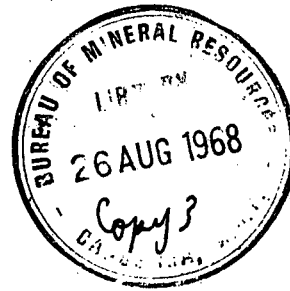


COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

~~RESTRICTED~~  
1967/141



SUMMARY OF B.M.R. EXPLORATION RUM JUNGLE AREA, 1967.

by

P.W.Crohn, J.E.Gardener, W.J.Langron, C.E.Prichard.

1

The information contained in this report has been obtained by the Department of National Development as part of the policy of the Commonwealth Government to assist in the exploration and development of mineral resources. It may not be published in any form or use in a company prospectus or statement without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

SUMMARY OF B.M.R. EXPLORATION

RUM JUNGLE AREA, 1967

by

P.W. Crohn, J. Gardener,  
W.J. Langron, C.E. Prichard

RECORD 1967/141

CONTENTS

	<u>Page</u>
Summary	1
Introduction	1
Coomalie Gap West Area	2
Auger drilling, geochemical and radiometric surveys	2
Geophysical Surveys	3
Area 44 Extended	5
Auger drilling, geochemical and radiometric surveys	5
Geophysical Surveys	5
Acacia Area	7
Woodcutters Area	8
Auger drilling, geochemical and radiometric surveys	8
Rotary - Percussion drilling	8
Diamond drilling	9

---

The information contained in this report has been obtained by the Department of National Development, as part of the policy of the Commonwealth Government, to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

(ii)

Contents (Contd)

	<u>Page</u>
L 5 Anomaly	9
L 6 Anomaly and associated Cu and Zn anomalies	9
L 1 Anomaly and associated S.P. anomaly	10
L 2 Anomaly	10
L 3 Anomaly	10
Geophysical Surveys	11
L 5 Area	11
L 6 Geochemical Anomaly	12
L 1 Geochemical Anomaly	12
L 2 Geochemical Anomaly	13
L 3 Geochemical Anomaly	13
Gould - Waterhouse - Mt. Minza Area	13
Rotary - Percussion Drilling	13
Geophysical Surveys	13
Compilation of Data	14
Geological, geochemical and radiometric data	14
Geophysical data	15
Colour Air Photography	16
Comparison of Waggon and Auger drilling	16
Radiometric Contours - Mount Fitch	16
Geobotanical Survey	16
Gravity Survey	17
Aeromagnetic Survey	17
Mineragraphic Examination of uranium mineralisation - Mt. Fitch	19

(iii)

<u>Contents (Contd)</u>	<u>Page</u>
Proposed 1968 Programme	20
Auger drilling, geochemical and radiometric surveys	20
Rotary - Percussion drilling	20
Diamond drilling	21
Regional mapping	21
Further Work arising out of Compilation	22
Proposed Geophysical Programme for 1968	23
Staff	23
References	24
Table 1. Woodcutters area, diamond drilling results	



## Illustrations

- Plate 1. Locality Map
2. Coomalie Gap West - geochemical contours
  3. " " " - geology and geophysical and radiometric contours
  4. Coomalie Gap West area, profiles along 344S.
  5. Area 44 - Copper, lead and zinc anomalies
  6. Area 44 Extended - Radiometric contours
  7. Area 44 Extended, self-potential contours
  8. Woodcutters Area, R3 anomaly
  9. " " L5 anomaly, Surface projection and geology
  10. " " L5 anomaly, Longitudinal projection
  11. " " L6 anomaly
  12. " " L1 anomaly
  13. " " L2 anomaly
  14. Woodcutters area, self-potential contours
  15. Woodcutters area, profiles at 130S and DDH 67 - 7
  16. Mt. Minza area, self-potential contours
  17. Detailed aeromagnetic survey, Rum Jungle Area

## SUMMARY OF B.M.R. EXPLORATION

### RUM JUNGLE AREA, 1967

#### SUMMARY

B.M.R. exploration activities in the Rum Jungle area during 1967 comprised auger drilling and geochemical and radiometric surveys in the Coomalie Gap West, Area 44 Extended and Acacia areas; rotary-percussion drilling at Waterhouse No. 2 prospect and in the central and northern parts of the Woodcutters area; and diamond drilling at the Woodcutters L 5, L 6, L 1, L 2 and L 3 Anomalies. The compilation of geological, geochemical and radiometric data from the central portion of the Hundred of Goyder was substantially completed.

This work has resulted in locating a number of strong radiometric and geochemical anomalies in Area 44 Extended, and in outlining a zone of mineralisation 1600 feet long, with a vertical extent of at least 300 feet and an average width of about 20 feet, at the Woodcutters L 5 Anomaly.

Geophysical surveys undertaken in the area during the year consisted of detailed surveys in the Rum Jungle East area (Woodcutters area, Area 44 Extended, and Coomalie Gap West area), a reconnaissance survey in the Acacia area, a detailed survey in the Gould area (Mt. Minza area), and a gravity survey to determine the eastern boundary of the Rum Jungle Complex. An area of 170 square miles, approximating to The Hundred of Goyder, was flown by detailed aeromagnetic survey.

#### INTRODUCTION

During the year, auger drilling, geochemical and radiometric surveys were carried out in the Coomalie Gap West, Area 44 Extended, and Acacia areas, rotary-percussion drilling was undertaken in the Woodcutters and Waterhouse areas, and diamond drilling in the Woodcutters area, (Plate 1).

The auger drilling was undertaken by the B.M.R. Gemco drill, with assistance from the Mines Branch, N.T. Administration, drill for the last two months of the season. Rotary and percussion drilling were by an Atlas Copco Air Trek drill provided by the Mines Branch, and a Carey drill provided by the Petroleum Technology Section of the B.M.R. Diamond drilling at the Woodcutters L 5 prospect was by two drills provided by the Mines Branch, and drilling at other localities was under contract to the B.M.R.

Detailed geophysical surveys were made in the Rum Jungle East area in 1967 in the Woodcutters, Area 44 Extended, and Coomalie Gap West areas, where anomalies were known to exist from previous surveys. In the Woodcutters area, these previous surveys had found geochemical anomalies, and in Area 44 Extended and Coomalie Gap West, geochemical, radiometric and electromagnetic anomalies.

The geophysical surveys were mainly surface radiometric, Slingram and self-potential surveys. Significant anomalies were found in each area surveyed.

Electric and radiometric logs were made of diamond drill holes completed in the Woodcutters area.

Reconnaissance Slingram and surface radiometric surveys were also made in the Acacia area.

A self-potential survey in the Mt. Minza area found anomalies localised along a shale bed known as a source of electromagnetic and radiometric anomalies from previous surveys.

A gravity survey was started in mid-August to define the eastern boundary of the Rum Jungle Complex.

A method of depth sounding using modified Slingram equipment with variable coil spacing was developed in the Darwin office. The method is still under test but results to date appear reliable and to be of considerable assistance in the interpretation of electromagnetic survey data. The interpretation of the depth sounding data requires use of model experiment data already acquired in the Darwin office. Although no depth soundings are specifically mentioned in the text of this report, a number have been done on selected electromagnetic anomalies in various parts of the Rum Jungle area.

### COOMALIE GAP WEST

#### Auger drilling, geochemical and radiometric surveys

3,250 feet of auger drilling was carried out in the northern part of this area, and 199 geochemical samples were collected. Drilling was on 200-foot spacing on lines 400 feet apart.

Woodcutters 1  
drilling at 000

The area is underlain by rocks of the Coomalie Dolomite and Golden Dyke Formation, tightly folded about north-south axes. A radiometric anomaly with a peak of 0.04 mr/hr was recorded in the northern part of the area, but this is restricted to the AB soil horizons. Only isolated high geochemical values were recorded, (Plates 2, 3).

### Geophysical Surveys

In 1967 the northern boundary of the 1964 Slingram and surface radiometric surveys was extended north from 328S to 312S; that is, four additional traverses were surveyed.

The results indicate that the anomalies found in the 1964 surveys extend north into the area surveyed in 1967. These anomalies have been discussed in detail by Duckworth (1966, p. 4 to 6 and Plates 11 to 15). A strong narrow Slingram anomaly exists along the western boundary of the area at the boundary of the Golden Dyke Formation and Coomalie Dolomite. A similar anomaly, though not so long, is parallel to this anomaly and east of it. These two anomalies have been interpreted as being caused by two long, narrow, strong conductors dipping steeply east and with their tops within 100 ft. of the surface. Most of the rest of the area is covered by wide zones of low Slingram values the majority of which have been interpreted as due to a conducting water table.

The surface radiometric results show that Duckworth's zone A of anomalously high radiometric values extends north into the 1967 survey area.

A self-potential survey was made in 1967 in most of the northern section of the Coomalie Gap West area. Contoured results are shown in Plate 3, with axes of the main Slingram anomalies. A strong self-potential anomaly is localised along the long narrow strong Slingram anomaly on the boundary of the Golden Dyke Formation and Coomalie Dolomite. An induced polarisation survey was made on traverse 344S over the Slingram and self-potential anomalies. Results are shown on Plate 4; this Plate also shows the Turam profile obtained in 1964 and the self-potential profile obtained in 1967.

In the Slingram surveys, coil spacing was 200 ft., frequency used was 1760 Hz, and stations were 50 ft. apart in the northern section and 100 ft. apart in the southern section. In the radiometric and self-potential surveys, stations were 50 ft. apart. In the induced polarisation survey, frequency domain measurements were made as described in the induced polarisation survey in Area 44 Extended.

The following diamond drill hole is recommended to test the anomalies:-

Collar 344S, 22E  
Depression 45°  
Direction grid west  
Depth 450 ft. or to Coomalie Dolomite, whichever is deeper.

This hole will intersect the source of the geophysical anomalies where electromagnetic, self-potential and induced polarisation anomalies coincide. Plate 4 shows the anomaly profiles. The electromagnetic anomaly has been interpreted as being caused by a narrow strong conductor dipping east at about 70° and with its upper surface within 60 ft. of the surface and beneath the self-potential anomaly. The maximum intensity of the self-potential anomaly is around 20E on traverse 344S, and the electromagnetic and self-potential anomalies appear to have the same source. The self-potential anomaly is wider than would be expected from a narrow steeply dipping source; this width is probably due to a second self-potential anomaly at about 24E which is associated with the electromagnetic anomaly at the same place. The electromagnetic anomaly extends north and south from 344S, 20E for several thousand feet; the self-potential anomaly is localised along this electromagnetic anomaly, possibly because of sulphide concentration. The proposed diamond drill hole should determine the cause of this localisation.

The induced polarisation profiles show that the self-potential and electromagnetic anomalies coincide with an apparent resistivity low of 8 ohm-metres below 20E on traverse 344S; the apparent resistivity anomaly has the same source as the other anomalies. This source extends in depth to at least the limit of penetration of the induced polarisation survey, which is about 200 ft.

A broad frequency effect anomaly coincides with the anomalies described above. The width of the frequency effect anomaly suggests a wide source, possibly disseminated sulphide mineralisation surrounding the narrow steeply dipping source of the electromagnetic anomaly.

Depending on the results of this hole, additional testing of the anomalies by one or more further drill holes may be recommended.

Slingram and radiometric surveys were also undertaken in the southern section of the Coomalie Gap West area, but these have only just been completed. However, a preliminary inspection of the results shows that most of the area is covered by Coomalie Dolomite; Golden Dyke Formation occurs in the south-eastern corner of the surveyed area. No strong Slingram anomalies or significant radiometric anomalies were found.

#### AREA 44 EXTENDED

##### Auger drilling, geochemical and radiometric surveys

25,787 feet of auger drilling was carried out in this area, and 1,723 geochemical samples were collected. Drilling was on 200-foot spacing on lines 400 feet apart.

Crater Formation, Coomalie Dolomite, Acacia Gap Tongue and Golden Dyke Formation occur in this area.

In the north-central part of the area, a group of very strong geochemical anomalies with peak values of 5,000 ppm copper, 10,000 ppm lead and 10,000 ppm zinc has been delineated, overlying rocks of the Golden Dyke Formation close to its contact with the Coomalie Dolomite, (Plate 5). Radiometric anomalies with maximum values of 0.042 mr/hr occur in the south-central portion of the area, also in rocks of the Golden Dyke Formation, and a number of smaller anomalies with peak values of up to 0.024 mr/hr occur in rocks of the Crater Formation in the western part of the area, (Plate 6).

##### Geophysical Surveys:

Geophysical work in Area 44 Extended in 1967 consisted of a Slingram survey, a surface radiometric survey, a self-potential survey, and an induced polarisation survey over part of the area.

The Slingram results have yet to be contoured. Coil spacing was 200 ft., stations were 50 ft. apart, and frequency used was 1760Hz.

An area bounded roughly by 216S, 264S, 20W and 16E contains a number of strong anomalies. The anomalies are more pronounced in the real than the imaginary components, indicating the presence of strong conductors. The sharpness of the anomalies suggests they are due to conductors within 100 ft. of the surface.

The boundary between conducting slate of the Golden Dyke Formation and poorly conducting Coomalie Dolomite is defined by the change in the Slingram profiles from undisturbed to disturbed at about 60W.

A zone of anomalies associated with an anticlinal structure is evident in the northern part of the area, where anomalies curve south from 40W/188S to 20W/224S and north again to the base line on 184S.

A surface radiometric survey was conducted with stations 50 ft. apart. An anomalous zone was found around 84W, 216S; this is in the Crater Formation. An anomalous zone was found in the area of the 1962 Area 44 survey.

The area covered by the self-potential survey and contoured results are shown on Plate 7. Stations were 50 ft. apart.

The results show that not all the Slingram anomalies have self-potential anomalies associated with them. In addition, where self-potential and Slingram anomalies are associated together, the self-potential anomalies are localised on part of the length of Slingram anomalies.

The only self-potential anomaly on the Golden Dyke Formation - Coomalie Dolomite boundary is around 224S, 60W.

Moderate self-potential anomalies are associated with the Slingram anomalies on the anticlinal structure mentioned above.

The fact that some Slingram anomalies in Area 44 Extended have no self-potential anomalies associated with them at all, while other Slingram anomalies have, suggests more than one type of source of anomalies in this area; some of the sources may be mineralisation.

An induced polarisation survey was made between 228S, 252S, 26W and 2W in part of the area of strong Slingram and self-potential anomalies. Measurements were made in the frequency domain. Dipole-dipole electrode geometry was used. Dipole length was 100 ft., and frequencies used were 0.3 and 3.0 Hz.

The induced polarisation survey showed that the area of strong Slingram and self-potential anomalies surveyed is virtually one large induced polarisation anomaly. This is partly because the sources of the induced polarisation anomalies are close together (that is, close together with respect to the 100 ft. dipoles used; individual anomalies could have been resolved by using smaller dipoles), and partly because the country rock is itself a source of induced polarisation anomalies, being a carbonaceous slate. It was considered that the induced polarisation survey in Area 44 Extended was not making a significant enough contribution to the interpretation of other geophysical results, and the survey was stopped after a time. The main point of the induced polarisation results is that the induced polarisation anomalies are weak or non-existent in the eastern part of the area surveyed, so the induced polarisation anomalies over the Slingram and self-potential anomalies are significant. The apparent resistivities are extremely low, and some of the frequency effects are remarkably large; this probably indicates a high graphite content in the conductors. However, further interpretation requires correlation of all the geophysical results plus the geological and geochemical results; this interpretation will be made during the forthcoming wet season.

#### ACACIA AREA

Up to the end of September 4,380 feet of auger drilling had been completed in this area, and 256 geochemical samples collected. However, no analytical results were available up to that time. Drilling was on 400-foot spacing on lines 2,400 feet apart.

