COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

RECORD No. 1962/36

SOUTH ALLIGATOR RIVER GEOPHYSICAL SURVEY, NORTHERN TERRITORY 1961

by

J. ASHLEY

COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

RECORD No. 1962/36

SOUTH ALLIGATOR RIVER GEOPHYSICAL SURVEY,
NORTHERN TERRITORY 1961

by

J. ASHLEY

CONTENTS

ILLUSTRATIONS

SUMMARY

A self-potential survey of 21 areas between El Sherana and Coronation Hill in the South Alligator River uranium field was made at the request of United Uranium N.L. between June and August 1961. Routine radiometric surveys were also made over all but two of the areas. Uranium mineralization in the South Alligator River area is commonly associated with near-vertical beds of carbonaceous shale, and the self-potential method is particularly useful in delineating these shale beds.

Negative self-potential anomalies of 400 to 600 mV extending over distances of 800 to 1700 feet were found in six of the 21 areas. Quantitative analysis has shown that these anomalies can be accounted for by narrow vertical, or near-vertical, conducting beds.

Wagon-drilling of three of the areas of strong self-potential anomalies has located carbonaceous shale, and encouraging amounts of uranium mineralization have also been found at El Sherana North-West.

Recommendations are made for wagon-drilling of the other strong anomalies.

1. INTRODUCTION

The South Alligator River uranium field is situated 65 miles north-east of Pine Creek (inset map, Plate 1) and extends along the valley of the South Alligator River from Coronation Hill to Rockhole. Uranium was first discovered in 1953 at Coronation Hill and, since that time, several very rich deposits of pitchblende have been found. The uranium generally occurs as small pockets of pitchblende along or near shear zones in proximity to the contact between Upper and Lower Proterozoic rocks.

At the request of United Uranium N.L. a test geophysical survey was made in October 1960 (Rowston, 1961), using the self-potential and electromagnetic methods, in an effort to locate shear zones. These geophysical methods were chosen because carbonaceous shale, a good electrical conductor, is often associated with the shear zones. Both methods were successful, and for future geophysical work the self-potential method was recommended. The electromagnetic method was not favoured because the rugged topography made its operation difficult.

Between June and August 1961, Bureau of Mineral Resources geophysicist J. Ashley and two United Uranium N.L. assistants made a self-potential survey of 21 areas on the United Uranium N.L. leases, in an effort to trace shear zones and faults. Routine radiometric measurements were made on all but two of the areas. Seven resistivity measurements were made underground to determine the conductivities of rock formations thought to be associated with the self-potential anomalies.

2. GEOLOGY AND PREVIOUS GEOPHYSICAL WORK

Plate 1 illustrates the general geology of the South Alligator River area between El Sherana and Coronation Hill, and indicates the areas of geophysical survey.

The South Alligator River valley increases in width from four miles near El Sherana to about six miles at Coronation Hill. The valley is bounded by Upper Proterozoic escarpments of the Arnhem Land Plateau. Many steep-sided hills and small plateaux of Lower and Upper Proterozoic rocks form a range of hills extending from Coronation Hill to beyond El Sherana along the centre of the valley. Major north-westerly shear planes follow the same line, and there is evidence of considerable faulting in a northerly and north-easterly direction. Uranium ore is being extracted from this range of hills, and is usually associated with the major shear planes in proximity to the Upper/Lower Proterozoic contact. The ore occurs in both Lower and Upper Proterozoic rocks north of the outcrop of the Coirwong Greywacke.

Before 1960 the only geophysical work carried out in the South Alligator River area, apart from extensive airborne and ground radiometric surveys, was a magnetic and self-potential survey at Coronation Hill by Barlow (Misz, 1954). The magnetic work was successful in tracing a quartz reef, but the self-potential results were valueless.

3. GEOPHYSICAL METHODS

The self-potential, radiometric, and resistivity methods were used and are briefly described here.

Self-potential

Electrical self-potentials are associated with several minerals, principally sulphides. A negative potential is most commonly observed over a sulphide orebody. Positive anomalies have occasionally been reported usually in connexion with graphite and anthracite deposits. The test survey in 1960 indicated that carbonaceous shale beds associated with shear zones produce negative anomalies.

Although this method of prospecting has been extensively used in the past 40 years, the mechanism of the production of self-potentials is not fully understood, particularly in relation to non-sulphides.

In a self-potential survey the surface distribution of potential is measured relative to some arbitrary point known as a base station. One electrode is set up at the base station and the other electrode is placed at one of the field stations. Cables from the electrodes are led to a potentiometer, and the potential difference between the field and base stations is recorded.

Non-polarizing electrodes and a Bureau-type Self-potential Meter were used in the present survey.

Radiometric

Measurements of the radioactivity at the ground surface are fundamental to the search for uranium. However, the radioactivity measured is that of the top few feet of soil or rock, and the presence of high radioactivity does not necessarily indicate the presence of uranium ore. The converse is also unfortunately true; a deposit of high grade ore at a depth of more than a few feet may lie in a region of low surface radioactivity.

Three ratemeters type 1368A (Serial Nos. 26, 77, 315)each fitted with three G24H Geiger-Mueller tubes were used. (No. 315 was borrowed from United Uranium N.L.) These instruments record the radioactivity, dominantly the gamma-ray component, in units of milliroentgens/hour (mr/h).

Resistivity

In general, rocks of different composition have different electrical resistivities. Measurements at the ground surface indicate the combined resistivities of the rock formations in the vicinity of the observation point.

These measurements are made as follows:

Four steel electrodes are driven into the ground at equal intervals along a straight line (this is the Wenner configuration, and is only one of a number of possible electrode configurations). A commutated direct current is fed into the ground via the outer two electrodes. The resultant potential difference between the inner two electrodes, and the current passing into the ground, are applied to a meter to give a reading of resistance R. The apparent resistivity is then $2\pi aR$, where a is the electrode separation, and is referred to a point at the centre of the electrode spread. The depth of penetration of the current is approximately equal to a.

The instrument used was a Megger earth resistance tester, No. 986895. Measurements can be made with this instrument only if the contact resistance between the potential electrode and ground is less than 2000 ohms.

4. OPERATIONS AND PRESENTATION OF RESULTS

Altogether, 132 traverses, ranging in length from 125 to 1025 ft, were measured by the self-potential method; the number per area ranged between 1 and 12. A few of the traverses were laid out with theodolite and tape, but for most a prismatic compass was used; traverse spacing ranged between 60 and 200 ft. Field stations were positioned at 25-ft intervals (slope distance) along the traverses, and every second field station was pegged. The angles of the slopes were measured with an Abney level, and distances were reduced to the horizontal plane before the results were plotted.

The survey of each area, except Chavats Line and Orchid Gully, was linked to the United Uranium N.L. grid reference system by the Company surveyor.

Each of the 21 areas was surveyed by the self-potential method. To ensure good electrical contact between the electrode and ground, three shallow holes were dug and watered at each field station and three measurements of self-potential were made relative to the area base station. The base stations of adjacent areas were referred to a common datum. Areas linked together in this way are:

(a) Skull I and Skull II

(b) Scinto V North, Scinto V South, Palm-Scinto Camp-Clear Springs

(c) El Sherana North-West, South-East, and North-West Ridge

(d) Monolith-Koolpin Creek and Koolpin Creek

Measurements of self-potential were made along three mine adits, namely El Sherana 57-ft level (eastern extension), Palette No. 1 South Drive and Palette No. 5. Stations were paced at intervals of approximately 5 or 10 ft and one reading of potential was taken at each station. Corrections were made for the difference between the contact potentials of the electrodes. This difference was checked about four times each day. The estimated error in any value of potential is 10 mV. The results are presented as equipotential contour maps and potential profiles. The adit results are discussed in the Appendix to this Record.

All the areas except Saddle Ridge South and Saddle Ridge Open Cut were surveyed radiometrically. Some difficulty was experienced with the two Bureau ratemeters because they began to oscillate when their temperatures reached a certain value. The instrument borrowed from United Uranium N.L. had been modified to prevent this oscillation, and the Bureau ratemeters were subsequently modified also.

The radiometric results are presented either as contour maps or as profiles superimposed on the self-potential profiles. For areas where the level of radioactivity is very low and uniform, no maps or profiles are given but the results are summarised in Chapter 5.

Seven resistivity measurements were made in the El Sherana 57-ft level (eastern extension) mine adit to determine the resistivities of the different rock types underlying a self-potential anomaly. The Wenner electrode configuration was used with electrode spacings of 150 and 210 cm. Foot-long steel electrodes were used and some difficulty was experienced in obtaining good electrode-ground contacts. The results are tabulated in the Appendix.

An attempt was made to take resistivity measurements in the Stock Pile area. However, the contact resistance between electrode and ground could not be reduced to 2000 ohms, so the attempt was abandoned.

5. DISCUSSION OF RESULTS, AND RECOMMENDATIONS

The results from each area will be discussed separately. The most interesting self-potential results were obtained at El Sherana South-East, North-West, and North-West Ridge and at Cliff Face, Monolith-Koolpin Creek, Skull I and II, Scinto V North, and Scinto V South. It must be stressed that self-potential anomalies do not indicate uranium, but they do direct attention to possible favourable geological environments. Also, the absence of anomalies does not eliminate the possibility of the presence of uranium.

El Sherana South-East

The test traverses measured by Rowston in 1960 on the south-eastern side of the El Sherana open-cut and alongside the High Road adit indicated a negative self-potential anomaly. The area between the Open Cut and High Road adit was surveyed to delineate this anomaly. Plate 2 is a contour map of the self-potential results and Plate 3 shows the self-potential profiles. The geology of the area, the self-potential axes, and the position of carbonaceous shale in the 57-ft level adit (eastern extension) of the El Sherana mine are given on Plate 4. The carbonaceous shale in the adit occurs in a major shear zone and dips to the south at between 70° and 85°. The major self-potential axis AA is approximately in line with the carbonaceous shale and could indicate a continuation of this bed.

Self-potential results have been interpreted assuming that the feature producing the anomaly can be represented by a vertical sheet of negligible thickness. The theory of the potential distribution about a sheet of this type is given by Edge and Laby (1931). The theory requires that the current source and sink be uniformly distributed along the lower and upper edges of the sheet and that the medium surrounding the sheet is electrically isotropic.

The calculation was made to determine whether the major part of the anomaly could be accounted for by a vertical sheet extending from the north-western side of the open-cut to the vicinity of the High Road adit.

Plate 5 shows the observed and calculated profiles along Travese 00 and the longitudinal section of the vertical sheets for which the profile is calculated. To obtain a potential distribution of high amplitude but limited lateral extent it was necessary to use two sheets carrying a total current of 4.43 amp surrounded by a medium of resistivity 1.5×10^4 ohm-cm. The calculation for Traverse 00 applies almost exactly to Traverse 200E. The self-potential minimum is displaced 10 ft to the south of the sheets by the slope of the ground. The calculation indicates that the sheet must be about 20 ft below the ground surface to produce the observed potential gradient of the northern side of the anomaly. The bed of carbonaceous shale, which it is assumed the sheet represents, will be curved to follow the trend and displaced 10 feet north of the major axis of the anomaly given on Plate 4.

A contour map of the radiometric observations is presented as Plate 6. There is an increase in the general level of radioactivity towards the open-cut, which suggests that the area has become contaminated during mining operations. No radiometric anomaly coincides with the axis of the self-potential anomaly.

A wagon-drill hole to test the self-potential anomaly is recommended at one of the following sites, depending on accessibility:

(a) On Traverse 00. Collar at 15 ft north of peg 00, inclined at 65° to the horizontal in a northerly direction to intersect the assumed shale bed at 60 ft drill depth.

(b) On Traverse 200E. Collar at 75 ft north of peg 00 and similar to (a).

El Sherana North-West

Plates 2 and 6 illustrate the self-potential and radiometric contours respectively. The principal self-potential anomaly appears to be a continuation of the anomaly observed south-east of the open-cut, and it is reasonable to suppose that this anomaly indicates the position of the shear zone (coincident with the carbonaceous shale bed) observed in the El Sherana open-cut.

An interpretation of the anomaly along Traverses 700W and 100W was made using vertical sheets in the same manner as for the El Sherana South-East anomaly. Plate 7 gives the observed and calculated profiles along these traverses and also shows the arrangement of vertical sheets. Straight sheets were again used in the calculation but the assumed carbonaceous shale bed will be curved to follow the axis of the anomaly. The displacement between the self-potential minimum and the shale bed is negligible. It has been necessary to place the top surface of the shale bed very close (10 ft) to the ground surface to produce the observed anomaly.

The results of Traverse 440W show that the conductor must dip towards the south, but no calculation has been made to determine this dip.

The higher value of potential along the axis of the anomaly between Traverses 200W and 310W may indicate a fault zone trending approximately north.

The radiometric contours show an extensive area of high radioactivity east of a line passing through 100W/100S (i.e. peg 100S on Traverse 100W) and 440W/400N, which is probably worthy of investigation. The western limit of this area coincides with the position of a fault zone suggested by the self-potential results. Accessibility to the area is good, and a few costeans over the area of highest radioactivity are recommended.

Another radiometric 'high' centred near 550W/200N coincides approximately with the main self-potential anomaly.

On the basis of the self-potential results, the following wagon-drill hole is recommended:

> Along Traverse 700W. Collar at 165 ft north of the baseline i.e. peg 215 ft north, inclined at 65° to the horizontal in a southerly direction to intersect the assumed carbonaceous shale at 60 ft drill depth.

El Sherana North-West Ridge

This area is situated on the northern side of El Sherana North-West area. A ridge, composed of or capped by the Koolpin Formation and trending north-west, occupies almost the whole area. High radioactivity occurs at two places on the ridge, and the self-potential survey was made to define the geological structure in the vicinity of these radiometric anomalies.

The self-potential and radiometric results are included in the contour maps on Plates 2 and 6 respectively. The dominant feature of the self-potential results is the large negative anomaly centred about 600W/150S and 500W/150S. Haematitic rock crops out along the ridge, and as this is frequently indicative of carbonaceous or graphitic material at depth there is some geological support for the belief that this anomaly is due to carbonaceous rocks. A line passing through the zone of higher (less negative) potential at 200W/00, 100W/100S, 00/200S also passes through the high-potential zone of El Sherana North-West at about 250W/100N and may indicate a fault. The irregular negative anomaly east of the postulated fault (El Sherana North-West Ridge) is narrow and could be attributed to thin vertical conducting beds of the Koolpin Formation.

Neither of the radiometric anomalies coincides with the negative self-potential anomalies. However, it is believed that the large self-potential anomaly is worth testing, particularly as it is easily accessible, and a vertical wagon-drill hole at 550W/150S is recommended.

Cliff Face-Palette 5

On Plate 8 the self-potential contours and radiometric contours (above 0.030 mr/h only) are presented for this area. The positions of the axes of the self-potential anomalies in relation to the geology are shown on Plate 9. The axis AA' of the major anomaly coincides with a shear zone exposed in a western crosscut from the Palette 5 adit. No extensive shears or faults have been proved in the Cliff Face area or in the area east of Palette 5 adit. However, the self-potential anomaly indicates a feature extending over a distance of at least 800 ft, and could represent a shear zone in association with a bed of carbonaceous shale. There are considerable amounts of dull carbonaceous shale in Palette 5 adit, but no appreciable self-potential anomalies were detected above and along the adit. Possibly anomalies are associated only with carbonaceous shale that has been sheared. Carbonaceous shale is present in the 37-ft level south drive from the Cliff Face mine shaft. The minor self-potential anomaly whose axis is close to the mine shaft may be associated with this carbonaceous shale.

The radioactivity over the whole area, except where the contours are shown on Plate 8, is low. The high radioactivity near the mine shaft is probably due to gangue and dust deposited during the mining operations.

The shape of the self-potential profile along Traverse 130E indicates a bed dipping towards the south-west, which is consistent with the direction of dip of beds at the south-western end of the traverse. The anomaly also indicates that the top surface of the bed is close to the ground surface.

A vertical wagon-drill hole, collared at peg 375N along Traverse 130E is recommended to test the anomaly.

Monolith-Koolpin Creek

The self-potential contours for this area are presented on Plate 10. The hill Monolith is situated just north-west of peg 100N on Traverse 00. A geophysical survey over the area south-east of the Koolpin Creek mine shaft (Rowston, 1961) detected a well-defined negative self-potential anomaly whose axis trends north-west and passes through the mine shaft. This anomaly continues north-west of the mine shaft, but the axis is displaced by about 50 ft to the south-west. The anomaly disappears between Traverses 800E and 1000E, but the anomaly centred about the pegs 100N on Traverses 400E, 500E, and 600E may be due to the same feature. Carbonaceous shale is present in the mine shaft, and it is assumed that the major self-potential anomaly is associated with a near-vertical bed of carbonaceous shale. The shale may be coincident with a shear zone; in this case the mine shaft is at the junction of a shear zone and a cross fault, the latter being inferred from the displacement of the axis of the self-potential anomaly.

Uranium ore is present in the Koolpin Creek mine shaft between 10 ft and 50 ft below ground level, and a very small pocket of secondary mineralization was found near the surface about half way between 00/150N and 200E/150N.

Except along Traverses 1000E and KC, the surface radioactivity is below 0.020 mr/h. Along Traverse 1000E an increase in radioactivity coincides with the self-potential minimum.

The only other anomaly of possible importance is the one centred about pegs 500E/100S and 600E/100S. The local geology gives no clue to the origin of this anomaly because there is an extensive cover of surficial material.

