COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF NATIONAL DEVELOPMENT.

BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS.

RECORDS:

1963/49

GEOCHEMICAL AND RADIOMETRIC SURVEY, RUM JUNGLE, NORTHERN TERRITORY 1961.

by

B.P. Ruxton and J.W. Shields

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GEOCHEMICAL AND RADIOMETRIC SURVEYS RUM JUNGLE, NORTHERN TERRITORY. 1961.

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SUMMARY

Between mid-July and early December, 1961, nine surface radiometric anomalies selected by Territory Enterprise Pty.Ltd., were auger drilled on square-grid patterns by the Geological Branch of the Bureau of Mineral Resources.

The object was to trace radiometric anomalies at the surface through the soil cover to bedrock as a guide for future diamond drilling of these anomalies for uranium, and to determine if base metal anomalies were associated with any of these radioactive anomalies.

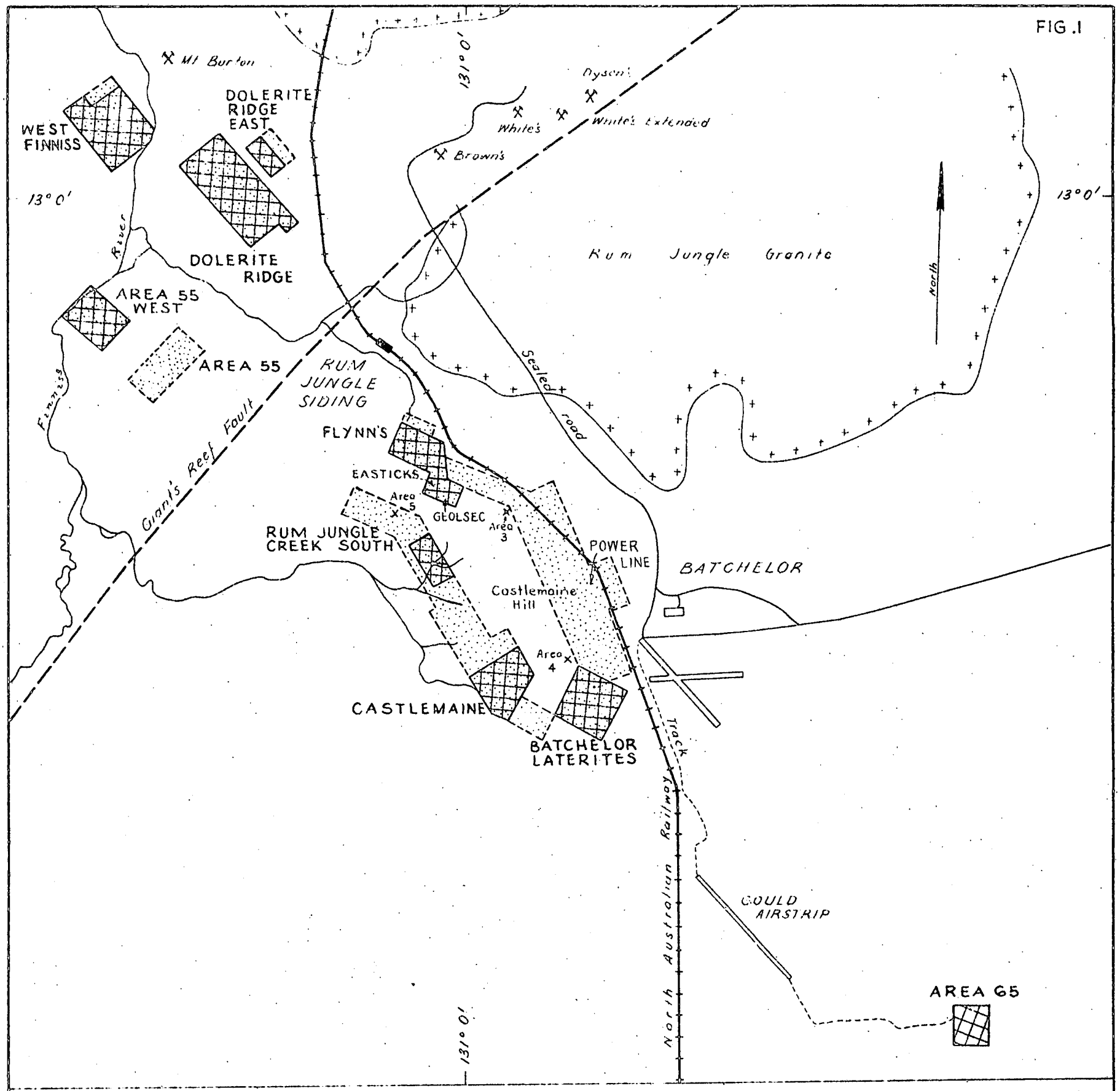
A total of 871 auger holes were drilled to an average depth of 23 ft. for a cost of £9,000. Each auger hole was tested for radioactivity by probing. Samples taken every six feet were analysed for copper, zinc, and lead by field geochemical methods, and some samples were later analysed by the spectrograph in the Canberra laboratory. Contour plans were prepared showing the distribution of the average values of radioactivity, copper, zinc, and lead, (i) on the surface, (ii) in the soil, and (iii) in the weathered bedrock.

Two of the surface radiometric anomalies, Area 65 and Dolerite Ridge East, did not persist through the soil into bedrock. The size of the surface anomaly of 0.03 mR/Hr at the north-west end of the Rum Jungle Creek South open cut decreased and the intensity increased in bedrock to 0.19 mR/Hr. At the southern end of the open cut a surface radiometric anomaly was traced through the soil to secondary uranium minerals which were exposed 8 ft. below the soil surface in bedrock 350 ft laterally away.

The surface radiometric anomalies at Castlemaine, Batchelor Laterites, Dolerite Ridge, and West Finniss continue vertically through the soil into bedrock with little change of shape or intensity.

At Flynns the surface radiometric anomaly is restricted in bedrock and the intense localised surface highs (up to 0.60 mR/Hr) do not persist below 20 ft. depth. Two new surface radiometric anomalies were discovered and auger drilled south-east of Flynns. One by R.W. Eastick of Geophysical Branch, named 'Easticks', and one by B.R. Ruxton, named 'Geolsec'. Some of the samples from these anomalies were later found to be phosphate rock, the radioactivity being due to uranium-bearing apatite. Phosphate rock was then found at five localities around Castlemaine Hill.

FIG.1



Reference

Areas of nine surface radiometric anomalies auger drilled in 1961.

Areas covered by Geophysical Surveys 1960-61

RUM JUNGLE GEOCHEMICAL SURVEY N.T., 1961

LOCALITY MAP

Scale 1 0 1 2 MILE

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

to accompany Record No. 1963/49

D 52/3

The surface radiometric anomaly at Area 55 West of 0.03 to 0.04 mR/Hr continues vertically through the soil into bedrock with increased intensity and in one auger hole 16 feet averaged 0.20 mR/Hr.

Of the surface radiometric anomalies investigated, only one, Area 55 West, is associated with strong base metal anomalies. Two others, Area 65 and Flynns, are associated with moderate lead anomalies. At Batchelor Laterites the strong surface radiometric anomaly is associated with weak copper and zinc values. In the other areas, radiometric and base metal anomalies appear unrelated.

INTRODUCTION

The discovery of uranium minerals at an old copper mine (White's Mine) near Rum Jungle in 1949 was followed by airborne radiometric surveys by the Bureau of Mineral Resources (B.M.R.) in 1950 (Wood & McCarthy, 1952). The airborne anomalies discovered were later examined on the ground by the B.M.R. and Territory Enterprise Pty.Ltd. (T.E.P.). Surface radiometric surveys, costeaning, churn drilling, surface geochemical surveys, and electromagnetic surveys were carried out over several of these anomalies. Concurrently the regional geology was mapped by the B.M.R. (Rum Jungle Special Sheet, 1 inch to 1 mile, 1960). This work confirmed the idea put forward in 1954 by W. Thomas (T.E.P.) that most of the uranium mineralisation occurred in the shales of the Golden Dyke Formation at or near their contact with the underlying Coomalie Dolomite. Uranium was found to be associated with either copper or lead mineralisation or both. Accordingly, in 1958, a surface geochemical survey was carried out by the B.M.R. over a large area to the north-west of Giants Reef Fault (Haldane & Debnam, 1959). The geochemical anomalies, of copper and lead, outlined the known areas of mineralisation and indicated two more anomalies: Area 55 West (copper and lead), and Area 55W West (lead).

In 1957 T.E.P. began diamond drilling on the south-western side of Castlemaine Hill, south-west of Giants Reef Fault, following a line of radiometric anomalies first outlined by the 1950 airborne survey. Between 1958 and 1960 pattern diamond drilling by T.E.P. of a weak surface radiometric anomaly at Rum Jungle Creek South, disclosed a large uranium ore body several hundred feet south-east of the surface anomaly. Although minor pyrite occurs with the ore there is no base metal mineralisation. As a result of this discovery it was decided to test other radiometric anomalies in the Rum Jungle district in detail.

Nine surface radiometric anomalies were selected by geologists of T.E.P. to be tested between June 1961 and June 1963. It was decided that the B.M.R. would carry out radiometric, electromagnetic, and geochemical surveys, and T.E.P. would carry out scout diamond drilling on each area. The objects of the geochemical survey were:

1. to study the vertical behaviour of surface radiometric and geochemical anomalies, particularly the displacement of the surface radiometric anomaly from the uranium ore body at Rum Jungle Creek South, and

2. to delimit targets for diamond drilling in the weathered bedrock beneath the superficial cover.

Field work began on 12th July 1961 with B.P. Ruxton as geologist (Party Leader) and S.G. Goadby as chemist. A Gemco auger drill, hired on contract from Shaw and Coffey, Perth, began work on 14th July. In September a second auger drill was hired and J.W. Shields (geologist) and A.G. Fricker (chemist) joined the party. J.M. Rhodes (geologist) joined the party early in October. Field work was completed on 5th December. The interpretation and presentation of the results was carried out by B.P. Ruxton and J.W. Shields between December 1961 and March 1962.

Thanks are due to T.E.P. for their co-operation and help throughout the survey, and especially to Mr. T. Barlow and Mr. R.N. Spratt.

SURVEY METHOD

Field Procedure

The radiometric anomalies investigated are all in the neighbourhood of Rum Jungle (Fig.1). The base lines and traverses across them were surveyed and pegged by the Geophysical Branch of the Darwin Uranium Group. The area of auger drilling was shaped to cover the particular radiometric anomaly and any nearby electromagnetic or surface geochemical anomalies.

In most areas auger holes were drilled 20 to 30 feet deep at the corners of 200 ft squares. Where considered necessary, follow-up work was carried out on a 100 x 100 ft grid. The soil was seldom thicker than eight feet and recognisable bedrock was usually encountered within 30 feet of the surface.

Each auger hole was probed radiometrically using probes made up by Geophysical Branch with G24H tubes, and modified ratemeters, type Harwell 1368A. Readings were normally made every foot unless high values were obtained when the interval was reduced to six or three inches. Owing to differences, of the detectors and the geometry of detection, between the probe and the ratemeter probe readings have to be doubled to compare approximately with surface radiometric readings. In this report and on the plates the probe readings have been corrected.

As each auger hole was drilled cuttings were collected every two feet and laid out on the ground in a row. When the rods were withdrawn at the completion of each hole cuttings were collected from the bit. Samples were taken every six feet, i.e. 2-4, 8-10, 14-16, 20-22 ft. etc., and from the base of the hole (the bit sample). Each sample, of about 250 grams, was placed into a plastic bag (6 x 9 inches) with a labelled aluminium tag. Labels were made self-explanatory; thus F/26E/16N/32-34 refers to a sample collected from 32-34 ft. deep in an auger hole drilled at 26E, 16N on Flynn's grid.

The grid points on each area were surveyed with a dumpy level and topographic contours were drawn at five-foot intervals.

Laboratory Procedure

The samples were dried, crushed, and sieved on an 80-mesh silk screen. The -80 mesh fraction was taken for analysis.

Chemical analyses were made for copper, zinc, and lead following the methods of the U.S. Geological Survey. The sample was digested with concentrated sulphuric acid on a hotplate. Suitable aliquots of the solution were taken for the individual analyses. Copper was determined with biquinolyl (cuproine), and zinc and lead with dithizone. All determinations were estimated by visual comparison with standards.

At Rum Jungle Creek South total metals only were determined. In the first stage of drilling at Castlemaine only copper and zinc were determined. At Area 55 West a special set of samples collected at 0-1 feet and 0-2 feet depth were analysed by A.G. Fricker using the potassium bisulphate fusion method for copper, zinc, and lead.

All the samples from Area 55 West, Area 55, Dolerite Ridge East, and Dolerite Ridge are being spectrographically analysed at the Bureau of Mineral Resources Laboratory in Canberra for Cu, Pb, Ni, Co, V, and Mo. These results will be given in a later report.

Presentation of Results

Plans for each area were compiled showing contours based on the average values for radioactivity and base metals both in soil and in weathered bedrock. The following contour intervals were selected: radiometric 0.024, 0.048, 0.096 and 0.192 mR/Hr (background 0.016 mR/Hr); copper and zinc - 25, 50, 100, 200, 400, 800, and 1600 p.p.m.; and lead - 6, 12, 24, 48, 96, and 192 p.p.m. Contour intervals increase in geometric progression.

RESULTS

AREA 65 (WATERHOUSE NO. 1 PROSPECT)

Area 65 is four miles south-east of Batchelor on the boundary between the Hundreds of Goyder and Waterhouse. The hilly nature of the prospect made auger drilling on a square-grid pattern impracticable. Several traverses were designed to test the various known surface anomalies (Plate 2). Previous work on this prospect has been described by Rosenhain & Alle (1953), and Daly & Tate (1958).

Radiometric

The surface radiometric anomalies are small in area and weak (0.02 mR/Hr), though one spot at 1.7E 4S has a value of 0.05 mR/Hr. This is at the contact between talc-chlorite schist and greywacke (Plate 1).

Radiometric values in the weathered rock were also low and the 0.024 mR/Hr surrounds only five auger holes near 7E 1S.

Chemical

A moderate (96p.p.m.) lead anomaly was found in weathered talc-chlorite schist near its contact with greywacke (Plate 2). It coincides with a weak (200 p.p.m.) surface copper anomaly reported by Daly & Tate (1958), though this weakens to only 100 p.p.m. in the weathered rock. Two small weak (200 p.p.m.) copper anomalies occur in weathered rock, one in chlorite schist around 00 3W and one in greywacke at 3.75E 5N.

Discussion

Electromagnetic Turam anomalies E and B pass through the weak copper anomalies in weathered rock, and Turam anomaly A passes through the weak radiometric anomaly in weathered rock.