Reconnaissance Slingram and surface radiometric surveys were also made in this area. Traverses were 2400 ft. apart and stations were 100 ft. apart. In the Slingram survey, coil spacing was 200 ft. and the frequency used was 1760 Hz.

The Slingram results define the boundary of the Golden Dyke Formation and Coomalie Dolomite. This boundary is shown on Plate 1 at a scale of one inch to the mile. The Slingram profiles over Coomalie Dolomite are practically undisturbed; the profiles over the rest of the Acacia area are very disturbed. Part of the area, particularly in the north, appears to contain amphibolite. The results are being studied to differentiate between Golden Dyke Formation and Crater Formation. It is of interest to note that in the Acacia area no strong Slingram anomalies occur on the boundary



of the Golden Dyke Formation and Coomalie Dolomite (in contrast to the Coomalie Gap West area), and that no areas of strong Slingram anomalies lie within the Golden Dyke Formation (in contrast to Area 44 Extended).

The surface radiometric results show anomalies at about 4W to 12E on 168N and about 66E to 78E on 240N. Old costeans were found near the anomalies on 168N, indicating that someone has investigated the anomalies. The anomalies on 240N are in the Crater Formation.

#### WOODCUTTERS AREA

##### Auger drilling

No auger drilling or geochemical or radiometric surveys were carried out in this area during the year, but the results of surveys undertaken in 1966 have become available since the last Annual Summary was compiled. Generally, these surveys have confirmed the results of previous investigations (Shatwell, 1966), except in the L 3 area, where only isolated high geochemical values were recorded. In other areas, notably L 1, L 2 and L 6, both the position and the general extent of previously outlined geochemical anomalies have been confirmed, although there were some variations in the position and intensity of individual peaks within the anomalies (Semple, 1967 b).

##### Rotary - Percussion Drilling

The Air Trek drill made available by the Mines Branch, N.T. Administration, drilled 22 holes of average depth 70 feet at radiometric anomaly R 3 and three holes at anomaly R 2. At R 3 the maximum value recorded was 0.070 mr/hr at 26 feet in a hole at 154 S, 34 E (Rum Jungle East grid), but no values in excess of 0.021 mr/hr were recorded in adjacent holes, located 50 feet north, south and east, and 100 feet west of the anomalous hole (Plate 8). No anomalous values were recorded in holes at R 2.

The B.M.R. Carey drill was used to drill a line of five holes at the L 2 geochemical anomaly in an attempt to establish a pattern of subsurface geochemical values before diamond drilling was undertaken. The maximum depth obtained in these holes was 210 feet, but the distribution of geochemical values, sampled over 10-foot intervals, was rather irregular, and could not be related to known lithological or structural features.

### Diamond Drilling

Since the compilation of the 1966 Summary of Activities, seven additional diamond drill holes have been completed at Anomaly L 5, and eleven at other anomalies in the Woodcutters area; one hole is in progress at Anomaly L 5, and two at Anomaly L 2.

Anomaly L 5. Altogether, six intersections of sulphide lode material have now been obtained at this locality, lying between 204 S and 220 S, and ranging from 250 feet to 600 feet in vertical depth. Assuming an average thickness of 20 feet for the lode, a total of about 1,000,000 tons of lode material is estimated to be present within this section, (Plate 10). In addition, DDH 67/3 intersected six feet of ore, averaging 7% Pb, 13.6% Zn and 5.4 oz. Ag/ton, about 150 feet west of the main lode. No other hole has intersected mineralisation in this position.

Dips obtained from drill cores, shallow costeans and outcrop show that a north-plunging anticline is the major structure in the L 5 area, (Plate 9). In the northern part of the area, the lode appears to occupy a shear zone which strikes parallel to the axial plane of the anticline and dips west at about 80°; the surface expression of this zone consists of a gossan extending from 208 to 204 S, and a quartz reef from 204 to 200 S. In the southern part of the area, however, the structural relations are more complex. The thickening of the lode in DDH 66/3, and its absence in DDHs 66/11 and 67/3 may be due to a dip reversal or to a repetition of the lode by drag-folding or faulting. DDH 67/10, being drilled on 216 S in a westerly direction, should help to elucidate this problem.

Anomaly L 6 and associated copper and zinc anomalies, (Plate 11). Four diamond drill holes have been drilled into this group of anomalies between 150 S and 168 S. DDH 66/13 intersected weathered very pyritic black slate containing traces of base metals (maximum 0.15% Cu, 0.07% Pb and 0.15% Zn) between 212 feet and 258 feet. However, core recovery over this length was only 25%. No other holes intersected mineralisation, and probing did not indicate uranium mineralisation.

All the holes penetrated pyritic black slate of the Golden Dyke Formation. Because of lack of outcrop in this area, the structure is not known.

Anomaly L 1 and associated self-potential anomaly, (Plate 12). Anomaly L 1 is a strong lead anomaly with occurrences of anomalous zinc and radioactivity. Four drill holes have been completed on this anomaly between 116 S and 120 S, but DDH 67/5, on 118 S, was the only one of these to intersect appreciable mineralisation. Scattered galena and sphalerite occurred in carbonate rock over about 150 feet (drilled length), and one two-foot length between 686' and 688' assayed 6.1% Pb and 26.0% Zn, but adjacent lengths contained less than 1% Pb and 0.1% Zn. Probing did not indicate uranium mineralisation in any of the holes on this anomaly.

Outcrops of quartzite show that anomaly L 1 occurs on a south plunging anticlinal nose, and drilling indicates that this is very low in the Golden Dyke Formation.

An S.P. anomaly occurs overlapping and south of Anomaly L 1. It was thought that its centre, at 130 S, 36 E, might indicate the position at which the beds responsible for the surface anomaly reached the base of the zone of weathering. DDH 67/7 was accordingly drilled vertically at this position, but did not locate uranium or base metal mineralisation.

Anomaly L 2, (Plate 13). A zinc anomaly overlaps the southern part of this lead anomaly and some anomalous radioactivity was recorded in the upper soil horizons. One hole has been completed and two are in progress.

DDH 67/9 was sited to test under high lead and zinc values at the southern end of the anomaly (90 S). No lode was intersected nor mineralisation seen, although anomalous lead (2000 ppm) and zinc (1200 ppm) were present in the core.

Anomaly L 3. A lead anomaly was indicated in this area by the 1965 geochemical survey, and a local grid was surveyed and sampled in more detail in 1966. This detailed survey confirmed the occurrence of isolated high lead values, but it showed that these values do not form a well defined anomaly. Geophysical surveys on the local grid in 1966 defined strong coincident Turam, I.P., and S.P. anomalies, and DDH 67/11 was drilled along 46 E to test these. No lode was intersected, and the results of spectrographic analysis of the core are not yet available.

### Geophysical Surveys:

Geophysical work in the Woodcutters area in 1967 consisted of a self-potential survey in the areas of the L 1, L 2, L 3, L 5 and L 6 geochemical anomalies, a Turam survey within the L 5 area, and radiometric and electric logging of diamond drill holes.

#### L 5 area

The Turam survey was made from 192S to 228S over the geochemical anomaly. The primary field was produced by a loop east of the area surveyed. Coil spacing was 50 ft., stations were 50 ft. apart, and frequencies used were 220 Hz. and 660 Hz. The Turam results are related to pyritic carbonaceous slate at depth. Variations in the Turam profiles are probably related to variations in composition of the slate and depth of weathering. There is no direct correlation between the Turam results and the Woodcutters lode.

Self-potential anomalies (Plate 14) were found between 180S and 228S in roughly the same position as the L 5 geochemical anomaly. From 208S northwards the self-potential anomalies are east of the sulphides intersected by diamond drilling. From 212S southwards the self-potential anomalies are west of the sulphide intersections. However, the self-potential anomalies appear to be too far away from the sulphide intersections to be produced directly by them. Calculations assuming thin plates in the positions indicated by diamond drilling produce anomalies closer to the intersections than found in the field; similarly with ellipsoids in place of the thin plates. It is also fairly obvious that the sulphide intersections are not the direct origin of the self-potential anomalies. Nevertheless the presence of the self-potential anomalies consistently close to the sulphide intersections and the L 5 geochemical anomaly is too much of a coincidence not to be significant. Further work is being done to solve this problem.

The following diamond drill holes, completed in the L 5 area between January and October 1967, were logged:-

DDH 66-11, 66-12, 67-3 and 67-4.

No significant radiometric anomalies were found. The resistance logs reflect geology. Slates and sulphides are highly conductive, dolomite is resistant; weathered zones showed variable conductivity.

The self-potential logs of all diamond drill holes in the Woodcutters area have been studied in relation to the surface results. The holes were cased to a depth which prevented logs being made in places of most interest. However, it is apparent that in some cases self-potential anomalies were drilled and no source of anomaly was found other than the major sulphide intersection. The origin of self-potential anomalies in the Woodcutters area is not clear.

#### L6 geochemical anomaly

Minor self-potential anomalies (Plate 14) were found between 140S and 176S in the area of the L 6 and other minor unnamed geochemical anomalies. Diamond drilling in this area has not revealed a sulphide lode. Holes completed and logged between January and October 1967 were DDH66-13 and DDH67-1 (radiometric log only). No significant radiometric anomalies were found. The remarks on the electric logs in the L 5 area apply to the electric logs in this area too.

#### L 1 geochemical anomaly

The L 1 geochemical anomaly is between 108S and 126S. A self-potential anomaly (Plate 14) was found centred at about 36E, 130S, which is about 1000 ft. south of the geochemical anomaly.

Diamond drilling of the L 1 anomaly found no sulphide lode. A vertical hole was drilled at 36E, 130S in the centre of the self-potential anomaly. The self-potential and lithological logs of this hole (DDH67-7) are shown in Plate 15. The logs were run after the casing had been removed. It is only possible to do this with a vertical hole. The risk of losing a probe in an uncased inclined hole is high.

The self-potential log shows that the anomaly is apparently confined to the completely weathered zone. The drill hole showed the existence of the anomaly but did not locate a source for the anomaly and did not reveal the origin of the anomaly. No significant radiometric anomaly was found in DDH67-7.

Other diamond drill holes completed and logged in this area between January and October 1967 were:

DDH67-2 (no self-potential log)  
DDH67-5  
DDH67-6 (radiometric log only)

No significant radiometric anomalies were found. The remarks on the electric logs of the holes in the L 5 area apply to the electric logs in this area too.

#### L 2 geochemical anomaly

The L 2 geochemical anomaly is between 72S and 92S. No self-potential anomalies (Plate 14) were found in this area. DDH67-9 was completed in this area between January and October 1967. No significant radiometric anomalies were found in the hole. The remarks on the electric logs of the holes in the L 5 area apply to the electric logs in this area too.

#### L 3 geochemical anomaly

A self-potential survey was made on the local L 3 grid. Results are shown on Plate 14. A self-potential anomaly was found on the western part of the grid. This anomaly is associated with Turam and induced polarisation anomalies found in 1966. The anomalies are near the boundary of the Golden Dyke Formation and Coomalie Dolomite. The anomalies are being drilled (DDH67-11).

### GOULD - WATERHOUSE - MOUNT MINZA AREA

#### Rotary - Percussion Drilling

No auger drilling or geochemical or radiometric surveys were undertaken in this area during the year, but ten holes were drilled with the B.M.R. Carey drill in the vicinity of the Waterhouse No. 2 prospect. However, owing to difficult drilling conditions, only three holes reached a depth of 150 feet, and the results are regarded as inconclusive. Maximum radioactivity of 0.048 mr/hr was recorded at 86 feet in a hole sited at 253 S, 393 E (Gould area local grid). Some further testing of the area is proposed when a B.M.R. Mayhew drill becomes available towards the end of 1967 or in 1968.

#### Geophysical Surveys:

A self-potential survey was made over electromagnetic anomalies found in the Mt. Minza area during the 1965 Gould area survey. Contoured results are shown on Plate 16.

Diamond drilling in 1966 showed that the source of the Slingram anomalies is a graphitic black shale. Self-potential anomalies were found which are localised along the strike of this shale. This localisation of self-potential anomalies along the conducting shale may be evidence of mineralisation. This conducting graphitic black shale is somewhat more radioactive than other shales in the area, and it is possible that this shale is a host for uranium mineralisation.

The following diamond drill hole is recommended to test Slingram, self-potential and radiometric anomalies in the Mt. Minza area:-

Collar 201S, 444.5E  
 Direction grid east  
 Depression 60°  
 Depth 400 ft.

Duckworth (in preparation) discusses this diamond drill hole site in detail. He points out that radiometric work in the South Alligator area has shown that high grade ore bodies at moderate depth have produced no recognizable surface radiometric anomaly. He concludes that if the conducting radioactive shale at Mt. Minza is considered to be a possible host for uranium mineralisation, the best way to test it for uranium mineralisation is a programme of intensive non-core drilling of the top of the conductor to depths of about 200 ft. In the case of the discovery of the El Sherana North West ore body, the drilling was exploring the self-potential anomaly.

#### COMPILATION OF DATA

##### Geological, geochemical and radiometric data

Compilation of geological, geochemical, and radiometric data from the central part of the Hundred of Goyder was substantially completed during the year. The area covered by this compilation extends from the vicinity of Mount Fitch to south of Castlemaine Hill, and comprises 19 map sheets on a scale of 400 feet to 1 inch. The work to date has indicated a number of localities, notably in the Burton Creek, Area 55, Embayment, and Rum Jungle Creek South areas, where further exploration is warranted, but a full assessment of the data, and their correlation with geophysical results, still remains to be done.

### Geophysical data

During 1967 geophysical information obtained by the B.M.R. on the Hundred of Goyder has been compiled on to geological base maps at scale 1" = 400 ft. All data with the exception of readings along scattered traverses have been so compiled.

The main difficulty in compiling the geophysical data is to combine data of varying quality. Integrating data at the junction of grids is especially troublesome as, for example, overlapping electromagnetic surveys where both the inductive (loop) and constructive (earthed primary cable) methods are involved. In any instance the direction of the primary cable has an influence on the trend of the contours. Other uncertainties enter because of seasonal effects as for example with S.P. and radiometric methods. Reconciling data in such situations has been based on the judgement of the geophysicist in charge of the compilation. However, zones in which anything of significance is suspected are noted for further examination during the joint assessment of the compilation.

Areas for which all available geophysical data have been compiled are:

E31, E32.

E41, E42.

E51, E52, (E53), (E54).

E61, E62, E63, (E64).

E71, E72, E73.

E81, E82, E83.

E93, E94.

Sheets shown in brackets contain only scattered traverses and profiles.

The assessment of the geophysical data has only just commenced. The approach adopted is to assess the results of each method (these results are plotted on individual sheets) and to bring those results which are considered significant forward onto the geological base map. A preliminary assessment has been made, on this basis, of sheet E72, and indicates that the approach is satisfactory.



### COLOUR AIR PHOTOGRAPHY

The Bureau of Mineral Resources Cessna aircraft was used during the year to take colour air photographs of part of the Rum Jungle area, comprising a run at 10,000 feet altitude along the Stuart Highway, Batchelor Road and railway, and several runs at 5,000 feet altitude in the Woodcutters area. It is proposed to use these photos for an evaluation of the amount of recognisable geological detail, compared to that on black and white photographs at the same scale.

### COMPARISON OF WAGGON AND AUGER DRILLING

A study of the relative effectiveness of waggon and auger drill holes for the detection of uranium mineralisation was undertaken jointly by Territory Enterprises Pty. Ltd. and the Bureau of Mineral Resources in the Rum Jungle Creek South area. Ten blast holes were put down to a depth of 100 feet, and an auger drill hole was put down alongside each blast hole, the average depth of the auger holes being 40 feet. Although the values obtained by radiometric probing in the blast holes were generally higher than in the auger holes, the peak values in five of the auger holes were in excess of 0.03 mr/hr, and such values would normally be regarded as warranting further testing. It is concluded, therefore, that auger drilling provides adequate data for reconnaissance prospecting, and that blast hole drilling would be more suitable as a follow-up method of investigation before major testing programmes by diamond drilling are undertaken.

