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RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED
MELBOURNE, AUSTRALIA

PROJECT:— PRP/7/100

REPORT No.:— Misc. 1958

GEOPHYSICAL SURVEYS, LAKE DORA

NORTH-WEST TASMANIA

PLUS ADDENDUM - 21-4-58

by

J. Boniwell

Plus addendum 21/4/58

GEOPHYSICS

Q51 No 1

58-1199

*Geophysical Surveys, Lake Dora
+ Addendum 21/4/58
by J. Boniwell 17/2/58*

FILE REFERENCE:— 8D/20A

MAP REFERENCE:—

DATE:— 17/2/1958

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PRP 7/100 GEOPHYSICAL SURVEYS, LAKE DORA

The incidence of an aeromagnetic system immediately west of Lake Dora, apparently coupled to extensive mineralised occurrences in a favourable geologic setting, led to a ground geophysical sampling by electromagnetic and magnetic methods.

WORK

A grid of lines 400 feet apart, controlled by a Base-line striking 335 degrees azimuth, facilitated coverage at 100' stations of an area roughly 1 mile by $\frac{1}{2}$ mile by a dual frequency horizontal loop method (Turan), and at the same time, afforded the limited amount of vertical magnetometric coverage.

The discovery of an inductive anomaly on the western extremities of this grid necessitated an extension by way of a sub-BL, parallel to the main BL and 2500 feet west of it. Here, line spacings were closed up to 200 feet, and the station intervals to 50 feet.

Magnetic profiling, in the first instance, was restricted to reconnaissance of the peak aeromagnetic anomaly, but later, was transferred in an auxiliary capacity to provide coverage of the outlying em. anomaly. The resulting two magnetic grids are not tied.

Three plates on a scale of 400 feet to 1 inch depict the results of the surveys. The two electromagnetic plans (plates 1 & 11) pertain to the lower operating frequency, viz: 440 cps.

DISCUSSION OF RESULTS

The ground magnetic anomalies are highly localised, particularly in lateral extent, but their order and distribution are such that their sum effect is commensurate with the disposition and magnitude of the air-borne system. Most of the peak activity is clearly due to the dissemination of magnetite in the near-surface rocks, and at no time does this mineralisation exceed 1%, but the presence of haematitic bands in the country rock must part-explain the variations in the background.

This reduction in the significance of the aeromagnetic indications places greater emphasis on the electromagnetic results. It is significant, therefore, that the areas of observed mineralisation have not produced electrical anomalies of any real size or merit. This is not only consistent with the magnetic findings but infers that the non-magnetic mineralisation generally, as in the outcroppings, is as dispersed.

The one inductive anomaly of intrinsic interest occurs near the western contact of the mineralised host rocks (Dundas Group). It is of good order and quality, dips west at about 50-60 degrees, and is relatively shallow at less than 50 feet, possibly less than 25 feet.

This anomaly lies on the axis of the main aeromagnetic ridge (see plate lll), and perhaps it is more than coincidence that this, the only real electrical disturbance outlined, occurs at the intersection of the axis with an inferred line of faulting striking north-west. In this regard, it would seem important in any future investigation, that the fact that the axis of aeromagnetic activity passes west of Wallford Peak before turning east of Lake Rolleston, should be considered.

The cause of the electromagnetic anomaly is not clear. The high conductivities indicated by the good order ratio characteristics suggest fairly massive mineralisation or the incidence of graphite. Purely on a statistical basis, the latter is more likely, and this is heightened by the fact that there is no consistent magnetic correlation with the conductor. However, some mineralisation is present, and the introduction of pyrite stringers along the planes of rock movement could readily account for the geophysical evidence. Nonetheless, without gravimetric coverage, the amount of mineralisation remains pure speculation.

Several reconnaissance self-potential lines were run, including one over the conductor. The results were consistently featureless. Considering that the properties of the glacial cover all combine to provide for low permeabilities, it is hardly surprising that the depth of oxidation is virtually nil, a factor which would effectively negate this geophysical approach.

RECOMMENDATIONS

Gravimeter profiling of the electrical anomaly is recommended prior to the setting of any possible drilling target. Should drilling prove warranted, the seeking of further targets in the same general area by geophysical means might prove profitable and rewarding.

J. B. Boniwell
Geophysicist

Zeehan, Tas.
17th February 1958.