The magnetic anomaly is associated with a patch of unsheared amphibolite in the talc-chlorite schist. Sulphide minerals in the amphibolite are probably responsible for the very weak copper and moderate lead anomalies.

Recommendations

No further auger drilling is necessary. However, several inclined diamond drill holes are recommended to intersect the talc-chlorite schist/greywacke contact below the oxidized zone.

CASTLEMAINE

Radiometric

Castlemaine radiometric anomaly is just over one mile south-east of Rum Jungle Creek South on the south-western footslope of Castlemaine Hill. The 0.025 mR/Hr contour covers an area 900 feet long (aligned north-west) by 200 feet wide over shales and ferruginous rocks. It cuts out abruptly at the contact with quartzite breccia upslope (Plates 3 & 4). Higher radiometric values are extremely local and are due to individual ferruginous boulders which give readings up to 0.10 mR/Hr. The area auger drilled covered this radiometric anomaly and the electromagnetic and surface geochemical anomalies occurring downslope.

The surface radiometric anomaly continues vertically through the soil and 20 to 30 feet into the weathered bedrock beneath with/out appreciable change of shape or intensity (Plate 4). Several high spots, outlined by the 0.048 mR/Hr contour, occur in ferruginous rocks adjacent to the quartzite breccia and probably indicate a fault zone striking north-west. Downslope around 97E 1S three

auger holes in weathered siltstone and shale are surrounded by the 0.024 mR/Hr contour though there is no radiometric anomaly on the surface or in the soil.

Geochemical

T.E.P. carried out a surface geochemical survey in 1958. Samples were collected at one foot depth on a rectangular grid (200 x 400 feet, not coincident with the 1961 geophysical grid), and were analysed by the optical spectrograph. Their results showed strong copper (400-800 p.p.m.), and lead (100-800 p.p.m.) anomalies to the south of the creek around 105E 1S and 111E 3S respectively, and another strong (400 p.p.m.) copper anomaly north of the creek around 90E 3N (Plates 4 and 5).

In the weathered rock to 20-30 feet strong copper (100-400 p.p.m.), zinc (100-800 p.p.m. Plate 6), and lead (96-192 p.p.m.) anomalies occur south of the creek. The lead anomaly is not closed off at the south-eastern edge of the grid. To the north of the creek a strong copper anomaly (400-800 p.p.m.) runs from 104E 4N to the edge of the grid at 92E 4N and is not closed off (Plate 5).

Lithological and geochemical evidence suggests an east-trending fault along the creek in the centre of the area.

Recommendations

T.E.P. have completed their diamond drilling programme in this area. Further auger drilling is, however, warranted to the north-west and south-east of the present grid to close off the copper and lead anomalies.

AREA 55 WEST

Area 55 West occupies gently sloping ground on the south-east side of the Finniss River just to the south of its confluence with Rum Jungle Creek. A small weak surface radiometric anomaly, 1000 x 100 feet of 0.03 to 0.04 mR/Hr, is elongated westwards along the contact between shale and carbonaceous rocks (Plates 7 and 8). Adjacent to and south of this anomaly west-trending surface anomalies of copper (200 p.p.m.) and lead (200 p.p.m.) were found by the 1958 geochemical survey (Haldane & Debnam, 1959).

A detailed surface geochemical survey using the bisulphate fusion method was carried out in 1961 (Plate 9). It shows a strong linear north-north-east trending anomalies for both copper (100-800 p.p.m.) and lead (120-480 p.p.m.) between 39W 19S and 41W 15S. This line marks the site of a fault separating sericitic phyllite from tremolitic shale. These strong anomalies occur at the head of a small topographic depression along which the chemical contours are elongated.

Radiometric

The surface radiometric anomaly continues vertically through the soil into weathered bedrock with some changes of shape and an increase in intensity. Auger holes 18S 46W,

16S 43W, 16S 42W, and 15S 41W have average radiometric values between 20 and 40 feet of over 0.048 mR/Hr. The maximum individual radiometric value was 0.35 mR/Hr at 42 feet 9 inches at 41W 15S. In this auger hole values averaged 0.06 mR/Hr from 2 to 37 feet; 0.20 mR/Hr from 37 to 53 feet; and 0.02 mR/Hr from 53 to 74 feet. Auger cuttings assayed between 38 and 54 feet showed only 0.013 percent U_3O_8.

Geochemical

Copper (800-3200 p.p.m.), zinc (400-800 p.p.m.), and lead (24-96 p.p.m.) values are high near the north-trending fault and show moderate irregular values to the west of this (Plates 10,11 and 12). At 39W 18S copper ranges between 3000 and 6000 p.p.m. from 8 to 42 feet. At 41W 15S, where the maximum radioactivity was logged between 37 and 53 feet, chemical values increase suddenly at 74 feet to 960 p.p.m. copper; 3000 p.p.m. zinc; and 80 p.p.m. lead. At this depth the radioactivity is very low.

In the sericitic phyllite east of the north-trending fault all the metal values are low in weathered rock (copper less than 100 p.p.m., zinc less than 50 p.p.m., lead less than 24 p.p.m.).

Recommendations

No further auger drilling is recommended.

Grid diamond drilling is warranted to test the radiometric and chemical anomalies in the weathered rock adjacent to the shale/calcareous rock contact, particularly near the north-trending fault.

DOLERITE RIDGE EAST AND DOLERITE RIDGE

Dolerite Ridge is named after a small hill of dolerite which trends north-west as a long low ridge half way between Rum Jungle Siding and Mount Burton. A few hundred yards north-east of this a parallel low ridge has been named 'Dolerite Ridge East'. Both these areas were auger drilled on a 400 x 200 ft grid.

DOLERITE RIDGE EAST

Radiometric

The small very weak (.025 mR/Hr) surface radiometric anomaly is not continued into the soil or weathered rock (Plate 13).

Geochemical

A weak (240 p.p.m.) surface copper anomaly was found by Haldane & Debnam(1959) on the eastern corner of this grid (Plate 13). However, no copper anomaly occurs in the weathered rock (values are less than 100 p.p.m.). Zinc and lead values are also very low, less than 100 p.p.m. and 10.p.p.m. respectively.

Recommendations

No further auger drilling and no diamond drilling is warranted.

DOLERITE RIDGE

Radiometric

A long linear north-north-west trending surface radiometric anomaly, some 3200 x 300 feet of 0.025 to 0.030 mR/Hr, occurs on the edge of a topographic rise over grey shale and siltstone near their contact with greywacke (Plates 13 and 14). This anomaly continues vertically through the soil into weathered rock without appreciable change of shape or intensity.

Near the south-east margin of the grid another smaller surface radiometric anomaly, 1700 x 300 feet of .025 to .030 mR/Hr, trends north-eastwards across a low rise. This continues vertically into the weathered shale and sericitic phyllite with similar shape and intensity. There is however a south-easterly prolongation of the anomaly in weathered rock for 500 feet off the main grid outlined by the 0.024 mR/Hr contour. In one auger hole, at 00N 154W the radiometric values averaged 0.058 mR/Hr.

Geochemical

The 1958 geochemical survey (Haldane & Debnam, 1959) delineated an irregular surface copper anomaly, shown by the 120 p.p.m. contour Plate 13, over part of the main grid and a surface lead anomaly, shown by the 60 and 120 p.p.m. contours on Plate 14, on the south-eastern edge of the main grid where the sub-surface radiometric anomaly occurs.

The present geochemical survey in soil and weathered bedrock indicates a moderate (12 to 48 p.p.m.) lead anomaly along grid line 4S (off the edge of the main grid) and geological evidence suggests a north-east-trending shear zone here. A north-east-trending fault occurs along grid line 6N (Plate 13). Between this fault and the shear zone localised copper (100 to 200 p.p.m.) and zinc (100 to 400 p.p.m.) anomalies are found in grey shale. Elsewhere on Dolerite Ridge the chemical values are low.

In the 1958 geochemical survey the bisulphate fusion method was used in the determination of lead and this method gives much higher values than the sulphuric acid extraction method used in the present survey.

Recommendations

Further auger drilling is recommended to the south-east of the main grid/close off the copper, lead, and zinc anomalies in weathered rock. Grid diamond drilling is warranted around the sub-surface radiometric anomaly at 154W 00N.

WEST FINNISS

Radiometric

A long linear north-north-west trending surface radiometric anomaly occurs west of the Finniss River - about half a mile north-west of Dolerite Ridge. The 0.030 mR/Hr contours covers an area of at least 2200 x 300 feet across the top of a low rise (Plates 15 and 16).

The anomaly continues vertically through the soil into weathered grey shale where it is slightly smaller in area and intensity (0.024 mR/Hr).

Geochemical

Small chemical anomalies occur on either side of the radiometric anomaly; copper 100–200 p.p.m., zinc 50–400 p.p.m., and lead 12–24 p.p.m. (Plates 16 and 17).

Recommendations

No further auger drilling and no diamond drilling is warranted.

BATCHELOR LATERITES

Radiometric

At the south-eastern end of Castlemaine Hill a strong radiometric anomaly occurs on the western side slopes of a north-trending ferruginous gravel ridge known as Batchelor Laterites. This gravel has been used for the construction of the nearby airfield and the ridge is pock-marked with pits. An area of 1600 ft x 500 ft is enclosed by the 0.030 mR/Hr and within this several spots particularly in the pits, have values between 0.060 and 0.10 mR/Hr (Plate 18).

Seventeen churn drill holes were sunk into the most intense part of the radiometric anomaly around 144E 19N by T.E.P. and none showed significant radioactivity below 30 feet. Part of the gravel ridge was inaccesible to vehicles owing to the profusion of pits; the remainder was auger drilled on a 400 x 200 ft grid.

The radiometric anomaly in weathered rock is similar in shape to the surface anomaly but is less intense. It is outlined by the 0.024 mR/Hr contour. Only one auger hole at 144E 26N had an average radiometric value in weathered rock greater than 0.024 mR/Hr. The radiometric anomalies occur mainly in the eastern side of a north-trending band of quartz greywacke (a weathering product of underlying limestone) near its contact with grey shale and siltstone (Plate 18).

Geochemical

Chemical contours are very low in the weathered rock, copper 50 p.p.m., zinc 25 p.p.m., and lead 6 p.p.m. The higher copper and zinc values occur in or near the radiometric anomaly (Plate 19).

Recommendations

No further auger drilling and no diamond drilling is warranted.

FLYNN'S(RUM JUNGLE LATERITES)

A chain of airborne scintillometer anomalies trends down the north-eastern side of Castlemaine Hill. One of these was located by T.E.P. near the railway line at two small hillocks of massive limonitic rock (3W 29N and 6W 32N, Plate 20). This rock is highly radioactive and registered up to 0.60 mR/Hr, and, hand specimens assayed up to 0.15 percent U_3O_8. This prospect was named 'Flynn's' because of its proximity to the Flynn's Homestead.

Radiometric

The 0.020 mR/Hr surface radiometric contour covers an area of about 1200 x 300 feet elongated north-west along the contact between greywacke and talc-sericite schist. In the soil and weathered rock the anomaly becomes slightly more intense, but it is restricted and only two auger holes OOW 30N, 2W 30N, have averaged radiometric values over 0.048 mR/Hr. Churn drilling by T.E.P. through the small hillocks of massive limonite showed a rapid decrease of radioactivity with depth and the presence of limestone at 90 to 150 feet.

Geochemical

A weak copper (25 to 100 p.p.m.) and a moderate lead anomaly (12 to 48 p.p.m.) in weathered rock coincide approximately with the subsurface radiometric anomaly (around 2W 30N, Plate 21).

Recommendations

No further auger drilling and no diamond drilling is warranted.

RUM JUNGLE CREEK SOUTH

In the centre of the south-west side of Castlemaine Hill two circular-shaped surface radiometric anomalies occur, one on each side of a small creek. This prospect, named 'Rum Jungle Creek South' was pattern diamond drilled by T.E.P. between 1958 and 1960 and a large uranium ore body was outlined between the two anomalies (Plate 22). There has been considerable speculation as to why the surface radiometric anomalies are laterally displaced from the orebody, accordingly auger drilling was carried out. However, when the survey was begun in July 1961, the open cut was excavated to a depth of 30 feet below the surface and so only limited drilling was possible.

North-west end of Open Cut

Radiometric

The 0.03 mR/Hr surface radiometric contour outlines a circular area some 500 feet in diameter centred on 27.5E 7N. The anomaly in weathered rock is smaller, more intense (0.048 mR/Hr) and centred upslope around 27E 10N. The highest values, 0.096 to 0.192 mR/Hr around 27E 10N, occur along north-west trending talcose shear zones which cut grey carbonaceous shale (Plate 23).

These highly radioactive talcose shear zones were traced into the open cut and traces of saleeite were found in one of them by T.E.P.

The auger hole at 26.75E 10.85N drilled adjacent to the quartzite breccia passed through varicoloured silts and clays including lilac silt and graphitic clay. The average radiometric reading was above0.096 mR/Hr. The lilac silt between 1 and 3 ft. was later found to contain 28 percent P_2O_5 and that between 10 and 14 ft., 22 percent P_2O_5.

Geochemical

A weak total metal anomaly (200 p.p.m.) is centred on 25E 10N (Plate 23).

Recommendations

Further auger drilling should be carried out to assess the extent of the phosphate rock found at 26.75E 10.85N.

South-East End of the Open Cut.

Radiometric

During excavation of the open cut a small area of secondary uranium minerals was discovered in grey shale at a depth of 8 feet at 39.6E 7.5N (Plate 23). The soil cover here is 5 feet thick and no radiometric anomaly is present at the ground surface above the uranium mineralization. A moderate(0.03 to 0.07 mR/Hr) surface radiometric anomaly occurs 350 feet downslope from this being centred around 38.2E 4.5N (Plate 23). The positioning of auger holes (A-G inclusive) was arranged to determine the relation, if any, between the uranium mineralisation in the soil covered bedrock and the surface anomaly downslope from it.

The results of this drilling showed that the radioactive minerals migrated 350 feet laterally along the soil/bedrock boundary and gradually upwards through the soil (Plate 24). The intensity and linear shape of the surface radiometric anomaly are due to the fact that a small creek has dissected the soil profile and exposed the strongly radioactive B horizon of the soil at the surface along a terrace. Without this dissection of the soil profile the surface anomaly would have been very much weaker.

Below 20 feet in auger holes A, B and C the radiometric values averaged over 0.048 mR/Hr and 38 feet in A there is a maximum reading of 0.146 mR/Hr. This sub surface anomaly in the weathered rock does not appear to be connected with the surface anomaly and is probably part of the radioactive halo of the main ore body.

Geochemical

Total metal values are low, 100 p.p.m. or less.