### RADIOMETRIC CONTOURS - MOUNT FITCH

At the request of Sir Harold Raggatt, a series of radiometric contours at 10-foot vertical intervals was prepared from the results of probing T.E.P. diamond drill holes of the Mount Fitch prospect. Although there is considerable local variation, this compilation shows that some strongly anomalous results were obtained within every ten-foot interval from the surface to 100 feet, and it is therefore concluded that indications of uranium mineralisation would have been obtained by any exploration programme involving shallow drilling, irrespective of the actual depth of the holes.

### GEOBOTANICAL SURVEY

This project, which is being undertaken by Dr. W.F. Ridley of the Geological Survey of Queensland, involves a study of the trace element contents of leaves, bark and twigs of trees growing on the mineralised zone at the Woodcutters L 5 prospect, compared to trees growing on a near-by unmineralised area.

Samples were collected at the beginning and end of the dry season, but analytical results are not yet available.

### GRAVITY SURVEY

A gravity survey was started in mid-August 1967 with the primary object of determining the behaviour of the eastern boundary of the Rum Jungle Complex. Traverses extend from within the Rum Jungle East grid westwards until they are on the Rum Jungle Complex. Stations were 100 ft. apart in most cases.

Preliminary reductions have been made using a density of 2.3 gm/cc. Traverses surveyed to date are shown on Plate 1.

Results indicate that the Rum Jungle Complex is at shallow depth beneath the sediments east of the outcrop. The only clear indication of a major boundary would seem to be at about 55 W on traverse 240 S. Formal interpretation of the results will not be done until completion of the survey and the densities of a large number of rock specimens have been determined.

Some follow-up work has located a closed gravity high on the eastern side of the Giant's Reef Fault with centre at approximately 150 S, 115 W. The amplitude of this anomaly is larger than those on the L 5 area and it is proposed to investigate the location by auger drilling before the end of the season.

### AEROMAGNETIC SURVEY

A detailed aeromagnetic survey of an area of about 200 square miles approximating to the Hundred of Goyder was completed from May to July, 1967. The study of the magnetic data in relation to geological and drilling information and to the results of ground geophysical surveys by other methods is not yet complete and only a preliminary assessment of the survey can be given at present.

Plate 17 shows the aeromagnetic contours at 50 gamma intervals superimposed on the geological map (Rum Jungle District, Special, 1960) and the preliminary structural interpretation.

The broad pattern of magnetic anomalies correlates fairly well with the known geology. The disposition of the anomalous zones over the sediments follows the trend of the sediments around the Rum Jungle Complex. The Mount Fitch Fault is clearly delineated by the abrupt change from the undisturbed area on the west to the strongly disturbed area on the east. The Giant's Reef Fault is less evident in the magnetic contours, although in places it is reflected by the termination of anomalies or changes in strike of the magnetic contours.

A possible east-striking fault is interpreted from the steep magnetic gradient along the southern edge of the anomalies in the Rum Jungle Triangle area. Other possible faults are suggested north and west of the Waterhouse Granite and in the Golden Dyke Formation 4 miles east of the Batchelor Airfield.

In the north-eastern part of the survey area, strong anomalies (6 and 7) occur over the Acacia Gap Tongue and are flanked on the east by a zone of less intense anomalies occurring over the Golden Dyke Formation. The latter anomalies can probably be accounted for by amphibolite, which has been mapped at a few places within this zone. East of the Stuart Highway another anomalous area coincides with outcrops of Acacia Gap Tongue. The Woodcutters area shows little magnetic relief and this may be related to a thinner section of the Golden Dyke Formation over the anticlinal structure. The anomalous areas to the west and east of Woodcutters are synclinal.

The anomalous zone east of the Stuart Highway extends south and swings west and continues through Area 65. Strong anomalies are associated with both the Golden Dyke and Acacia Gap and it does not appear to be possible to distinguish between these two formations on the basis of the magnetic results.

The intense anomalies in the Embayment Area south-west of Browns and in Area 55 are ascribed to the amphibolite revealed by the drilling in these areas. The source of the anomalies between Dolerite Ridge and Mount Fitch has been established by drilling as amphibolite mineralised with pyrrhotite and magnetite. The amphibolite in the Rum Jungle Creek South and Castlemaine Hill areas, however, appears to produce little or no magnetic effect.

The Coomalie Dolomite is shown in general to be non-magnetic and this comment appears to apply also to the Celia Dolomite, except for the two anomalies (21 and 22) situated immediately north of Crater Hill.

The Crater Formation, east of the Rum Jungle Complex and north-west of Batchelor, has no associated magnetic anomalies but elsewhere the magnetic contours follow the trend of the Formation and several well-defined anomalies

occur over the Crater Formation outcrop. These are anomalies 24 and 25 east of Crater Hill, anomaly 11 and three smaller anomalies in line to the west, which apparently coincide with the contact of the Crater Formation and the Complex, and anomalies 20, 35 and 18 north of the Waterhouse Granite.

There appears to be little correlation between the magnetic results over the Rum Jungle Complex and the major rock units into which the Complex has been subdivided (Rhodes, 1965). The arcuate trend of the contours in the northern part of the survey area corresponds approximately to the southern boundary of the zone of granite gneiss and this unit is possibly characterised by lower magnetic disturbance than other units of the Complex. The small isolated anomalies may be due to the amphibolite veins which intrude the Complex or to small outcrops of banded ironstone reported to occur in a few places.

#### MINERAGRAPHIC EXAMINATION OF URANIUM MINERAL - MT. FITCH

Five samples of diamond drill core from the Mount Fitch prospect, showing uranium mineralisation, were submitted by Territory Enterprises Pty. Ltd. for identification of the uranium mineral, which was suspected of possibly being thucholite. However, examination and testing by X-ray diffraction by Dr. J.A. McDonald, of the Baas Becking Geobiological Research Laboratory, has shown that the dominant uranium mineral gives essentially a uraninite diffraction pattern; minor discrepancies are thought to be due to the effects of oxidation. Thucholite, if present, must be in very subordinate amounts only.

## PROPOSED 1968 PROGRAMME

### Auger Drilling, geochemical and radiometric surveys

(a) Drilling of the southern part of the Coomalie Gap West area on a 400 x 200 foot spacing (deferred from 1967), and filling the gap between the northern part of the Coomalie Gap West area and the southern boundary of Area 44 Extended.

(b) Follow-up work, probably on 400 x 200 foot spacing, in areas of interest delineated by 1967 reconnaissance work in the Acacia area.

(c) Semi-detailed work, possibly initially on lines 1,200 feet apart, in an area of about 2 x 3 miles immediately west of Manton Dam.

(d) Reconnaissance surveys, consisting of a few widely spaced traverses, mainly for geological information, in the Celia Creek area and to the south-west of the Waterhouse Granite.

### Rotary - Percussion Drilling

Some further testing of radiometric and geochemical anomalies in the vicinity of the Waterhouse No. 2 prospect and in the central and northern parts of the Woodcutters area is to be undertaken by a Mayhew drill from the B.M.R. Petroleum Technology Section, commencing about mid-November 1967.

From about May 1968, a Mayhew from the Petroleum Technology Section will again be available for about two months, and will be used mainly for the testing of geochemical, geophysical and radiometric anomalies in Area 44 Extended and the Coomalie Gap West area. This work will be planned in conjunction with the proposed diamond drilling programmes in these areas. If time permits, some work may also be undertaken by the Mayhew on any new targets arising out of current and proposed auger drilling programmes in the Acacia area and the area west of Manton Dam.

### Diamond Drilling

Subsequent to the completion of the two holes on the Woodcutters L 2 anomaly, which are now in progress by the contract drills (November 1, 1967), it is probable that at least one more hole will be sited on this anomaly, and one more hole is also proposed on the Woodcutters L 3 anomaly. If wet season conditions permit, it is then proposed that these drills put down two or three holes on geophysical anomalies in the Coomalie Gap West area to complete the current contract.

In the meantime it is proposed that the drills made available by the Mines Branch, N.T. Administration, after completing hole DDH 67/10 at the Woodcutters L 5 anomaly, proceed to test some of the major geochemical anomalies in Area 44 Extended. In the first stage of testing, the known geochemical and radiometric anomalies in this area are expected to provide targets for at least eight drill holes, averaging 500 to 600 feet in length. Some follow-up drilling may also be required if encouraging indications are obtained in the earlier holes.

During 1968, one 400-foot hole is also proposed on a geophysical anomaly in the Mount Minza area, and one or more holes may be sited at the Waterhouse No. 2 prospect if the results of the proposed rotary-percussion drilling warrant it. Other diamond drilling targets are expected to be delineated during 1968 by the proposed auger drilling programmes in the Acacia area and the areas west of Manton Dam, and some drilling may also be warranted to investigate aeromagnetic and gravity anomalies delineated by recent B.M.R. surveys. Total diamond drilling on these various projects during 1968 is expected to amount to about 12,000 feet.

### Regional Mapping

Several aspects of Rum Jungle geology are considered to warrant re-examination at an early date:

(a) Investigation of the granite contact, especially in areas of intense tourmalinisation and other apparent contact metamorphic effects, to check whether the unconformable relations described from the vicinity of Rum Jungle Siding are applicable elsewhere.

(b) Investigation of the Beestons - Crater Formation relationships. There seems to be some room for doubt whether these two formations have everywhere been correctly differentiated, e.g., east of Mt. Fitch, where Crater Formation to the south appears to be replaced by Beestons Formation to the north. This study may have economic applications in that the Beestons

Formation, like the Crater Formation, may warrant investigation as a possible host for the occurrence of placer-type radioactive mineralisation.

(c) Investigation of the Celia - Coomalie Dolomite relationship. Again, there is room for doubt whether these two units have everywhere been correctly differentiated, e.g., in the vicinity of Manton Dam. The investigation may also have economic applications, especially in the Celia Creek area, which contains a re-entrant similar to the Embayment, except that the dominant rock within this area is shown on current maps as Celia Dolomite.

(d) A further study, including collation of all available drill hole data, also appears to be warranted to investigate the geological relationships of the group of rocks referred to collectively as hematite-quartzite-breccia. It seems likely that rocks of several different ages and different origins are included in this group, and their occurrence in close proximity to known ore bodies in the Embayment and Rum Jungle Creek South areas indicates that this investigation may also have economic applications.

#### Further Work arising out of Compilation

Apart from the further over-all evaluation of the geological, geochemical and radiometric data, and their correlation with geophysical results, it is proposed to undertake a detailed assessment of uranium and base metal mineralisation in the White's Extended - Dyson's - Intermediate sections of the Embayment area, the uranium and base metal mineralisation in the vicinity of Mount Burton open cut, and the uranium mineralisation in Area 55.

In the meantime, a number of recommendations for the further testing of certain anomalies and other favourable indications of mineralisation, have already been made by Y. Miezitis, especially with reference to the Mount Fitch, Burton Creek, Area 55, Embayment, and Rum Jungle Creek South areas. A total of some six to eight weeks' auger drilling and up to 6,000 feet of diamond drilling may be required; this would include some diamond drilling in the areas for which detailed assessment is still incomplete, and for which further recommendations may be expected as this assessment proceeds, e.g., in the Embayment area.

In view of the scattered nature of the targets, and the generally small amount of work to be carried out at each one, it is suggested that it might be most convenient for this work to be undertaken by T.E.P. Ltd., provided that the Bureau is able to maintain close liaison with the programme.

# PROPOSED GEOPHYSICAL PROGRAMME FOR 1968

The proposal falls under the following main headings.

1. Follow-up work resulting from the assessment of data compilation in the Hundred of Goyder. The amount of follow-up cannot be gauged accurately at this stage, but a cursory examination suggests that it could occupy a fairly large portion of the programme. In many instances it, together with item 2, will take priority.
2. Co-operation in the U.K.A.E.A. investigation of the Crater Beds, if this project materializes.
3. Detailed follow up of reconnaissance work in the Acacia area.
4. Reconnaissance work in other areas e.g. West of Manton Dam, Milton area.
5. Electric and radiometric logging of diamond drill holes as required.

## Staff

Four geologists and three geophysicists are expected to be available for the 1968 programme.

However, some of the projects may carry through into 1969, especially if additional commitments have to be undertaken, such as a major investigation of the Crater Formation.



References

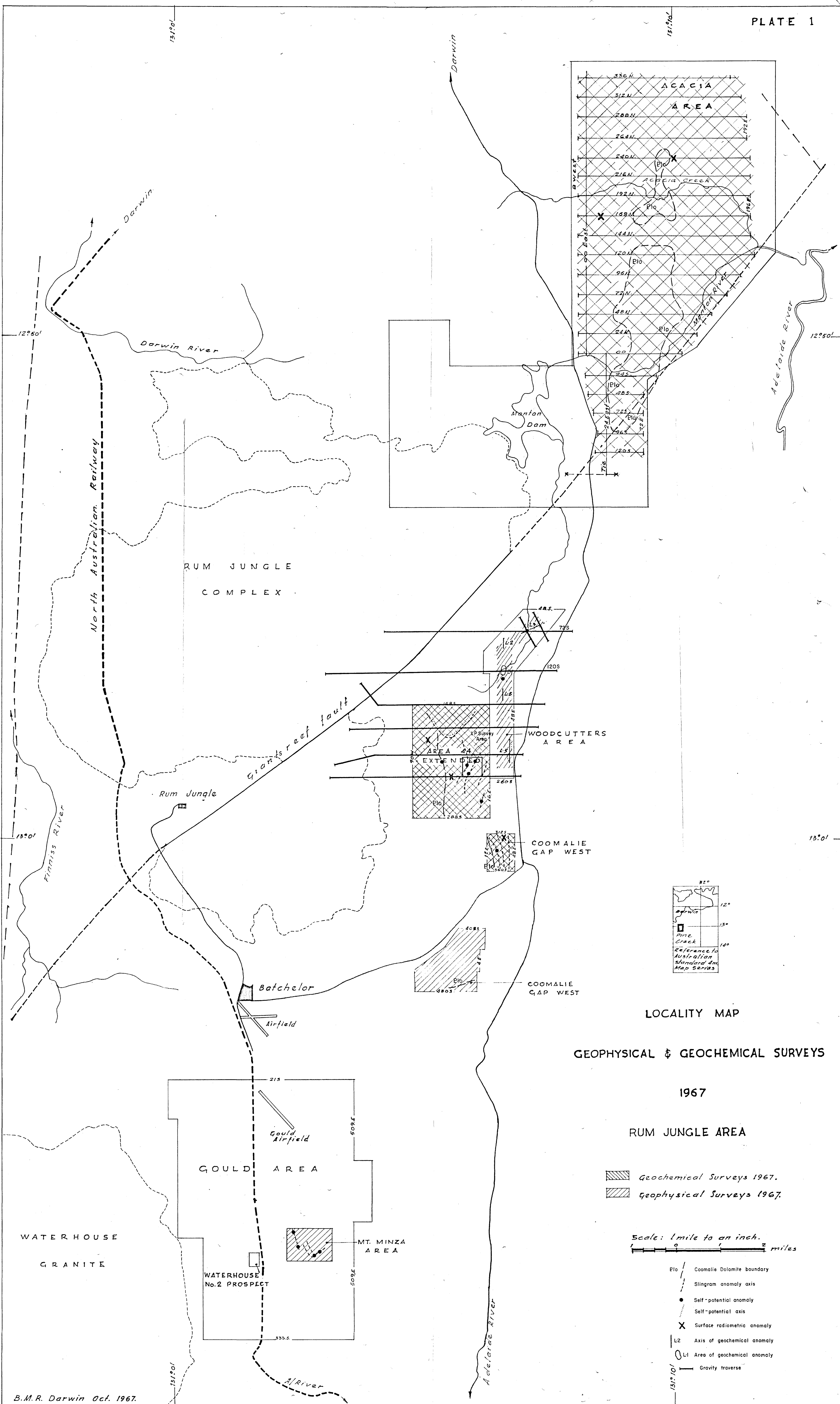
- Duckworth, K. 1966 Rum Jungle East area electromagnetic and radiometric surveys, N.T., 1964. Bur. Min. Resour. Aust. Rec. 1966/98.
- Duckworth, K. Note on The Selection of a Diamond Drill Site, Mt. Minza, Rum Jungle Area, N.T. Bur. Min. Resour. Aust. Rec. (in preparation).
- Gardener, J.E. & Shatwell, D.O. 1966. Summary of Activities, Darwin Uranium Group, 1966. Bur. Min. Resour. Aust. Rec. 1966/196.
- Semple, D.G. 1967a Geochemical and Radiometric Investigation, Gould area, N.T., 1966 (Mount Minza and Waterhouse No. 2 areas). Bur. Min. Resour. Aust. Rec. 1967/41.
- Semple, D.G. 1967 b Geochemical and Radiometric Investigation, Rum Jungle East, N.T., 1966. Bur. Min. Resour. Aust. Rec. 1967/42.
- Shatwell, D.O. 1966 Geochemical and Radiometric Investigation, Rum Jungle East area, 1965 (Coomalie Gap and Woodcutters areas). Bur. Min. Resour. Aust. Rec. 1966/34.