The self-potential anomaly south-east of the mine shaft has not been tested, and until this is done it is not recommended that the area north-west of the shaft be investigated.

Skull I and II

An extensive area has been surveyed; it consists of the two survey areas of Skull I and II, between the Skull Prospect and Saddle Ridge North. The self-potential results are presented as a contour map (Plate II) for Skull I and II (excluding the results from Traverse 515W, Skull I).

Skull I is a small area in the vicinity of the Skull prospect; the position of the prospect is indicated approximately on Plate 11. The Skull II area extends from east of Skull I towards Saddle Ridge North. The self-potential results from each area, although referred to the same base station, will be discussed separately.

Skull I. At the Skull prospect, secondary mineralization is present in a cliff exposure of Upper Proterozoic sandstone. The area between Traverse 00 and the Skull prospect has been extensively bulldozed, and was not surveyed.

A self-potential anomaly was located, centred about 00/50S, 64E/50S, and 110E/50S. An anomaly is also indicated at about 515W/25S, and it may be part of the same anomaly. Wagon-drilling between Traverse 00 and the Skull prospect, approximately along the Skull I baseline, revealed black shale close to the ground surface. The self-potential anomaly probably indicates the easterly limit of the black shale. At the time of writing, the Company is investigating the Skull prospect, and if results are promising it is recommended that the area of the self-potential anomaly be further examined.

Skull II. The survey of the Skull II area was started on Traverse ^{x}E, where a small amount of surface mineralization is present in the vicinity of peg 00. The anomaly detected along Traverse ^{x}E was subsequently traced eastwards towards Saddle Ridge North and westwards to Skull I area.

The Company, anxious to follow any promising indications, investigated the anomaly along Traverse ^{x}E between pegs 100S and 200N with eleven wagon-drill holes to depths of 60 to 100 ft. An interpretation of the drilling results, complying with the general dip of the Lower Proterozoic rocks (60-85° to the south-west), is shown on Plate 12. The nature of the contact between the Upper and Lower Proterozoic rocks here is unknown. However, as the Upper Proterozoic rocks to the west are dipping at between 20° and 30° and the assumed dip of the Lower Proterozoic rocks is between 60° and 85°, the contact is probably an unconformity. A possible fault is indicated by the occurrence of quartz in drill holes 7 and 9. By analogy with other areas, the most likely place for uranium mineralization would be close to the fault. However, high radioactivity was nowhere observed in the drill holes.

The above interpretation of the drilling results is based on geological evidence and on the assumption that Traverse ^{x}E is perpendicular to the strike of the beds; the self-potential results have not been considered, primarily because there is no obvious connexion between them and the drilling results. The anomalies on Traverses ^{x}E and ^{x}90E are somewhat different from those on neighbouring traverses. A geological contact at about ^{x}120W/225N, ^{x}190E/75N, ^{x}390E/100N and ^{x}600E/00 is indicated. The contour map (Plate II) shows that the general trend of the contours is disturbed between ^{x}E/100N and ^{x}90E/250N. This may indicate a north-striking fault, in which case an interpretation of the self-potential results along Traverse ^{x}E will be difficult.

A fault, trending approximately north-east through about ^{x}400W/200N is inferred from the increase in self-potential between ^{x}200W/150N and ^{x}600N/300N.

The radioactivity over Skull II is uniformly low, and no recommendations for further work in this area are made.

Scinto V North and South

At Scinto V North, United Uranium N.L. mined a rich deposit of uranium by the open-cut method, and at Scinto V South, they conducted an intensive wagon-drilling programme which yielded negative results.

Self-potential and radiometric surveys were made north-west of the open-cut at Scinto V North and south-east of the drilling area at Scinto V South. The results (Plates 13 and 14) are discussed separately for each area.

Scinto V North. The open-cut is situated on the southern slope of a ridge which extends in an easterly direction from the vicinity of the open-cut. Along the crest of the ridge quartz breccia crops out, but the flanks of the ridge are mostly scree-covered. Phyllitic shale, carbonaceous shale, ferruginous shale, and siltstone of Lower Proterozoic age are exposed in the open-cut.

The self-potential results are shown on Plate 13. The axis of the ridge passes through 120E/275N, 00/300N, 400W/150N. There are two areas of low self-potential; one encloses the open-cut and the other extends over most of the ridge west of the open-cut. There is high radioactivity in the neighbourhood and north of the open-cut, but elsewhere the radioactivity is low (Plate 14). (of)

United Uranium N.L. decided to investigate the broad anomaly west of the open-cut by wagon-drilling along Traverse 400W between pegs 50N and 175N. The drilling indicated that the quartz breccia is a vertical body which increases in width from 40 ft at the surface to 60 ft at a depth of 110 ft. It is flanked on both sides by flat-lying beds of the Koolpin Formation, which change with depth from ferruginous material to calcareous shale and then to black shale at between 100 and 110 ft. The dip of these beds appears to be similar to the slope of the ground on either side of the quartz breccia. The drill holes were radiometrically logged but no high radioactivity was detected.

Another series of wagon-drill holes was made between a point 30 ft west of 120E/100N and a point 60 ft west of 150E/350N. Again no anomalous radioactivity was recorded.

It is considered that further testing of this area is unwarranted.

Scinto V South. The area surveyed is part of the scree slope on the south-western side of the Scinto Plateau. The self-potential results (Plate 13) indicate a broad anomaly extending from Traverse 200W to Traverse 700E. There is no geological evidence to suggest the cause of this anomaly but, on the drilling information accumulated elsewhere, it is likely that carbonaceous shale is present at depth. The trend of the contours suggests that there is some geological feature, e.g. a fault, between Traverses 200E and 400E.

By analogy with the Scinto V North area the most likely position for uranium mineralization is between Traverses 400E and 600E. A series of wagon-drill holes is recommended between 500E/50N and 500E/200S but a high priority should not be given to this area.

Palm-Scinto Camp-Clear Springs

The area between Scinto V South and Clear Springs was investigated along eleven traverses spaced between 125 and 1100 ft apart. The positions of these traverses and Traverse 1325E, Scinto V South, are shown on Plate 15. The self-potential and radiometric profiles are given on Plate 16.

Only along Traverse PB00 was a pronounced self-potential anomaly detected. High radioactivity was observed at some points along PA00, CC00, and CE00 (a count of 0.05 mr/h was recorded near point CE00/325N). Along PA00 it occurs at the base of the southern cliff edge of the Scinto Plateau, and has been cursorily examined by the Company; along CE00 it is again confined to a very small area at the base of the cliff. On CC00 the anomalous radioactivity is probably due to volcanic rocks which exhibit increased radioactivity elsewhere on the Scinto Plateau.

The area cannot be excluded from possible uranium-bearing localities but the self-potential results do not indicate any particular areas for testing. A possible exception to this is Traverse PB00 where the self-potential minimum may be worth investigating if the Scinto V South area gives promising results.

Palette East

Self-potential measurements were made on only one traverse, and the results are shown on Plate 17. A low ridge of sandstone boulders, some of which are highly radioactive, trends north between pegs 100E and 150W. Prior to the geophysical work, wagon-drilling between pegs 50W and 100E indicated that the sandstone was not in situ. The self-potential results indicate a possible geological contact at about peg 250W. The radiometric results do not warrant any further investigation along this line.

Orchid Gully

High radioactivity is exhibited by many boulders of the Edith River Volcanics in this area. Considerable bulldozing, however, has failed to reveal radioactivity at depth.

Three self-potential profiles were measured across the bulldozed area, and the results are presented on Plate 17. The baseline lies along the axis of the bulldozed area. The self-potential and radiometric results give no reason for further investigation in this area.

Chavats Line

Very high radioactivity was observed at one locality in this area and it was considered that this radioactivity may be associated with a fault zone trending north-east. Three self-potential traverses were surveyed to investigate this possibility, and the results are given on Plate 17. The high radioactivity is shown on Traverse 00.

There is no indication of a fault zone, and no recommendations can be made from the self-potential results.

Saddle Ridge Open-Cut

Five self-potential traverses were measured in the vicinity of the Saddle Ridge Open-Cut, and these results are shown on Plate 18. The fault which was detected in the Saddle Ridge Open-Cut trends west but is not indicated by the self-potential results along Traverse 00W. As there are no significant anomalies along Traverses 00N and 24S, no recommendations can be made.

Saddle Ridge North

Self-potential measurements were made along two short traverses, and the results are given on Plate 18. Secondary mineralization is present at about 00/50N and at about 50 ft west of 160E/00. A self-potential anomaly has been detected, whose axis passes through 00/25S and 160E/25N. However, the anomaly is of small amplitude and its significance in relation to the uranium mineralization is doubtful.

Saddle Ridge South

In this area there is a radiometric anomaly (5 times background) which has been investigated by extensive costeaning and by sinking a mine shaft to a depth of 70 ft. The shaft is in limestone containing haematite boulders which are radioactive. No orebody has been found in this area.

The geology is complex and the self-potential survey was made in an attempt to establish the fault pattern. The self-potential contours are shown on Plate 19. The only anomaly of possible interest is the one whose axis passes through 200N/475W. The Company geologists postulate a fault in this vicinity and have placed it about 250 ft north-west of the axis of the self-potential anomaly. However, the evidence for this particular position is slight, and the anomaly may well be associated with the fault.

No recommendations on future work are made.

Christmas Creek

This is one of the few Company prospects where uranium mineralisation has been found on the southern side of the Coirwong Greywacke. At Christmas Creek, secondary mineralization was found in an outcrop of quartzite (?) at about 00/100S and 200W/100S (Plate 20) but did not persist at depth. It was hoped that a self-potential survey would give some aid in elucidating the geology, and would indicate drilling targets. The self-potential profiles indicate a possible geological contact at approximately peg 400E/350N, 200E/225N, 00/250N, and 200W/100N, deepening towards the west.

Between Traverses 00 and 200E there may be a fault giving a horizontal displacement of about 150 ft in the supposed contact. There is no radiometric anomaly associated with the contact.

On the basis of the geophysical results, further work in this area appears unwarranted.

Alligator Fault

At the Alligator Fault area the situation is similar to that at Christmas Creek. Surface secondary mineralization is found on a ridge of Kurrundie (?) sandstone but is not present at depths reached by bulldozing. The Alligator Fault is presumed to be on the northern side of the ridge, and the geophysical work was designed to locate the fault in the vicinity of the uranium mineralization.

The results are shown on Plate 20. The baseline was surveyed along the foot of the sandstone ridge. There is no obvious correlation between the results on each traverse, and the self-potential method failed to detect the fault. No recommendations for further work are made.

Flying Fox

This is an area of high surface radioactivity but, as shown by wagon-drilling and extensive bulldozing, this radioactivity falls off rapidly with depth. The ground surface is covered by scree material and alluvium which apparently contains the radioactive material; the origin of the scree material is not known.

The self-potential and radioactivity were measured along two traverses and the profiles are given on Plate 21. There is no indication from the self-potential results of any structure associated with the surface radioactivity. This tends to support the theory that the radioactive scree material has travelled some distance from its parent rock. Certainly the self-potential results do not indicate any drilling targets.

Stock Pile

This is a similar area to Flying Fox and again there is high surface radioactivity in the scree material on the southern side of the Coirwong Greywacke. The radiometric anomaly is not, however, as extensive as that at Flying Fox. Two self-potential profiles were measured and these, together with the radiometric results, are given on Plate 21. Along Traverse 00 a small but distinct change in the self-potential was recorded at the position of the radiometric anomaly. This change in self-potential may represent the junction between beds of different resistivity, and the radioactivity could be associated with the junction.

A costean is recommended along Traverse 00 between pegs 150W and 250W. If the radioactivity increases with depth then a vertical wagon-drill hole collared at peg 200W is recommended.

Coronation Hill South-West

Secondary surface mineralization is present south-west of the summit of Coronation Hill. A costean 4 ft deep and 50 ft long has exposed further mineralization. The geology in this area is complex, and the self-potential survey (Plate 22) was made to aid its interpretation and to define drilling targets. The topography severely limited the area that could be surveyed.

The costean is situated about 6 ft north of Traverse 00 between pegs 00 and 50W.

There are no large anomalies or distinctive trends in the potential contours. No recommendations for further work are made.

6. ACKNOWLEDGEMENTS

The co-operation of the staff of United Uranium N.L. and of the field assistants provided by United Uranium N.L. is gratefully acknowledged.

7. REFERENCES

EDGE, A.B.B. and LABY, T.H. 1931 THE PRINCIPLES & PRACTICE OF GEOPHYSICAL PROSPECTING. Cambridge University Press.

MISZ, J.B. 1954 Preliminary geophysical report on the Coronation Hill uranium prospect, Katherine-Darwin area, N.T. Bur. Min. Resour. Aust. Rec. (Unnumbered report).

ROWSTON, D.L. 1961. Koolpin Creek and El Sherana geophysical Surveys, South Alligator River, N.T. 1960. Bur. Min. Resour. Aust. Rec. 1961/33.

APPENDIX

Self-potential and resistivity measurements underground

Self-potential measurements were made along the floors of the El Sherana 57 ft level (eastern extension), Palette No. 5 and Palette No. 1 (south drive) adits. These results, together with geological sections along the adits, are shown on Plates 23, 24 and 25 respectively. On Plate 24 the self-potential along a traverse at ground level above, and following the line of, the adit is also shown.

The most striking results are those from the El Sherana adit. The potential over the black shale is about 200 millivolts lower than that over the chert breccia and brown shale. This gives considerable support to the assumption that the black shale is associated with the negative anomalies observed at ground level south east of the El Sherana open-cut.

In the Palette 5 adit there are no distinct self-potential anomalies although a considerable quantity of carbonaceous shale is exposed. The reason why there are no anomalies associated with the black shale is not clear; possibly the shale here is no more conducting than the surrounding rock. The general level of self-potential in the adit is slightly lower (about 60 mV) than that at ground level.

The results from Palette No. 1 adit are similar to those obtained from the El Sherana adit. The self-potential over the black shale is about 150 mV lower than that over sandstone. The phyllitic shale here appears to exhibit the same electrical properties as the black shale.

Resistivity measurements over carbonaceous shale, contorted carbonaceous shale, and chert breccia were made in the El Sherana adit. The results are tabulated below. The station numbers indicate the distance in feet of the station from the adit entrance.

Station at centre of electrode spread: Wenner configuration)	Electrode spacing a (cm)	Reading R(ohms)	Resistivity 2 aR (ohm-cm)	Rock Type
95.5	150	0.540	510	Chert breccia
97.5	210	0.620	820	
160	150	0.030	28	Carbonacous shale
180	150	0.100	94	Carbonaceous shale
180 (side of adit)	150	0.010	9	
200	150	0.970	910	Contorted carbonaceous shale
200	210	0.570	750	

The low resistivity of uncontorted carbonaceous shale in comparison with chert breccia supports the belief that the self-potential anomalies are associated with carbonaceous shale.

No explanation of the production of the self-potential can be given at this stage. Samples of carbonaceous shale are being obtained from United Uranium N.L. and it is proposed to conduct laboratory experiments in an effort to determine the method of production of self-potentials.

PLATE I

REFERENCE

18	Geophysical Survey Areas

1 El Sherana South-East
2 El Sherana North-West
3 El Sherana North-West Ridge
4 Cliff Face - Palette 5
5 Monolith - Koolpin Creek
5A Koolpin Creek (Rowston 1961)
6 Skull I
7 Skull II
8 Scinto V North
9 Scinto V South
10 Palm - Scinto Comp - Clear Springs
11 Palette East
12 Orchid Gully
13 Chavats Line
14 Saddle Ridge Open Cut
15 Saddle Ridge North
16 Saddle Ridge South
17 Christmas Creek
18 Alligator Fault
19 Flying Fox
20 Stock Pile (now Boundary Prospect)

Bureau of Mineral Resources, Geology and Geophysics,
Darwin N.T. December 1961

REFERENCE

UPPER PROTEROZOIC
Katherine River Group
Kombolgie Formation

- Plum Tree Volcanic Member — Andesite, andesite tuff, conglomerate, tuffaceous and micaceous sandstone
- Kurrundie Member — Brown quartz greywacke, siltstone, quartz conglomerate lenses

Edith River Volcanics

- Undifferentiated Mainly rhyolite with dacite and lenses of sedimentary breccia, tuff, greywacke conglomerate.
- Scinto Breccia Member — Silicified sedimentary breccia, etc.
- Coronation Member — Conglomerate, greywacke conglomerate. Sedimentary breccia intercalated with acid and intermediate volcanics, quartz sandstone

Geology by B.M.R. 1955.

LOWER PROTEROZOIC

- Basic igneous intrusives, epidiorite etc.