DISCOVERY OF PHOSPHATE ROCK

Just before auger drilling began at Flynn's R.W. Eastick of Geophysical Branch found a radiometric anomaly 2000 feet south-east of Flynn's prospect at 12E 20N. Here a few brick-like surface boulders were found to give radiometric values up to 0.08 mR/Hr. Owing to an analytical error, very high zinc values were recorded on the ferruginous rocks at Flynn's and in order to follow this up several auger holes were drilled at Eastick's anomaly. Very high zinc values again occurred; accordingly a rapid surface search for radiometric anomalies was made south-eastwards along the flanks of Castlemaine Hill. On 23rd August, Ruxton found a radiometric anomaly and an exposure of brick-like boulders giving readings up to 0.08 mR/Hr at 23E 18N. Further upslope around 26E 14N large patches of a lilac coloured rock with a finely etched weathering pattern gave readings over 0.10 mR/Hr. Ruxton named this anomaly 'Geolsec'. Specimens of the lilac rock also gave high zinc values so several of them were sent to Canberra for a check analysis for zinc; several auger holes were drilled at Geolsec, and the Geophysical Branch carried out a detailed surface radiometric survey.

The initial specimens sent to Canberra were found to contain very little zinc (less than 100 p.p.m.). After this a second batch of rock samples and auger cuttings were submitted for check analysis for zinc by the dithizone method. The values obtained were again less than 100 p.p.m. with the exception of four rock samples. One of these, a sample of 'lilac rock' from 25E 15N gave a value of 2000 p.p.m. Zn by the dithizone method. Spectrographic analysis by A.D. Haldane did not reveal the presence of zinc in this sample. Discussion with S. Baker who had carried out the chemical analyses, of the abnormal chemical and spectrochemical behaviour resulted in further testing, which established that the sample was a calcium phosphate (analysis 40% P_2O_5, 50% CaO, 4% Fe_2O_3). This was subsequently identified as apatite by x-ray diffraction and petrographic examination.

Whilst this analysis was being carried out in Canberra Ruxton found two more radiometric anomalies with associated outcrops of 'lilac rock' (Areas 3 and 4, Fig.1), farther south-east along Castlemaine Hill. Later he found another occurrence near Rum Jungle Creek South (Area 5) on the south-western side of Castlemaine Hill.

EASTICKS AND GEOLSEC

Radiometric: Both anomalies are about 900 x 200 feet of 0.020 mR/Hr. Easticks is elongated eastwards and Geolsec northwards. Radiometric values above 0.04 mR/Hr are very localised and are restricted to outcrops or boulders of lilac or brick coloured rock. Only a few auger holes were drilled at each area. They show a continuation of the anomaly into weathered rock with little change in intensity. Thus several auger holes in both areas have average radiometric values in weathered rock of over 0.048 mR/Hr and at 26E 15N and 26E 14.25N at Geolsec the readings average 0.104 mR/Hr. Most of the auger holes with high radiometric values are richly phosphatic and details are given by Walpole (1961).

Geolsec and Easticks occur on the boundary between the quartzite breccia believed to be Upper Proterozoic and the carbonate sequence of the Lower Proterozoic. The carbonate sequence is deeply weathered and the auger holes penetrate only the residual clays and silts. At Eastick's two auger holes at 11E 20N and 12E 21N passed through lilac hematitic clay into chlorite schist.

Geochemical: Chemical values are extremely low at both Eastick's and Geolsec.

Recommendations

The anomalous radioactivity at both Easticks and Geolsec is due to uranium-bearing apatite. It is unlikely that economic uranium mineralisation will occur in the carbonate sequence, however, at least one diamond drill hole should be sited to test the chlorite schist around 12E 21N, 11E 20N at Easticks.

The occurrences of phosphate rock will require detailed investigation and further auger drilling and several diamond drill holes are warranted.

DISCUSSION

Frequency Distribution of the Metal Values

The frequency distribution of metal values (including uranium) may be different in mineralised and unmineralised areas, and may vary with the area, the lithology, and the structure. Until the frequency distribution of metal values is understood it is not possible to assign meaningful background or threshold values. In 1961 no mineralised area was drilled, however the geochemical survey is continuing in 1962 and known metal mineralisation will be drilled at Area 55. Thus a full analysis of the metal values will be made at the completion of the survey. Meanwhile curves have been plotted of the logarithm of the metal values as abscissae and the cumulative percentage probabilities as ordinate (Plate 25).

Values of any metal in the crust of the earth usually have a log-normal distribution and when these values and their frequencies are plotted on log-probability paper a straight line is obtained. If two populations of metal values of different order and type are present each with a log-normal frequency distribution then they plot as two straight lines of different slope connected by a curve.

The log-probability curves from the present survey (Plate 25) show several straight lines indicating several log-normally distributed populations of metal values. An attempt will be made to interpret these curves at the completion of the geochemical survey in 1962.

GENERAL RECOMMENDATIONS

Castlemaine Hill

Electromagnetic surveys have shown the presence of a continuous conducting horizon around most of Castlemaine Hill from Rum Jungle Creek South east to Batchelor Laterites, and turning north-west towards Flynn's (Daly, 1962). Since the Rum Jungle Creek South ore body almost coincides with part of this conducting horizon other areas of uranium mineralisation may be found associated with it. Auger drilling is therefore, recommended to fill in the areas between Rum Jungle Creek South, Castlemaine, and Batchelor Laterites.

Area 55 to Browns

Uranium and base metal mineralisation are known to occur on the shear zone trending from Whites through Browns to Area 55 parallel to the Giants Reef Fault. Part of this shear zone was auger drilled at the south-eastern edge of the Dolerite Ridge and moderate radiometric and base metal anomalies occur here. It is therefore suggested that auger drilling be carried out along this shear zone from west of Browns to Area 55 and from Area 55 to connect with Area 55 West.

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PLATE I
(65/1)

AREA 65

GEOLOGY AND TOPOGRAPHIC CONTOURS

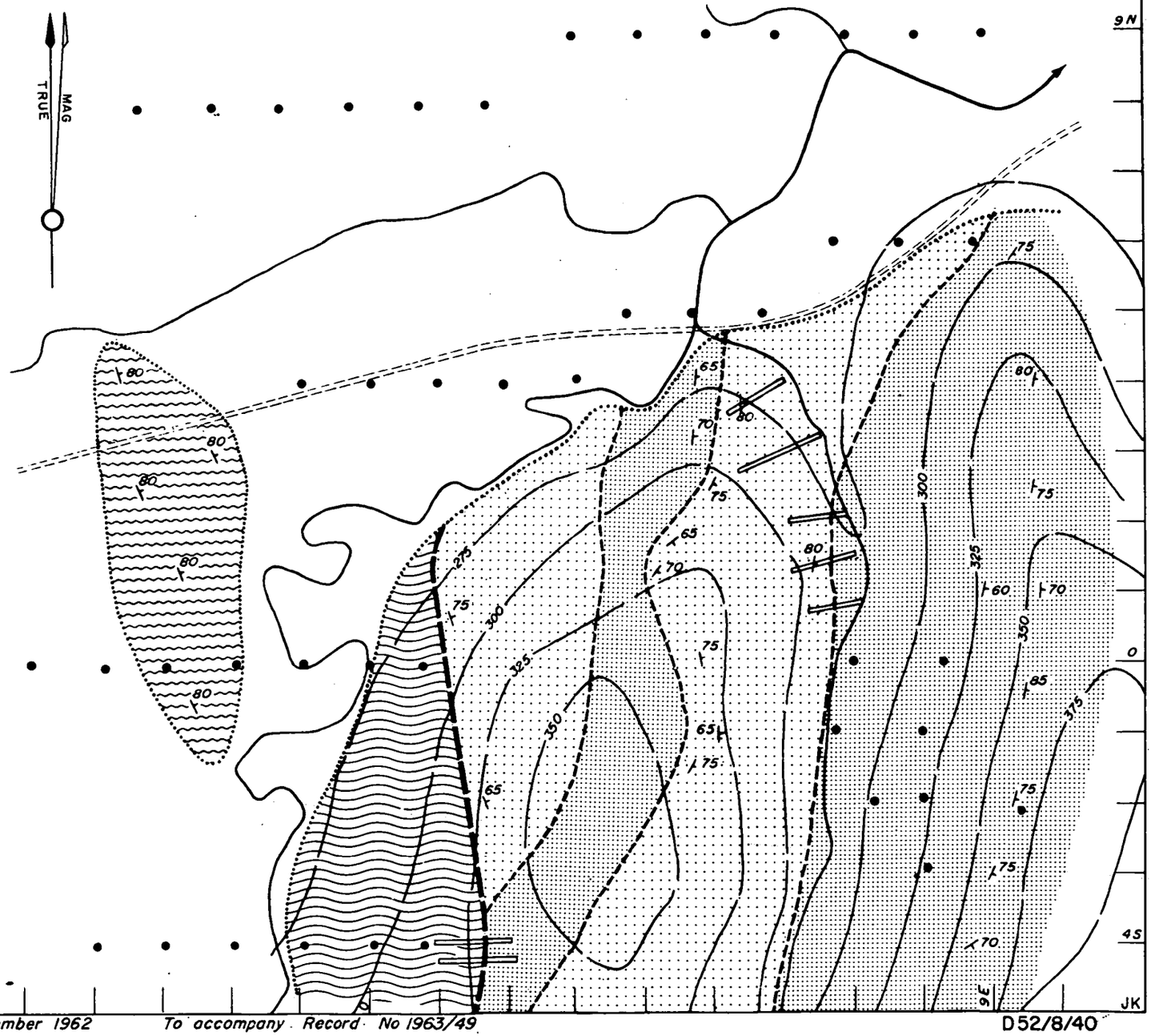
Scale

100 0 100 200 300 FT.

TRUE MAG

REFERENCE

- Topographic contours at intervals of 25 feet
- Geological boundary - approximate
- Fault - approximate
- Alluvium boundary
- 75 Dip and strike of bedding
- B.M.R. auger hole
- Costean
- Chlorite schist
- Talc-chlorite schist
- Quartzite and greywacke
- Greywacke and siltstone



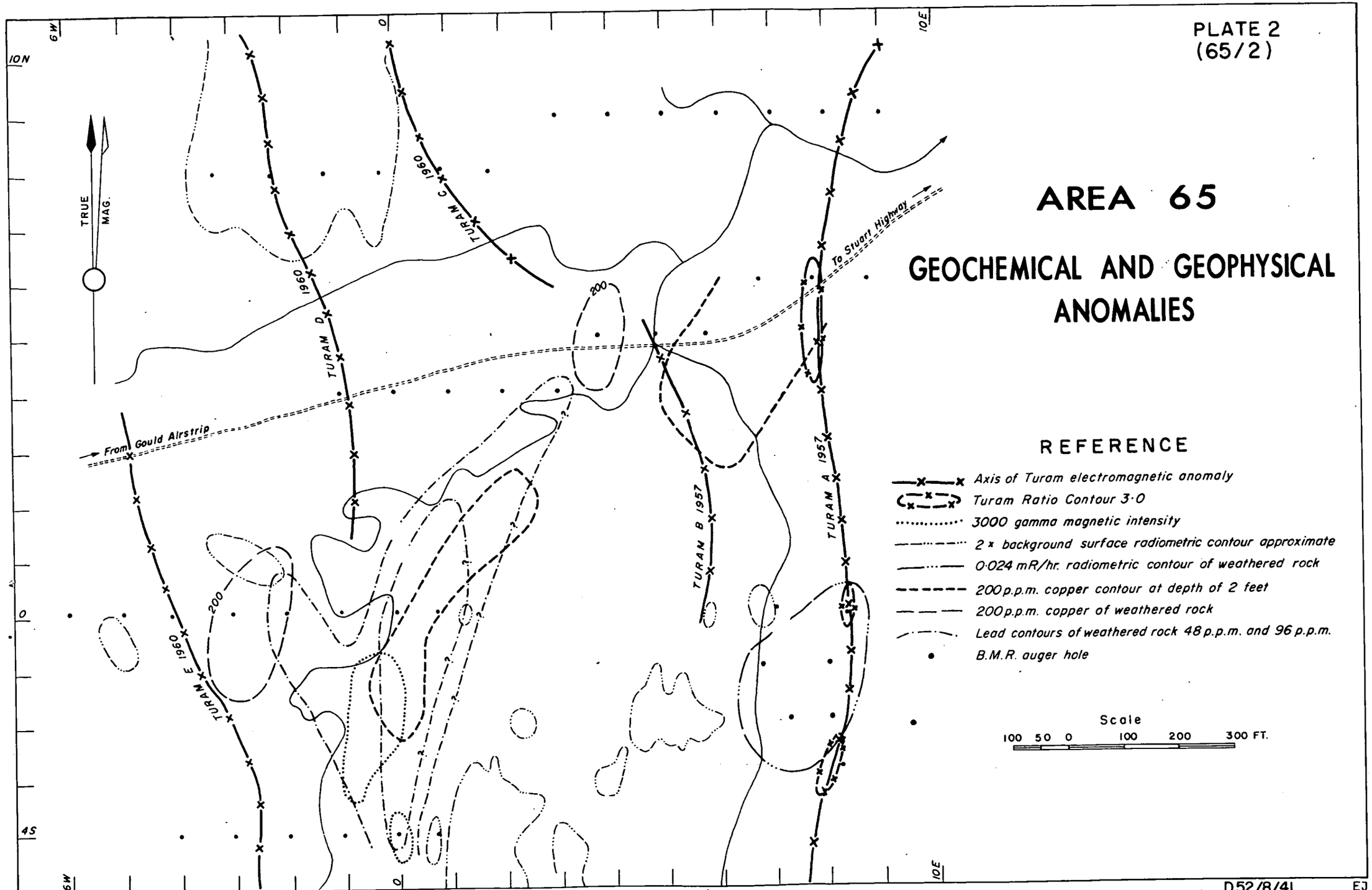
Bureau of Mineral Resources, Geology and Geophysics. December 1962 To accompany Record No 1963/49

D52/8/40

PLATE 2
(65/2)

AREA 65

GEOCHEMICAL AND GEOPHYSICAL ANOMALIES



REFERENCE

- Axis of Turam electromagnetic anomaly
- Turam Ratio Contour 3·0
- 3000 gamma magnetic intensity
- 2 x background surface radiometric contour approximate
- 0·024 mR/hr. radiometric contour of weathered rock
- 200 p.p.m. copper contour at depth of 2 feet
- 200 p.p.m. copper of weathered rock
- Lead contours of weathered rock 48 p.p.m. and 96 p.p.m.
- B.M.R. auger hole

Scale
100 50 0 100 200 300 FT.