Plans

T 403

T 404

T 356

GEOPHYSICAL SURVEYS - LAKE DORA AREA, N.W. TASMANIAADDENDUMGravity Survey, Lake Dora.

The major electromagnetic anomaly of the Lake Dora survey was covered by Worden gravimeter on April 15th, using that grid of lines set out from the sub-BL.

The observed gravity values were corrected for combined free-air and Bouguer effects on the assumption that the density of surface rocks is 2.65 gms./cc. The resultant Bouguer values are presented as profiles in Map T.403. Two structural effects were recognised, controlled by a regional gradient increasing to the South at the rate of approximately 0.98 mgal./1000'. To remove these factors, two basic profiles (see figs. 1 & 11 Map T.404) were used to empirically determine the residual gravity anomaly.

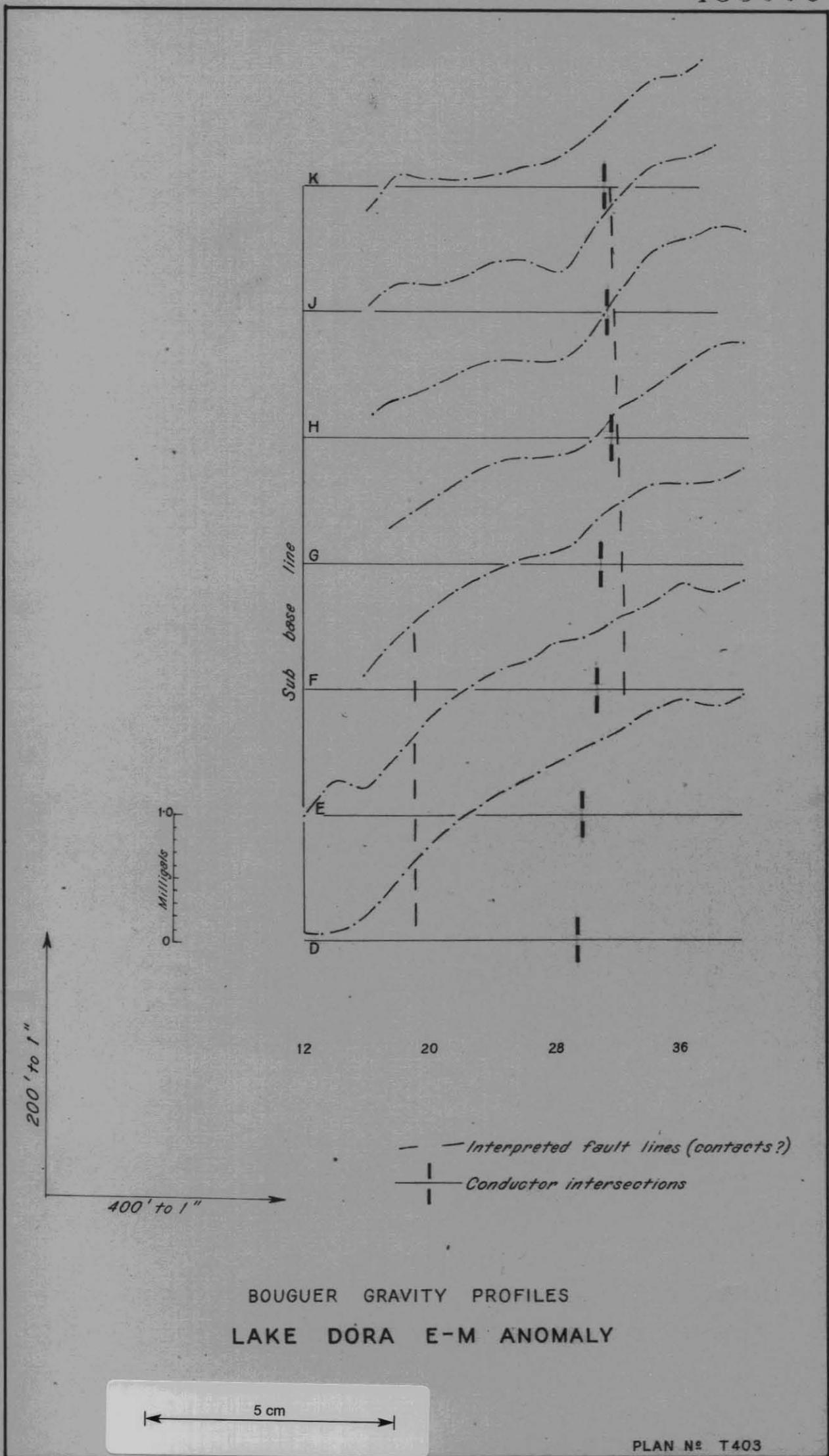
From the contour plan of residual gravity (T.405) it is clear that not only that no observable mass concentrations coincide with the electrical horizon, but that furthermore a zone of negative gravity is actually associated with the conductor. This immediately reduces the direct cause of conduction to the incidence of clay, carbon, or minor mineralisation in the shear planes of a zone of bedrock weakness, caused by faulting. The gravity results actually indicate two lines of faulting, the second coming in to the South and to the West.