South Alligator Group
Koolpin Formation

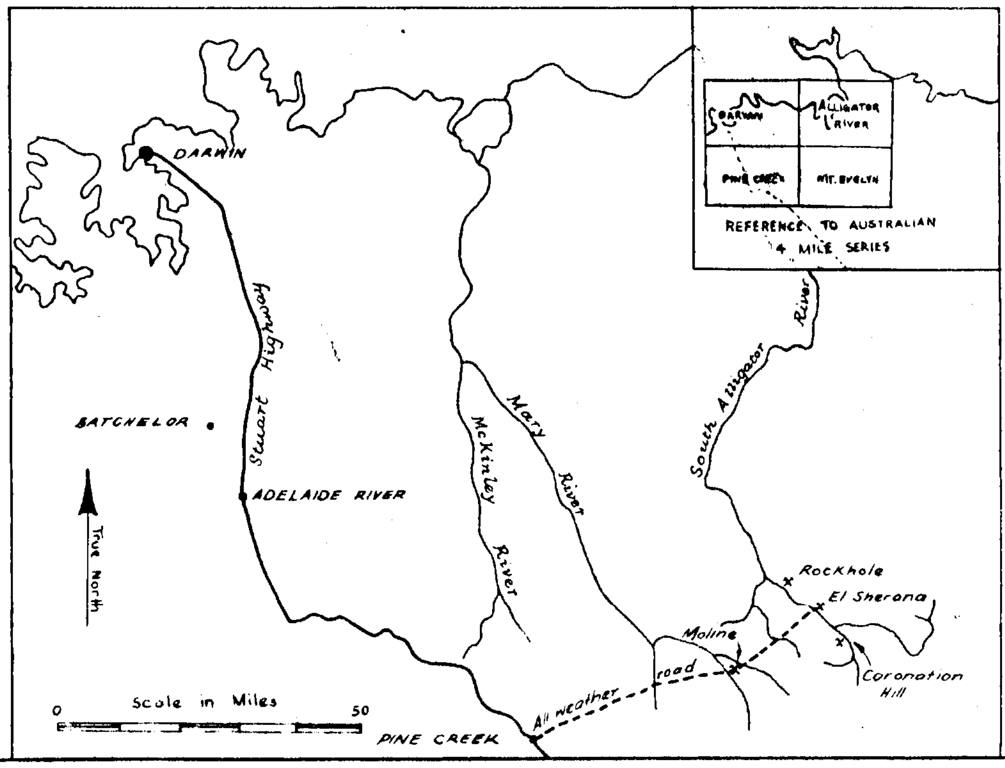
- Carbonaceous pyritic and dolomitic marl with chert lenses and nodules, carbonaceous siltstone.
- Algal bioherm reef dolomite and silicified dolomitic reef breccia, minor siltstone

Masson Formation

- Quartz greywacke, siltstone.
- Cairwong Greywacke Member — Quartz greywacke, minor conglomerate.

Archaean

- Stag Creek Volcanics — Altered basalt and basalt conglomerate (greenstone)



GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA N.T., 1961

GEOLOGICAL SKETCH MAP AND SURVEY LOCALITY PLAN

True North
Magnetic North

Scale (approx)
0 1000 2000 3000 4000 FT.

Geophysicist: J. Ashley

To Accompany Report No 1962/3

G380-6

H305-GP

GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA, N.T. 1961

EL SHERANA NORTH-WEST, NORTH-WEST RIDGE AND SOUTH-EAST AREAS.

SELF-POTENTIAL CONTOURS

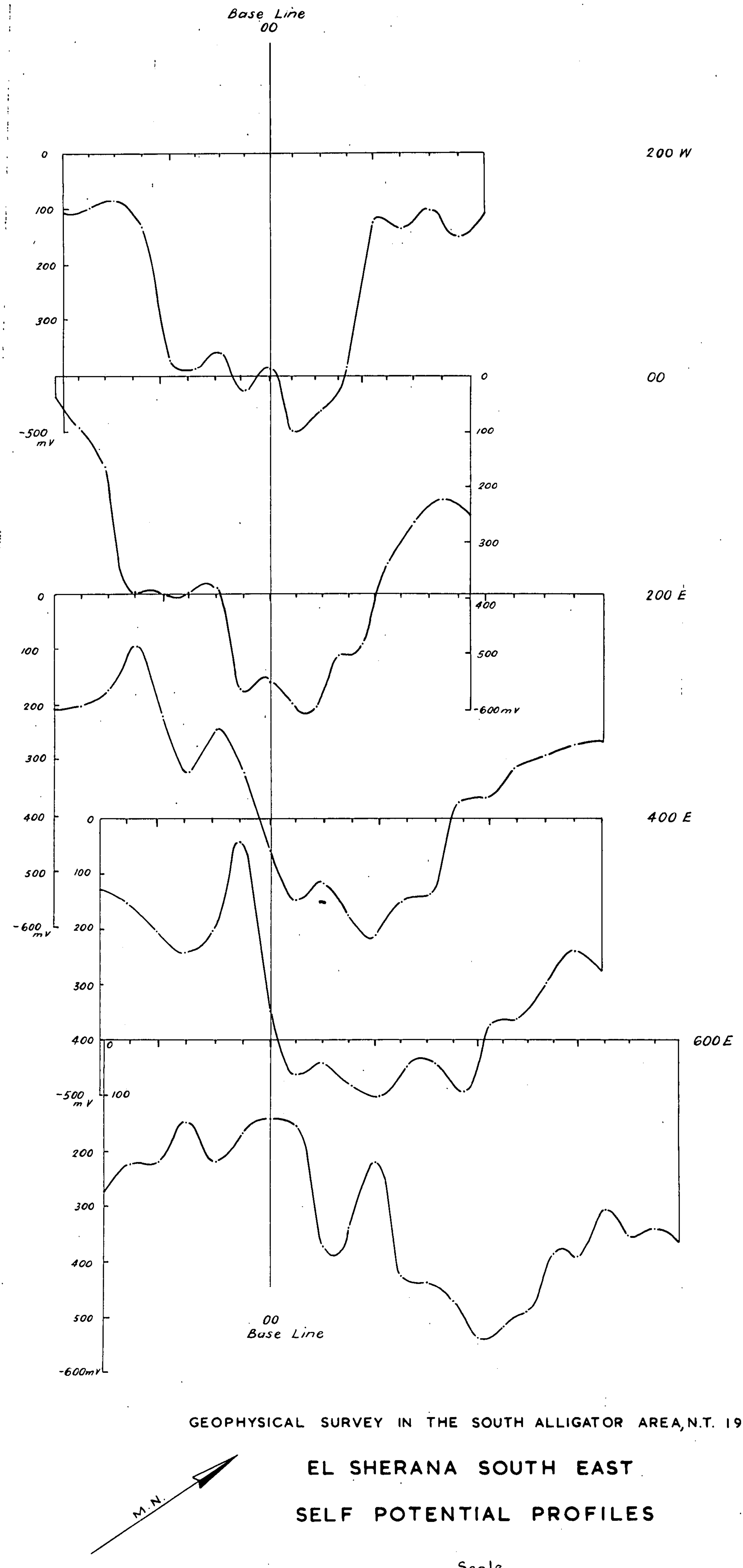
Scale.
100 0 100 200 300 FT.

Geophysicist: G. Ashley

Bureau of Mineral Resources
Geology and Geophysics, Darwin
October 1961.

To Accompany Record No 1962/38

G 380-7 H 299-6P



GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA, N.T. 1961

EL SHERANA SOUTH EAST

SELF POTENTIAL PROFILES

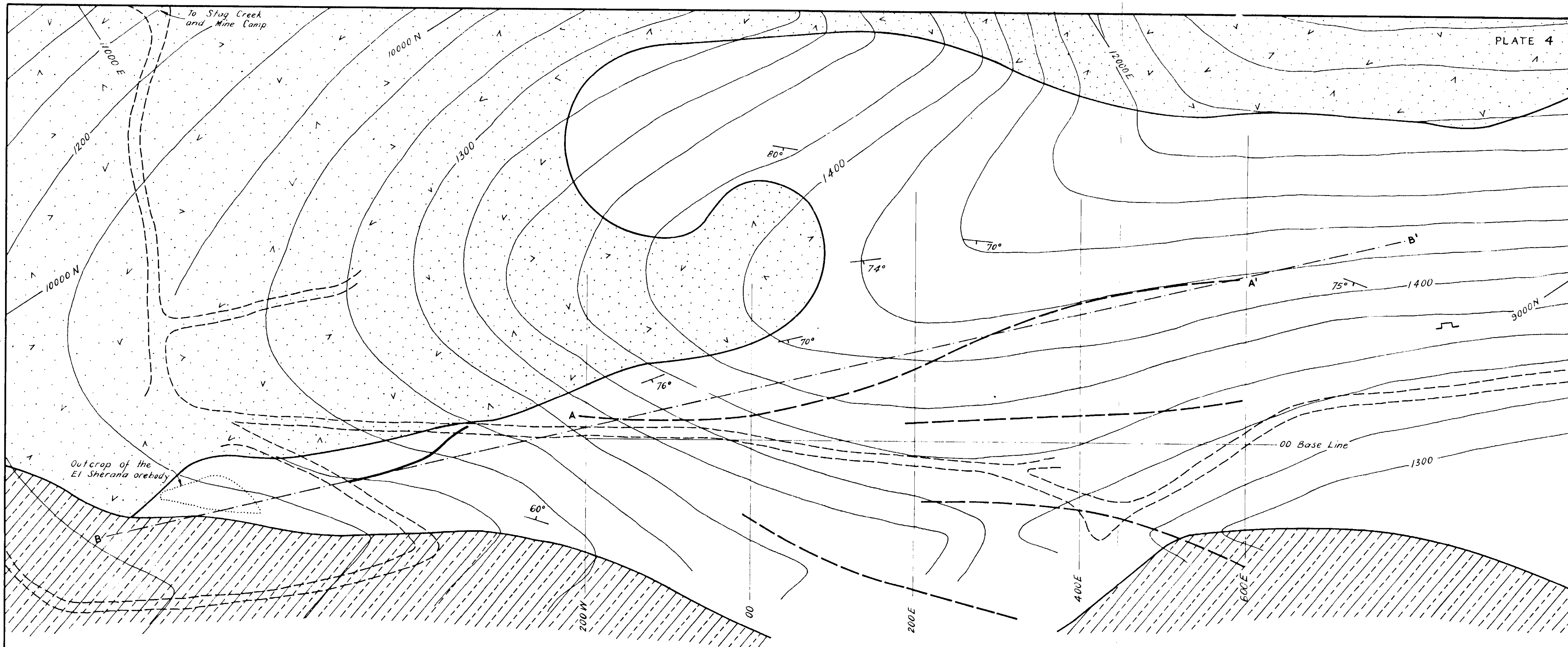
Scale
100 0 100 200 300 FT.

Geophysicist: J. Ashley

Bureau of Mineral Resources, Geology and Geophysics,
Darwin September 1961.

To Accompany Record No. 1962/36

G 380-8 H301-GP



Reference

UPPER PROTEROZOIC		Sandstone, tuff and rhyolite
		Greenish grey phyllitic and arenaceous shale
LOWER PROTEROZOIC		Banded ferruginous shale

- Axes of self-potential anomalies
- Position of vertical sheet used in calculation of anomaly
- Position of carbonaceous shale in El Sherana 57-ft level adit (eastern extension)
- Approximate position of entrance to High Road adit.
- 70° Dip
- 1300 Topographic contour of 1300 ft. referred to arbitrary datum. Contour interval 20 ft.
- Road

Geology by United Uranium, N.L.

Magnetic North

12000 E

11000 E

GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA N.T., 1961

EL SHERANA SOUTH-EAST

POSITIONS OF AXES OF SELF-POTENTIAL ANOMALIES IN RELATION TO GEOLOGY AND TOPOGRAPHY.

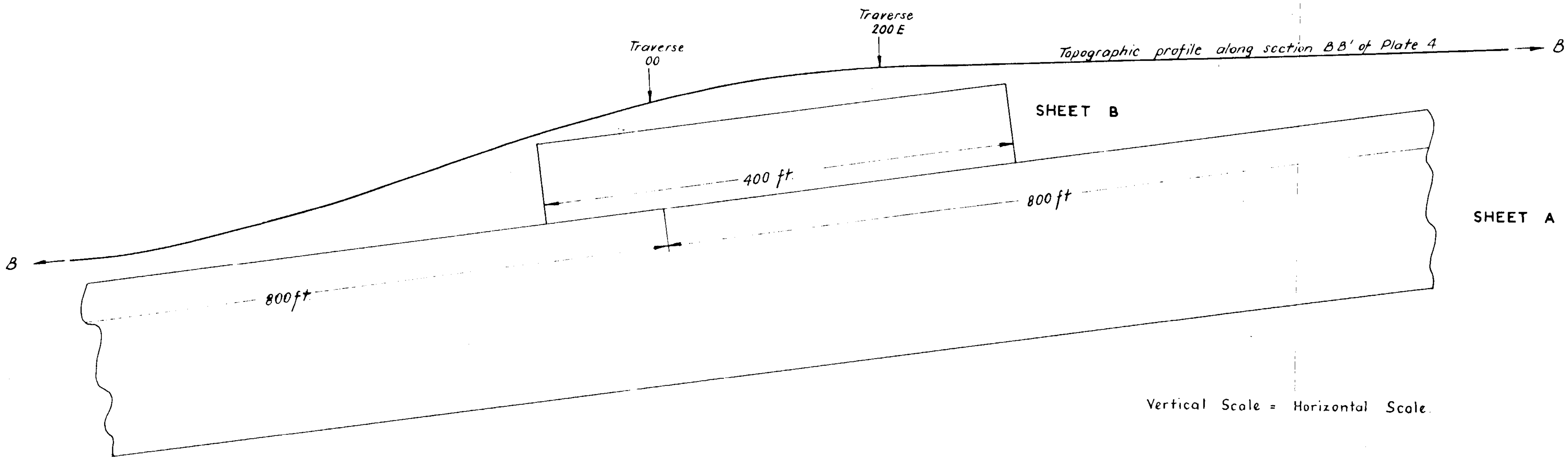
Scale
100 0 100 200 300 FT

Bureau of Mineral Resources, Geology and Geophysics, Darwin N.T. December 1961.

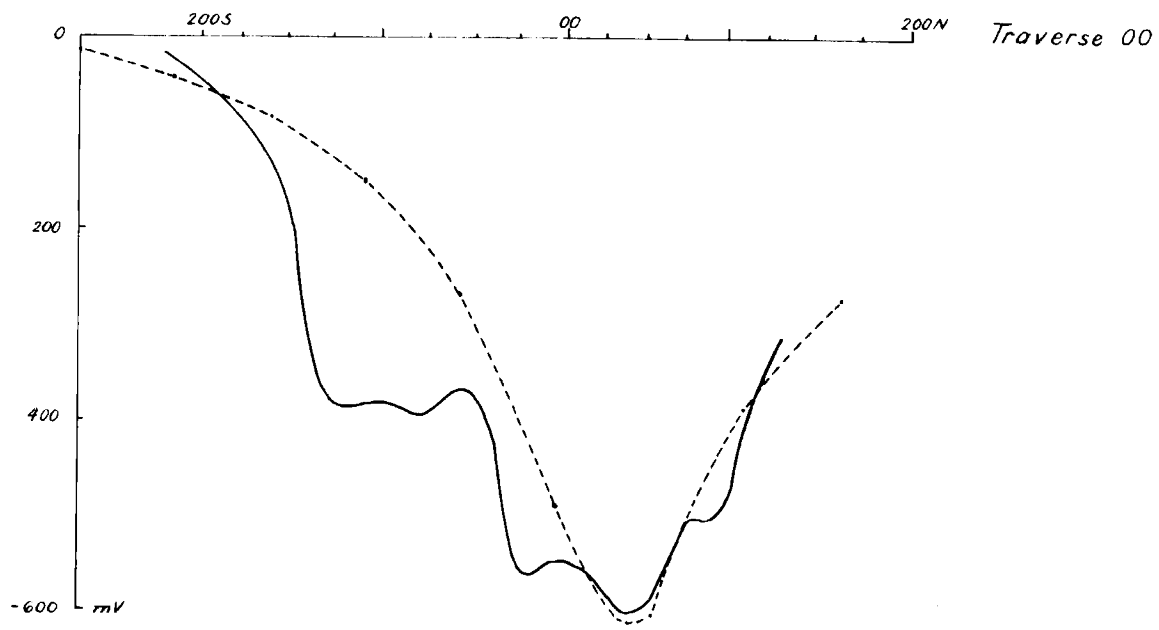
Geophysicist: J. Ashley.

To Accompany Record No 1962/36

G 380-9



Vertical Scale = Horizontal Scale.



——— Observed self-potential.

- - - - - Calculated self-potential for Sheets A and B combined.

NOTE: Sheets A and B are of negligible thickness.

GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA N.T., 1961

EL SHERANA SOUTH-EAST

OBSERVED AND CALCULATED SELF-POTENTIAL PROFILES ALONG TRAVERSE OO; LONGITUDINAL SECTION OF VERTICAL SHEETS USED IN CALCULATION.

Scale
100 0 100 200 300 FT

Geophysicist: J. Ashley.

Bureau of Mineral Resources, Geology and Geophysics,
Darwin, N.T. December 1961.