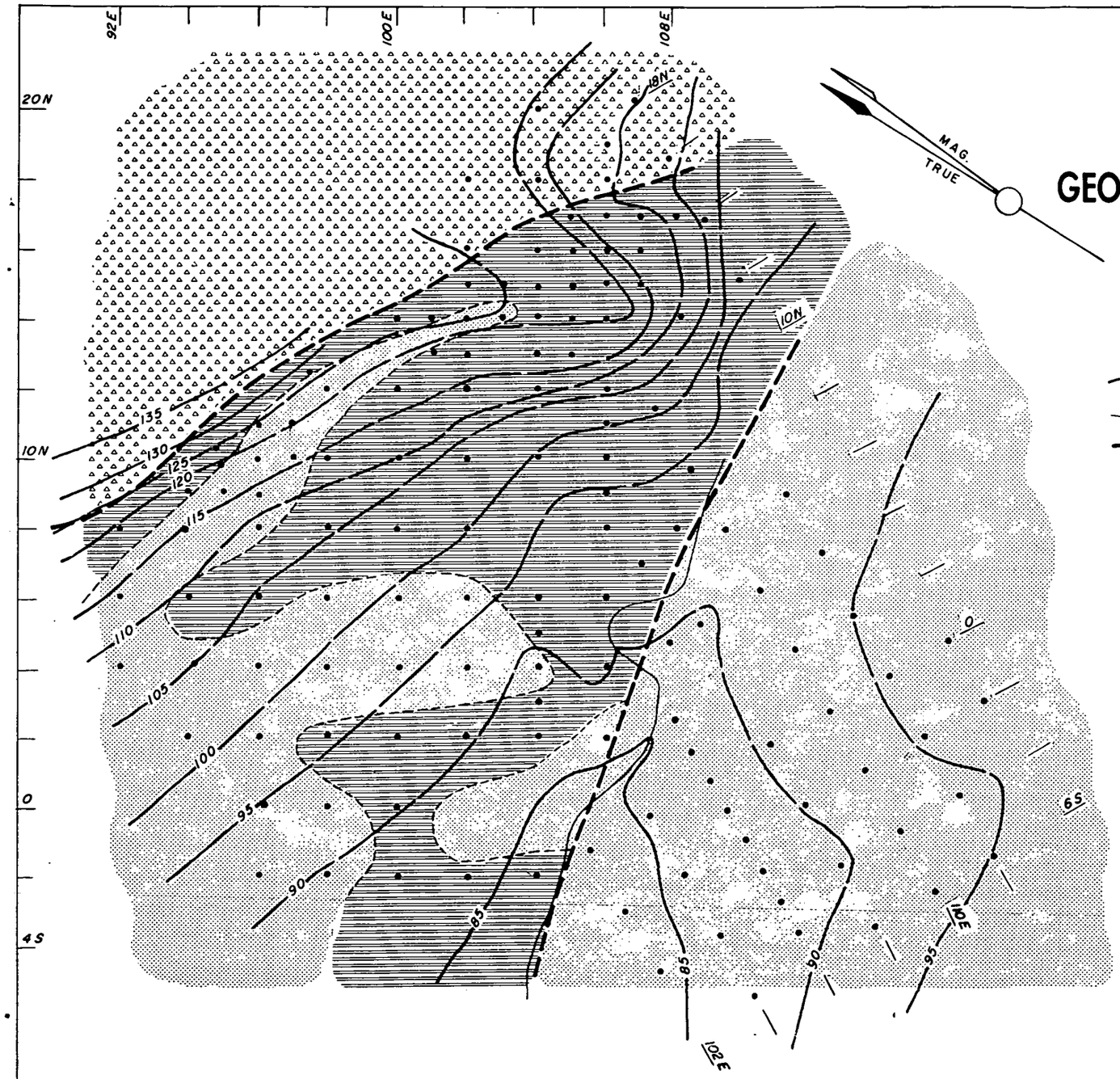
D52/8/41 EJ

Bureau of Mineral Resources, Geology and Geophysics. December 1962. To accompany Record No 1963/49

PLATE 3
(CH/1)

CASTLEMAINE

GEOLOGY AND TOPOGRAPHIC CONTOURS



REFERENCE

- Topographic contours at 5 feet intervals. Reference point 8S 114E at 100 feet.
- Geological boundary - approximate.
- Fault - approximate.
- B.M.R. auger hole.
- Quartzite breccia.
- Ferruginous sediments (altered calcareous beds).
- Grey shale and siltstone.

Scale

200 100 0 200 400 600 FT.

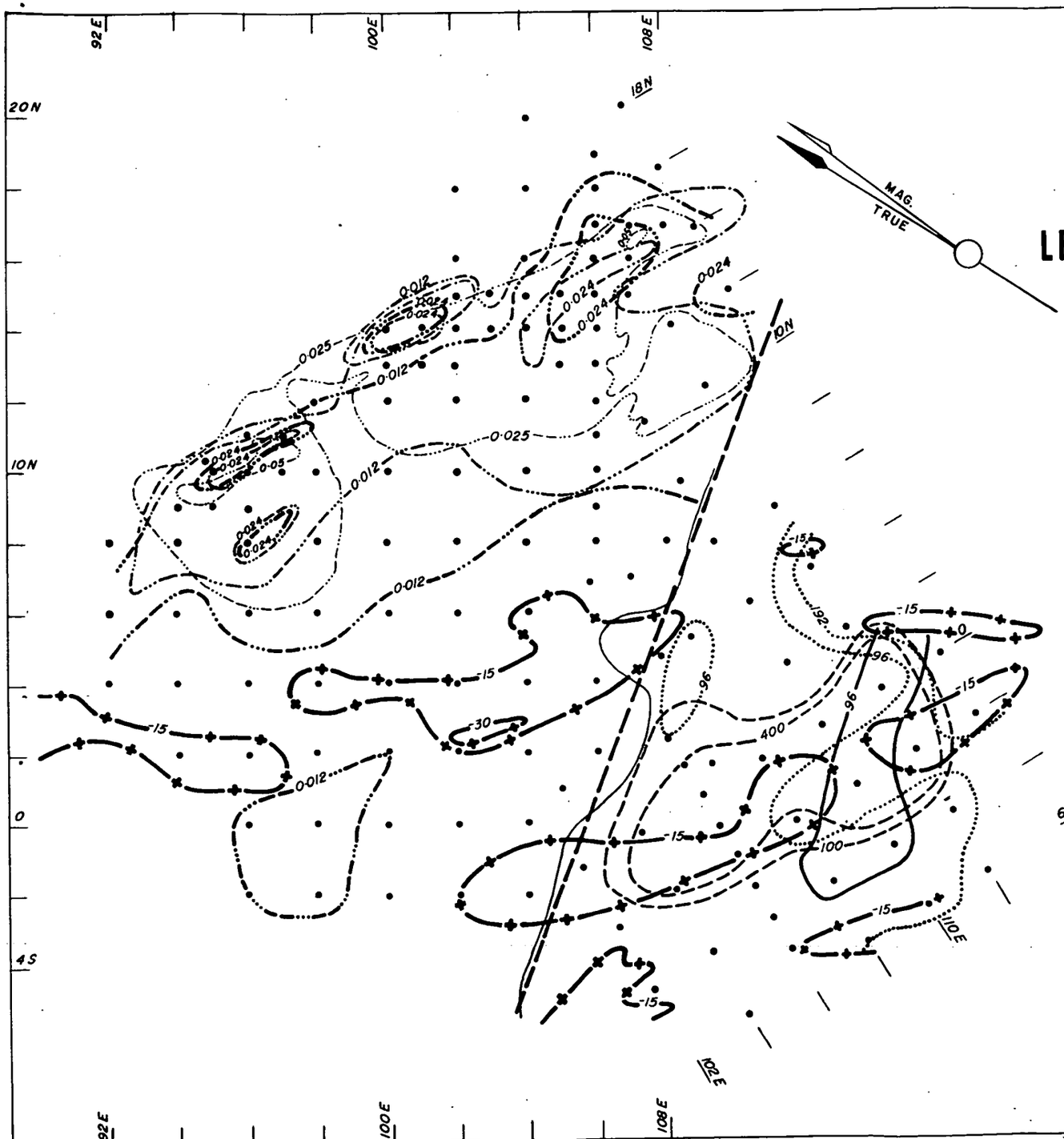
Bureau of Mineral Resources, Geology and Geophysics. January 1963. To accompany Record No 1963/49

D 52/8/42

PLATE 4
(CH/2)

CASTLEMAINE

LEAD AND GEOPHYSICAL ANOMALIES



REFERENCE

- Fault
- Surface radiometric contours 0·025 and 0·050 mR/hr. Geopysical survey 1961.
- Radiometric contours of soil at 0·012 and 0·024 mR/hr. Maximum average value 0·04 mR/hr. at 96 E 8N.
- Radiometric contours of weathered rock at 0·012 and 0·024 mR/hr. Maximum average value 0·048 mR/hr. at 95 E 10N.
- Radiometric contours inferred.
- Electromagnetic (Slingram) imaginary component contours -15 and -30%. Geophysical survey 1961.
- Lead contours of soil at 96 and 192 p.p.m. Based mainly on samples at depth of 2 - 4 feet.
- 96 p.p.m. lead contour of weathered rock.
- Lead contours at depth of 1 foot at intervals of 100 and 400 p.p.m. Based on data from Territory Enterprise Pty. Ltd. 1958.
- B.M.R. auger hole.

Note: No lead determinations are available above 10 grid north.

Scale

200 100 0 200 400 600 FT.

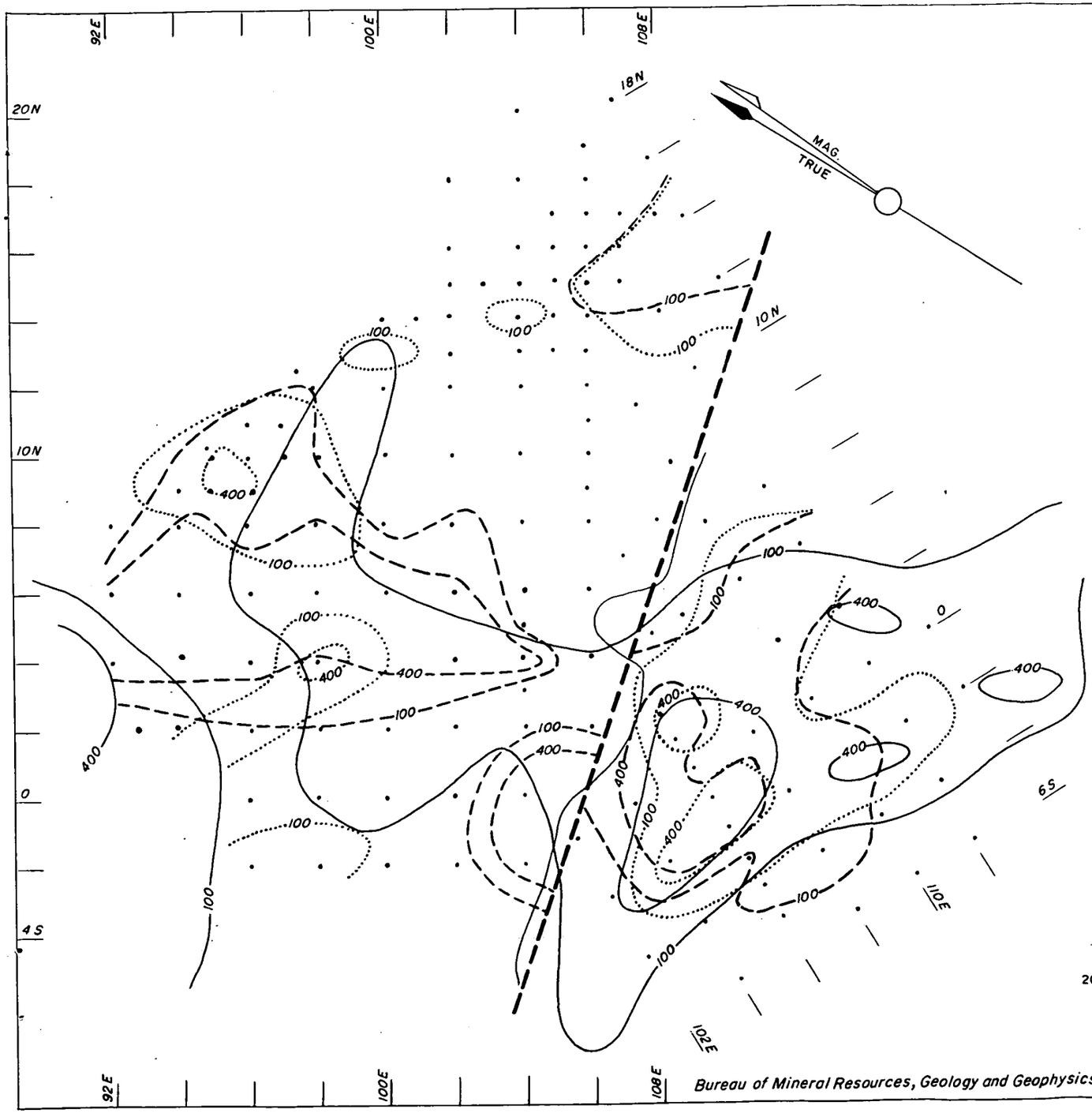
Bureau of Mineral Resources, Geology and Geophysics. February 1963. To accompany Record No 1963/49

D 52/8/43 EJ

PLATE 5
(CH/3)