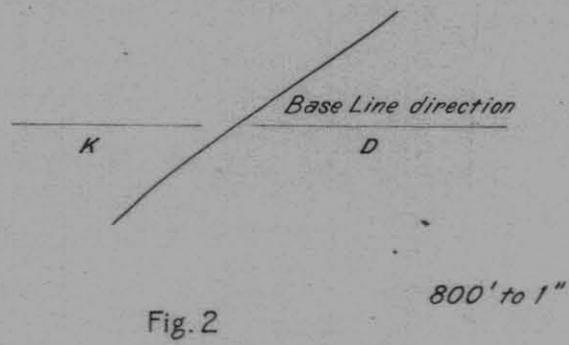
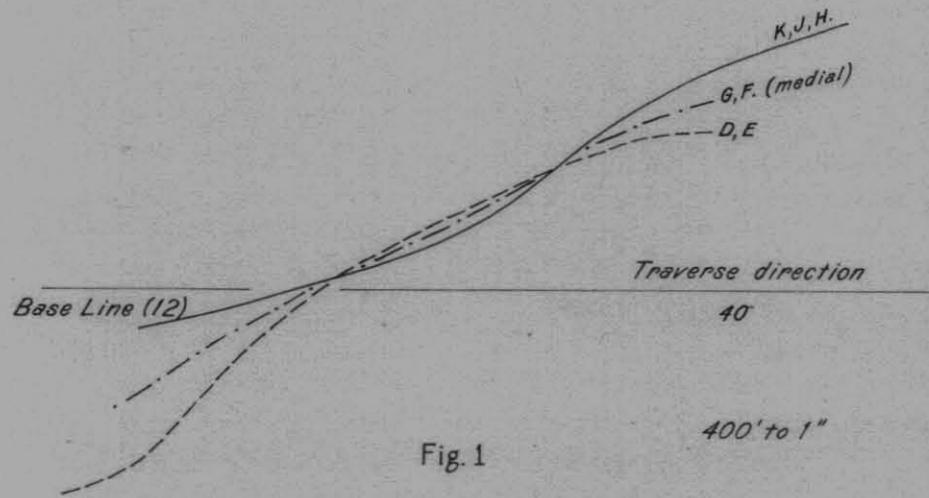
The centres of positive gravity immediately East of the conducting zone is found to correlate with areas of large positive phase differences which, in themselves, often are an expression of near-surface rock, particularly if slightly magnetic.

This complete reduction in significance of the electrical anomaly, albeit its good quality, must eliminate from further consideration a potentially economic sulphide deposit as a causative source. No further work is recommended.