To Accompany Record No. 1962/36

G380-10

GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA, N.T. 1961

EL SHERANA NORTH-WEST, NORTH-WEST RIDGE AND SOUTH-EAST AREAS

RADIOMETRIC CONTOURS

Contour Interval : 0·005 milliroentgen / hour

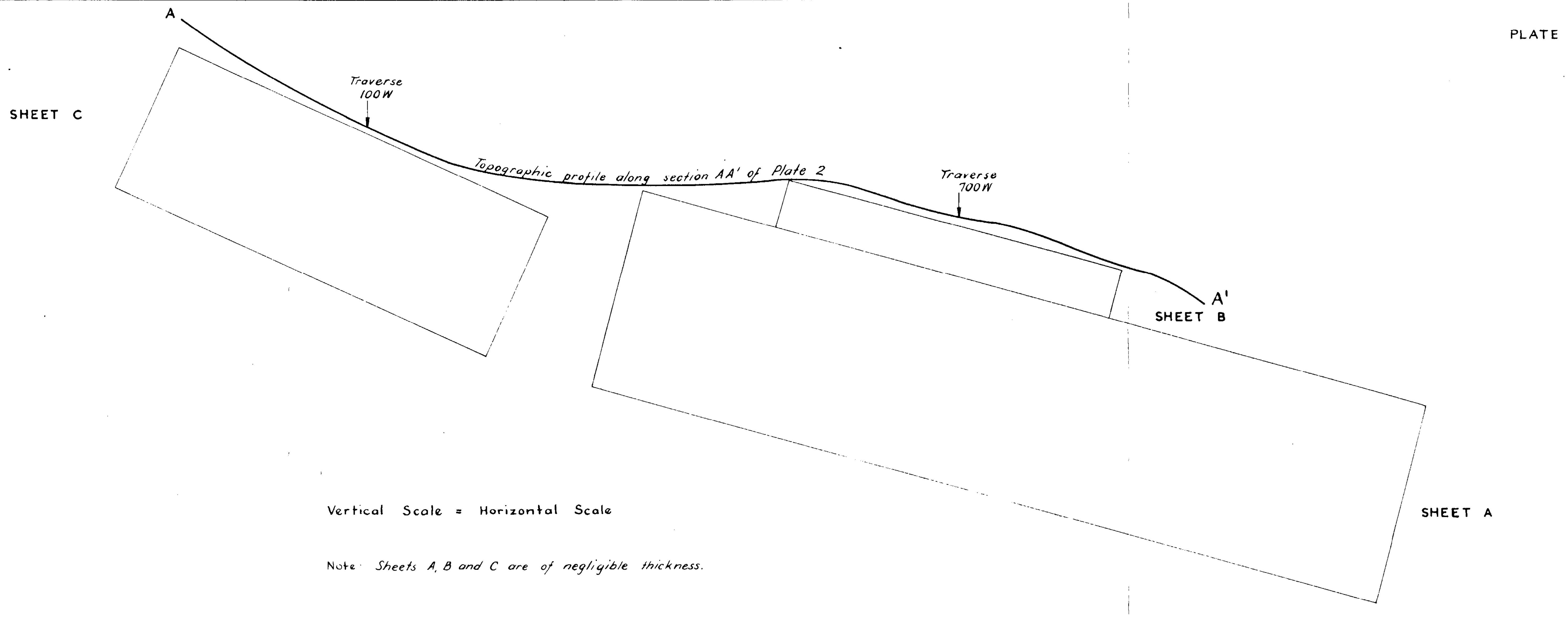
Scale
100 0 100 200 300 FT

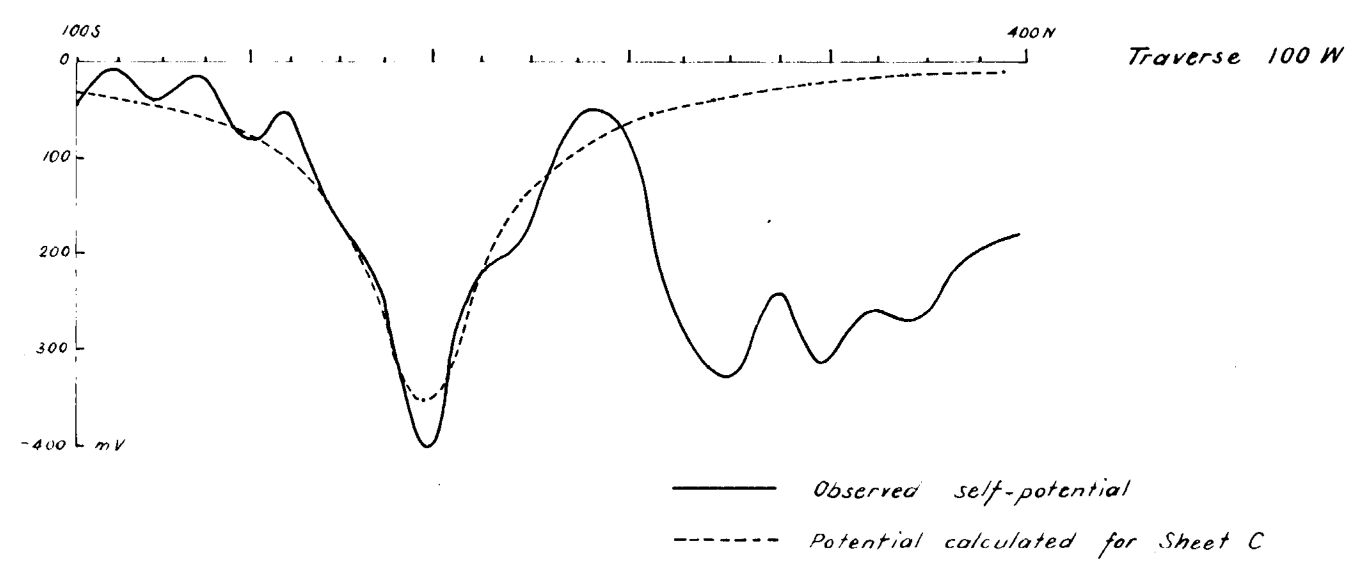
Geophysicist J. Ashley

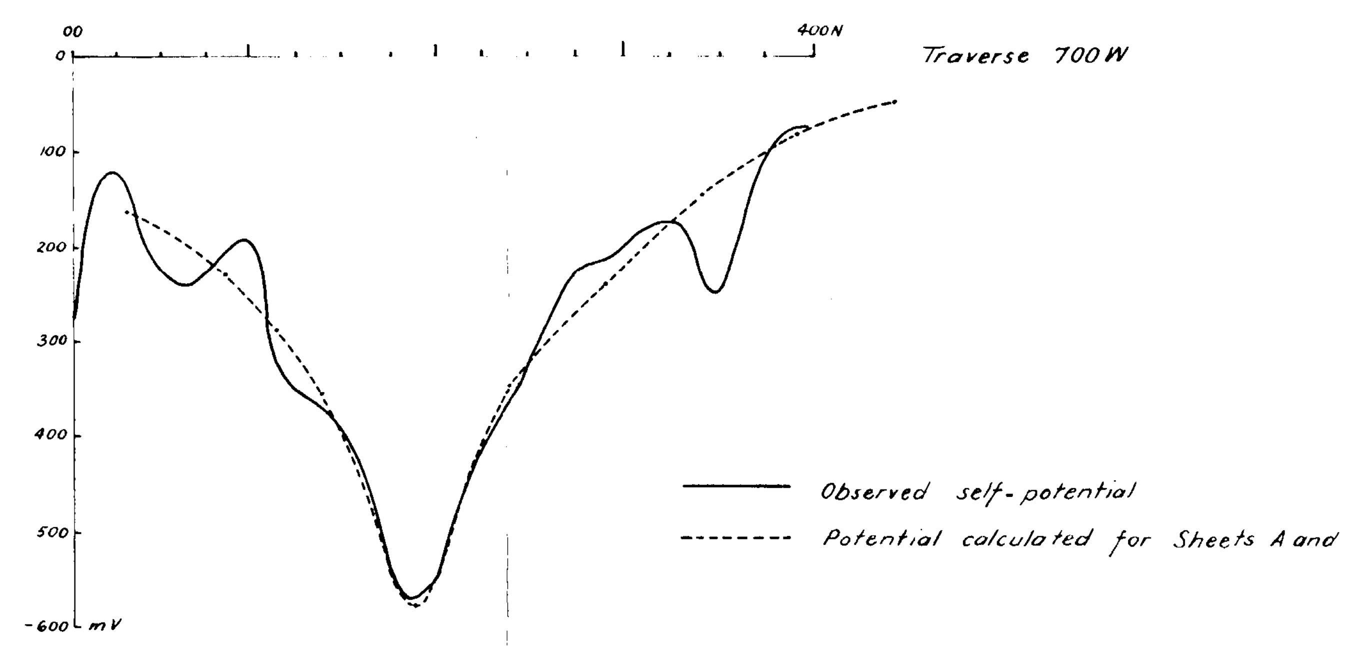
Bureau of Mineral Resources, Geology and Geophysics
Darwin October 1961

To Accompany Record No 1962/36

G 380-11 W298-GP







GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA N.T., 1961

EL SHERANA NORTH - WEST

OBSERVED AND CALCULATED SELF - POTENTIAL PROFILES ALONG TRAVERSES 100W AND 700 W; VERTICAL SHEETS USED IN CALCULATIONS (LONGITUDINAL SECTION.)

Scale

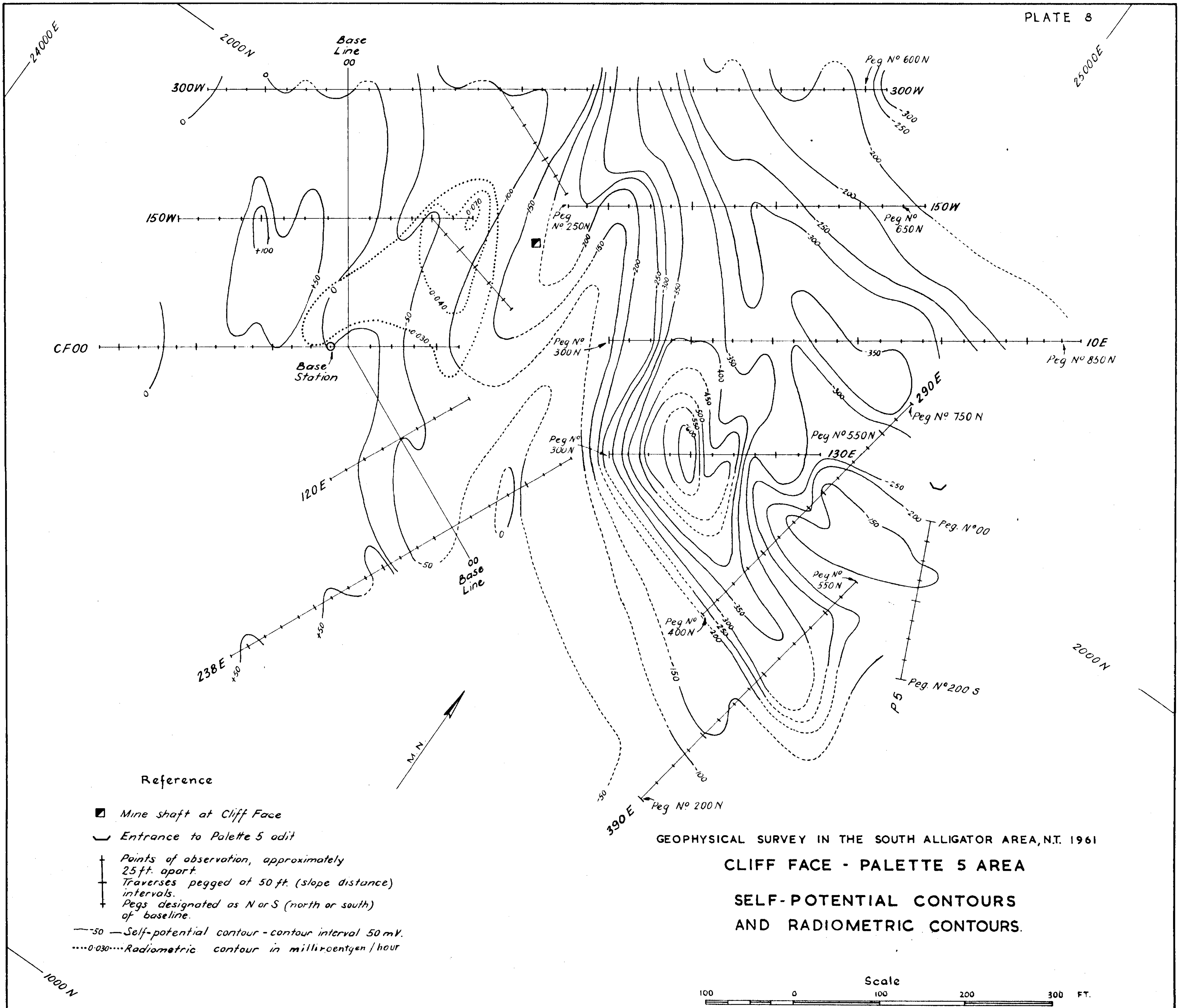
100 0 100 200 300 FT

Geophysicist: J. Ashley

Bureau of Mineral Resources, Geology and Geophysics,
Darwin, N.T. December 1961.

To Accompany Record No.1962/35

G 380-12



GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA, N.T. 1961

CLIFF FACE - PALETTE 5 AREA

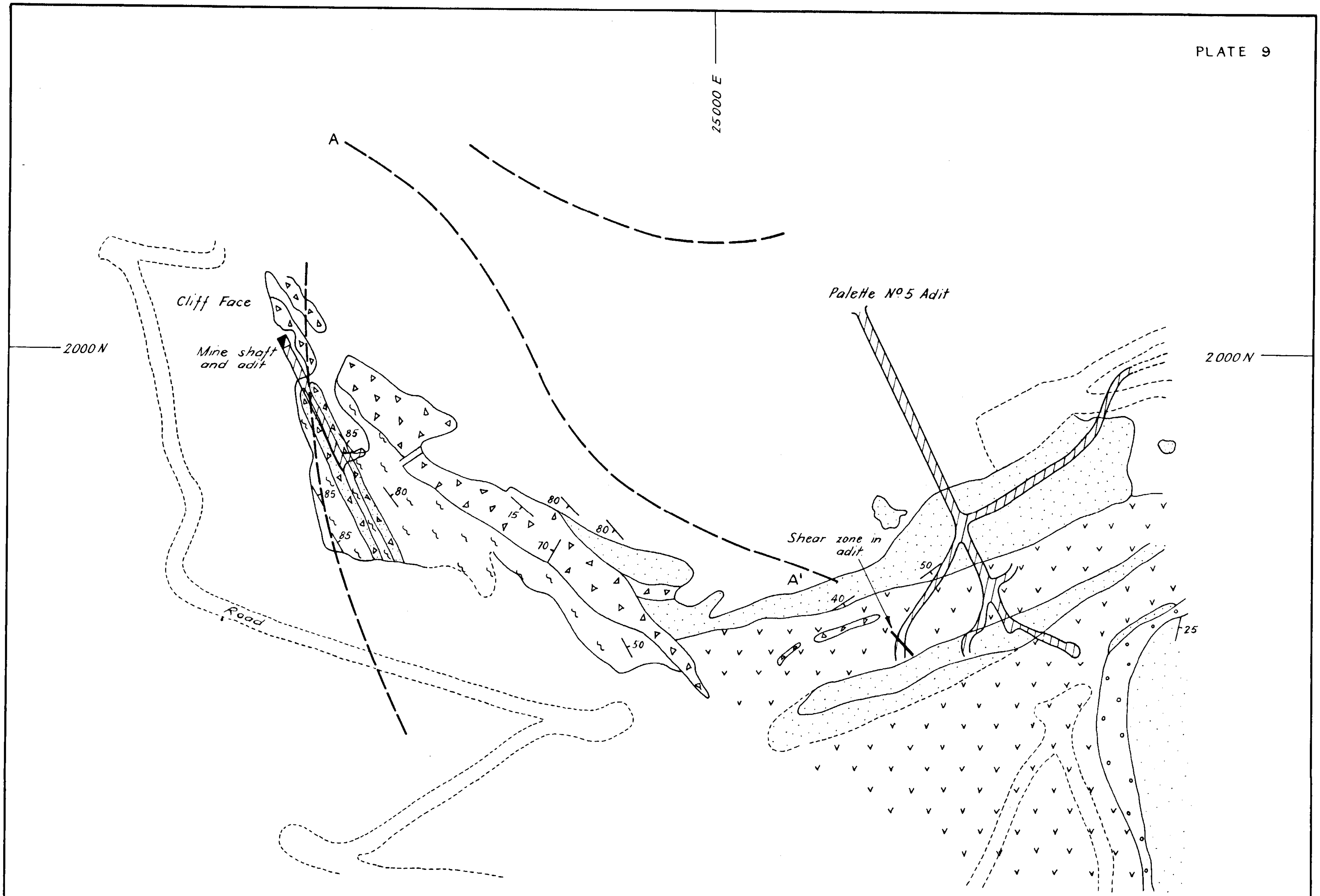
SELF-POTENTIAL CONTOURS AND RADIOMETRIC CONTOURS.

Bureau of Mineral Resources, Geology and Geophysics
Darwin September 1961.

Geophysicist: J. Ashley

To Accompany Record No. 1962/38

G380-13 H286-GP



Reference

Geology by United Uranium N.L.

UPPER PROTEROZOIC

- Sandstone, conglomerate, etc.
- Volcanics
- Conglomerate
- Breccia

LOWER PROTEROZOIC

- Shales, marl, etc.
- Breccia

— — Axes of self-potential anomalies.

Mag. North

GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA N.T., 1961

CLIFF FACE - PALETTE 5 AREA

POSITIONS OF AXES OF SELF-POTENTIAL ANOMALIES IN RELATION TO GEOLOGY

Scale

100 0 100 200 300 FT.