CASTLEMAINE

COPPER ANOMALIES



REFERENCE

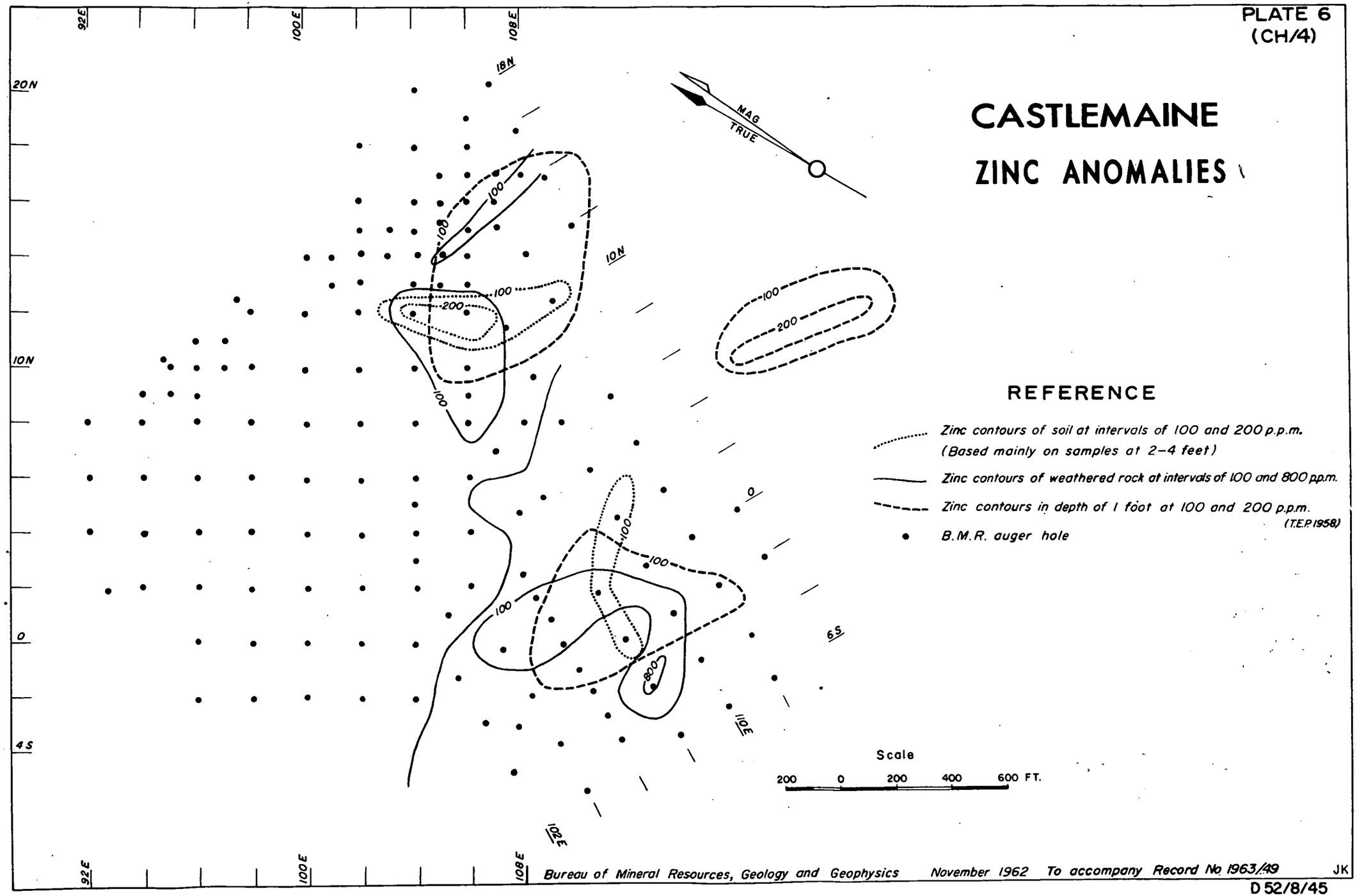
- Copper contours of soil at intervals of 100 and 400 p.p.m. (Based mainly on samples at depth of 2 - 4 feet)
- Copper contour of weathered rock at intervals at 100 and 400 p.p.m.
- Copper contours in depth of 1 foot at 100 and 400 p.p.m. (T.E.P. 1958)
- Fault
- B.M.R. auger hole.

Scale
200 100 0 200 400 600 FT.

Bureau of Mineral Resources, Geology and Geophysics. November 1962. To accompany Record No 1963/49 D52/8/44 EJ

PLATE 6
(CH/4)

CASTLEMAINE
ZINC ANOMALIES



REFERENCE

- Zinc contours of soil at intervals of 100 and 200 p.p.m. (Based mainly on samples at 2–4 feet)
- Zinc contours of weathered rock at intervals of 100 and 800 p.p.m.
- Zinc contours in depth of 1 foot at 100 and 200 p.p.m. (T.E.P. 1958)
- B.M.R. auger hole

Scale
200 0 200 400 600 FT.

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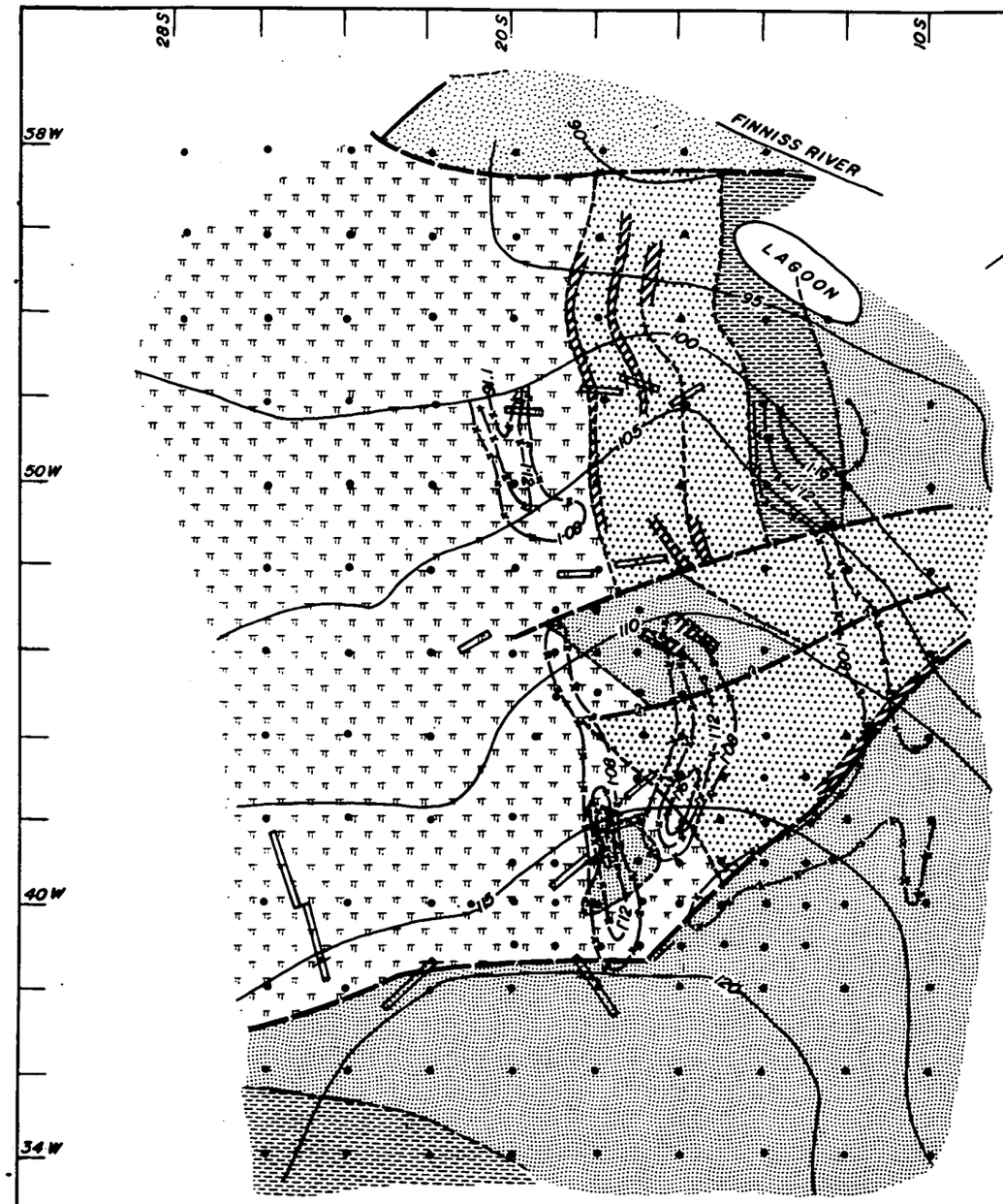
D 52/8/45

PLATE 7
(55 W/1)

AREA 55 WEST

GEOLOGY, TOPOGRAPHIC AND ELECTROMAGNETIC CONTOURS

Scale
200 0 200 400 600 FT.



REFERENCE

- Turam ratio contours at intervals of 1·08, 1·12 and 1·16. Geophysical Survey 1961
- Topographic contours at 5 ft. intervals. Reference point & datum 100·0 ft. at 22 S 52 W
- Geological boundary, approximate
- Fault, approximate
- Fault, inferred
- Strike and dip of beds
- B.M.R. auger hole
- Costean
- Alluvium
- Graphitic slate
- Sericitic phyllite, sometimes chloritic
- Tremolitic sericitic phyllite
- Banded "quartzite" (silicified dolomite ?)
- Tremolitic shales and limestone

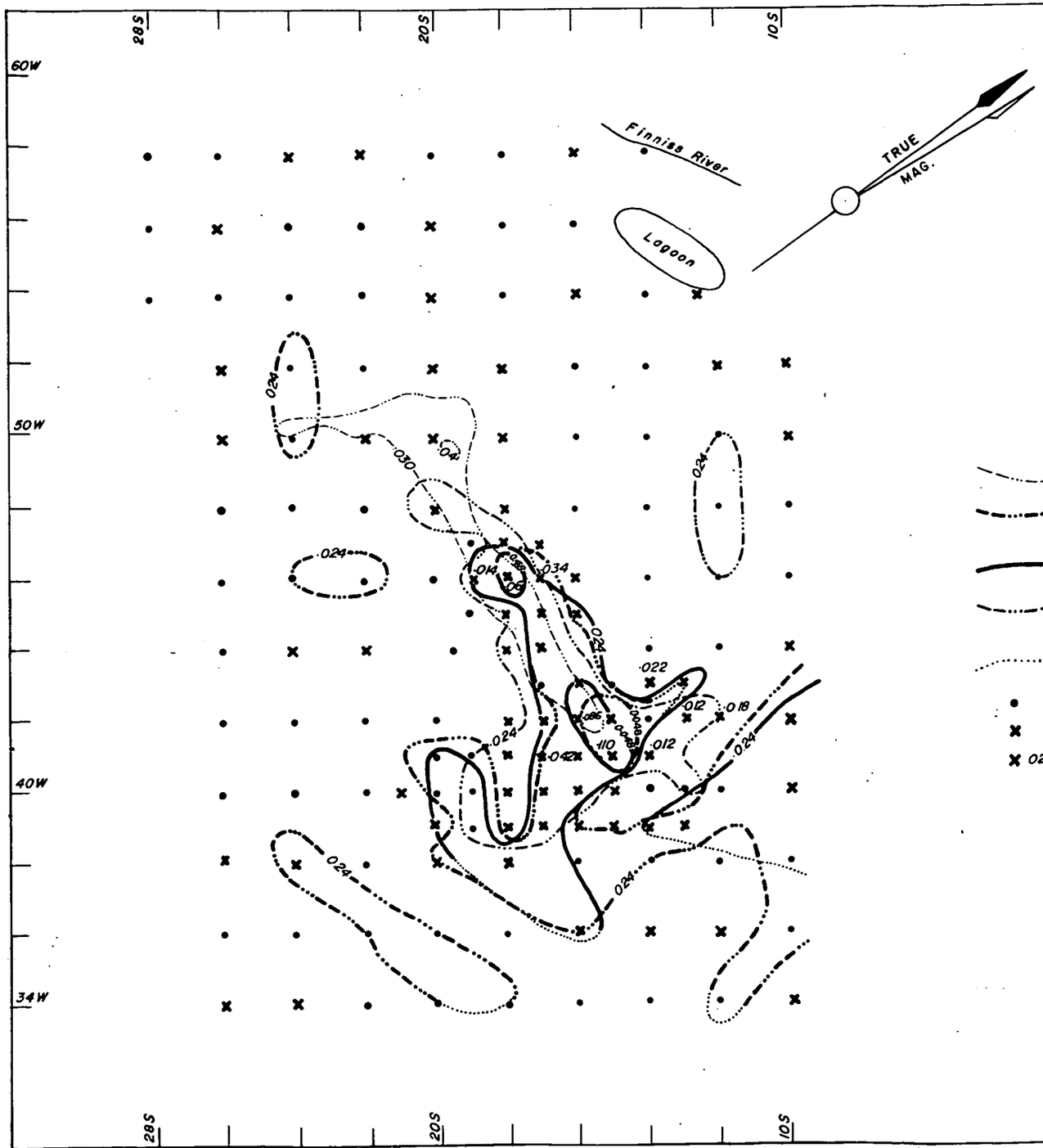
D 52/8/46 JK

Bureau of Mineral Resources, Geology and Geophysics. January 1963 To accompany Record No 1963/49

PLATE 8
(55W/2)

AREA 55 WEST

RADIOMETRIC ANOMALIES



REFERENCE

- Surface radiometric contours in mR/hr. B.M.R. Geophysical Survey 1961.
- Radiometric contours in weathered rock to depth of 20 feet at intervals of 0·024 and 0·048 mR/hr. Maximum 0·062mR/hr. at 46W 18S.
- Radiometric contours 0·024 and 0·048 mR/hr. of weathered rock in depth from 20 to 40 feet.
- Radiometric 0·024mR/hr. contours of soil. Maximum value 0·050 mR/hr. at 46 W 18S.
- Radiometric contours inferred. Maximum average value 0·086 mR/hr. at 41 W 15S.
- B.M.R. auger hole.
- B.M.R. auger hole probed below 20 feet.
- 021 B.M.R. auger hole probed below 40 feet. Average value in mR/hr.