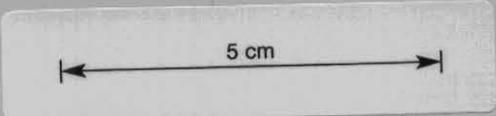
J.B. Boniwell

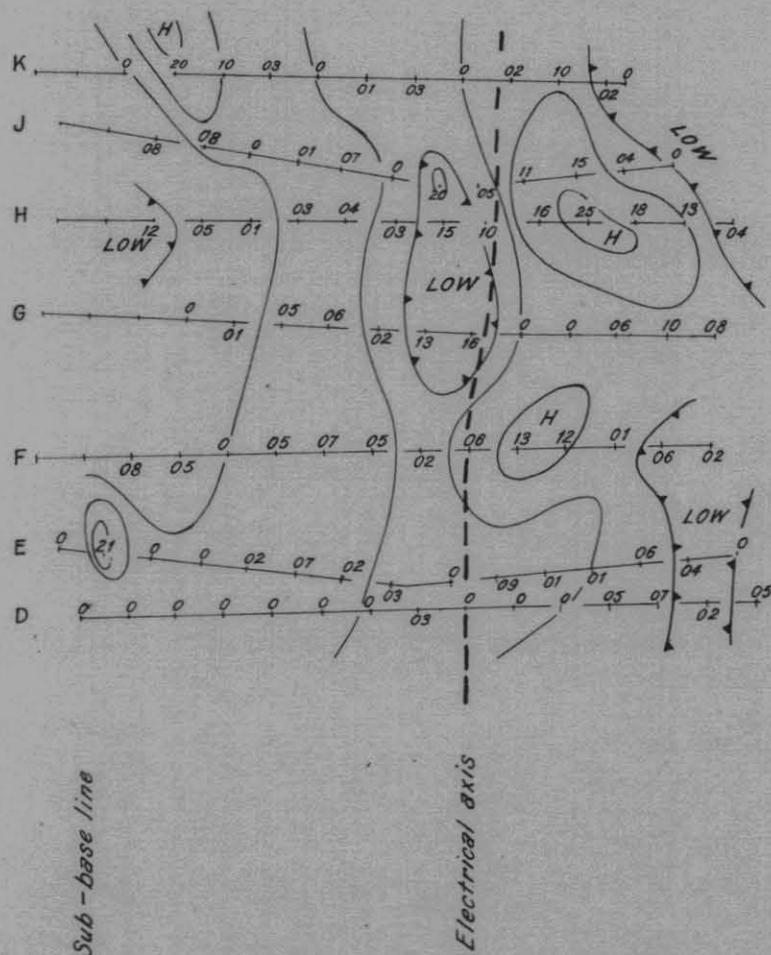
Zeehan, Tas.
21st April, 1958.





