at Frome's expense. This assistant also worked as a computer in reducing the magnetic data. His services were dispensed with on December 8, 1956. Charges for his services and expenses were borne by Frome between September 3 and December 9, 1956 excepting for a short period of time during the flying phase of the survey when the Contractor required his services as a replacement for a member of the flying crew who had become ill. A member of Frome's staff replaced the Contractor's loanee on December 9, 1956 and acted as an assistant computer for the remainder of the job. Finalization of the plane tracking and the commencement of data reduction and map preparation began on October 19, 1956. Final maps were completed on February 26, 1957.

Headquarters for the field operations were established at the Wintersun Hotel in Mildura in northwestern Victoria. Besides providing adequate living accommodation for the field personnel and office space for the computing staff, Mildura also afforded a suitable flying field for the twin engined Anson aircraft which the Contractor provided for the survey.

Several different flight plans for the execution of the survey were advanced by the New York, London and Melbourne principals. Circumstances, which developed during the survey, permitted a happy compromise, so that all parties obtained, in part at least, some of the control they desired.

The original flight plans as recommended by the several principals involved were modified prior to the initiation of actual operations by the introduction of aeromagnetic data donated to Frome by the Commonwealth Bureau of Mineral Resources.

These data, although not the quality provided by the Contractor, did furnish sufficient regional information to permit the deletion of several scheduled regional profiles with an appreciable saving in time, effort and money. This information has been included in this report and acknowledgement made thereof (Figure No. 1).

The actual flight plan used for Frome's concession area in the Murray River Basin consisted of northsouth profiles at approximately five mile intervals between the 141st and 143rd meridians, extending from the 36th parallel to the Murray River. Several areas of anomalous interest crossed during the course of the survey were further detailed with profiles spaced at one and two mile intervals. Control profiles were flown in an eastwest direction to tie the network together.

The various traverses flown during the course of the survey are shown on Plates 1 - 6. The convergence of several of the flights as well as any erratic spacing was caused by difficulty in navigating over the mallee area.

Navigation was by contact flying at an elevation of 1500 above sea level in most instances. Some of the reconnaissance flights were forced to go higher because of high terrain.

A total of 6599 lineal productive miles of traverse were flown during the survey. This total was a combination of 4398 miles of network or semi-detailed flying over the concession and 2201 miles of reconnaissance flights.

INSTRUMENTATION:

The Contractor employed a Gulf Research Corporation three element total intensity magnetometer for the project.

The magnetic detector was towed at the end of a cable approximately 100 feet in length.



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