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## ACQUISITION REPORT 1989 MINE LEASE GRAVITY SURVEY

for  
PASMINGO MINING

by  
Dr. D.E. Leaman

October 1989

**MICROFILMED**

ROSEGRAV

AMG REFERENCE POINTS ADDED

## INTRODUCTION

This brief report describes the specifications and results of gravity survey coverage in several parts of the consolidated Rosebery Mine Leases.

Surveys undertaken in 1989 were based on grids southeast of Snake Gully, near Koonya and Hercules, and north of Mt Read along the eastern margin of the leases. Such surveys supplement previous work reported by Leaman (1987, 1988).

Results have been commented and the implications of these will only be fully realised following some structural interpretation and analysis of the data.

## THE SURVEYS

Earlier surveys were undertaken using available access and achieved nominal station spacings of about 250 m over large areas. All stations were surveyed and levelled by mine survey staff. This type of coverage was able to identify locally anomalous rock volumes at Rosebery itself, Koonya-Grand Centre and around Hercules.

New surveys have been grid based using lines cut for mapping access and electrical surveys. Lines were pegged and observed at 20 m intervals. In gravity terms, and especially in view of previous experience, this has provided some station redundancy which allows assessment of survey, terrain or overburden noise.

Four grids were surveyed.

1. Snake Gully.

This grid is based on a 500 m cell and large internal gaps are retained.

2. Koonya.

This grid was based on a 200 m line spacing and extends from the spine of Bald Ridge to the Stitt valley.

3. Hercules.

Similar to the Koonya grid but with two additional more widely spaced lines south of the main grid.

4. Mt Read.

This large grid covers the entire eastern part of the expanded consolidated leases. General specification as for Koonya.

A station spacing of 50 to 100 m on most lines would have provided a satisfactory distribution of data points given a line spacing of 200 m. The finer sampling, as a matter of

convenience, may yield detailed character on units but is not considered significant in terms of mineralisation in this area. Coarser station spacings should be observed in any future extensions.

#### GRAVITY DATA: OBSERVATION AND REDUCTION

Observations were made by Highland Exploration during the period February 23 to May 27, 1989 using Lacoste & Romberg meter G704 with a scale constant of 0.99329 for the range relevant to the survey.

No tie network was established but all tie or secondary base points within the survey (18 in all) were directly linked by repeated, drift controlled measurements to the ultimate base of the survey at Rosebery post office (TASGRAV 8051.9906, obs val 980281.24 mgal).

Where stations were duplicated or re-read within the survey values were reproduced within 0.03 mgal. All positions and levels were surveyed and are not sources for error in the gravity survey. Terrain corrections range from 1.5 to 12 mgal and were found to depend slightly upon the maps used. Some discrepancies have been found in maps of various scales or vintages. These generated some differences between calculations for this and previous surveys necessitating some standardisation of maps used and appropriate adjustment of certain older stations. The reproducibility of the calculated terrain correction is better than 0.2 mgal.

Observations were reduced compatibly in standard format, consistent with the Tasmanian state data base, using the 1930 ellipsoid and a density of 2.67 t/cu m.

All data acquired in the Rosebery Mine leases, state as well as old and new Pasminco data, are tabulated in Appendix 1.

The year of the survey is defined by the first two digits of the station number and the originator of the data by the second pair of digits.

The data set was reviewed and checked by plotting all results at large scale and comparing reductions with base maps. This approach exposes inconsistencies in values calculated and any suspect patterns between terrain and gravity field which might imply either poor correction or linked geological effects.

Reproductions of contoured presentations of this data are included as Figures 1 and 2. The selected contour interval, of 0.25 mgal, reflects the general precision and reliability of the surveys.

## COMMENTS ON THE GRAVITY FIELD

Comprehensive interpretation of the data presented in Figures 1 and 2 or Appendix 1 will be described elsewhere. Inspection suggests that much analysis will be required to extract the structural implications of the field.

Several basic elements of the field have been described in previous reports detailing surveys completed in 1987 and 1988 (Leaman, 1987, 1988).

These include the disturbed nature of the field near Rosebery Mine and the distinct anomalously positive zones near Koonya and Hercules. All three can be correlated with significant alteration as determined by isotopic, magnetic and mineralisation indicators. Very limited quantitative analysis has yet been undertaken, e.g., Leaman, 1988b, although the data at Rosebery were tested against known density distributions to predict extensions of the host sequence within the mine area.

All previous work indicates that the gravity method, and the gravity field, can be used to identify mineralised or anomalous ground and to be effective across substantial depth ranges. But, as noted above, the data has not yet been used to attempt resolution of structure or the structural setting of the volcanic sequence or any mineralisation within it along the length of the leases.

The additional data provided by the 1989 surveys has confirmed the Koonya and Hercules effects but defined their limits and a number of marginal gradients. Few other features of comparable scale have been revealed although several other smaller or more diffuse anomalies must be reviewed.

Anomaly character at Snake Gully is subtler than indicated by the fragmental earlier coverage but this may reflect increased host depth, host absence or distortion by regional effects. Quantitative procedures are required to evaluate these options. The subtle patterns may have resulted from removal of host sequence by granite intrusion or the dominance of shallow granite itself. Appraisal of this issue is clearly of some importance to exploration and understanding of the area immediately south of the mine. The character of the gravity field suggests that the issues are soluble.

Clear regional effects are rarely obvious in the data set although two primary sources of such effects are known. Mantle effects contribute an E-W gradient of perhaps 2 or 3 mgal per kilometer in this area and the underlying spine of the Tor to Pine Hill Granite generates the generally negative pattern for the field with its N-S gradients north of Rosebery and south of Hercules. The relatively flat portion of the field with amplitude of -27 to -28 mgal south of Snake Gully probably defines the approximate position of the most massive crest on this spine.

The generally noisy character of the field north of Mt Read may indicate granite-related alteration or considerable lithological variation within the volcanic pile. Any patterns or anomalous responses can only be evaluated by mapping-controlled analysis.

#### REFERENCES

- Leaman, D.E., 1987. Report on gravity survey. Rosebery Mine leases, research programme. Report for EZ Co Aust Ltd, July 1987.
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AMG REFERENCE POINTS ADDED

GRAVITY FIELD COMPILATION (North)

D. Leaman Oct 1989

FIG 1



Report submitted on behalf of  
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10/10/89