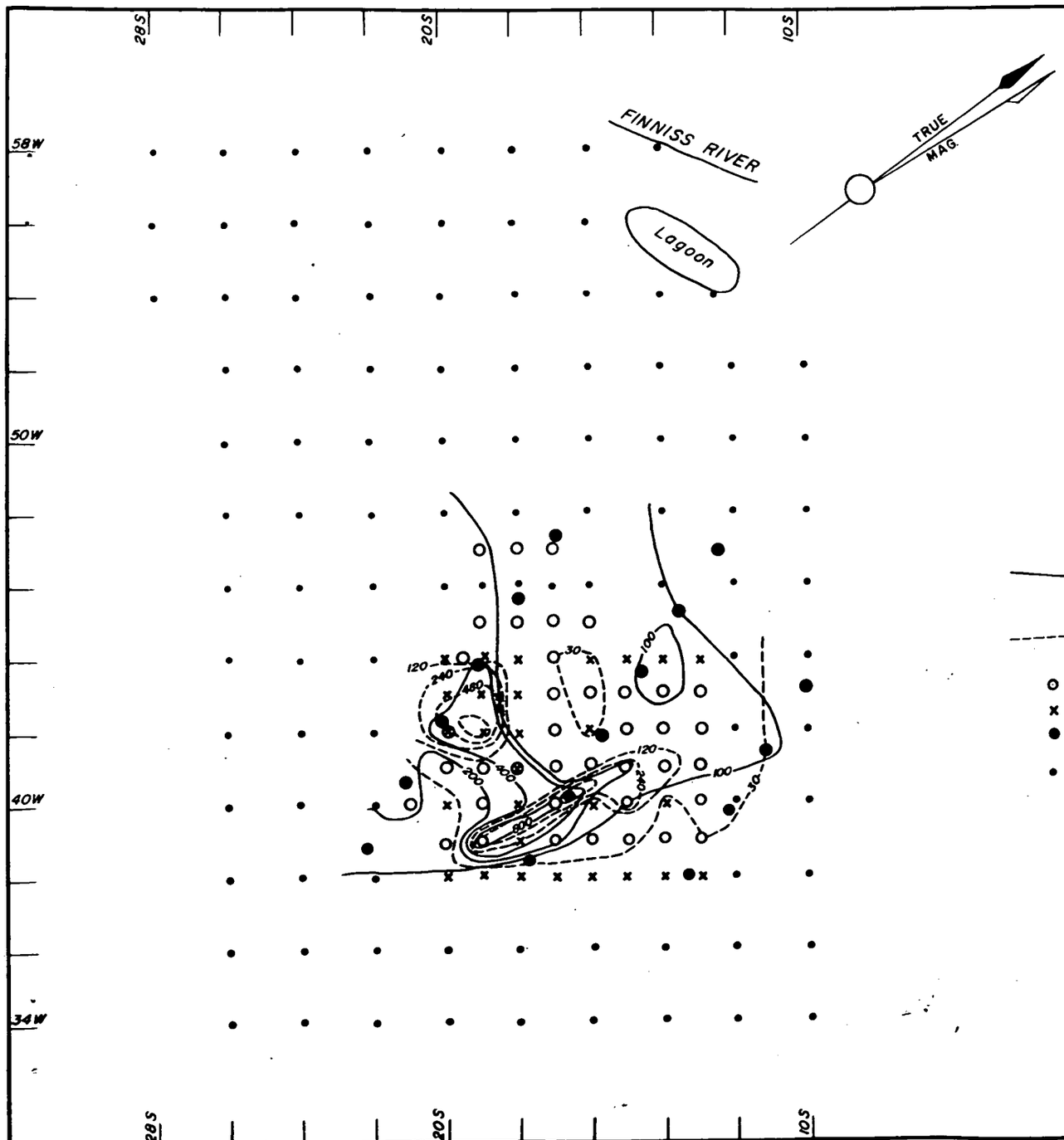
Scale

200 100 0 200 400 600 FT.

Bureau of Mineral Resources, Geology and Geophysics. January 1963. To accompany Record No 1963/49

D 52/8/47 EJ

PLATE 9
(55W/3)



AREA 55 WEST

SURFACE COPPER AND LEAD ANOMALIES

REFERENCE

Copper contours of 0-2 feet in depth at intervals of 100, 200, 400 and 800 p.p.m.

Lead contours of 0-2 feet in depth at intervals of 30, 120, 240, 480 and 960 p.p.m.

Sampling points:
- 0-2 feet B.M.R. auger hole
- 0-1 foot mattock hole
- 2 feet B.M.R. 1958

B.M.R. auger hole

Note: On these surveys copper and lead were determined by the bisulphate fusion method.

Scale

200 100 0 200 400 600 FT.

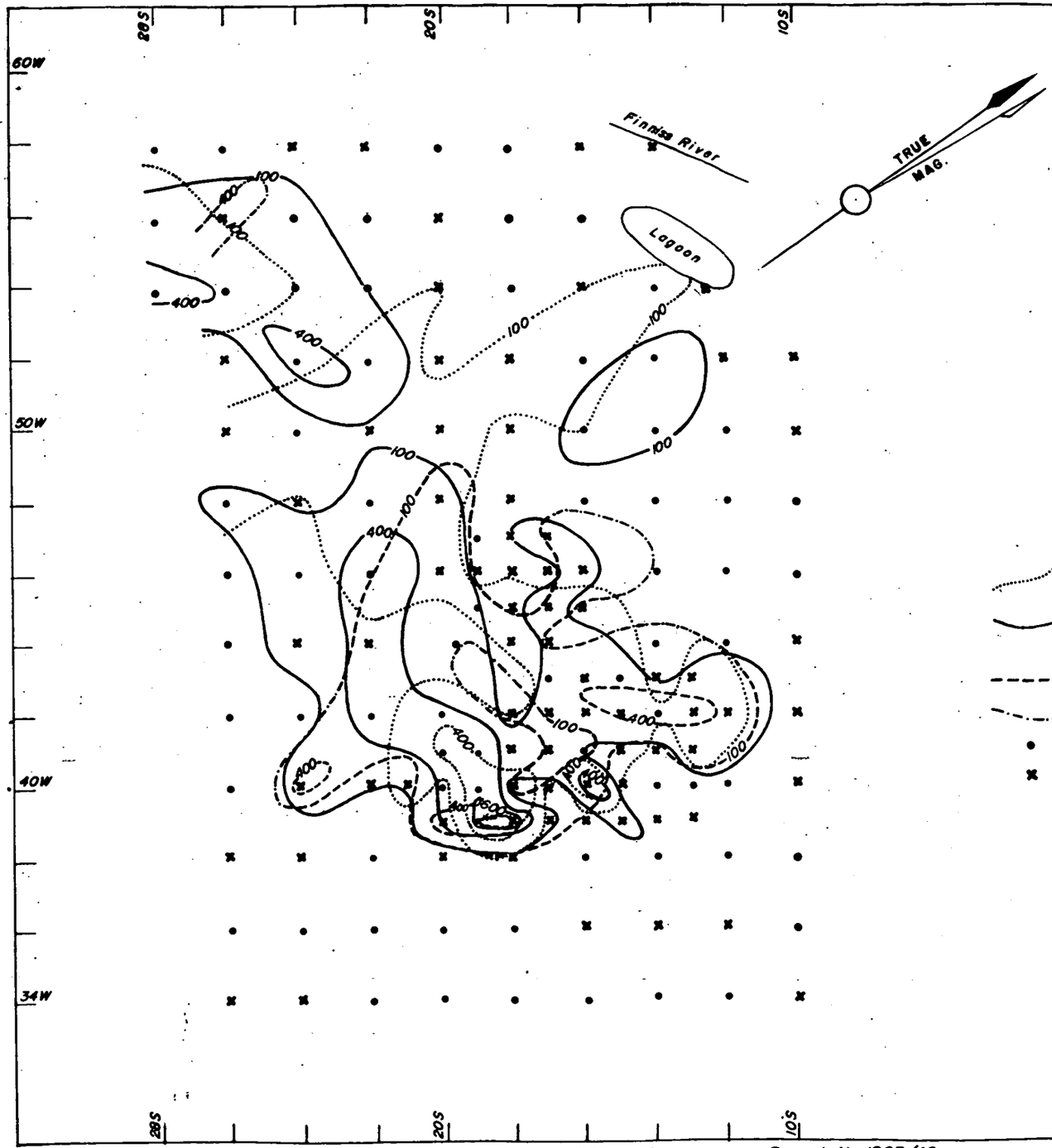
D52/8/48 JK

Bureau of Mineral Resources, Geology and Geophysics. February 1963. To accompany Record No 1963/49

PLATE 10
(55W/4)

AREA 55 WEST

COPPER ANOMALIES IN SOIL AND WEATHERED ROCK



REFERENCE

Copper contours of soil at intervals of 100 and 400 p.p.m. Average value 128 p.p.m. Maximum value 2400 p.p.m. at 39W 19S. (Based mainly on samples at depth of 2 - 4 ft.)

Copper contours of weathered rock to depth of 20 feet at intervals of 100, 400 and 1600 p.p.m. Average value 173 p.p.m. Maximum value 4500 p.p.m. at 39W 18S.

Copper contours of weathered rock in depth from 20 to 40 feet at intervals of 100, 400 and 1600 p.p.m. Maximum value 3750 p.p.m. at 39W 18S.

Copper contours inferred.

B.M.R. auger hole.

B.M.R. auger hole deeper than 20 feet.

Scale

200 100 0 200 400 600 FT.

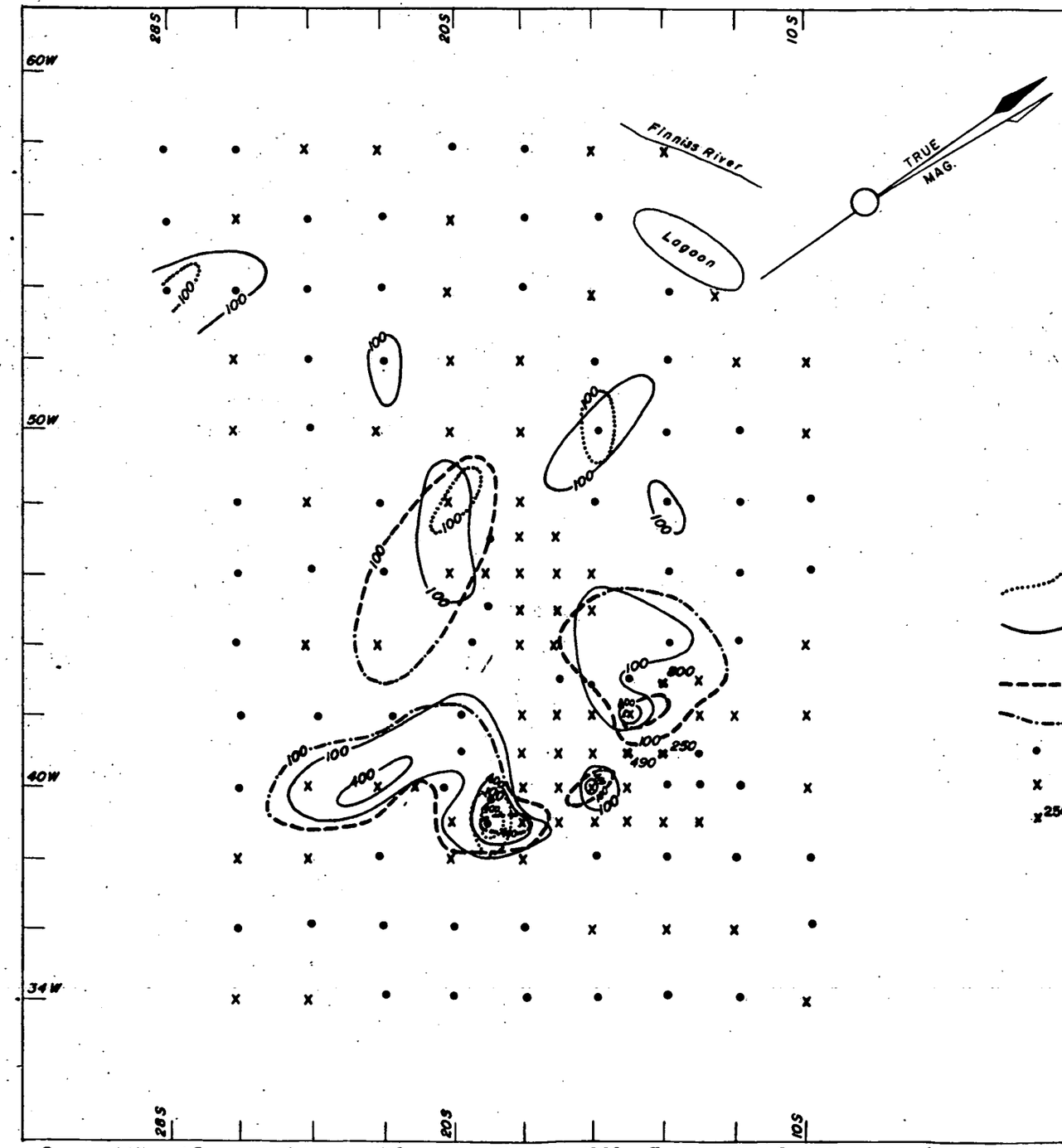
Bureau of Mineral Resources, Geology and Geophysics. January 1963. To accompany Record No 1963/49

D52/8/49 EJ

PLATE 11
(55W/5)

AREA 55 WEST

ZINC ANOMALIES IN SOIL AND WEATHERED ROCK



REFERENCE

- Zinc contours of soil at intervals of 100 and 400 p.p.m. Average value 34 p.p.m. Maximum value 5000 p.p.m at 39W. 19S. (Based mainly on samples at depth of 2-4 ft.)
- Zinc contours of weathered rock to depth of 20 feet at intervals of 100 and 400 p.p.m. Average value 48 p.p.m. Maximum value 4500 p.p.m. at 39W. 19S.
- Zinc contours of weathered rock in depth from 20 to 40 feet at intervals of 100 and 400 p.p.m. Maximum value 660 p.p.m. at 42W. 15S.
- Zinc contours inferred.
- B.M.R. auger hole
- x B.M.R. auger hole between 20 and 40 feet deep
- x250 B.M.R. auger hole deeper than 40 feet, with zinc values in p.p.m. below 40 feet indicated.

Scale
200 100 0 200 400 600 FT.