TABLE 1. WOODCUTTERS AREA, DIAMOND DRILLING RESULTS

Hole	Co-ords.		Depress-	Total	Intersection			Width	%	%	%	%	%	Remarks	
	S	E	ion.	depth	(feet)			down	Pb	Zn	Cu	Ag	Cd		
								(feet)							
<u>L.5 Anomaly</u>															
66/1	208	42	50°W	474	419	-	440	21	0.2	6.3	0.2	0.7	-	Also 377'-383': 6' av. 7.6% Pb, 0.3% Zn.	
66/2	204	38	60°E	352	277	-	299	22	1.9	0.8	-	0.2	-		
66/3	220	33	60°E	646	508	-	587	79	7.8	20.8	0.1	7.7	0.2		
66/5	192	37	60°E	487	383	-	404	-	..	..	..	..	..	No base metal values above 300 ppm. (0.03%)	
66/6	216	35	60°E	572	518	-	539	21	8.5	16.7	0.1	5.7	0.1		
66/7	224	33	60°E	652	514	-	517	-	..	..	..	..	..	Max. base metal values. 0.35% Zn, 0.05% Pb, 0.02% Cu.	
66/11	220	33	75°E	1015	..	-	..	-	..	..	..	..	..	No base metal values above 250ppm. (0.025%).	
66/12	212	36	65°E	775	665	-	695	30	1.8	0.1	0.3	7.4	..	Includes 15 feet averaging 13.5 oz. Ag/ton.	
67/3	216	35	75°E	916	464	-	470	6	7.0	13.6	..	5.4	0.1	This is not the main lode, which would have been expected at 700'	
67/4	200	36	65°E	716	610	-	625	-	..	..	..	..	..	Max. base metal values 0.04% Cu, 0.01% Pb, 0.02% Zn.	
67/8	204	35	65°E	790	742	-	755	13	..	..	..	..	..	Assay results not yet available.	
67/10	216	42	75°W	..	..		..	..	..	..	..	..	..	In progress. 364 feet at 26/10/67.	
<u>L5 Anomaly and associated copper and zinc anomalies</u>															
66/8	168	35	60°E	653	..		..	..	..	..	..	..	..	No base metal values above 0.1%.	
66/10	156	35	60°E	546	..		..	..	..	..	..	..	..	No base metal values above 250 ppm. (0.025%).	
66/13	150	31	65°E	620	212	-	258	..	..	..	..	..	..	Maximum values: 0.15% Cu, 0.07% Pb, 0.15% Zn.	
67/1	160	35	60°E	601	..		..	..	..	..	..	..	..	No base metal values above 120 ppm. (0.012%).	

Page 2. Table 1. Woodcutters area, diamond drilling results.

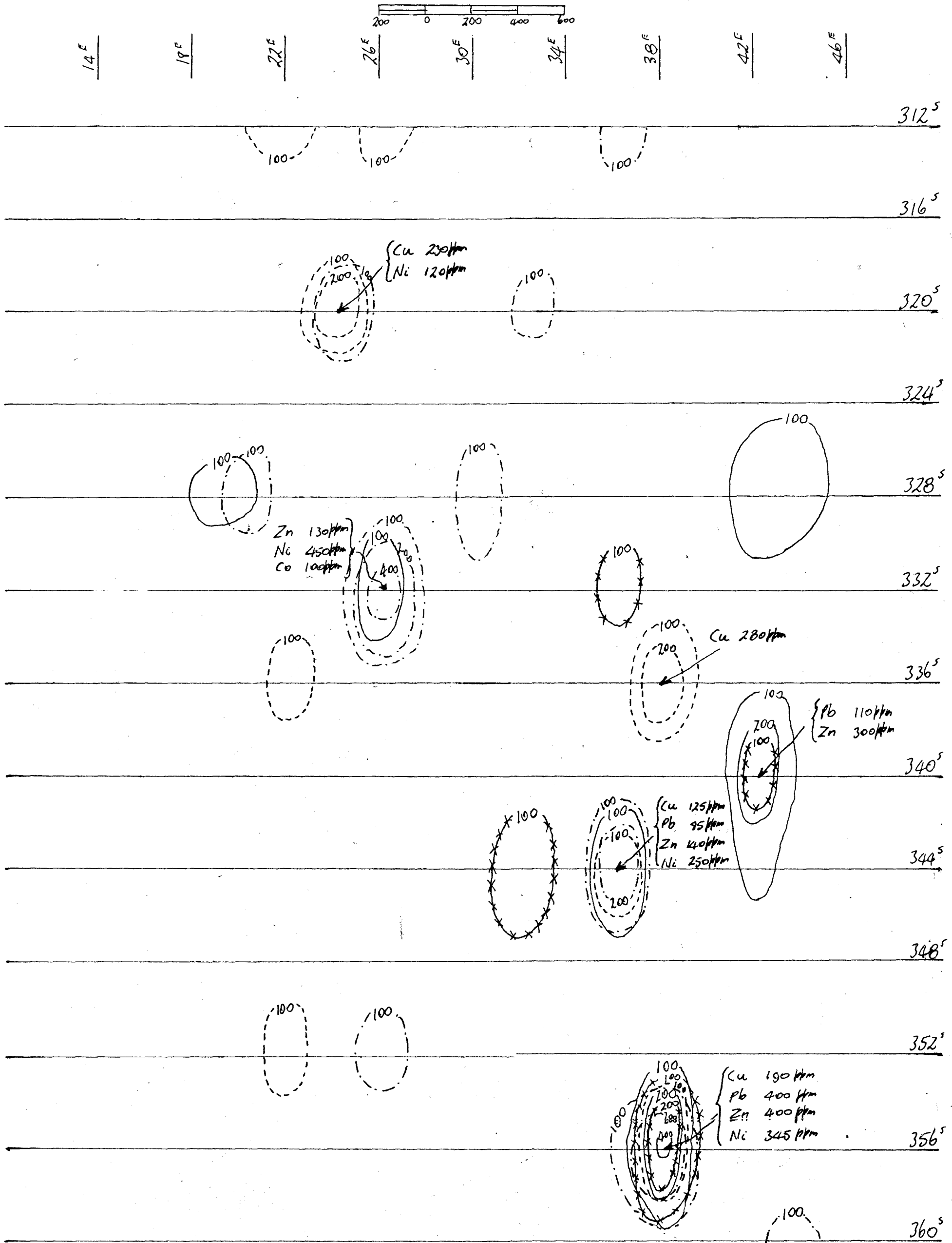
Hole	Co-ords. S. E.	Depress- ion	Total depth (feet)	Intersection (feet)	Width down hole (feet)	% Pb	% Zn	% Cu	% Ag	% Cd	Remarks
<u>L1 Anomaly and associated S.P. Anomaly.</u>											
66/9	120 32	60°E	525	...	..	..	..	..	..	..	No base metal values above 1,000 ppm. (0.1%).
67/2	118 33	50°E	488	...	..	..	..	..	..	..	No base metal values above 1,500 ppm. (0.15%).
67/5	118 41	60°W	752	686 - 688	2	6.1	26.0	0.9	4.2	0.2	Also 2.3% Pb, 0.8% Zn, 1.0 oz/ton Ag. over 4 feet: 625 - 629 feet.
67/6	116 33½	60°E	354	250 - 250'6	0.6"	..	..	..	..	..	Galena visible in quartz-calcite vein.
67/7	130 36	Vert.	667	...	...	...	...	...	...	...	
<u>L2 Anomaly</u>											
67/9	90 36	65°E	682	...	...	..	..	..	..	..	.. Minor mineralisation at 660', Scraped core analyses not yet available.
67/12	88 34	65°E	..	..	...	..	..	..	..	..	In progress. 355 feet at 2/11/67.
67/13	80 29½	65°E	..	..	...	..	..	..	..	..	In progress. 120 feet at 2/11/67.
<u>L/3 Anomaly</u>											
67/11	46E 46N	60° grid N:612 feet (L.3 Grid). (336°T)									No major mineralisation. Scraped core analyses not yet available.



COOMALIE GAP WEST  
(Northern Section)

GEOCHEMICAL CONTOURS

Scale: 1" = 400'



14E 18E 22E 26E 30E 34E 38E 42E 46E

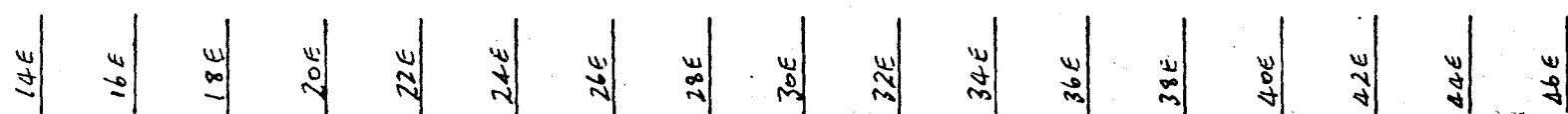
D. G. SEMPLE - JULY 1967

Copper	-----	100, 200 ppm.
Lead	-x-x-x-	100, 200 ppm.
Zinc	_____	100, 200 ppm.
Nickel	-----	100, 200, 400 ppm.

(Northern Section)

# GEOLOGY and

Scale: 1" = 400'



MAY, 1967.

## REFERENCE

### Slingram Real Component Axes

Turam Ratio Axes  
(Duckworth, 1964)