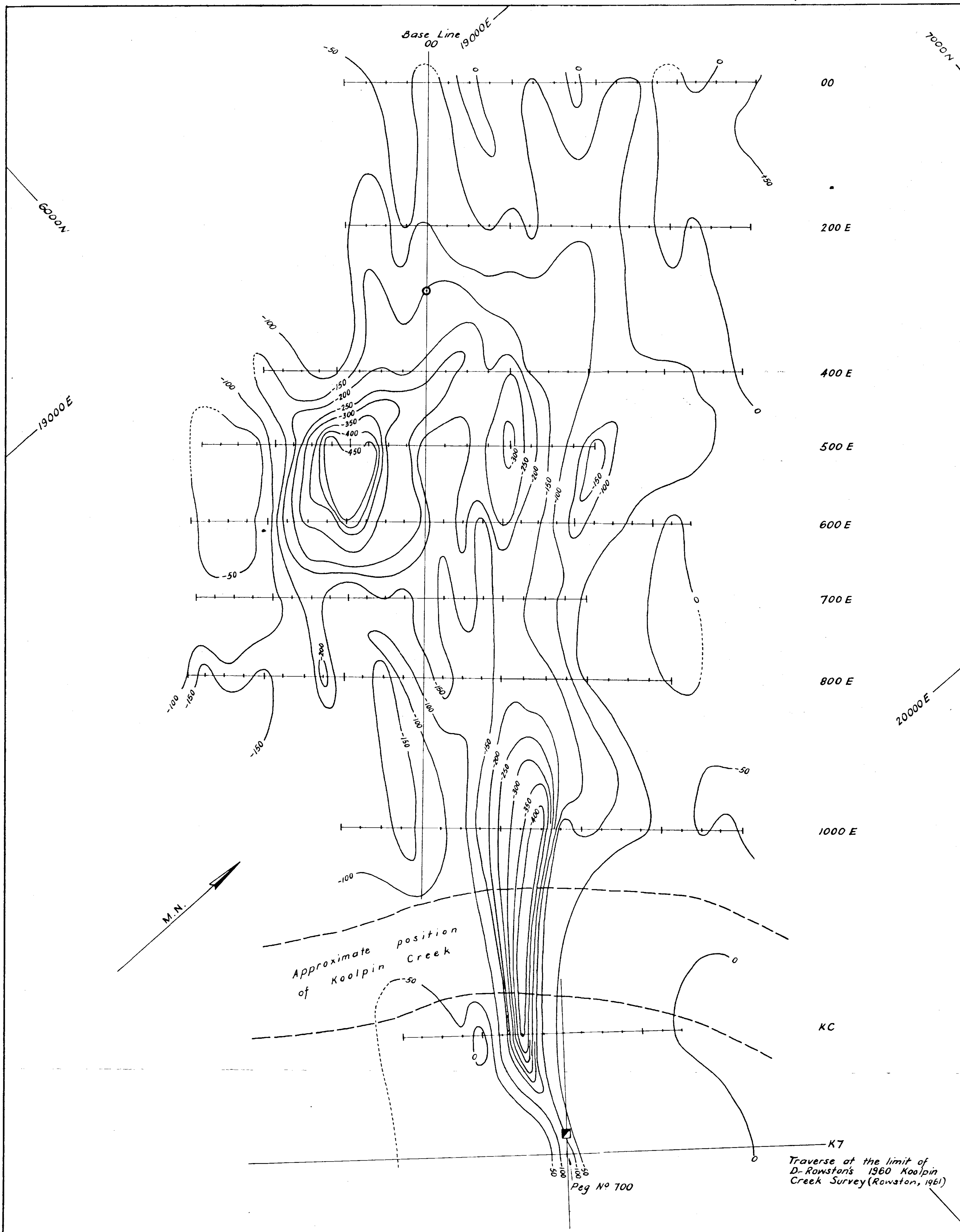
25000 E

Geophysicist: J. Ashley.

Bureau of Mineral Resources, Geology and Geophysics, Darwin, N.T. December 1961

To Accompany Record No. 1962/36

G380-14 H309-GP



Reference

○ Base station - valued at -150 millivolts to tie in the survey with D. Rowston's 1960 Koolpin Creek survey (Rowston, 1961)

◪ Koolpin Creek mine shaft.

Points of observation - approximately 25 ft. apart. Traverses pegged at 50 ft. (slope distance) intervals and designated N or S (north or south) of baselines.

5000N

GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA, N.T. 1961

MONOLITH - KOOLPIN CREEK AREA

SELF-POTENTIAL CONTOURS

Contour Interval : 50 millivolts

Scale

100 0 100 200 300 FT.

PLATE 10

Bureau of Mineral Resources, Geology and Geophysics, Darwin October 1961.

Geophysicist: G. Ashley

To Accompany Record No 1962/36

G380-15 H291-GP

PLATE II

Reference

- ○ Base station for both areas.
- Points of observation, approximately 25 ft apart. Traverses pegged at 50 ft (slope distance) intervals.
- Pegs designated N or S (North or South) of baselines

GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA, N.T. 1961

SKULL I AND SKULL II AREAS

SELF-POTENTIAL CONTOURS

Contour Interval: 50 millivolts

Scale

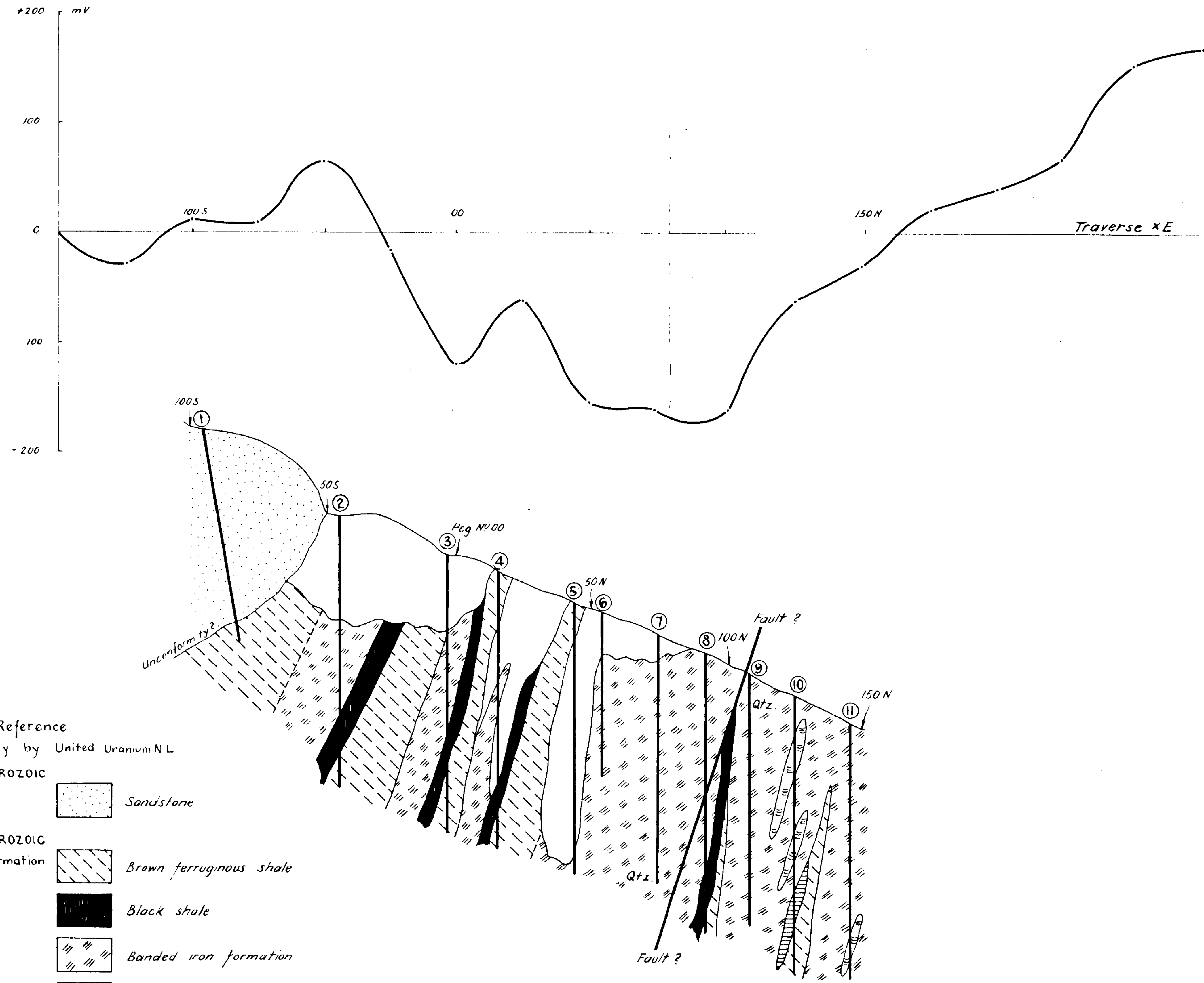
100 0 100 200 300 FT.

Geophysicist: J. Ashley

Bureau of Mineral Resources Geology and Geophysics
Darwin October 1961.

To Accompany Report No 1962/36

G380-16 H297-GP



Reference

Geology by United Uranium N.L.

UPPER PROTEROZOIC

Sandstone

LOWER PROTEROZOIC

Koolpin Formation

Brown ferruginous shale

Black shale

Banded iron formation

White bleached shale

Green chloritic schist ?

Yellow shale

③ *No. of wagon-drill hole.*

GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA N.T., 1961

SKULL II

GEOLOGICAL INTERPRETATION OF DRILLING RESULTS AND SELF-POTENTIAL PROFILE ALONG TRAVERSE ×E.

Vertical and Horizontal Scales

40 0 40 80 120 FT.

Geophysicist: J. Ashley

Bureau of Mineral Resources, Geology and Geophysics, Darwin, N.T. December 1961

To Accompany Record No 1962/136

G380-17

R E F E R E N C E

⊙ Base station for both areas

Approximate outline of open-cut

Points of observation, approximately 25 ft. apart.
Traverses pegged at 50 ft. (slope distance) interval.
Pegs designated N or S (north or south) of baseline.

-50 Self-potential contour-contour interval 50 millivolts

GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA, N.T., 1961

SCINTO V NORTH AND SCINTO V SOUTH AREAS

SELF-POTENTIAL CONTOURS

SCALE IN FEET

100 50 0 100 200 300

GEOPHYSICIST: J. Ashley

PLATE 13

23,000 E

1000 N

Bureau of Mineral Resources, Geology and Geophysics, Darwin, N.T., December 1961

To Accompany Record No 1962/36

G 380-18

R E F E R E N C E

- Approximate outline of open cut
- Points of observation, approximately 25 ft. apart. Traverses pegged at 50 ft. (slope distance) interval. Pegs designated N or S (north or south) of baseline.
- 0.025 — Radiometric contour-contour interval 0·005 mr/hr. up to 0·030 mr/hr and 0·010 mr/hr above 0·030 mr/hr

GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA, N.T., 1961

SCINTO V NORTH AND SCINTO V SOUTH AREAS

RADIOMETRIC CONTOURS

SCALE IN FEET

100 50 0 100 200 300

GEOPHYSICIST: J. Ashley

23,000 E

1000 N

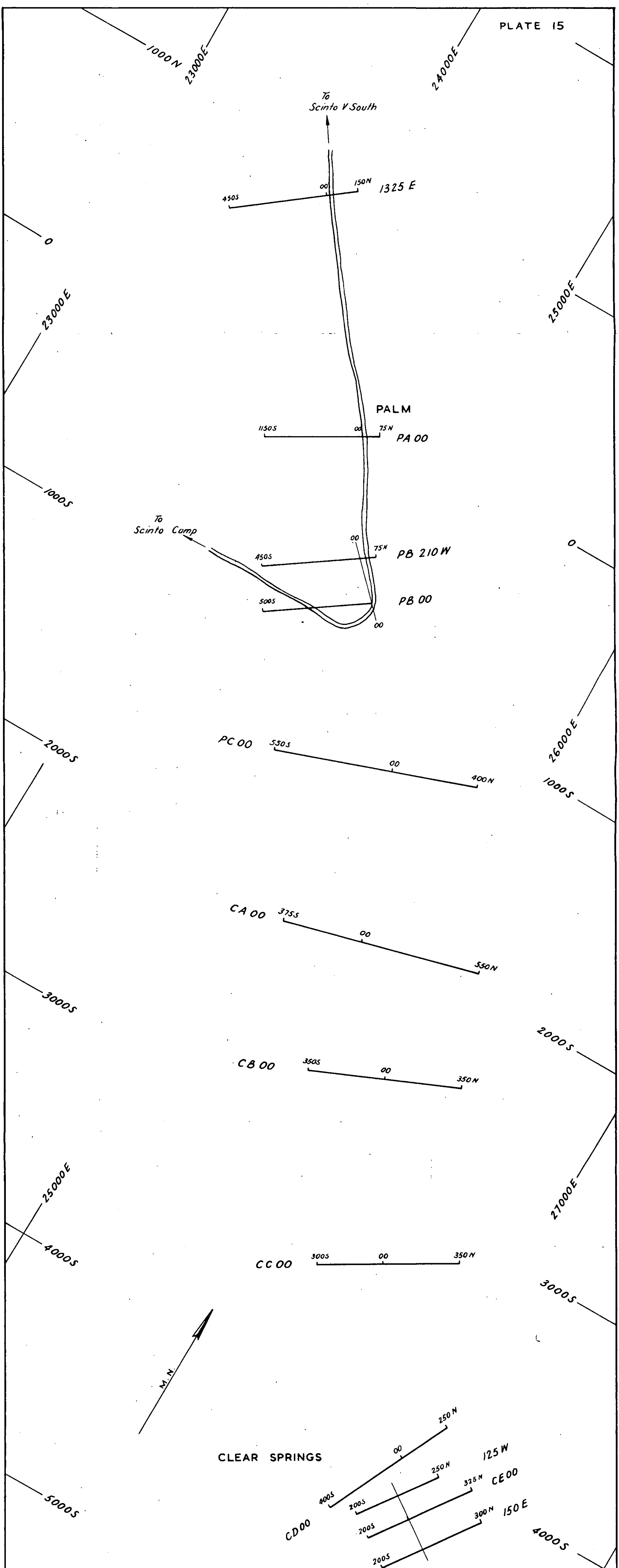
PLATE 14

Bureau of Mineral Resources, Geology and Geophysics, Darwin N.T, December 1961.

To Accompany Record No. 1962/36

G 380-19

PLATE 15



GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA, N.T. 1961

PALM - SCINTO CAMP - CLEAR SPRINGS AREA
POSITIONS OF SELF-POTENTIAL AND RADIOMETRIC TRAVERSES.

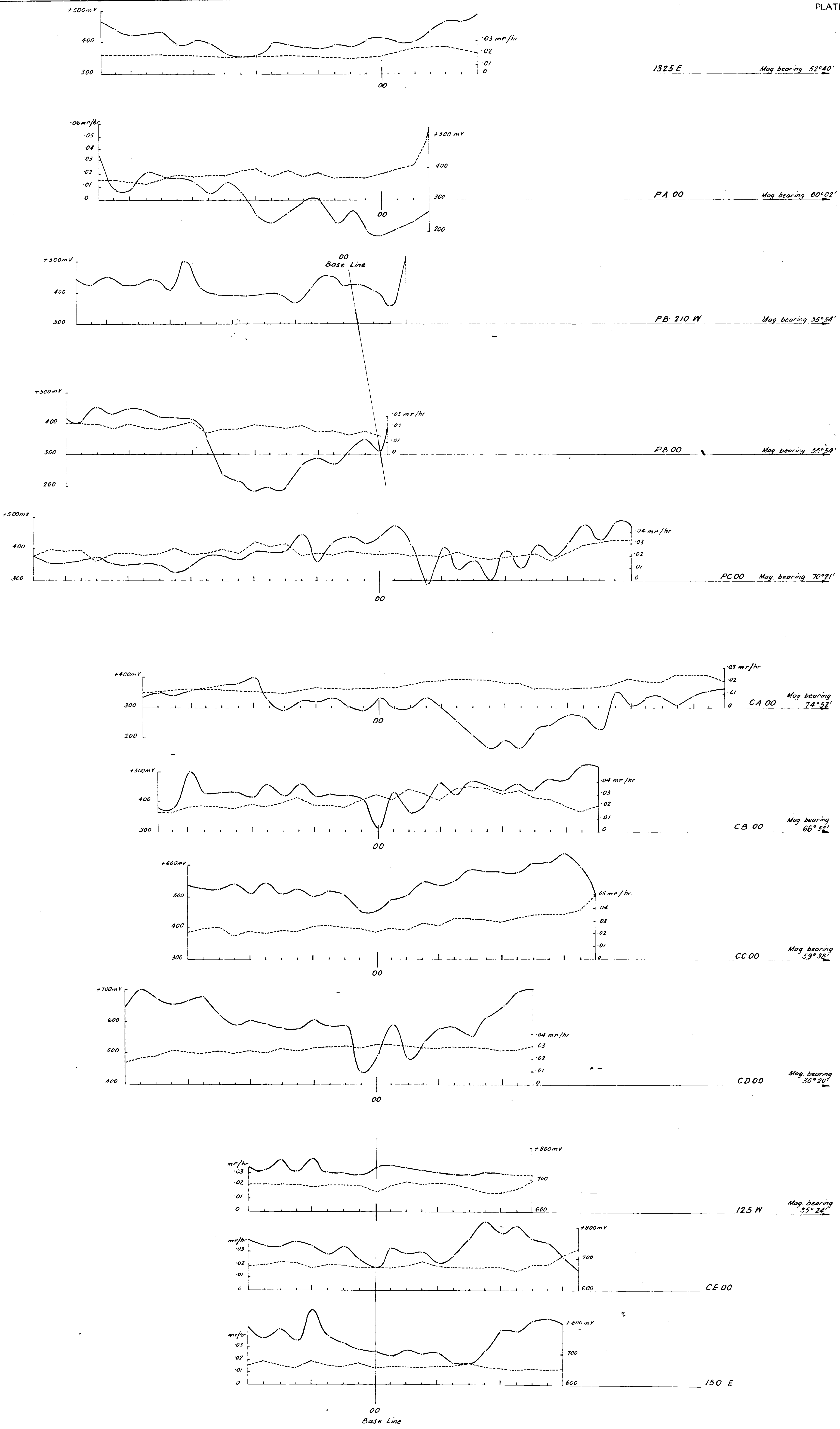
Geophysicist: J. Ashley

Scale: 400 0 400 800 FT.