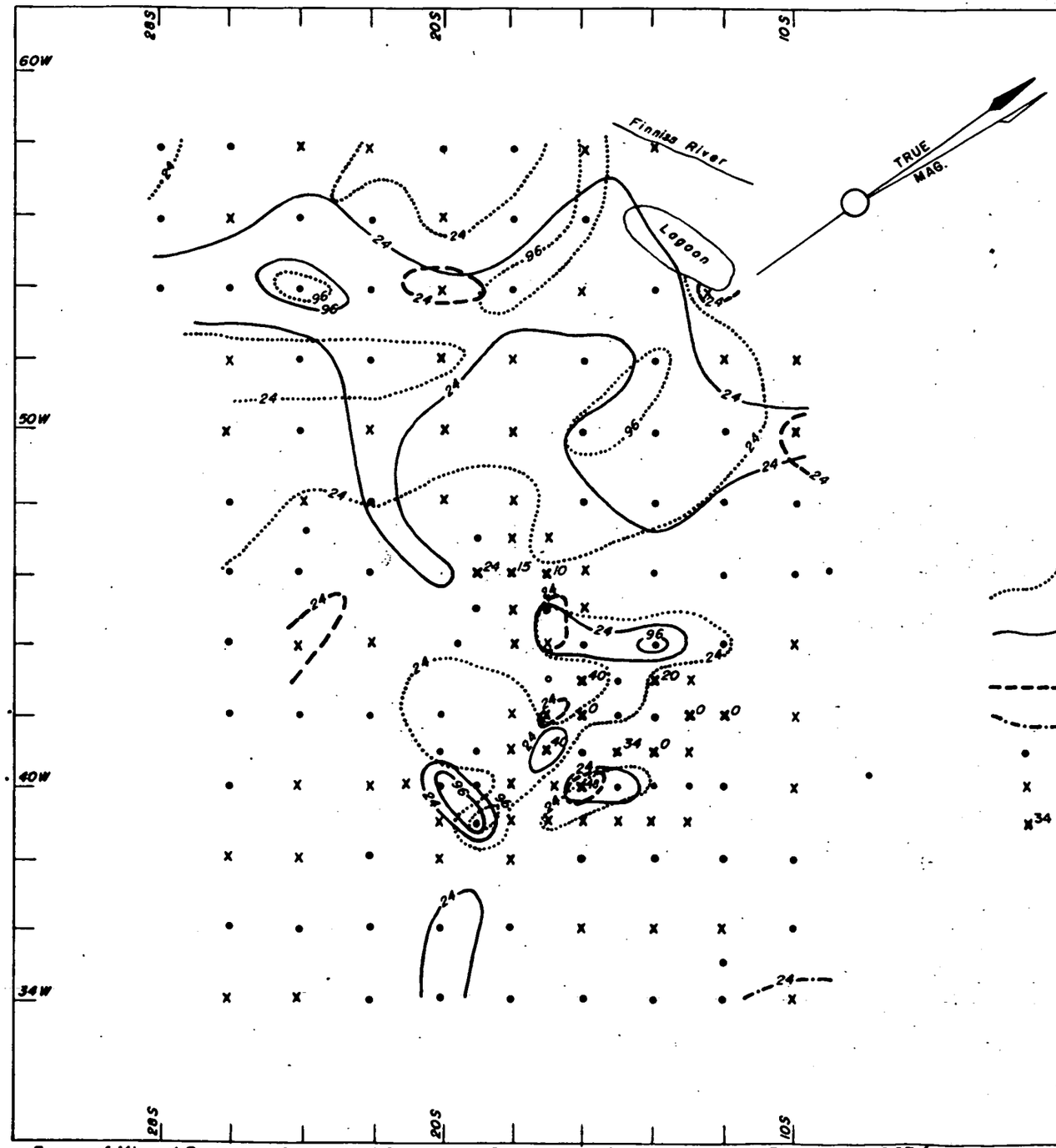
Bureau of Mineral Resources, Geology and Geophysics. December 1962. To accompany Record No 1963/49

D 52/8/50 EJ

PLATE 12
(55 W/6)

AREA 55 WEST

LEAD ANOMALIES IN SOIL AND WEATHERED ROCK



REFERENCE

- Lead contours of soil at intervals of 24 and 96 p.p.m. Average value 27 p.p.m. Maximum value 160 p.p.m. at 54 W 18 S. (Based mainly on samples at depth of 2–4 ft)
- Lead contours of weathered rock to depth of 20 feet at intervals of 24 and 96 p.p.m. Average value 18 p.p.m. Maximum value 170 p.p.m. at 44 W 14 S.
- 24 p.p.m. lead contour of weathered rock in depth from 20 to 40 feet. Maximum value 75 p.p.m. at 40 W 16 S.
- Lead contours inferred
- B.M.R. auger hole
- x B.M.R. auger hole deeper than 20 feet
- x34 B.M.R. auger hole deeper than 40 feet with lead value in p.p.m. below 40 feet indicated.

Scale
200 100 0 200 400 600 FT.

Bureau of Mineral Resources, Geology and Geophysics. December 1962. To accompany Record No 1963/49

D 52/8/51 EJ

DOLERITE RIDGE

GEOLOGY; TOPOGRAPHIC CONTOURS; GEOPHYSICAL ANOMALIES

PLATE 13
(DR/1)

48N 40N 30N 20N 10N 00 6S

130W 140W 150W 160W 170W

REFERENCE

- Topographic contours at 5 feet intervals. Reference point 00 150W at 100 feet.
- Geological boundary approximate.
- Geological boundary inferred.
- Fault.
- Quartz vein.
- Shear zone.
- Strike and dip of bedding.
- Costean.
- Calcareous shale.
- Grey shale.
- Sericitic phyllite and greywacke.
- Dolerite.
- Surface radiometric contours at 0·025 and 0·030 mR/hr. Geophysical survey 1961.
- Radiometric contours of soil 0·024 mR/hr. Maximum value 0·030 mR/hr. at 8N 150W.
- Radiometric contours of weathered rock at intervals of 0·024, 0·036 and 0·048 mR/hr.
- Electromagnetic (Slingram) imaginary component contours at -15, -25 and -35 %.
- Copper contours of soil at intervals of 100, 200 and 400 p.p.m. (Based mainly on samples at depth of 2 - 4 feet) Average value 79 p.p.m. Maximum value 500 p.p.m. at 00 164 W.
- Copper contours of weathered rock at intervals of 100, 200 and 400 p.p.m. Average value 82 p.p.m. Maximum value 610 p.p.m. at 4S 154W.
- Copper contours at depth of 2 feet at 120 and 240 p.p.m. Geochemical survey 1959.
- B.M.R. auger hole.

MAG.
TRUE

Scale
200 100 0 200 400 600 FT.

Bureau of Mineral Resources, Geology and Geophysics. January 1963. To accompany Record No 1963/49

D52/4/11

PLATE 14
(DR/2)

DOLERITE RIDGE

GEOCHEMICAL ANOMALIES

48N 40N 30N 20N 10N 00 6S

130W 140W 146W 150W 160W 170W

MAG.
TRUE

REFERENCE

- Lead contours at depth of 2 feet at 60 and 120 p.p.m. Geological survey 1959.
- Lead contours of soil at intervals of 12 and 48 p.p.m. (Based mainly on samples from depth of 2 - 4 feet). Average value 4 p.p.m. Maximum value 50 p.p.m.
- Lead contours of weathered rock at intervals of 12 and 48 p.p.m. Average value 3 p.p.m. Maximum value 90 p.p.m. at 4 S 154 W.
- Zinc contours of soil at intervals of 100 and 200 p.p.m. (Based mainly on samples at depth of 2 - 4 feet). Average value 35 p.p.m. Maximum value 340 p.p.m. at 20 N 168 W.
- Zinc contours of weathered rock at intervals of 100, 200 and 400 p.p.m. Average value 78 p.p.m. Maximum value 550 p.p.m. at 3 S 153 W.
- B.M.R. auger hole.

BASELINE

GEOCHEMICAL

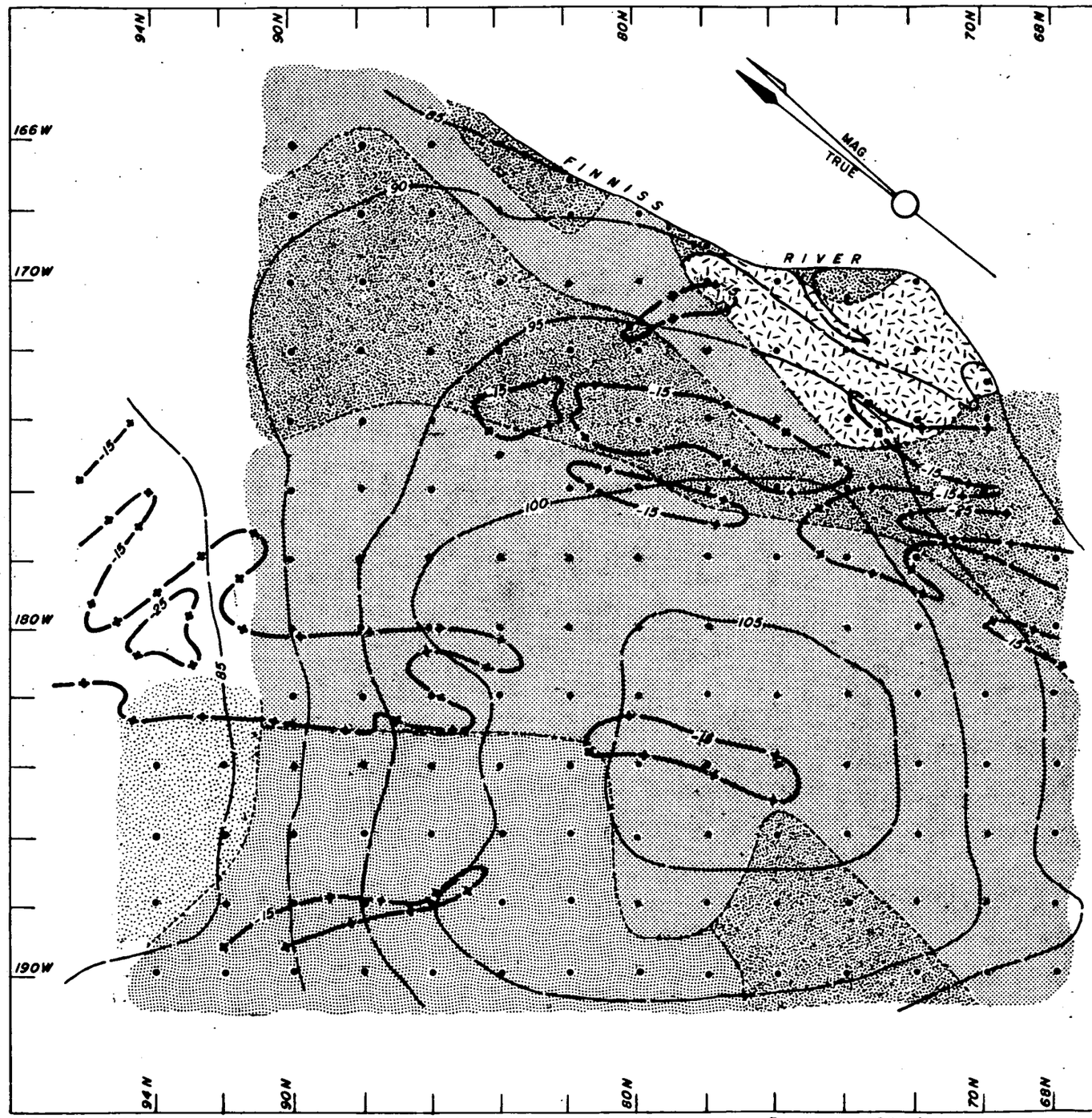
144 148 152 156 160 164 168 172

Scale
200 100 0 200 400 600 FT.

Bureau of Mineral Resources, Geology and Geophysics. January 1963. To accompany Record No 1963/49

D 52/4/12 EJ

PLATE 15
(WF/1)



WEST FINNISS

GEOLOGY; TOPOGRAPHIC AND ELECTROMAGNETIC CONTOURS

REFERENCE

- Geological boundary - approximate.
- Topographical contours at intervals of 5 feet. Reference point 178 W 86N at 100 feet.
- Electromagnetic (Slingram) imaginary component contours at -15 and -25 %.
- B.M.R. auger hole.
- Greywacke.
- Grey shale and siltstone.
- Chloritic and micaceous phyllite.
- Alluvium.
- Dolerite.

Scale
200 100 0 200 400 600 FT.

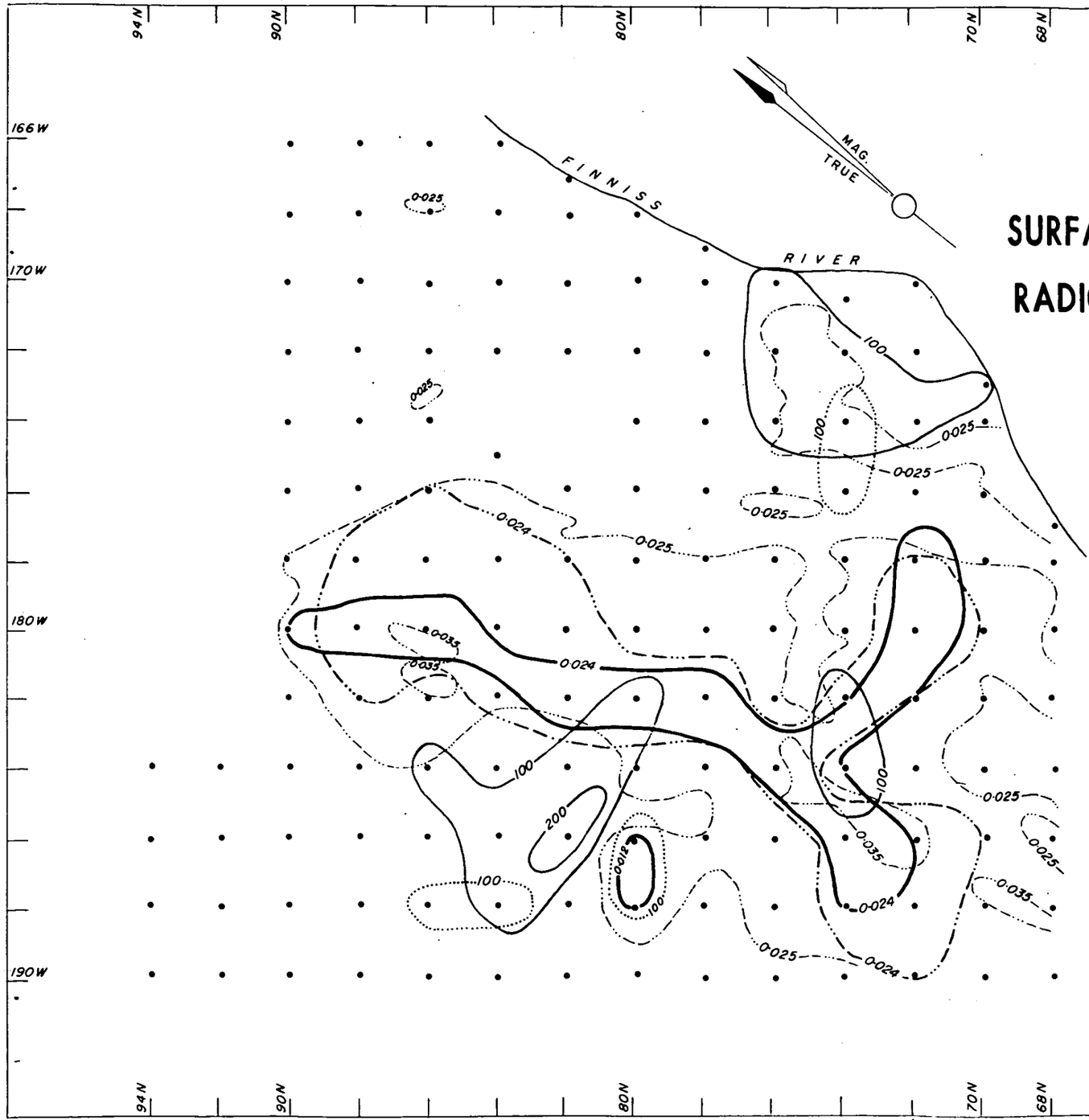
Bureau of Mineral Resources, Geology and Geophysics. December 1962. To accompany Record No 1963/49

D52/8/52 EJ

PLATE 16
(WF/2)

WEST FINNISS

SURFACE, SOIL, AND WEATHERED ROCK RADIOMETRIC AND COPPER ANOMALIES



REFERENCE

- Surface radiometric contours at 0·025 and 0·035 mR/hr. Geophysical survey 1961.
- Radiometric contours of soil at 0·024 mR/hr. Maximum average value 0·032 mR/hr. at 182 W 82 N.
- Radiometric contours of weathered rock at 0·024 mR/hr. Maximum average value 0·032 mR/hr. at 184 W 76 N.
- Copper contours of soil at 100 p.p.m. Average value 51 p.p.m. (Based mainly on samples at depth of 2 - 4 feet)
- Copper contours of weathered rock at 100 and 200 p.p.m. Average value 62 p.p.m.
- B.M.R. auger hole.