S. P. Contours  
(Gardener, 1967)

A/B horizon radiometric contours

C horizon radiometric contours

Outcrop boundary

Strike & dip of beds

\*-?-?-? Syncline - inferred

Vehicle track

## Highway

Wet season watercourse  
and billabong

Plo Cosmalie Dolomite

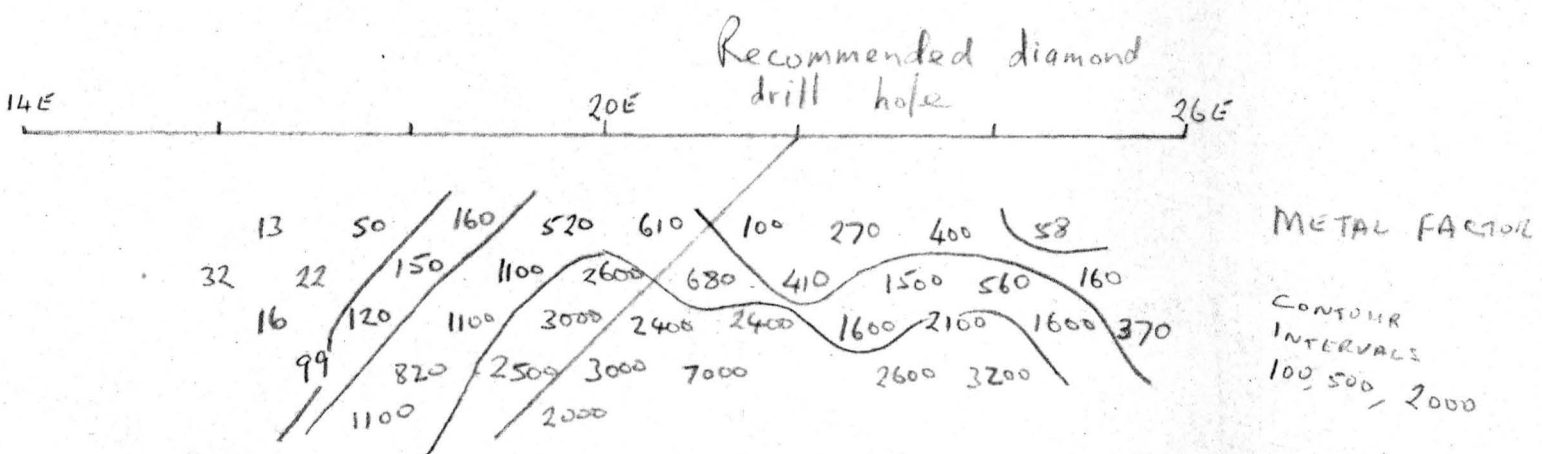
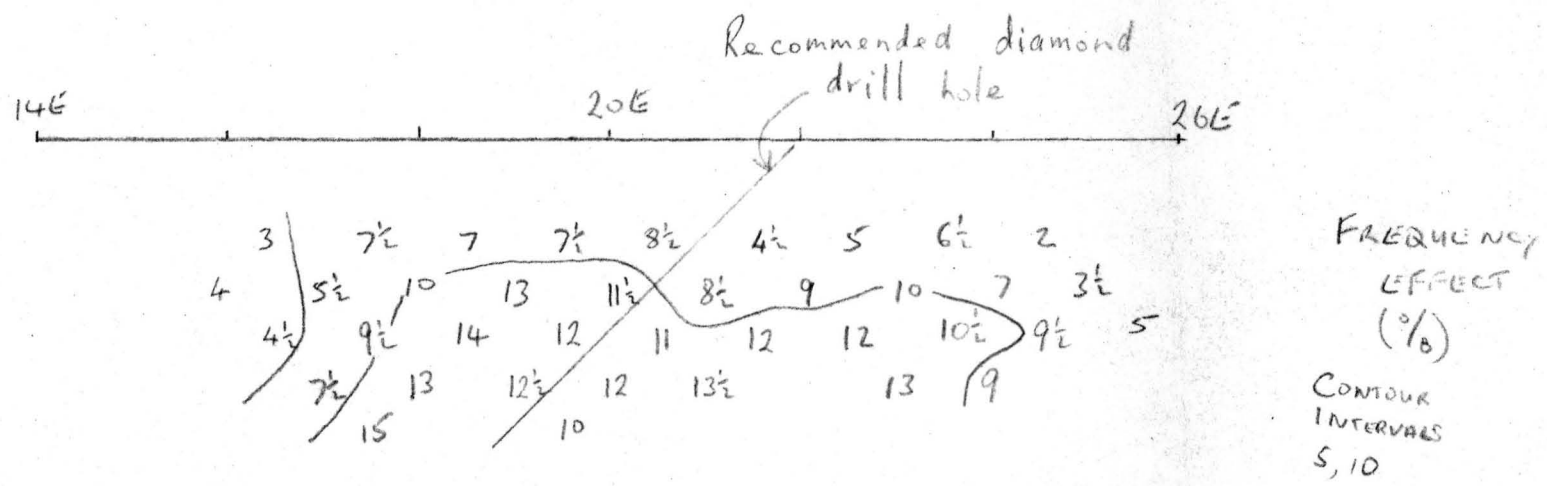
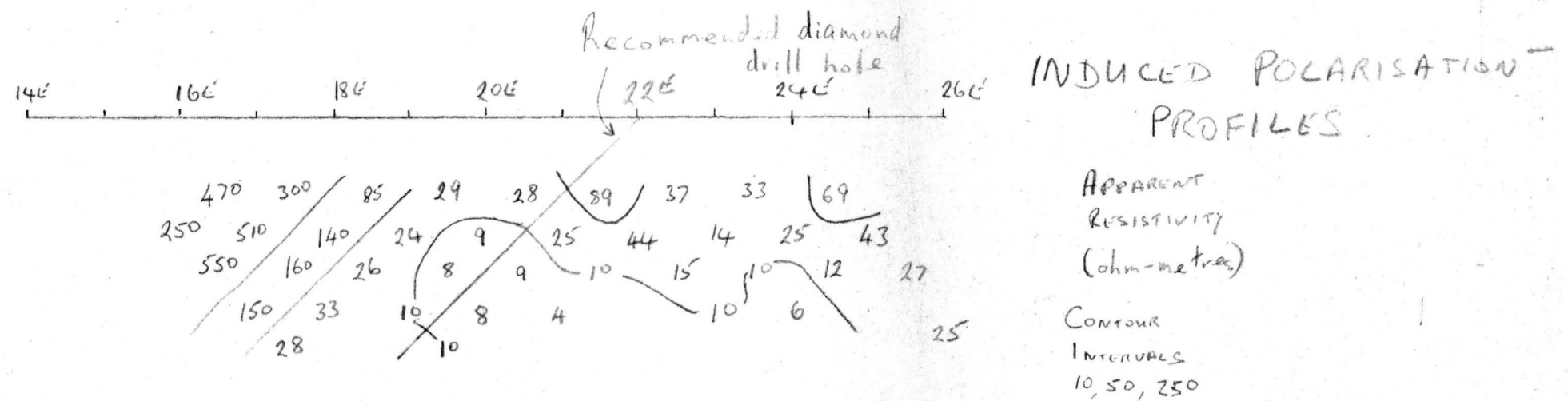
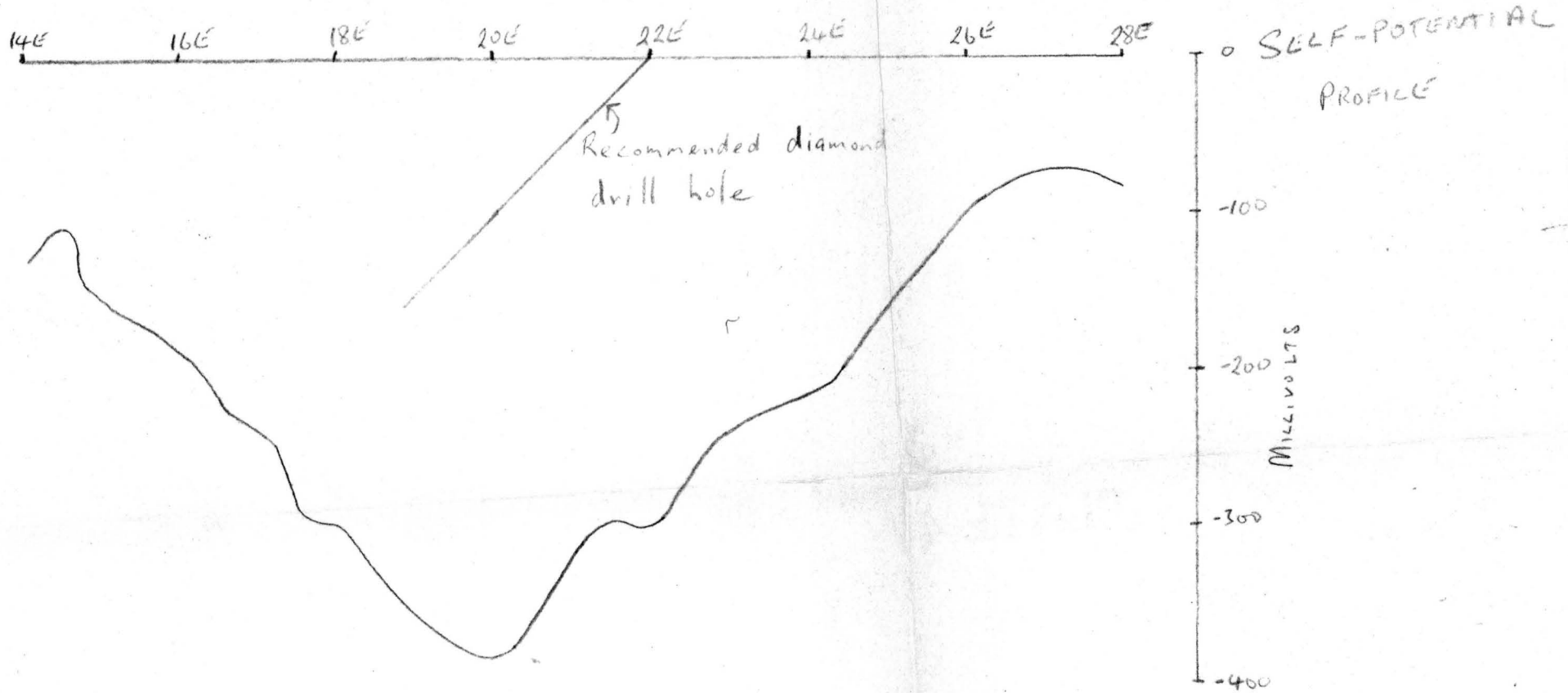
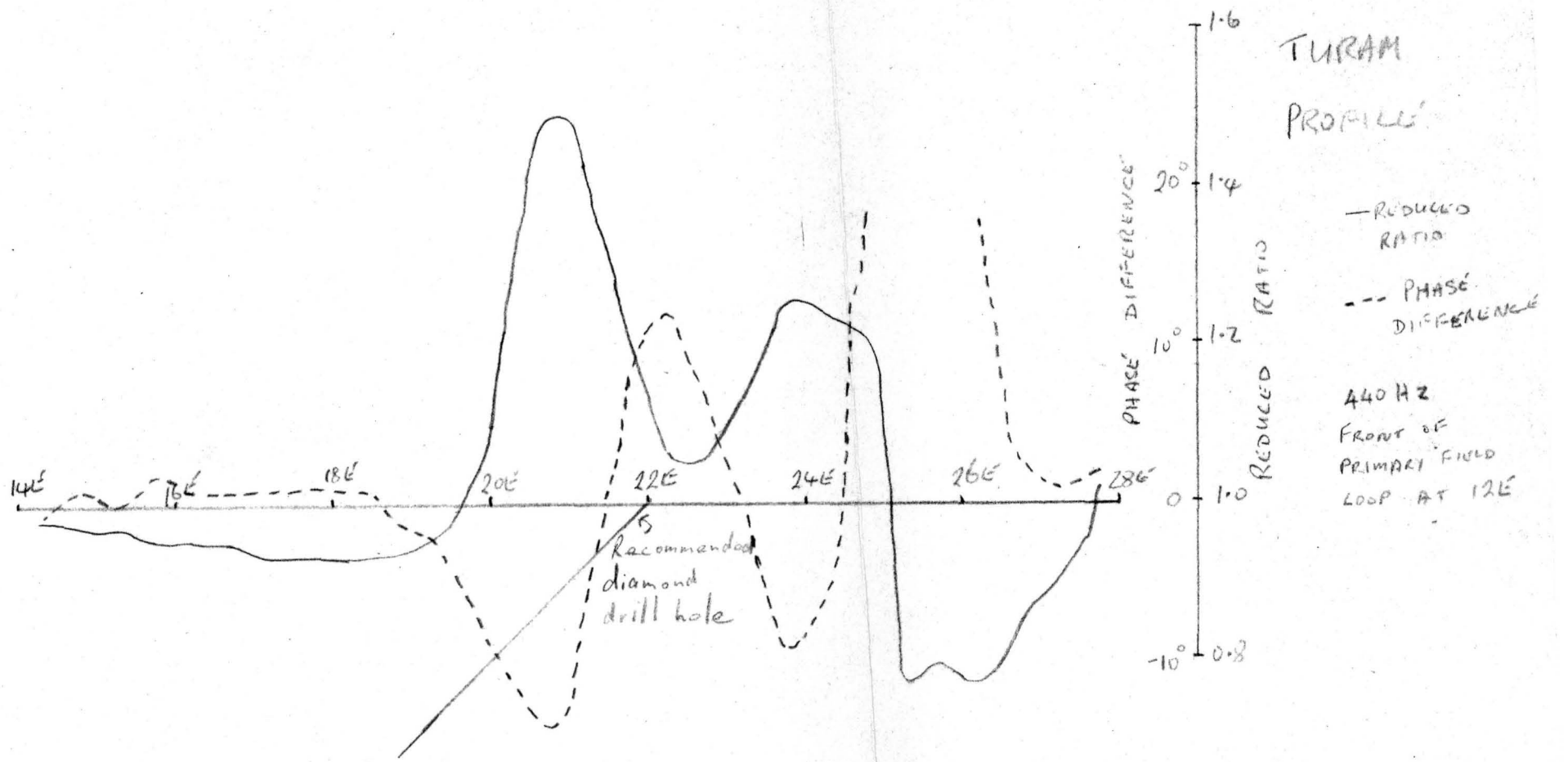
P/d Golden Dyke Fm. (shale)

Inferred Coomalic-Golden Dyke  
Boundary

Costean.

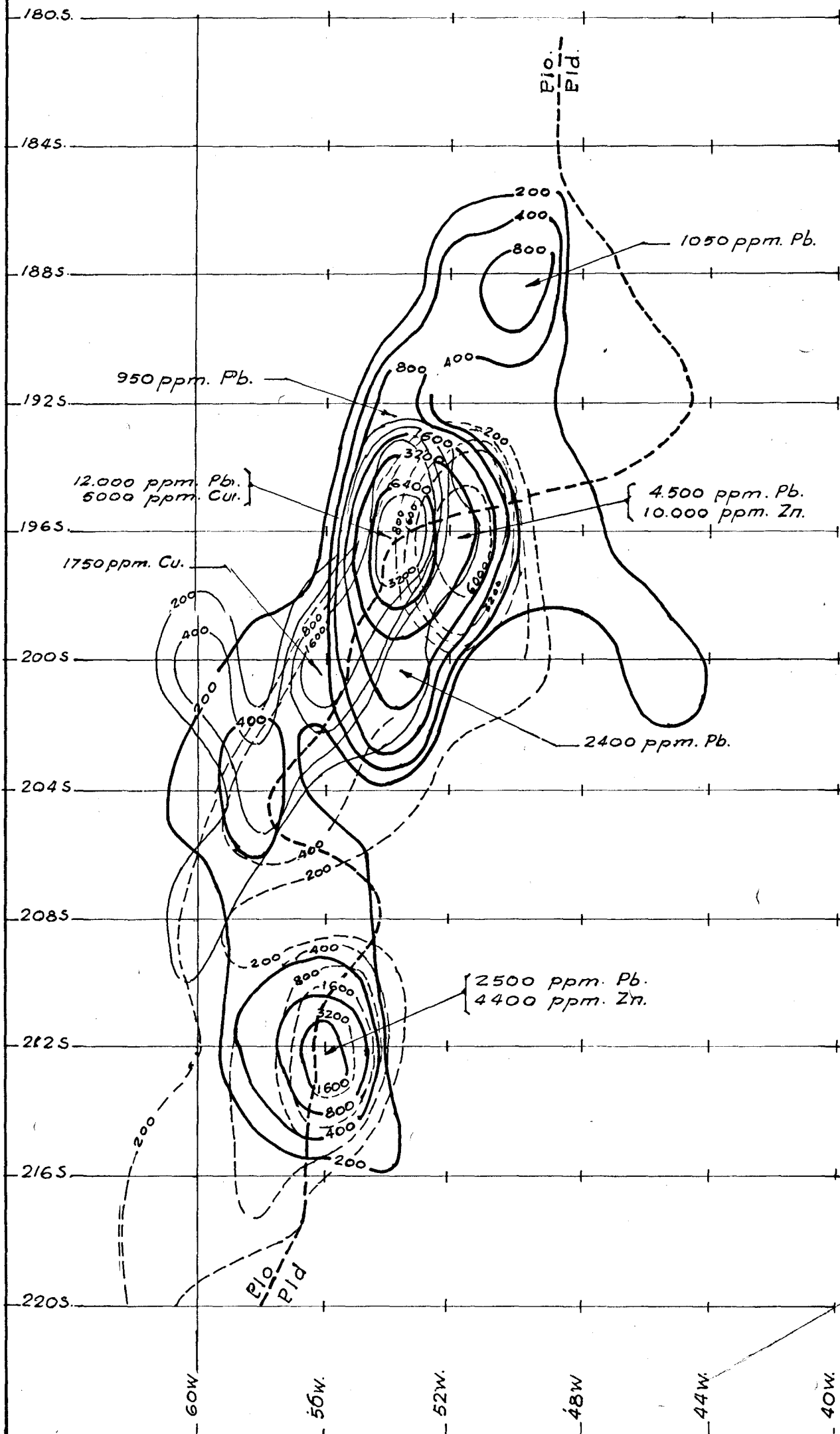
anticline - oculate

Syncline - accurate.



COOMALIE GAP WEST, 3445  
RUM JUNGLE EAST  
200' = 1"

FIG. 2



# REFERENCE.

## Lead contours:

200, 400, 800, 1600  
3200, 6400 p.p.m.

## Copper contours:

200, 400, 800  
1600, 3200 ppm.

## Zinc contours:

200, 400, 800, 1600  
3200, 6400 p.p.m.