Bureau of Mineral Resources, Geology and Geophysics. Darwin N.T. October 1961.

To Accompany Record No. 1962/36

G380-20 H284-GP



Reference

—·— Self-potential profiles

------ Radiometric profiles

GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA N.T., 1961

PALM-SCINTO CAMP-CLEAR SPRINGS AREA

SELF-POTENTIAL AND RADIOMETRIC PROFILES

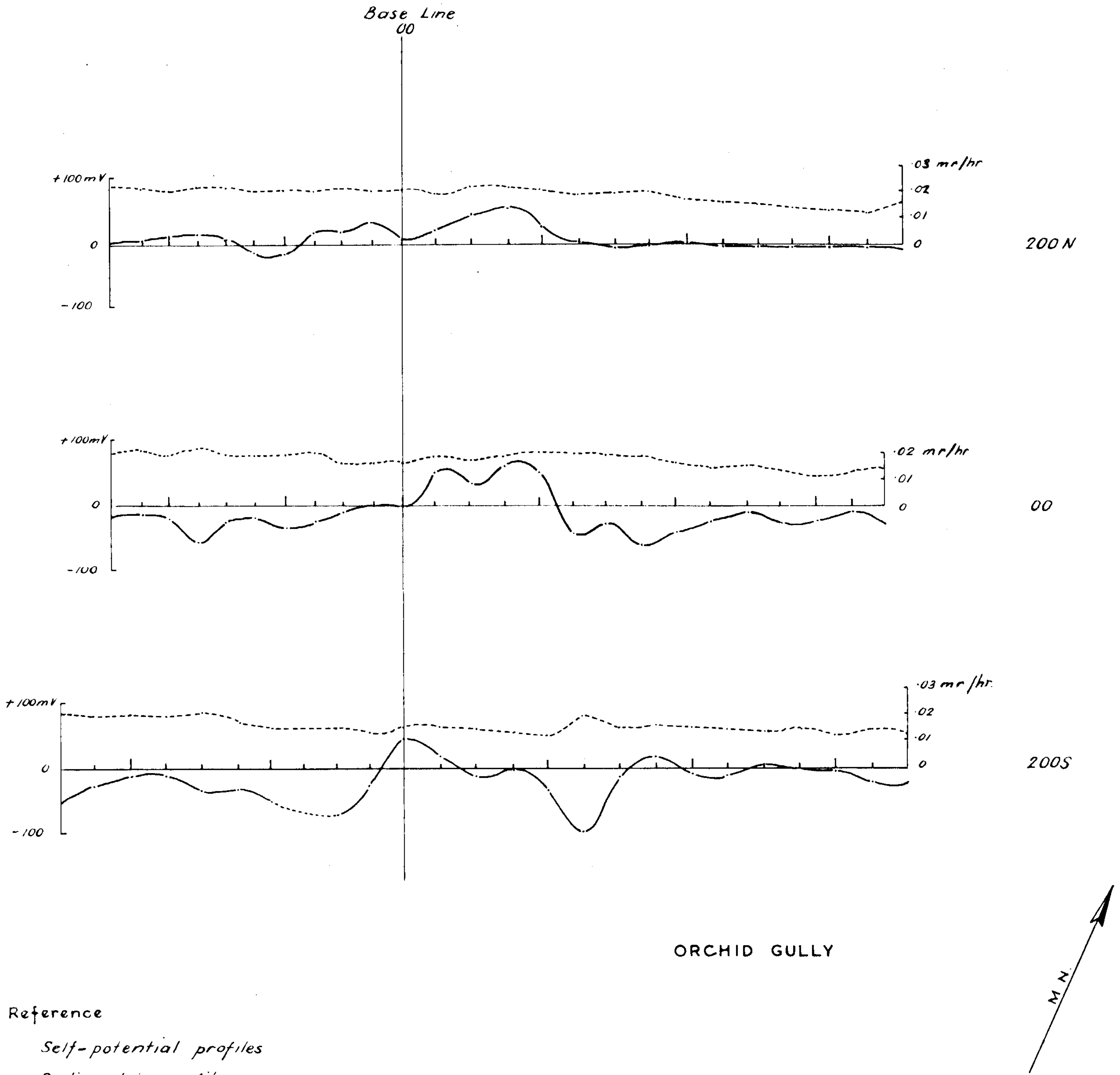
Scale

100 0 100 200 300 FT

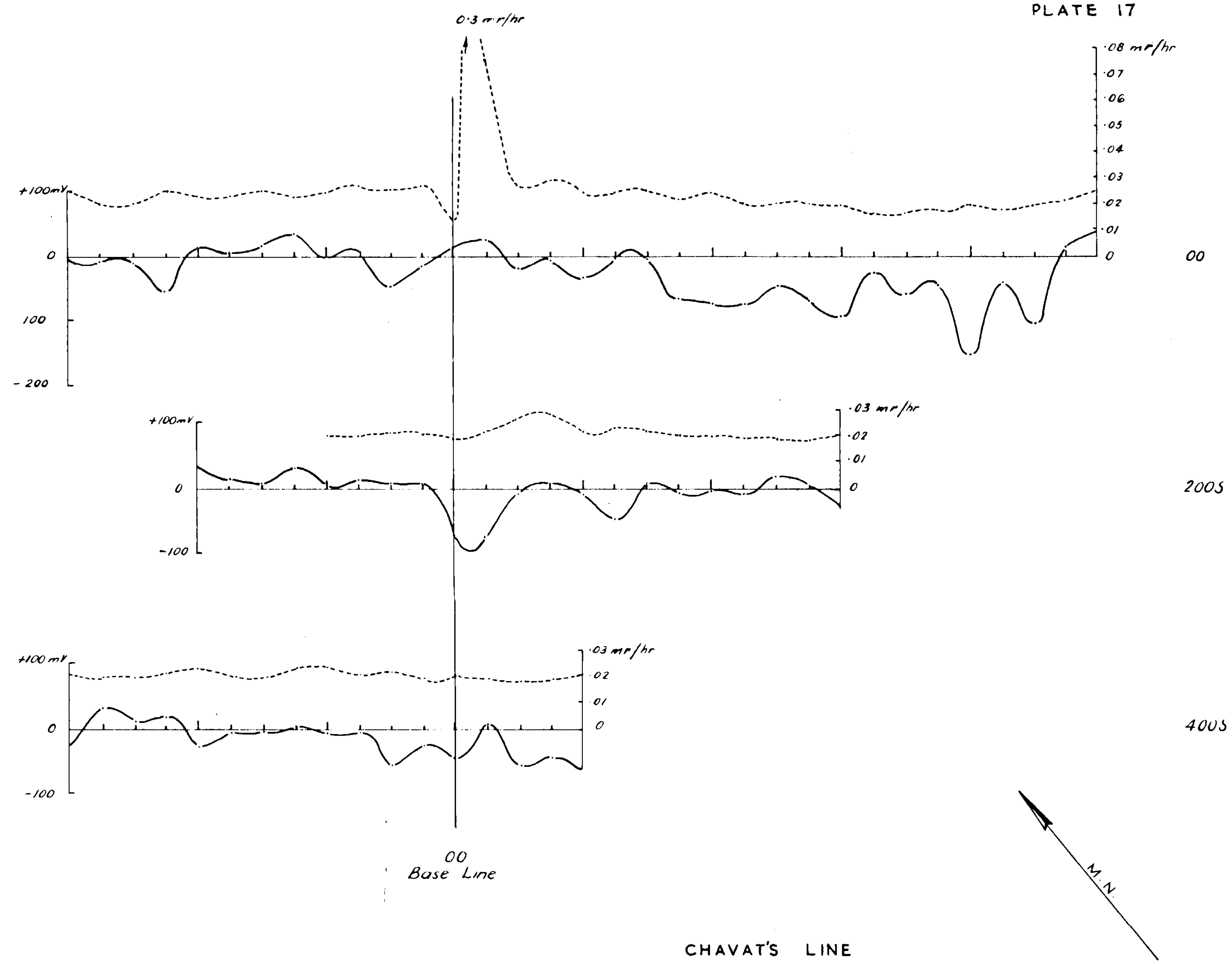
Bureau of Mineral Resources, Geology and Geophysics,
Darwin N.T. January 1962

Geophysicist: G. Ashley

To Accompany Record No. 1962/36



ORCHID GULLY

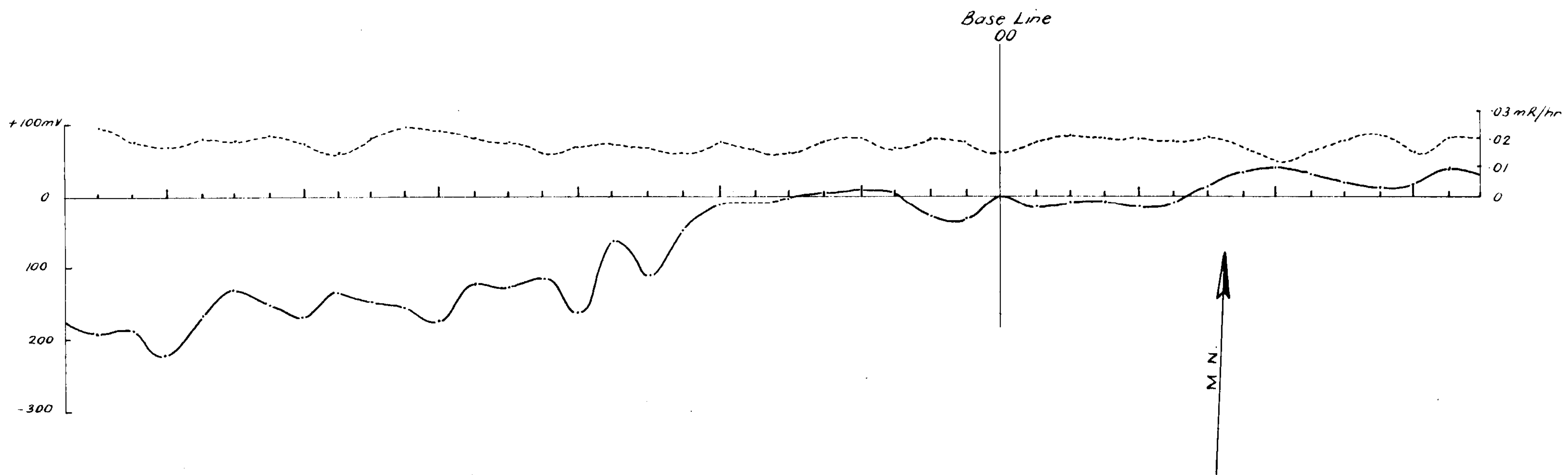


CHAVAT'S LINE

Reference

—·—·—·— Self-potential profiles

.... Radiometric profiles



PALETTE EAST

GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA, N.T. 1961

ORCHID GULLY, PALETTE EAST, AND CHAVATS LINE AREAS SELF-POTENTIAL AND RADIOMETRIC PROFILES

Scale

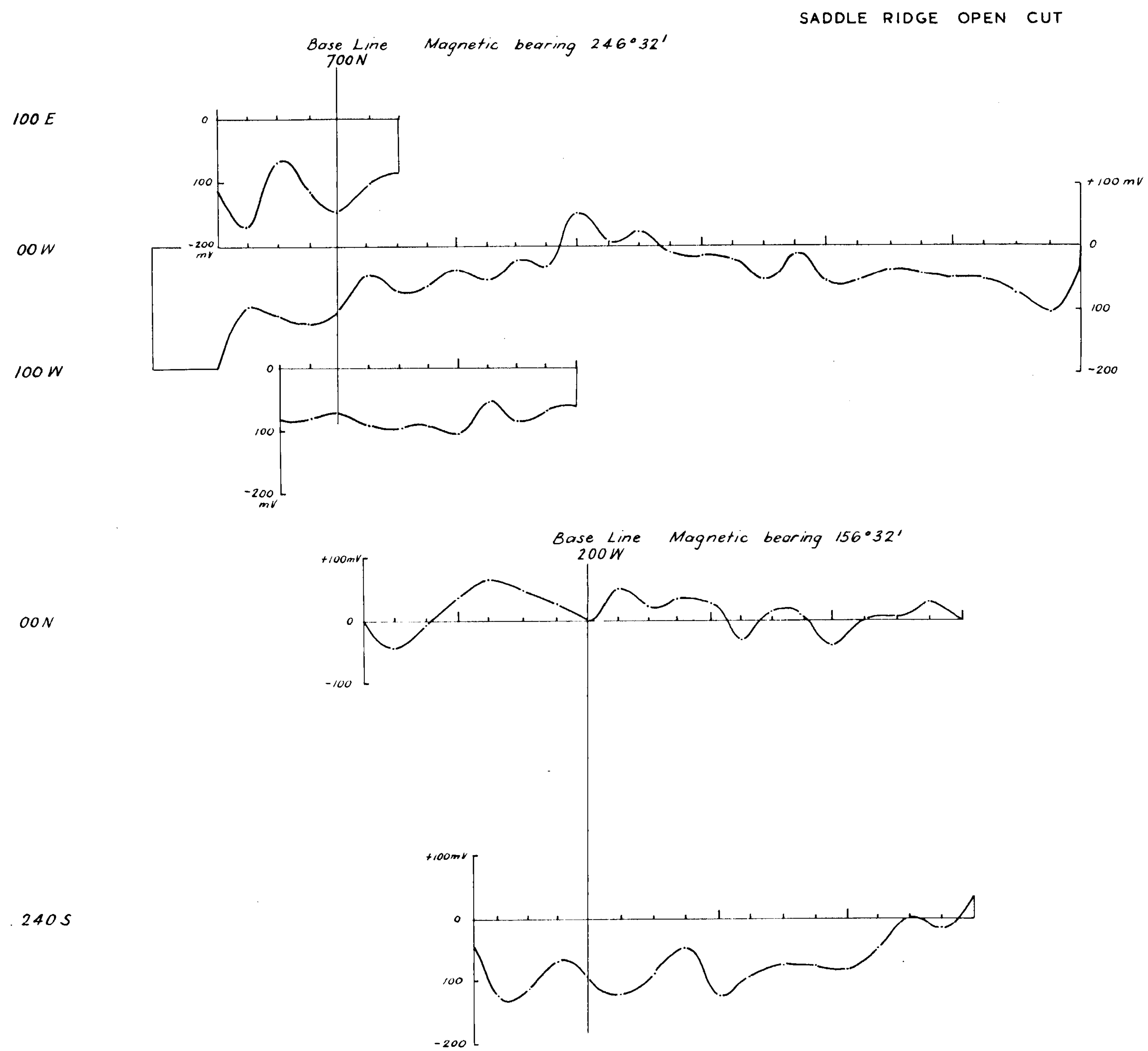
100 0 100 200 300 FT.