REGIONAL GRAVITY GRADIENTS
LAKE DORA E-M ANOMALY



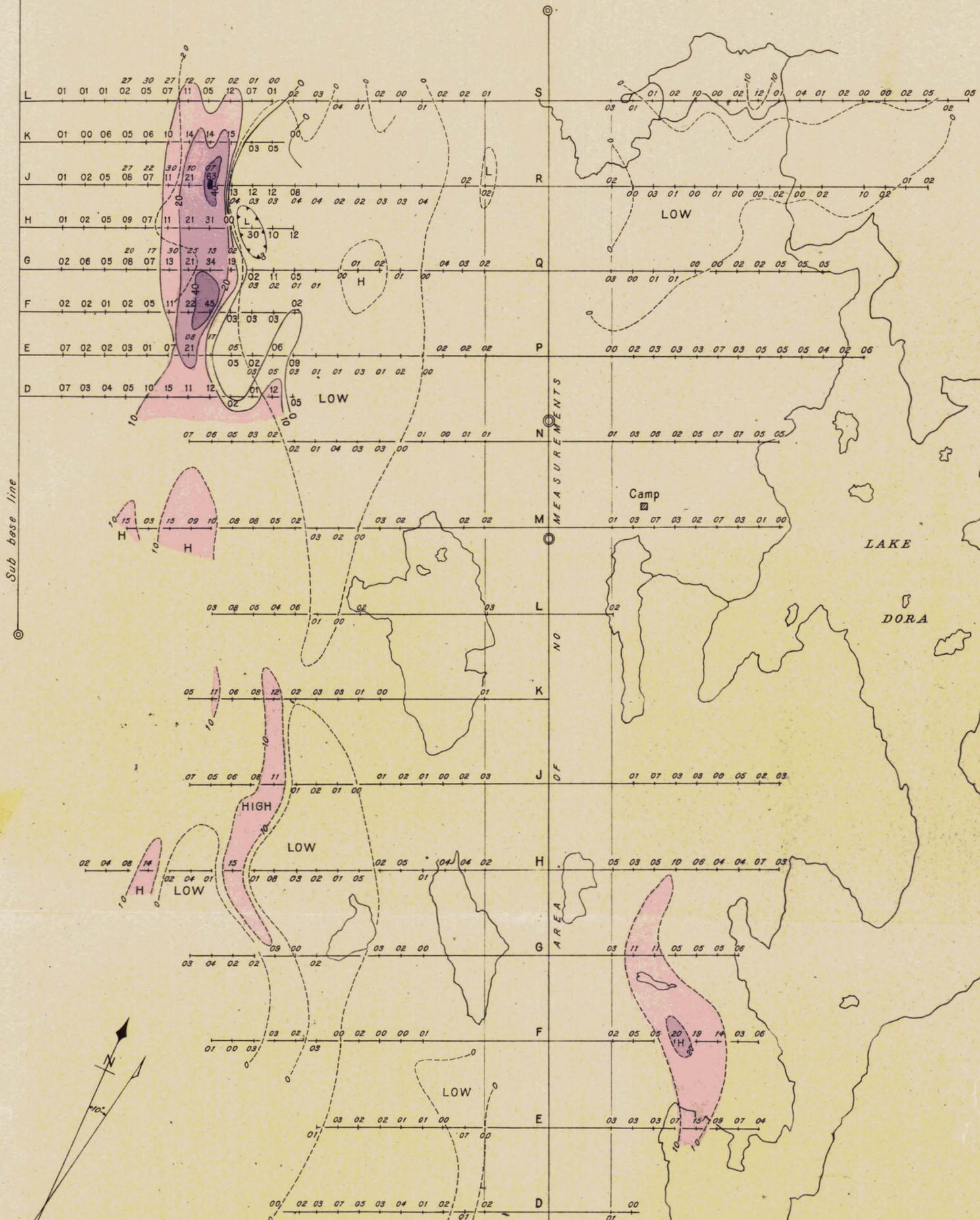


$\frac{95}{12}$ } Positive } Values in hundredths of a milligal
 Negative }

Contour Interval : 0-10 milligal

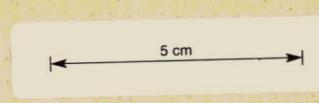
RESIDUAL GRAVITY CONTOURS
 LAKE DORA E-M ANOMALY

Scale 400 feet to 1 inch



- Legend**
- Phase difference contours measured from sub base line