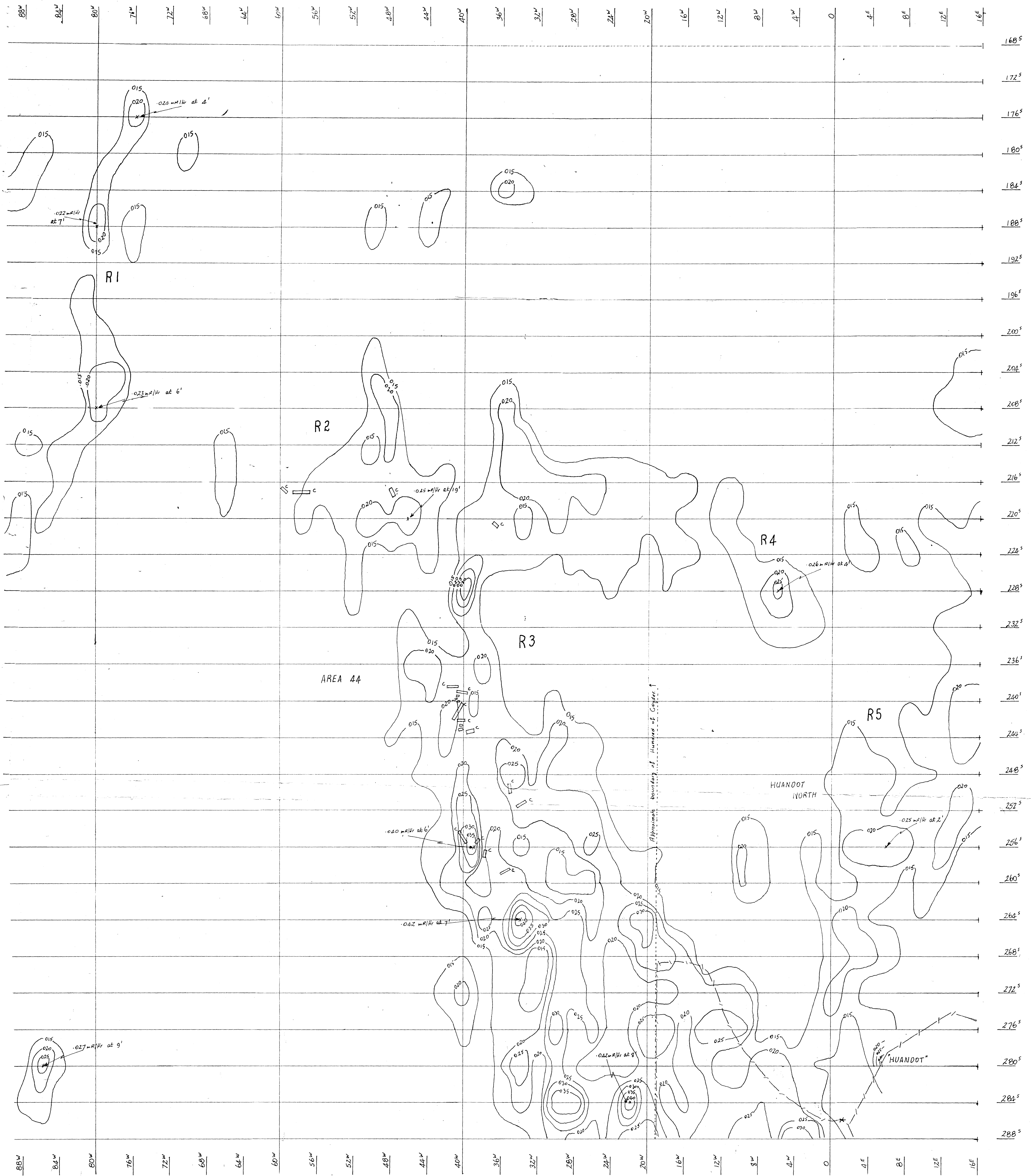
Coomalie Dolomite P10  
Golden Dyke Formation P1d

# AREA 44. COPPER, LEAD AND ZINC ANOMALIES

D.G. Semple August 1967




## RADIOMETRIC CONTOURS



D.G. SEMPLE - SEPTEMBER, 1967.

Holes drilled every 200' along traverses.

Fence :   
 (ocean :  C.



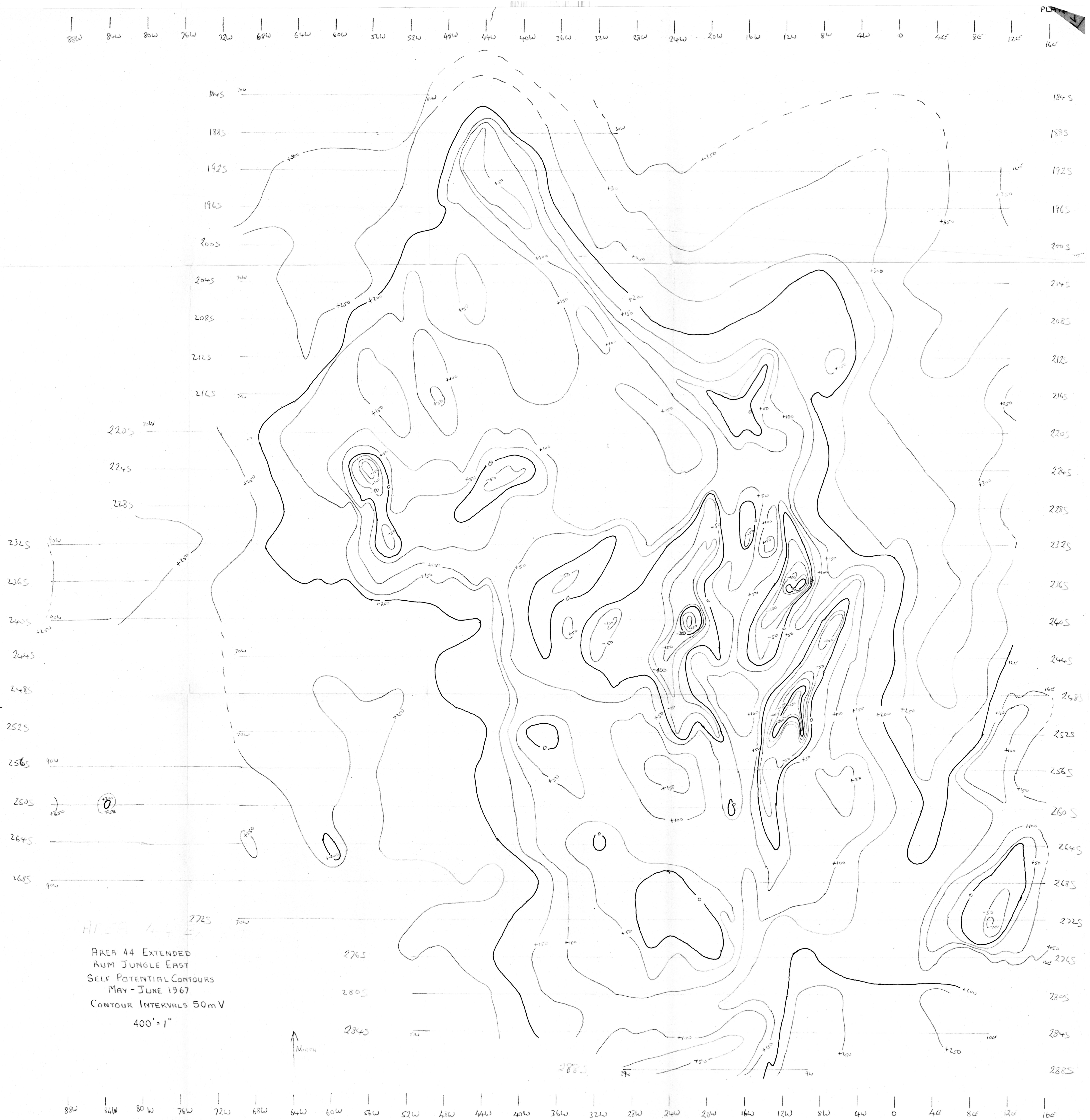
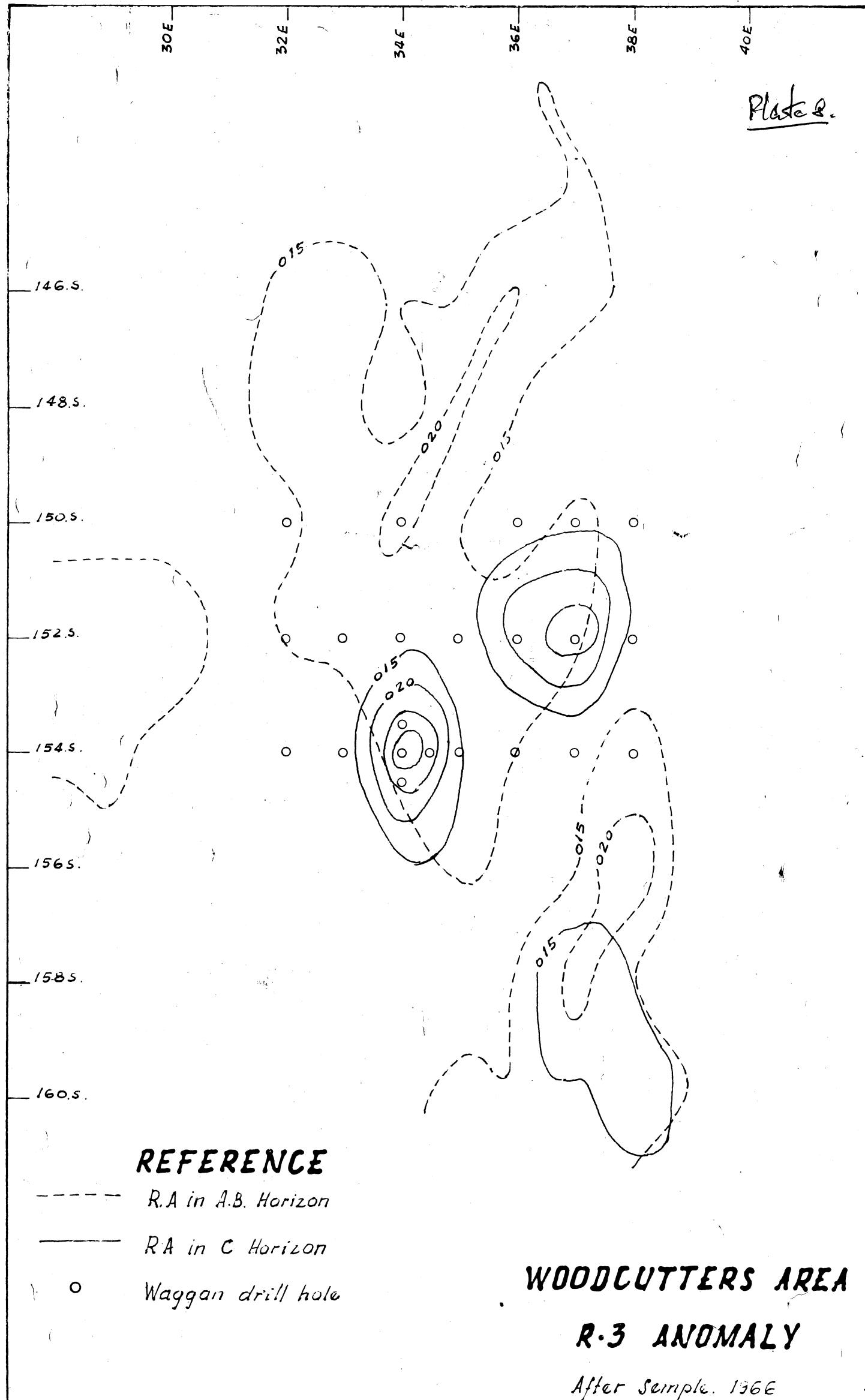


Plate B.

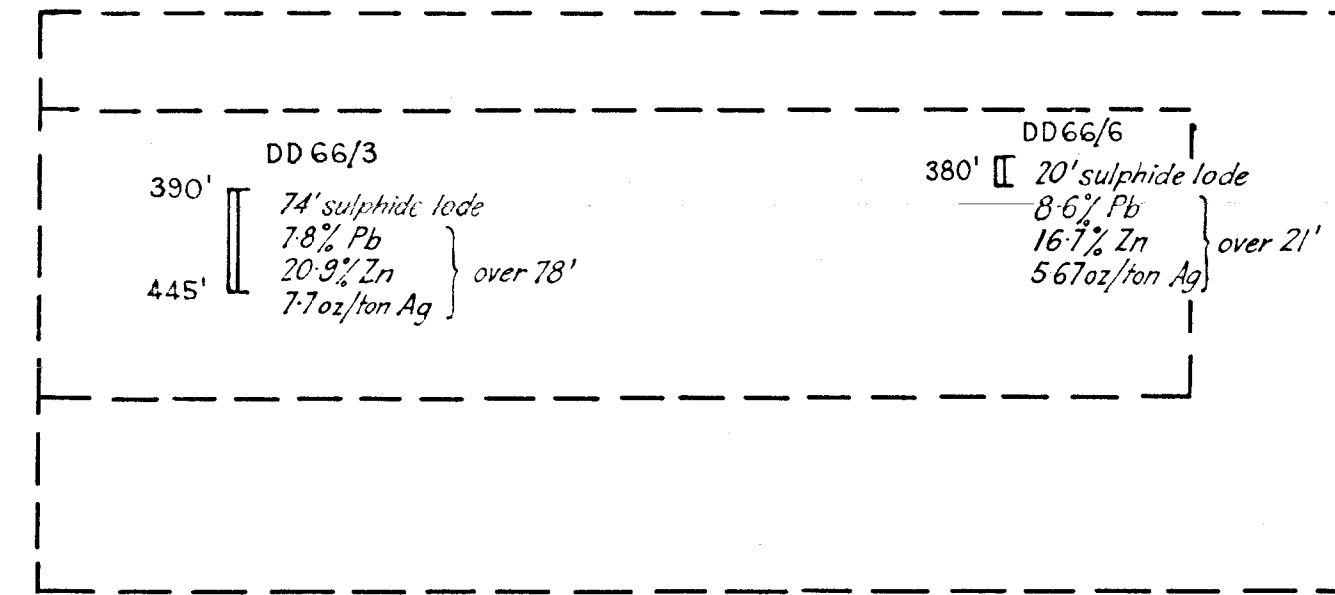


224 S      220 S      216 S      212 S      208 S      204 S      200 S      196 S      192 S

Gossan

Quartz

475' ⊥ TD DD 66/7



300' DD 66/1  
30' sulphide lode  
0.2% Pb  
6.29% Zn } over 21'

250' DD 66/2  
20' sulphide lode  
2.91% Pb  
0.99% Zn } over 12'  
0.4 oz/ton Ag

580' DD 66/12  
30' sulphide lode  
1.88% Pb  
0.16% Zn } over 30'  
7.41 oz/ton Ag

DD 67/8  
14' sulphide lode

530' DD 67/4  
15' - all < 0.1%

395' ⊥ TD DD 66/5

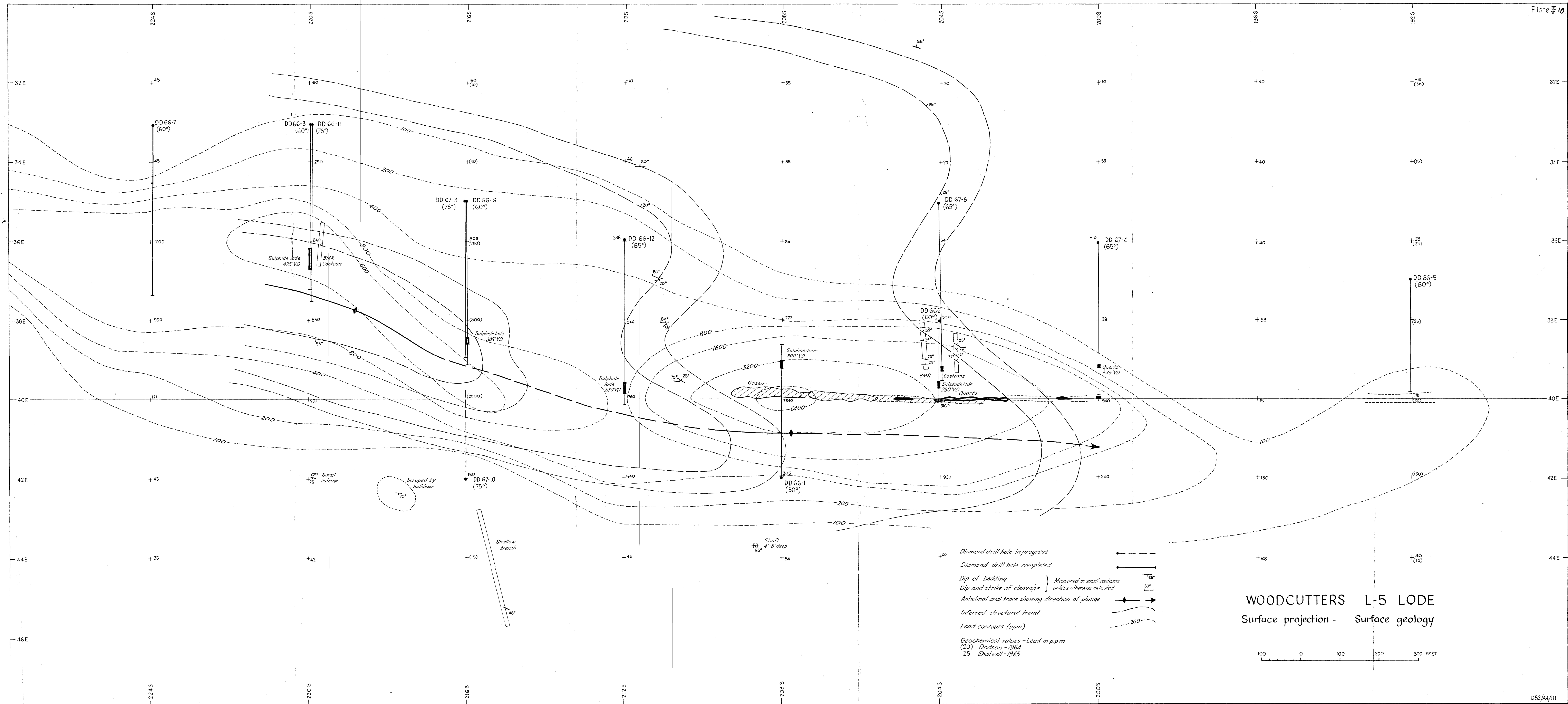
WOODCUTTERS L5 LODE  
Longitudinal projection