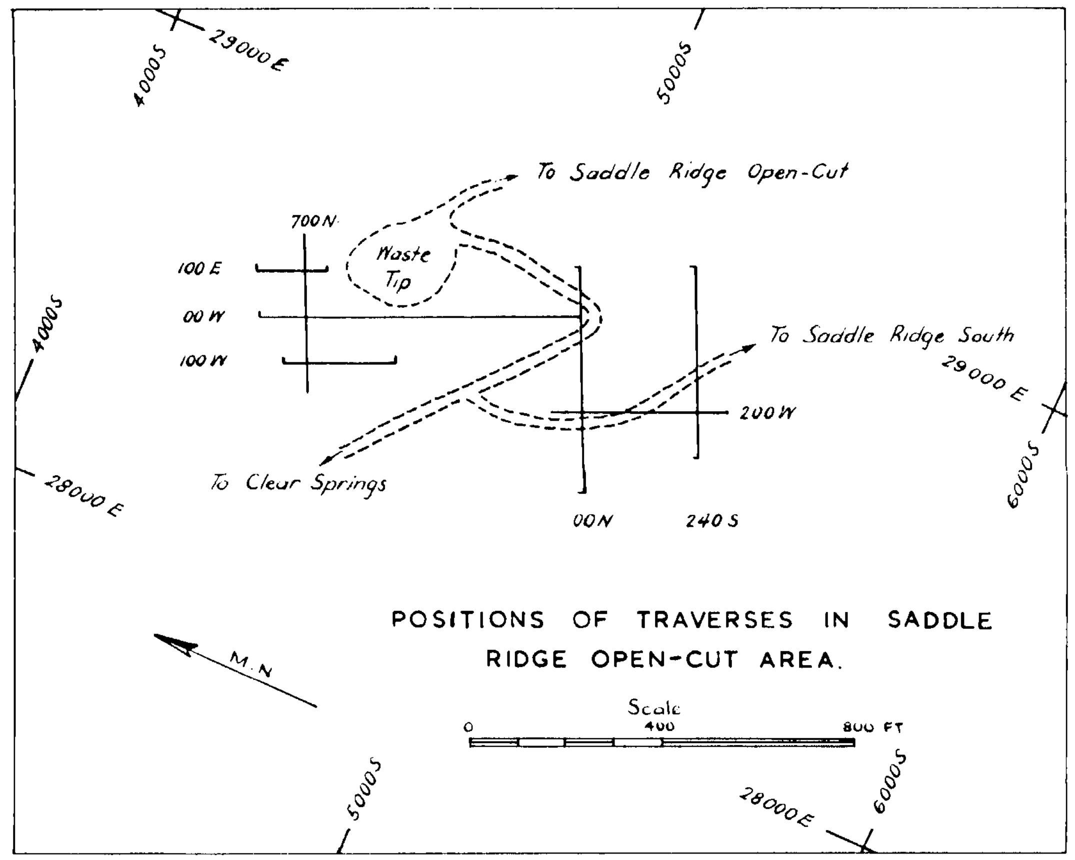
Geophysicist: J. Ashley

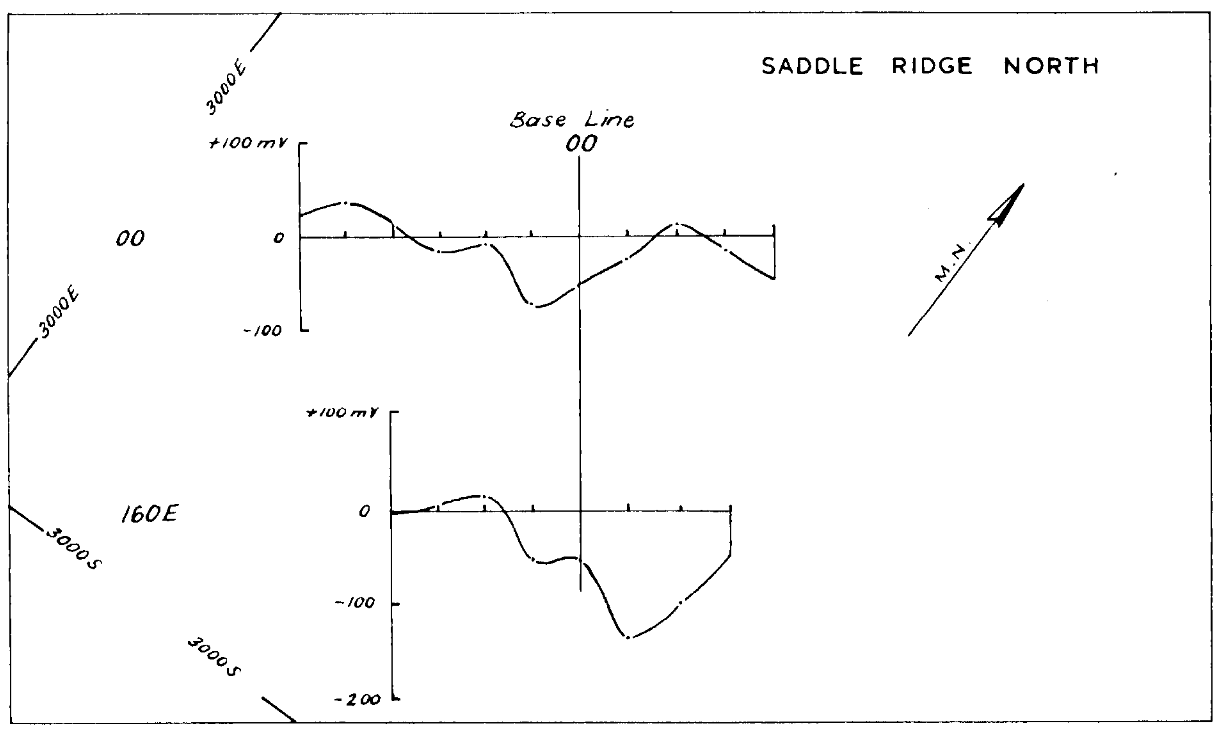
Bureau of Mineral Resources, Geology and Geophysics
Darwin September 1961

To Accompany Record No 1962/36

G380-22 H283-GP







GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA, N.T. 1961

SADDLE RIDGE OPEN-CUT AND SADDLE RIDGE NORTH AREAS SELF-POTENTIAL PROFILES

Scale

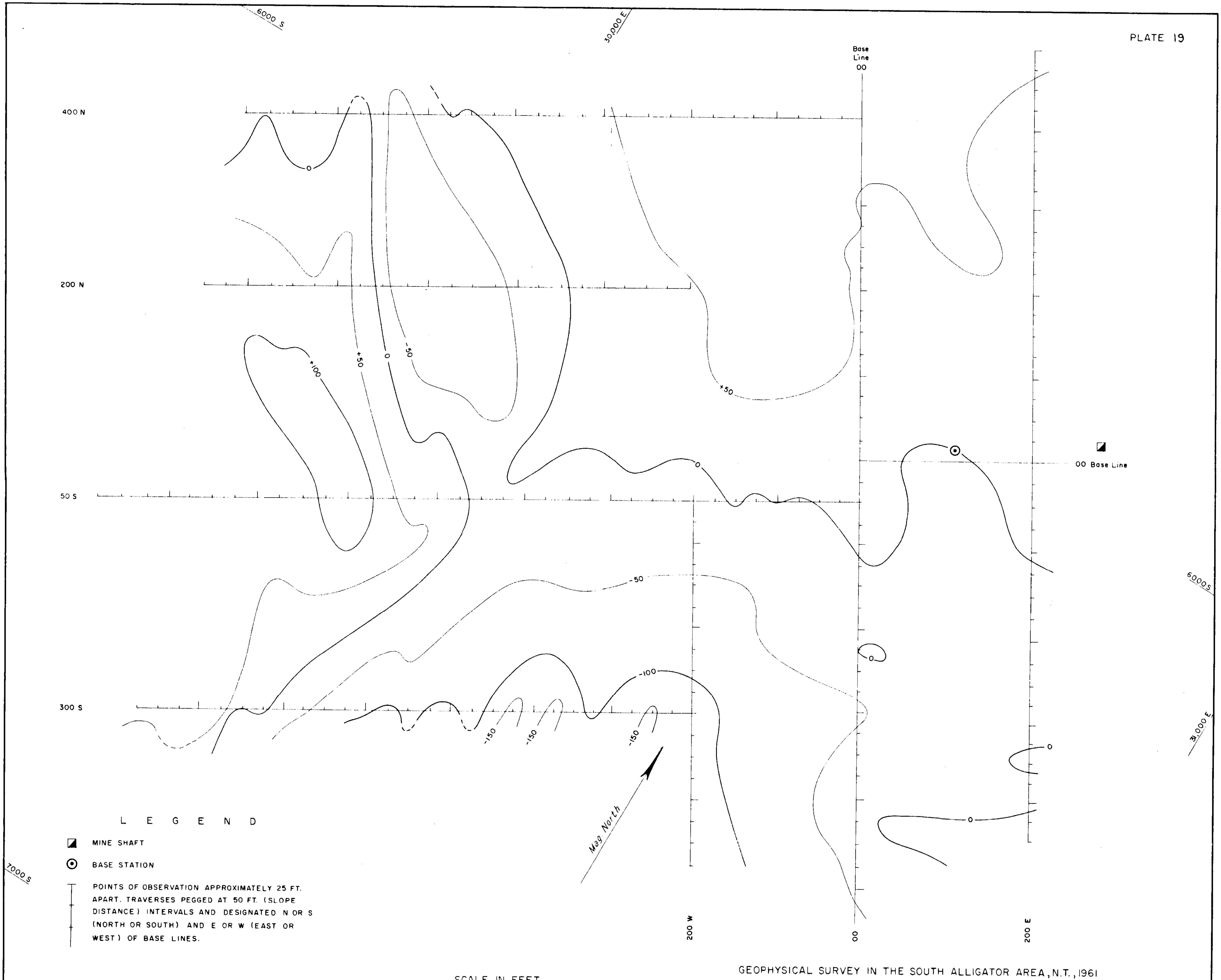
100 0 100 200 300 FT

Geophysicist: G. Ashley

Bureau of Mineral Resources, Geology and Geophysics, Darwin October 1961.

To Accompany Record No 1962/36

PLATE 19



L E G E N D

- MINE SHAFT
- BASE STATION
- POINTS OF OBSERVATION APPROXIMATELY 25 FT. APART. TRAVERSES PEGGED AT 50 FT. (SLOPE DISTANCE) INTERVALS AND DESIGNATED N OR S (NORTH OR SOUTH) AND E OR W (EAST OR WEST) OF BASE LINES.

SCALE IN FEET

100 50 0 100 200 300

GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA, N.T., 1961

SADDLE RIDGE SOUTH

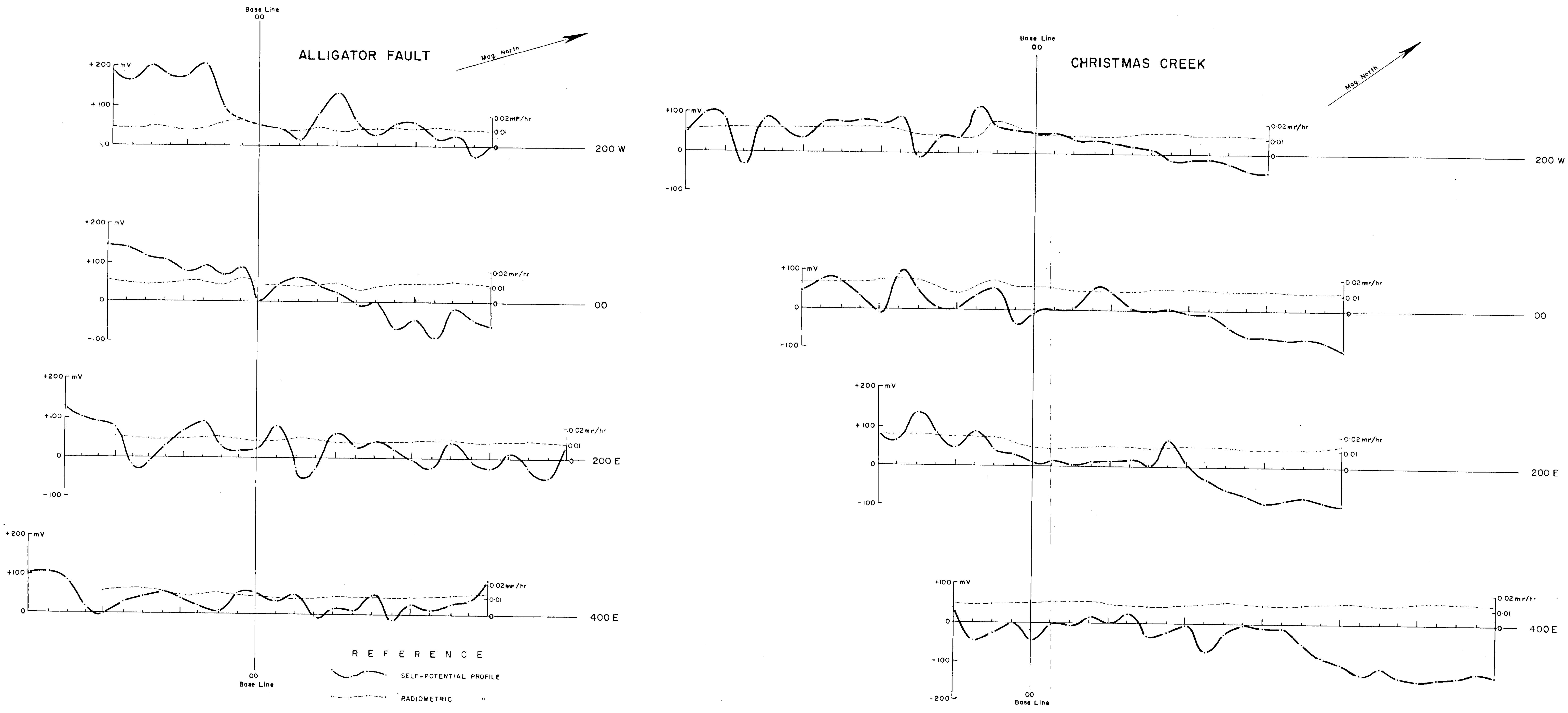
SELF-POTENTIAL CONTOURS

Bureau of Mineral Resources, Geology and Geophysics, Darwin, N.T., November 1961

Geophysicist J. Ashley

To Accompany Record No 1962/36

G 380-24 4307 GP



GEOPHYSICAL SURVEY IN SOUTH ALLIGATOR AREA, N.T., 1961

ALLIGATOR FAULT AND CHRISTMAS CREEK AREAS

SELF-POTENTIAL & RADIOMETRIC PROFILES

GEOPHYSICIST Y. Ashley

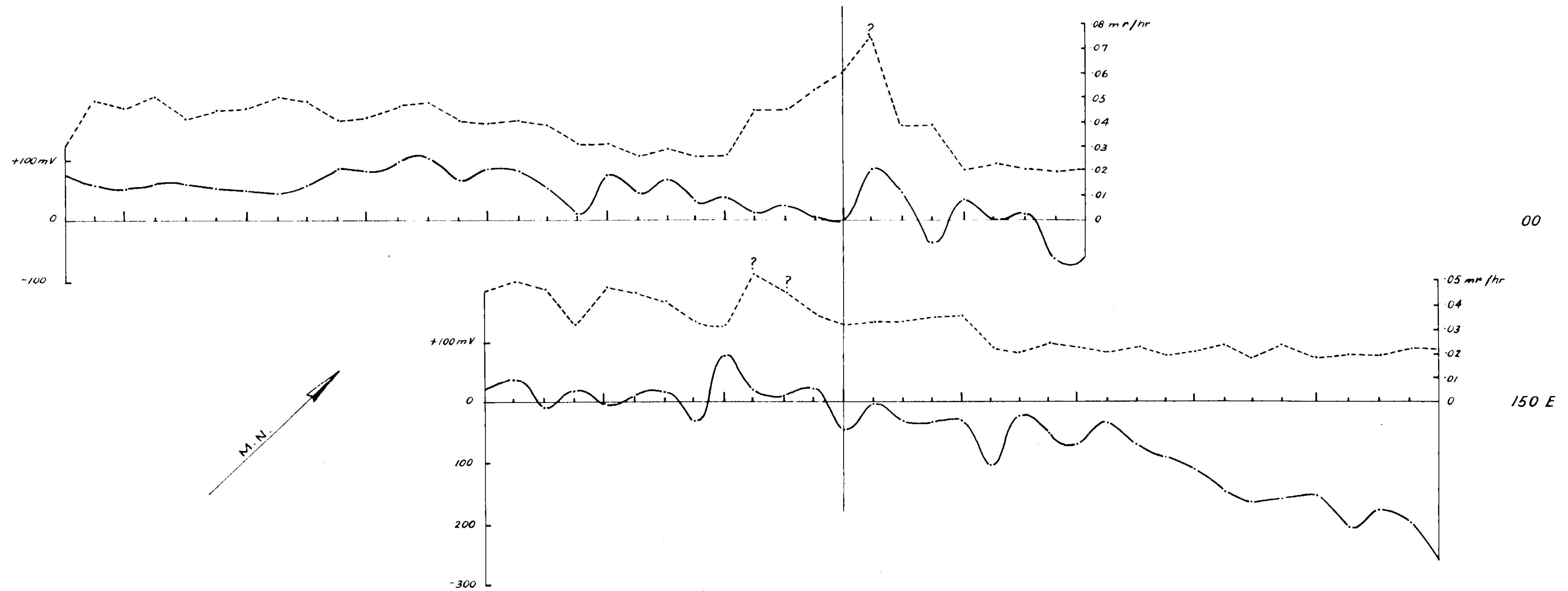
SCALE IN FEET

100 50 0 100 200 300 400

Bureau of Mineral Resources, Geology and Geophysics, Darwin, N.T., October 1961

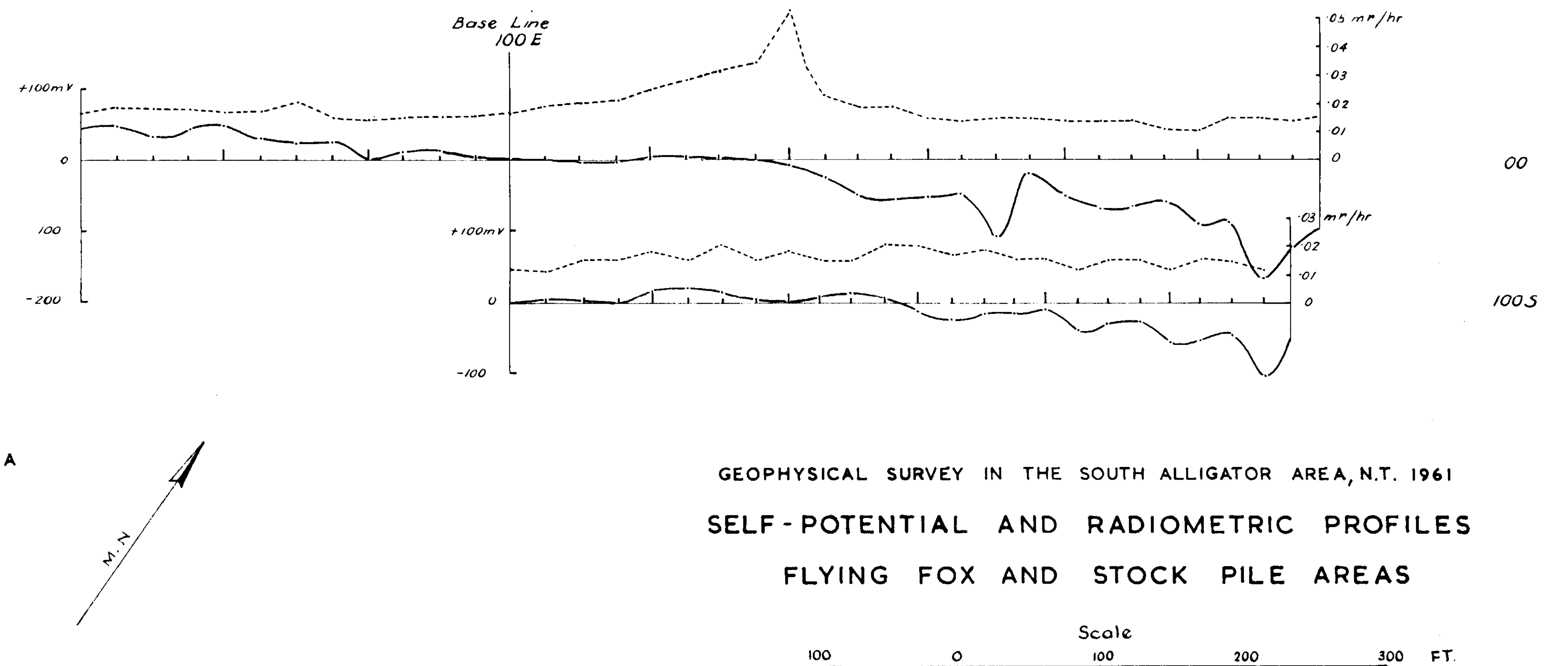
To Accompany Record No 1962/36

G 380-25 H304-GP



FLYING FOX AREA

Reference
Self potential
Radiometric



STOCKPILE AREA

GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA, N.T. 1961

SELF-POTENTIAL AND RADIOMETRIC PROFILES
FLYING FOX AND STOCK PILE AREAS

Scale
100 0 100 200 300 FT.