 - Phase difference contours measured from main base line
 - Contours of 1° negative phase
 - Negative station values (x10) in degrees
 - Positive
 - Matching electrode positions on base lines

Note: Stations values ascribed according to convention shown on accompanying equi-ratio plan



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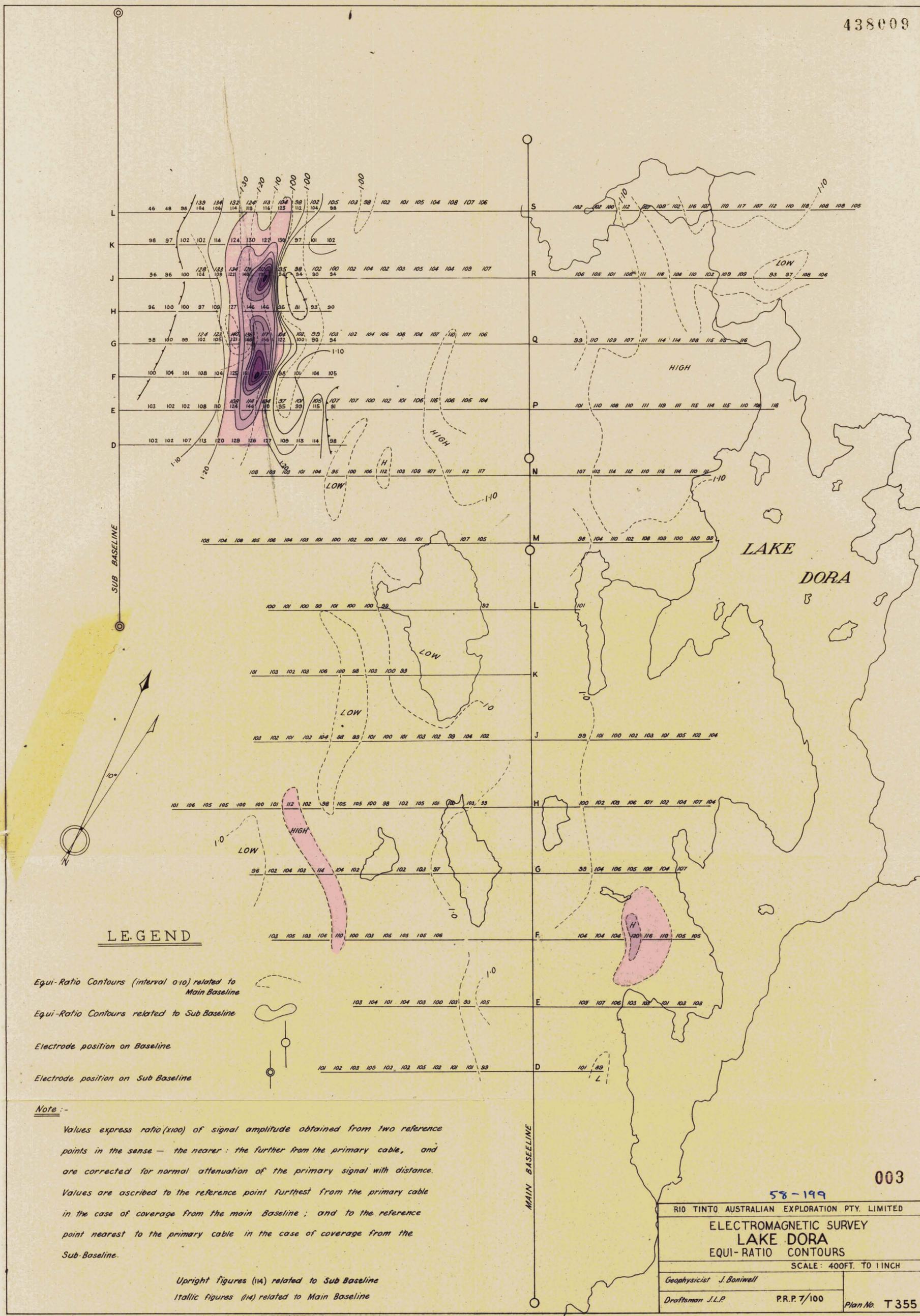
RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED

ELECTROMAGNETIC SURVEY

LAKE DORA AREA

LINES OF EQUAL PHASE DIFFERENCE

Scale: 400 feet to 1 inch	Authority: PRP/7/100
Geophysicist: J. Boniwell	Plan No: T 356



LEGEND

- Equi-Ratio Contours (interval 0.10) related to Main Baseline
- Equi-Ratio Contours related to Sub Baseline
- Electrode position on Baseline
- Electrode position on Sub Baseline

Note :-

Values express ratio(x100) of signal amplitude obtained from two reference points in the sense — the nearer : the further from the primary cable, and are corrected for normal attenuation of the primary signal with distance.

Values are ascribed to the reference point furthest from the primary cable in the case of coverage from the main Baseline ; and to the reference point nearest to the primary cable in the case of coverage from the Sub-Baseline.

Upright figures (114) related to Sub Baseline
 Italic figures (114) related to Main Baseline

003

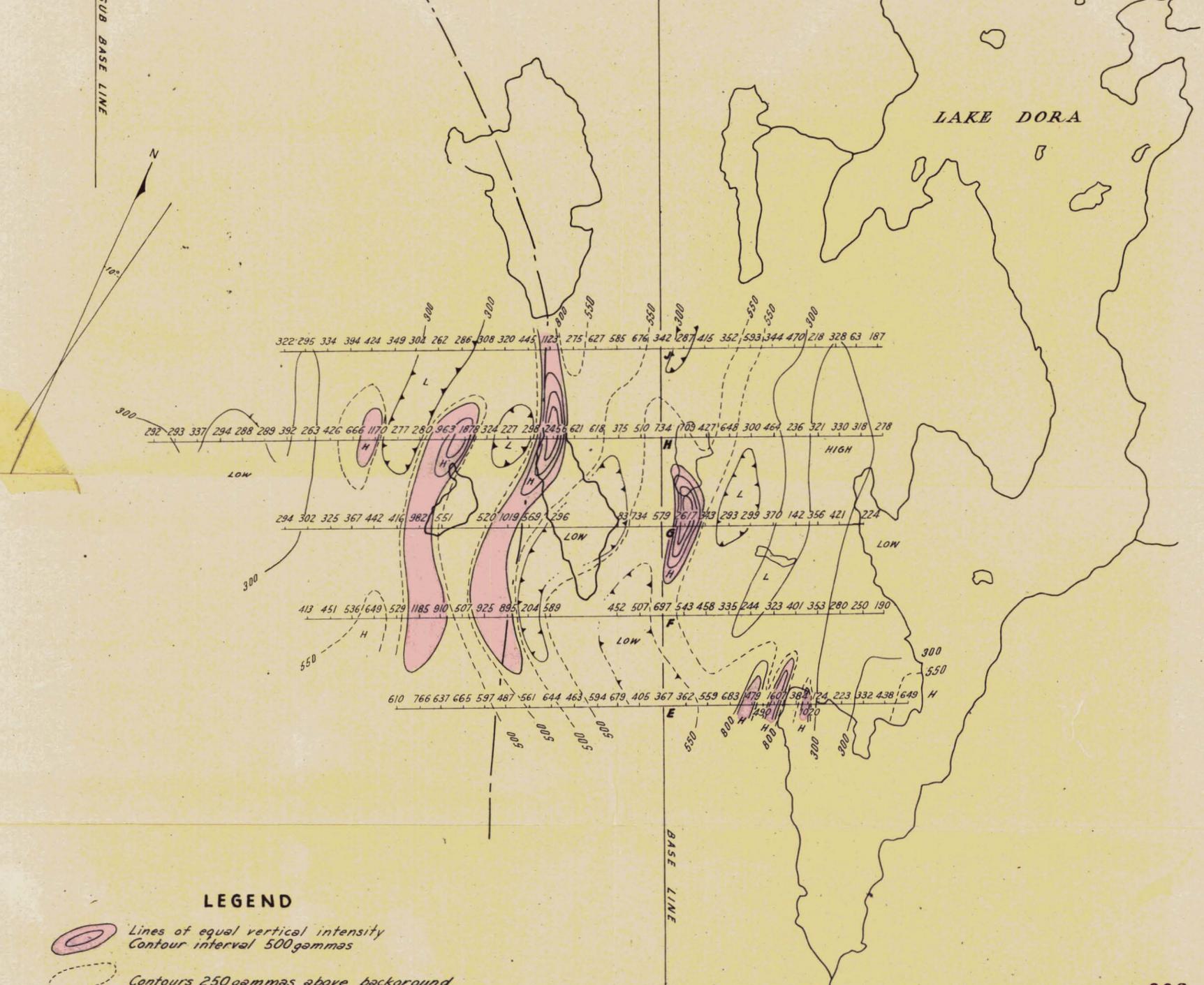
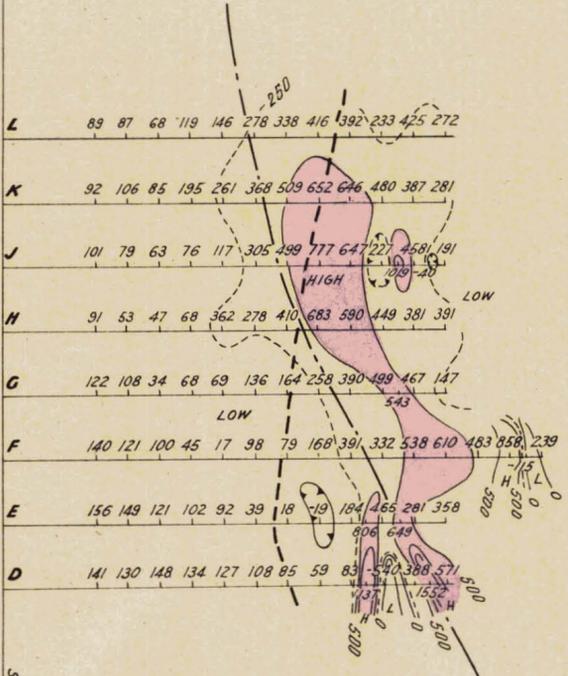
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**ELECTROMAGNETIC SURVEY
 LAKE DORA
 EQUI-RATIO CONTOURS**

SCALE: 400FT. TO 1 INCH

Geophysicist J. Boniwell	
Draftsman J.L.P.	P.R.P. 7/100
Plan No. T 355	



- LEGEND**
- Lines of equal vertical intensity
Contour interval 500 gammas
 - Contours 250 gammas above background
 - Axis of aeromagnetic activity
 - Conductor axis corrected for 50 feet displacement
inherent in electromagnetic plots

58-199 002

RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITED
VERTICAL MAGNETIC INTENSITY CONTOURS
LAKE DORA AREA
 N.W. TASMANIA

Scale 400 Feet to 1 inch
 Date March 1958 PRP/7/100 Plan No T375