880' ⊥ TD DD 66/11

815' ⊥ TD DD 67/3

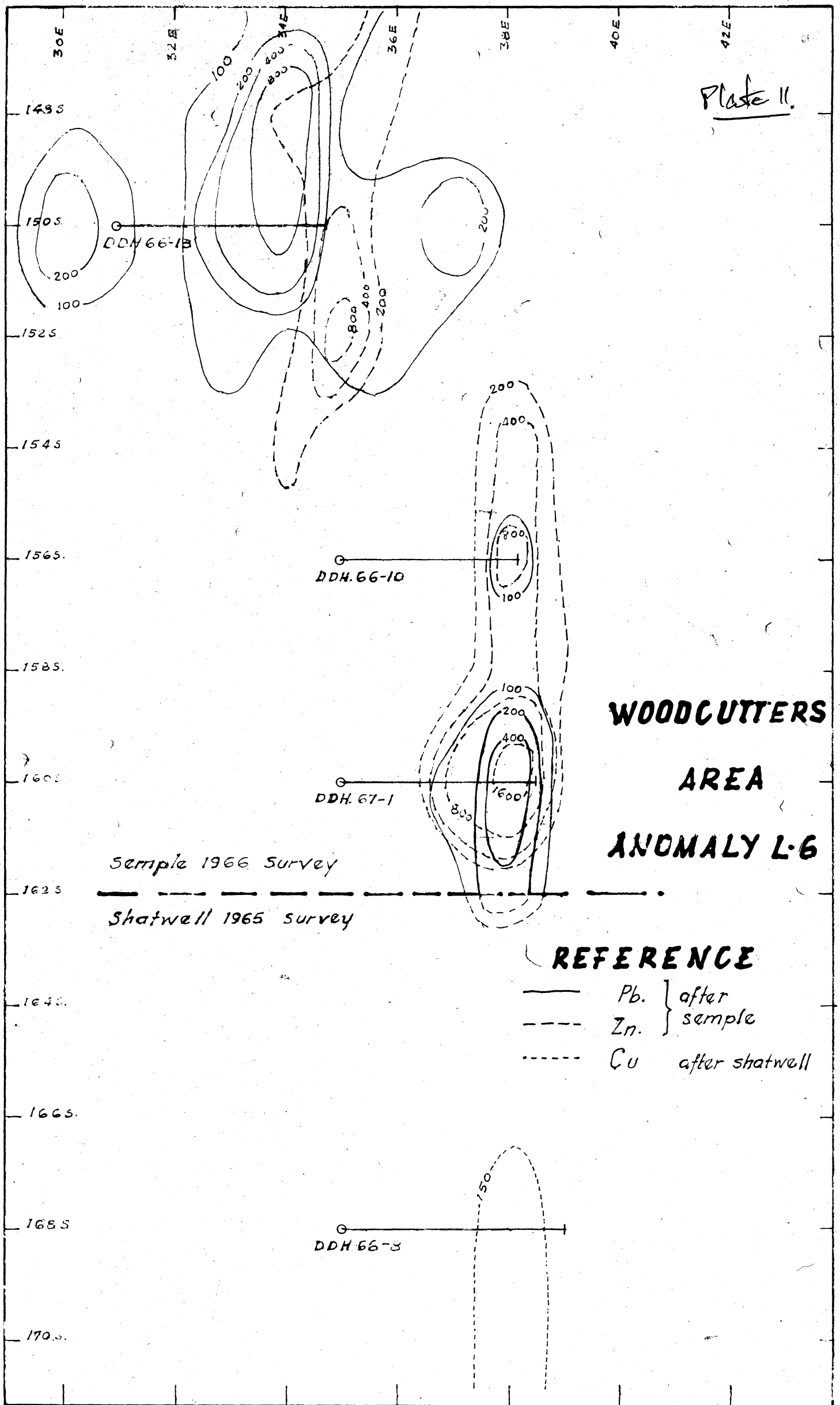






10-1

Plate II.



**WOODCUTTERS  
AREA  
ANOMALY L-6**

Simple 1966 Survey

-----

Shatwell 1965 Survey

**REFERENCE**

- Pb. } after
- - - Zn. } sample
- ... Cu after shatwell

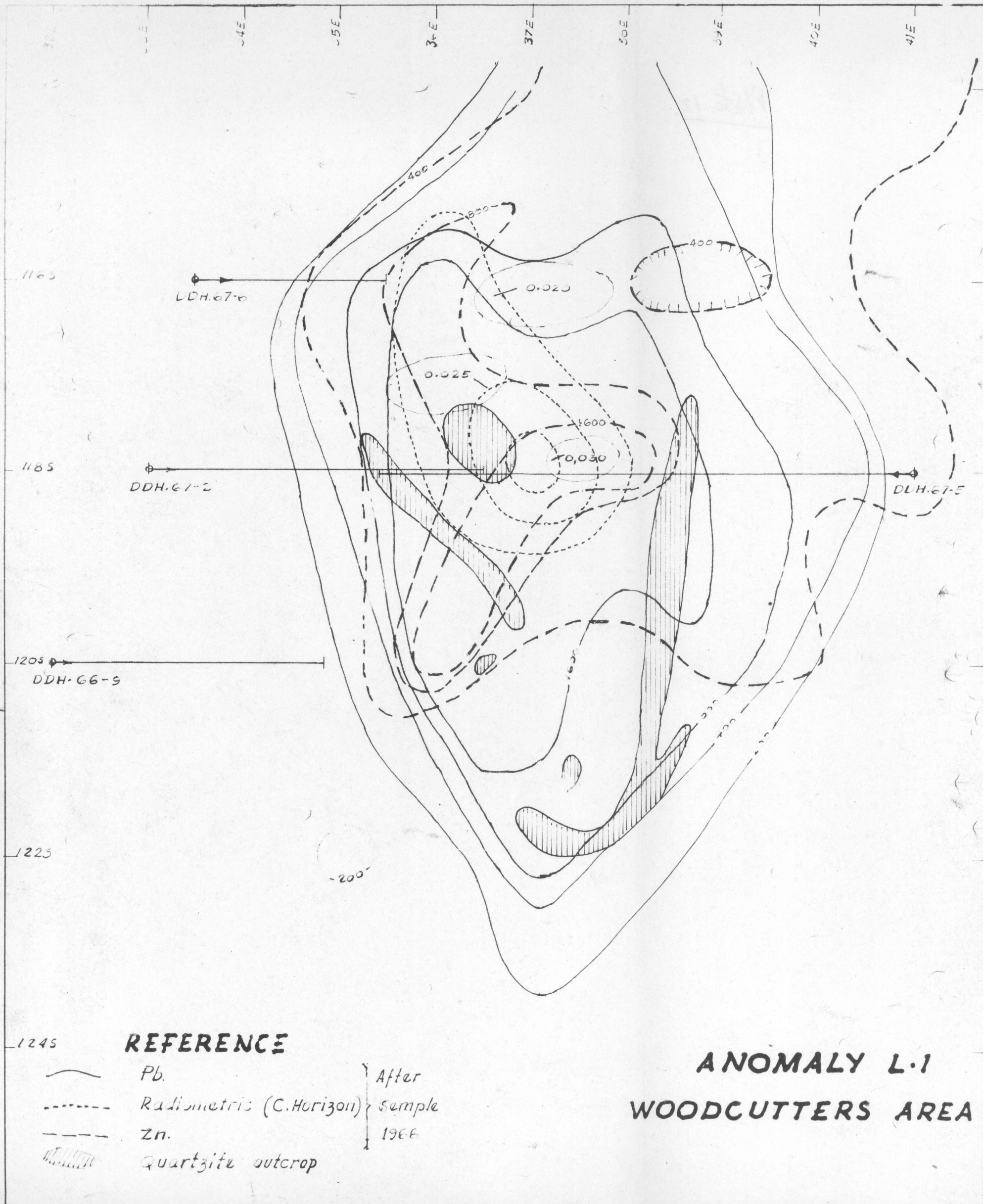
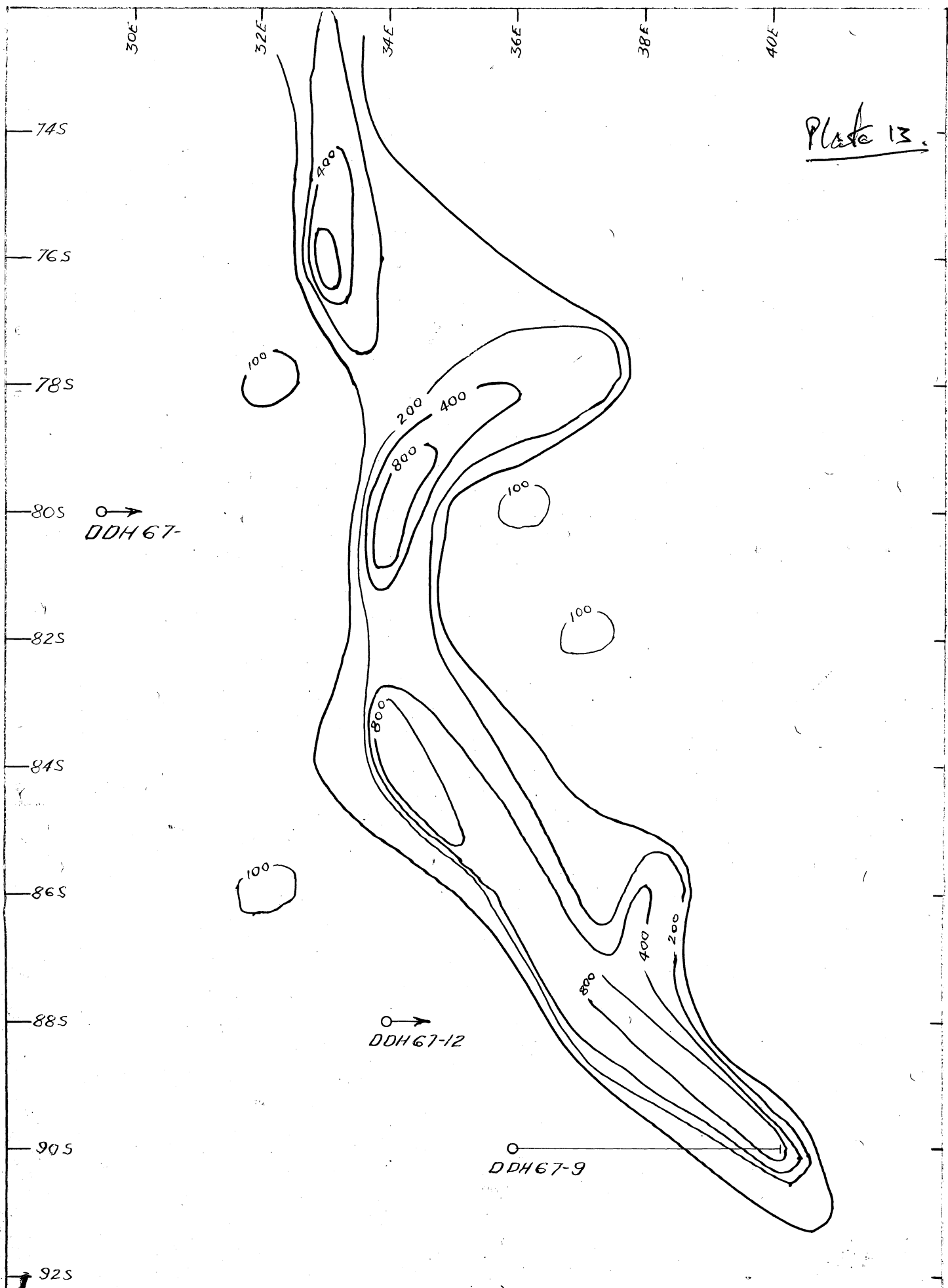


Plate 13.