Bureau of Mineral Resources, Geology and Geophysics
Darwin September 1961

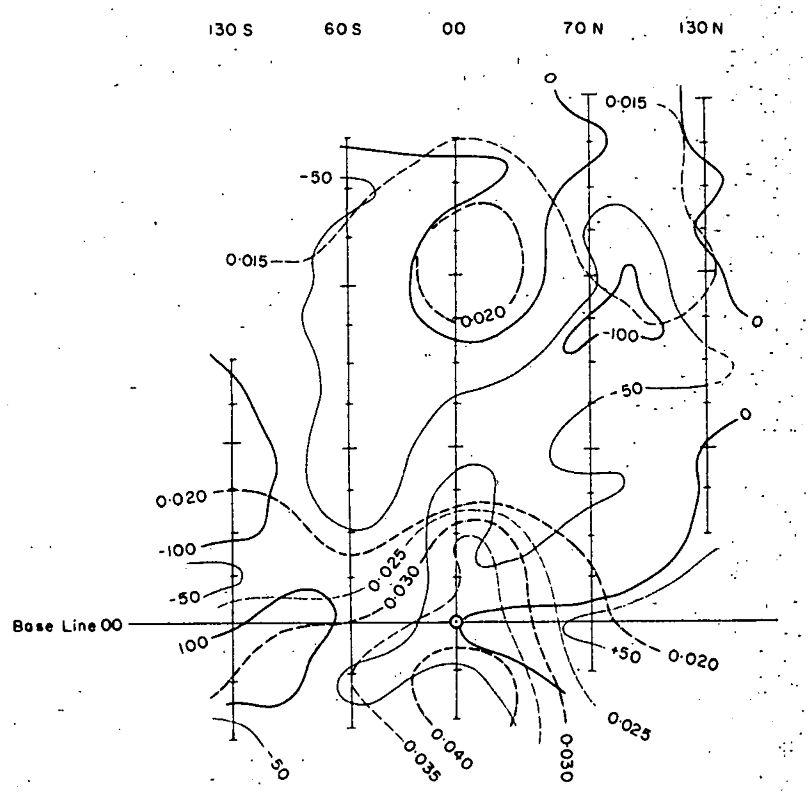
Geophysicist: J. Ashley

To Accompany Record No. 1962/6

G 380-26 H287-GP

PLATE 22

17,000 S



43,000 E

L E G E N D

-50, -100	SELF-POTENTIAL CONTOURS CONTOUR INTERVAL 50 mV
0·020, 0·025	RADIOMETRIC CONTOURS. CONTOUR INTERVAL 0·005 mr/hr
	POINTS OF OBSERVATION-APPROXIMATELY 25 FT. APART. TRAVERSES PEGGED AT 50 FT. (SLOPE DISTANCE) INTERVALS AND DESIGNATED E OR W (EAST OR WEST) OF BASE LINE
⊙	BASE STATION

Mag. North

43,000 E

GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA, N.T., 1961

CORONATION HILL SOUTH-WEST

SELF-POTENTIAL AND RADIOMETRIC CONTOURS

SCALE IN FEET

100 0 100 200 300

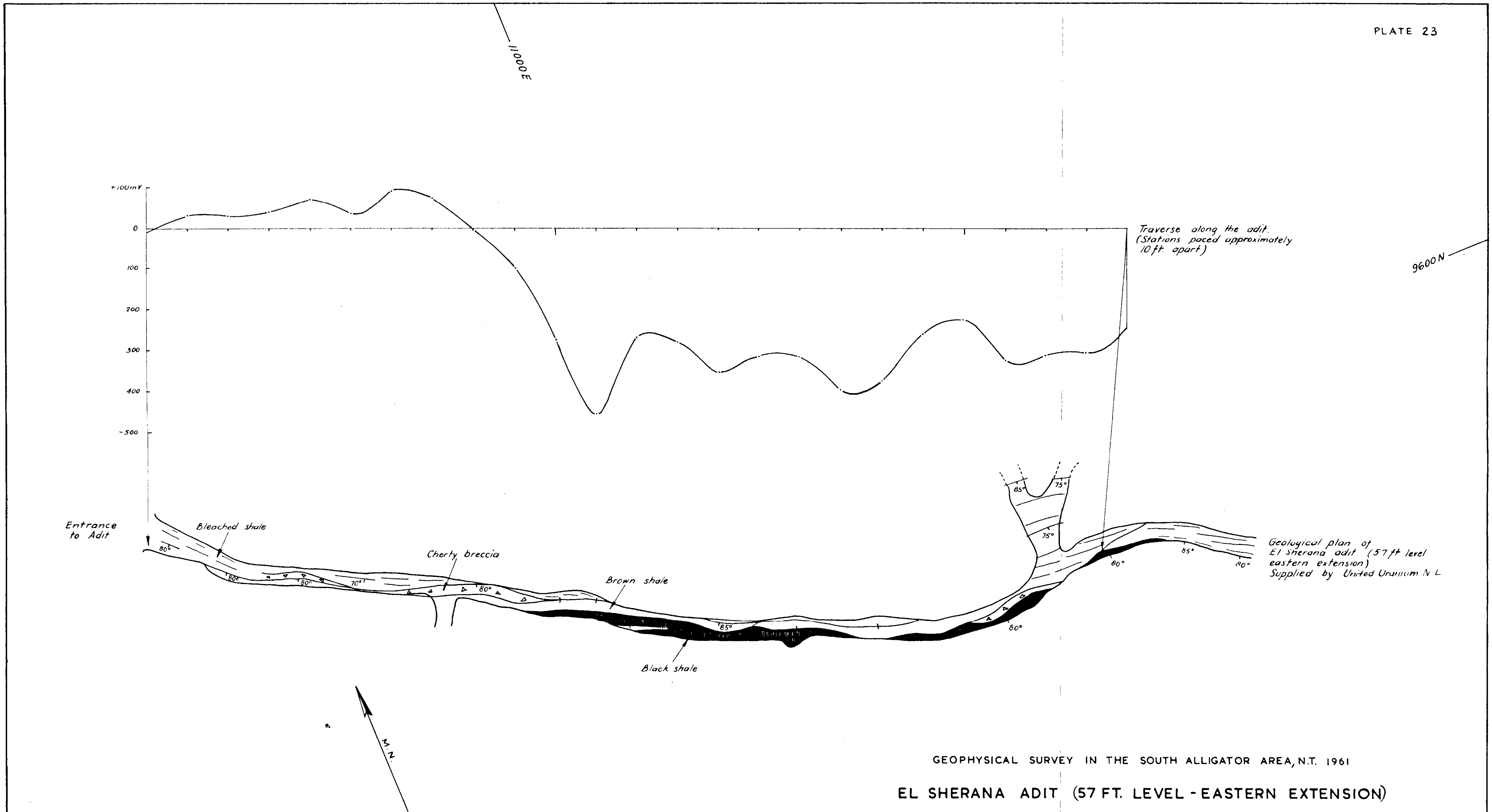
Geophysicist: J. Ashley

Bureau of Mineral Resources, Geology and Geophysics
Darwin, N.T., November 1961

17,000 S

To accompany Record No. 1962/36

G 380-27 H308-GP



GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA, N.T. 1961

EL SHERANA ADIT (57 FT. LEVEL - EASTERN EXTENSION)

GEOLOGICAL PLAN AND SELF-POTENTIAL PROFILE ALONG ADIT.

9600N

Scale

20 0 20 40 60 FT

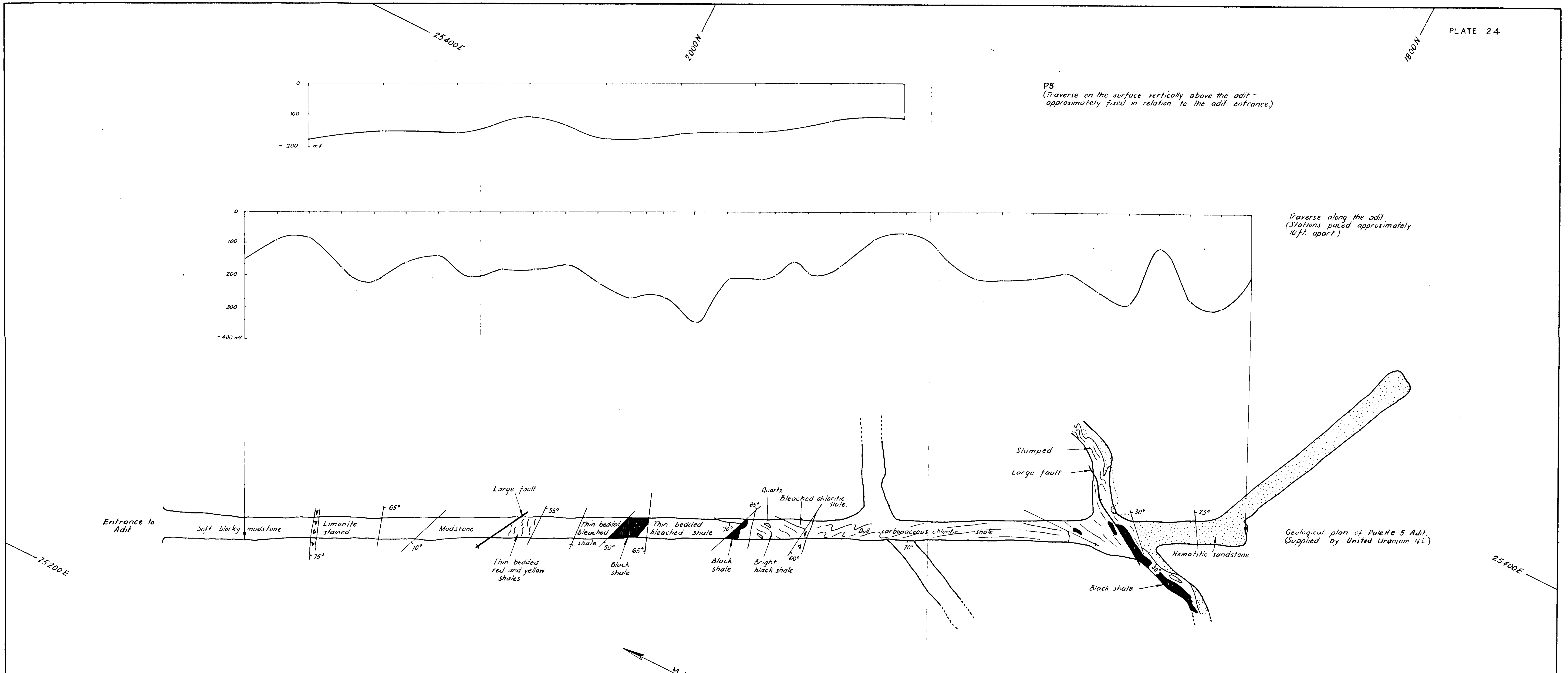
11000E

Geophysicist: J. Ashley

Bureau of Mineral Resources, Geology and Geophysics,
Darwin October 1961

To Accompany Record No. 1962/36

G 380-28 H300-GP



GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA, N.T. 1961

PALETTE 5 ADIT
GEOLOGICAL PLAN AND SELF-POTENTIAL PROFILES ALONG AND ABOVE THE ADIT.

Scale
20 0 20 40 60 FT.

Geophysicist: J. Ashley

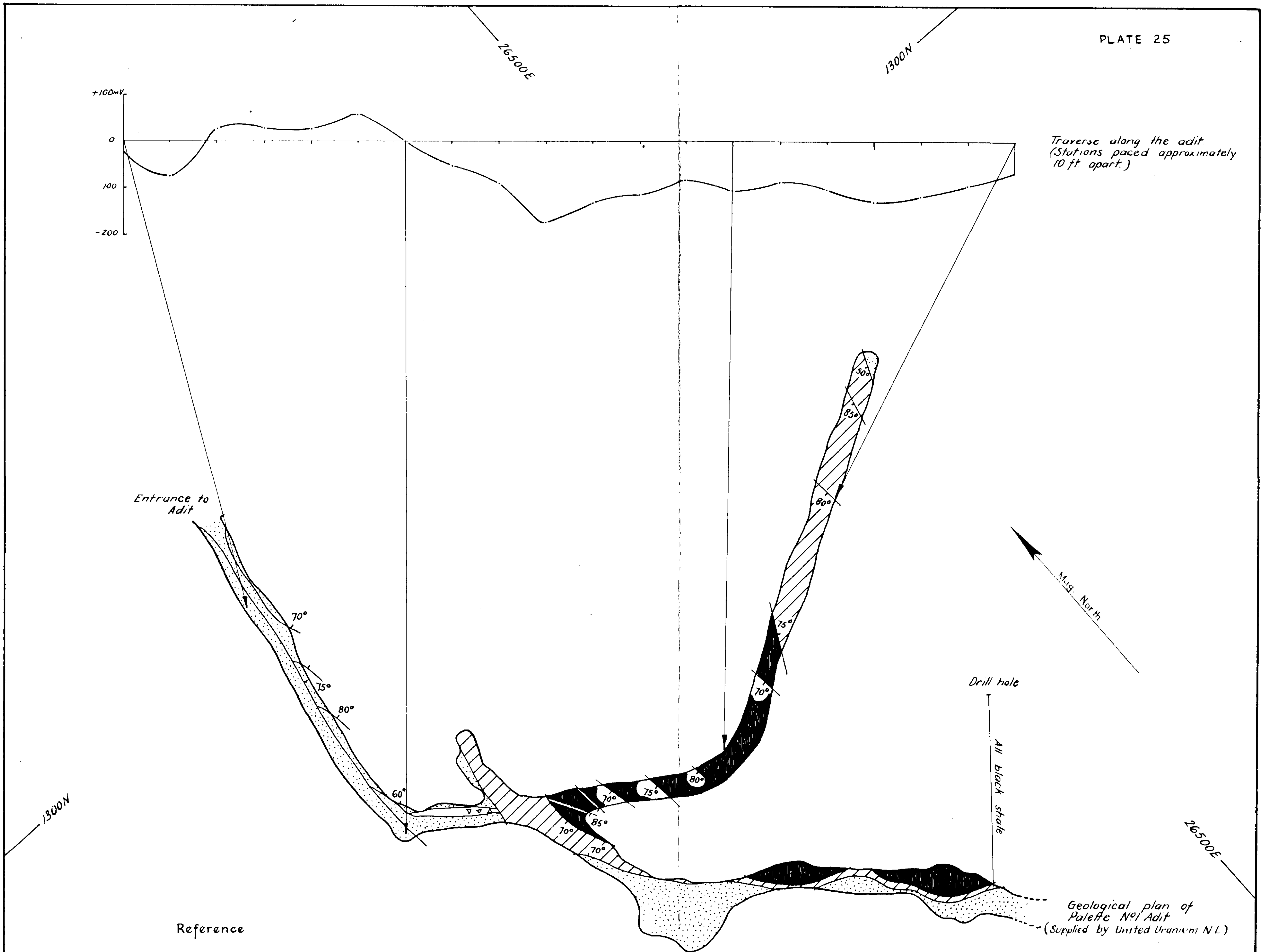
2000N 25200E 1800N

Bureau of Mineral Resources, Geology and Geophysics, Darwin, N.T. October 1961.

To Accompany Record No. 1962/38

G380-29 H289-GP

PLATE 25



Reference

GEOPHYSICAL SURVEY IN THE SOUTH ALLIGATOR AREA, N.T. 1961

PALETTE No. 1 ADIT - SOUTH DRIVE
GEOLOGICAL PLAN AND SELF-POTENTIAL PROFILE ALONG ADIT

Scale
20 0 20 40 60 FT

1100N
1100N

Bureau of Mineral Resources, Geology and Geophysics,
Darwin October 1961

Geophysicist: J. Ashley

To Accompany Record No. 1962/36

G380-30 H288-GP