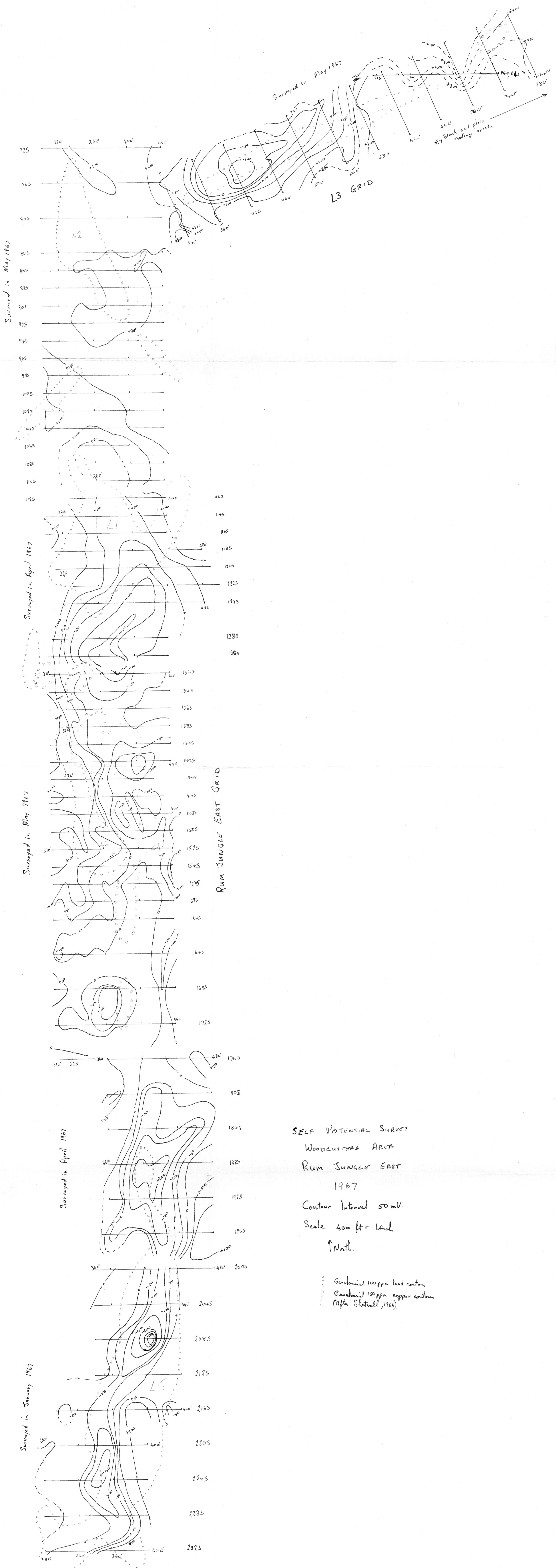


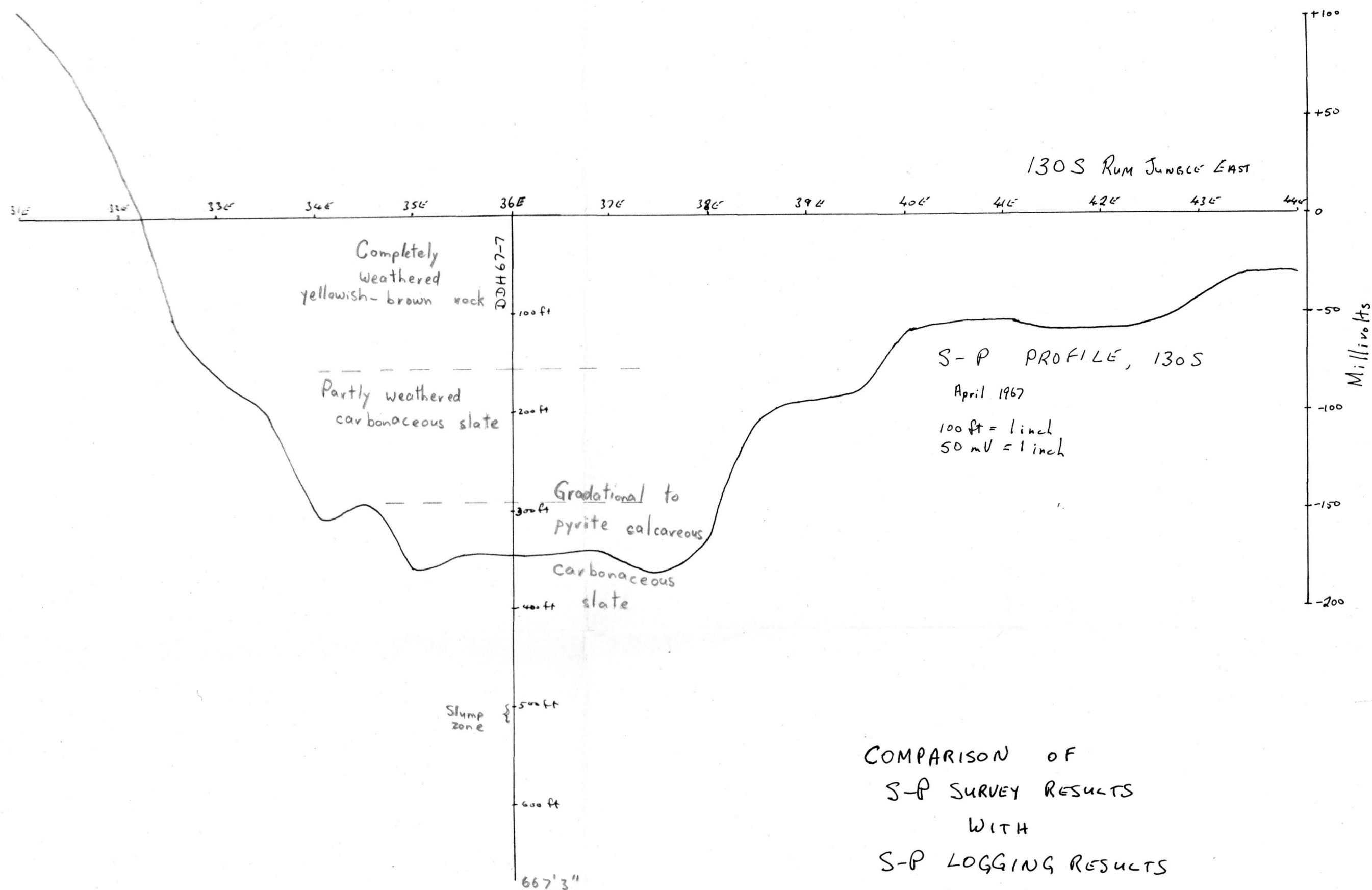
WOODCUTTERS AREA

ANOMALY L2

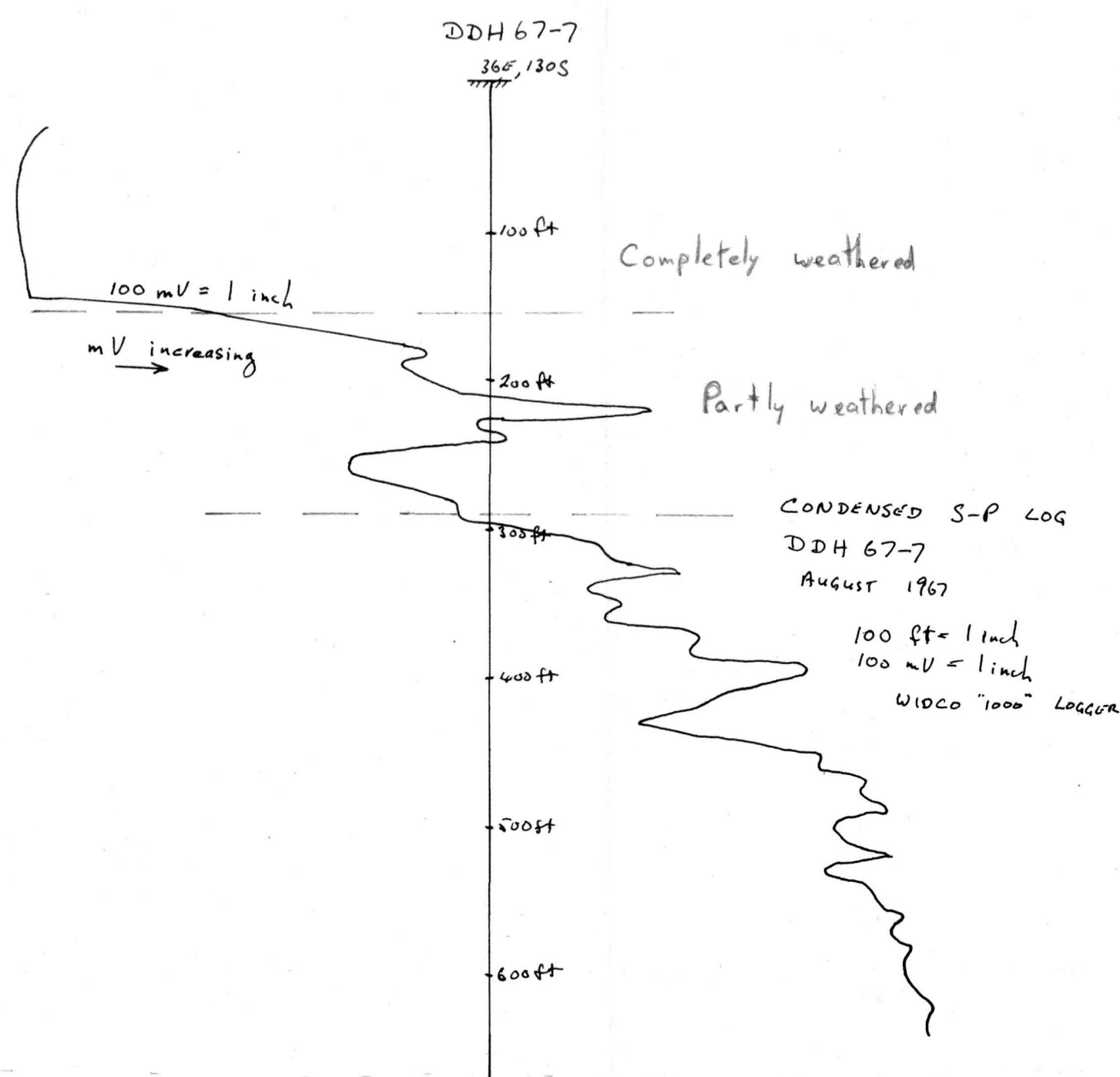
— Pb After Sample 1966







COMPARISON OF  
S-P SURVEY RESULTS  
WITH  
S-P LOGGING RESULTS  
DDH 67-7  
WOODCUTTERS AREA, Rum Jungle East

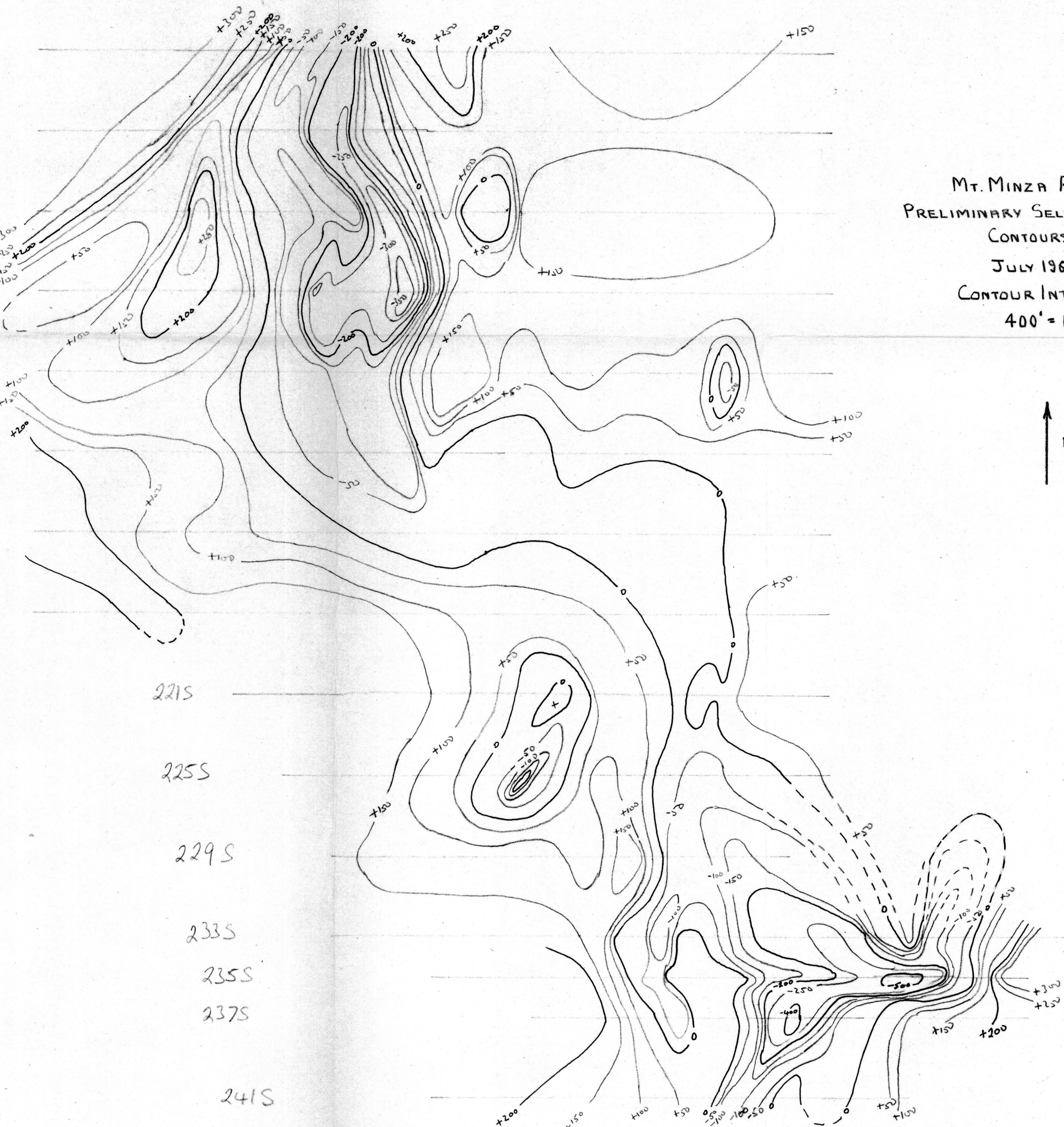
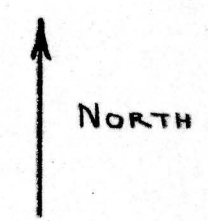




—430E —434E —438E —442E —446E —450E —454E —458E —462E —466E —470E —474E —478E —482E —486E

189S  
193S  
197S  
201S  
205S  
209S  
213S  
217S

MT. MINZA AREA  
PRELIMINARY SELF-POTENTIAL  
CONTOURS  
JULY 1967  
CONTOUR INTERVAL 50mV  
400' = 1"



430E 434E 438E 442E 446E 450E 454E 458E 462E 466E 470E 474E 478E 482E 486E



GEOLOGICAL LEGEND

- QUATERNARY**
- Alluvium
- UPPER PROTEROZOIC**
- TOLMER GROUP**
    - WOLFE SANDSTONE
    - DEPOT CREEK SANDSTONE MEMBER
    - Quartz sandstone, with lenses of hematite-rich breccia and lenses of quartz pebble conglomerate
- LOWER PROTEROZOIC**
- AGCONDIAN SYSTEM**
- RUM JUNGLE GRANITE**
    - Biotite granite
    - WATERHOUSE GRANITE
    - Porphyritic granite, and adamellite
    - Basic intrusives
  - FINNIS RIVER GROUP**
    - BURNELL CREEK FORMATION
    - Siltstone, greywacke siltstone, greywacke, quartz greywacke
  - GOODPARLA GROUP**
    - GOLDEN DINE FORMATION
    - Quartz siltstone and carbonaceous siltstone, in places pyritic
  - MASSON FORMATION**
    - ACACIA GAP TONGUE
    - Quartz greywacke, quartz sandstone, pyritic and silicified in places, pyritic, carbonaceous siltstone, siltstone
  - BATCHELOR GROUP**
    - COOMALIE DOLOMITE
    - Silicified and metamorphosed dolomite
  - CRATER FORMATION**
    - Quartz greywacke, greywacke, arkose, fine and pebble conglomerate, siltstone
  - CELIA DOLOMITE**
    - Argill dolomite, in places silicified and metamorphosed, silicified dolomite breccia, tremolite schist
  - BEESTONS FORMATION**
    - Arkose, greywacke, siltstone, conglomerate, arkose conglomerate, white friable quartz sandstone
- Geological boundary**
- Dip and strike of strata
  - Trend lines
  - Established synclinal trough—position accurate
  - Established synclinal trough—concealed; position approximate
  - Plunge of syncline
  - Plunge of anticline
  - Established fault—position accurate
  - Established fault—position approximate
  - Established fault—concealed
  - Probable fault
  - Quartz vein
  - Quartz-fournilite vein
  - Fossil locality

GEOLOGY AFTER RUM JUNGLE DISTRICT  
SPECIAL SHEET, 1:63,360, 1960 EDITION

TOPOGRAPHICAL LEGEND

- Highway
- Road or track
- River or creek
- Railway with station and siding
- Mine or prospect
- Open cut
- Dump
- Transmission line
- Dam

GEOPHYSICAL LEGEND

- Magnetic intensity contours
- Magnetic "low"
- Positive magnetic trend
- Negative magnetic trend
- Interpreted fault
- Anomaly referred to in text
- Granite zone of low magnetic disturbance

THE MAGNETIC DATA HAVE NOT  
BEEN CORRECTED FOR THE  
REGIONAL MAGNETIC GRADIENT

DETAILED AEROMAGNETIC SURVEY, RUM JUNGLE NT, 1967

TOTAL MAGNETIC INTENSITY CONTOURS  
GEOPHYSICAL INTERPRETATION  
AND  
GEOLOGY