Scale
200 100 0 200 400 600 FT.

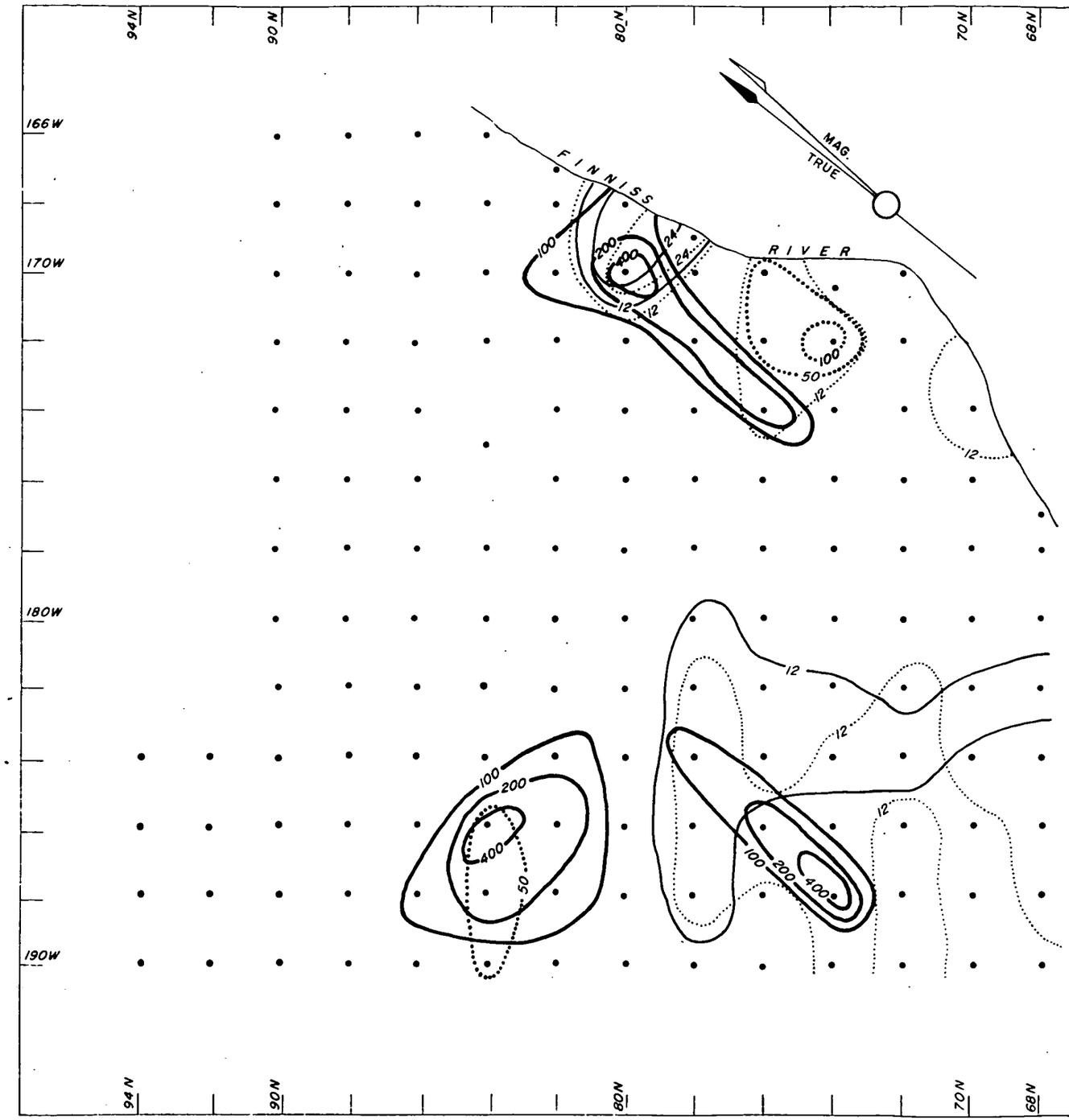
Bureau of Mineral Resources, Geology and Geophysics. February 1963. To accompany Record No 1963/49

D 52/8/53 EJ

PLATE 17
(WF/3)

WEST FINNISS

SOIL AND WEATHERED ROCK
LEAD AND ZINC ANOMALIES



REFERENCE

- Lead contours of soil at 12 and 24 p.p.m. Based mainly on samples at depth of 2 - 4 feet.
- Lead contours of weathered rock at 12 and 24 p.p.m.
- Zinc contours of soil at 50 and 100 p.p.m. Based mainly on samples at depth of 2 - 4 feet. Average value 22 p.p.m. Maximum value 340 p.p.m. at 172 W 74N.
- Zinc contours of weathered rock at 100, 200 and 400 p.p.m. Average value 60 p.p.m. Maximum value 700 p.p.m. at 188 W. 74 N
- B.M.R. auger hole.

Scale
200 100 0 200 400 600 FT.

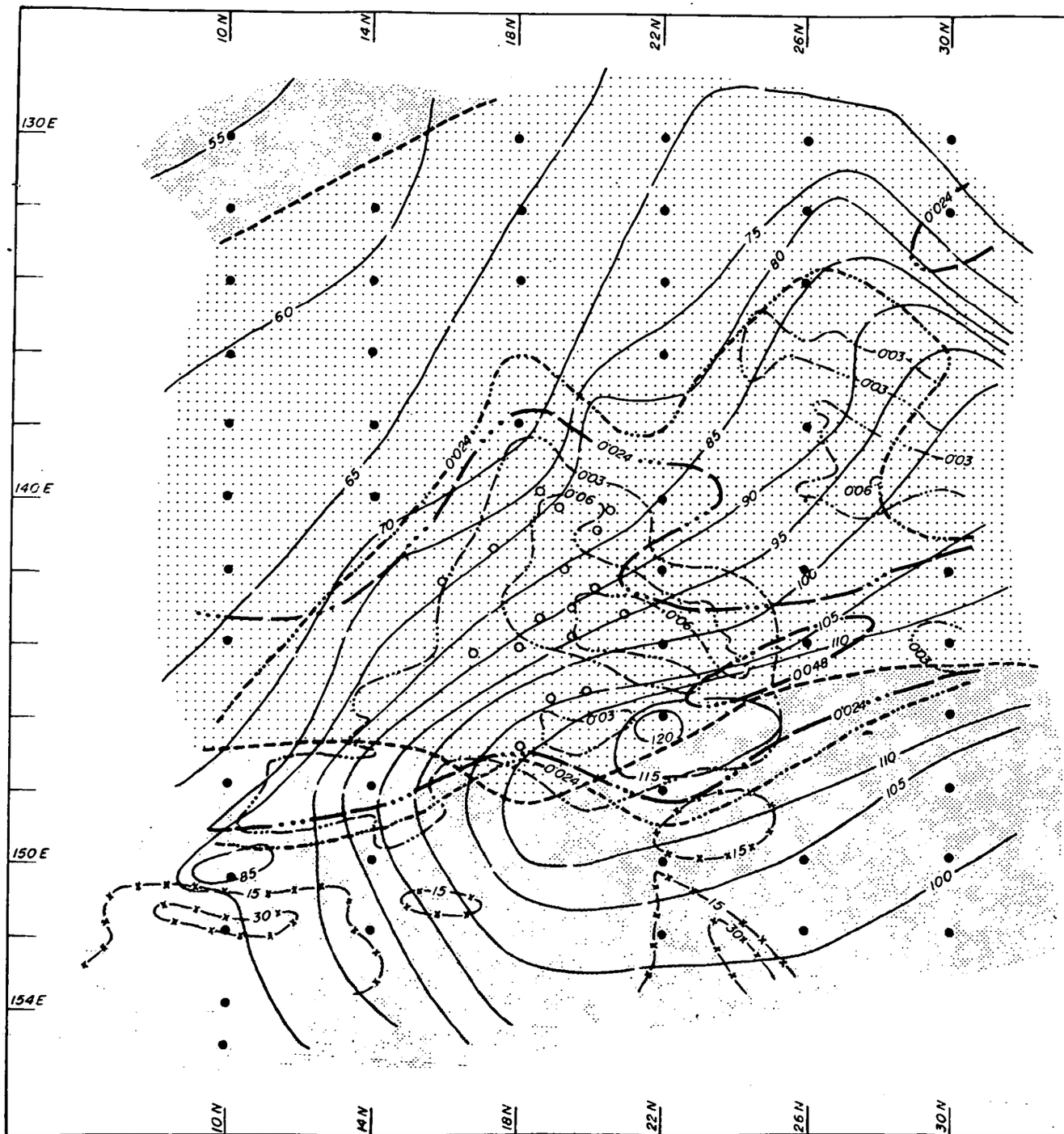
Bureau of Mineral Resources, Geology and Geophysics. December 1962. To accompany Record No 1963/49

D52/8/54 EJ

PLATE 18
(BL/1)

BATCHELOR LATERITES

GEOLOGY; TOPOGRAPHIC CONTOURS; GEOPHYSICAL ANOMALIES



Scale

200 0 200 400 600 FT

TRUE
MAG

REFERENCE

- Topographic contours at 5 feet intervals
  Reference point at 152 E 30 N at 100 feet
- Surface radiometric contours 003 and 006 mR/hr.
  Geophysical Survey 1961
- Radiometric contour of soil 0·024 mR/hr.
- Radiometric contours of weathered rock 0·024 and 0·048 mR/hr.
- Slingram imaginary component contours, -15% and -30%
  Geophysical Survey 1961
- Geological boundary – approximate
- B.M.R. auger hole
- T.E.P. churn drill hole
- Grey shale and siltstone
- Quartz greywacke

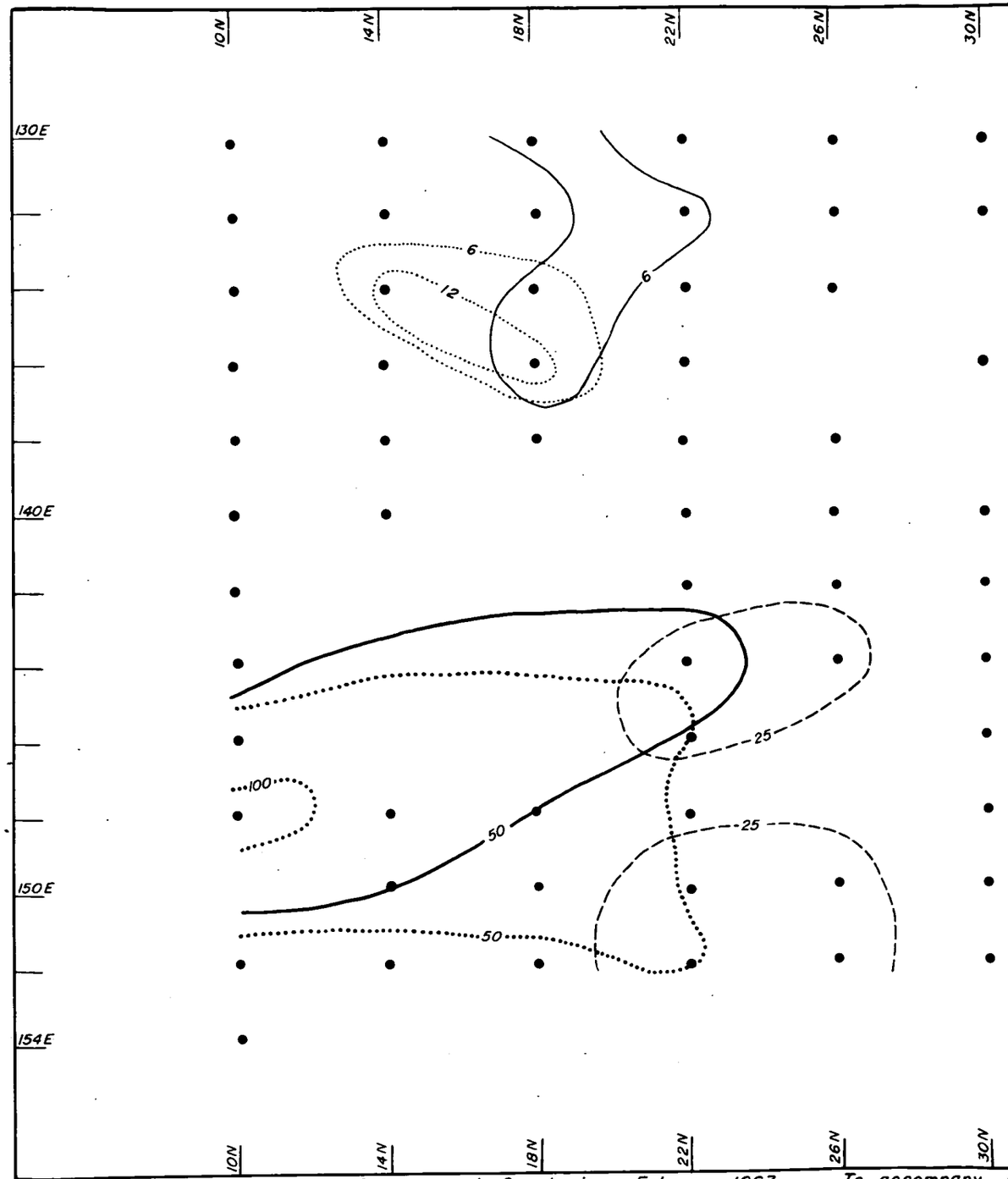
D52/8/55 JK

Bureau of Mineral Resources, Geology and Geophysics. December 1962 To accompany Record No 1963/49

PLATE 19
(BL/2)

BATCHELOR LATERITES

GEOCHEMICAL ANOMALIES



Scale

200 0 200 400 600 FT

REFERENCE

Copper contours of soil 50 and 100 p.p.m.
(Based mainly on samples at depth of 2-4 feet.)

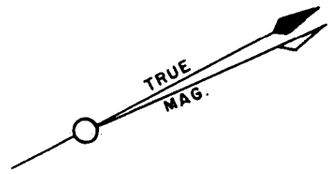
Copper contours of weathered rock 50 p.p.m.

Zinc contours of weathered rock 25 p.p.m. average value 12 p.p.m.
Maximum value 40 p.p.m. at 150 E 22 N
No zinc contours of soil

Lead contours of soil 6 and 12 p.p.m.
(Based mainly on samples at depth of 2-4 feet.)

Lead contours of weathered rock 6 p.p.m.

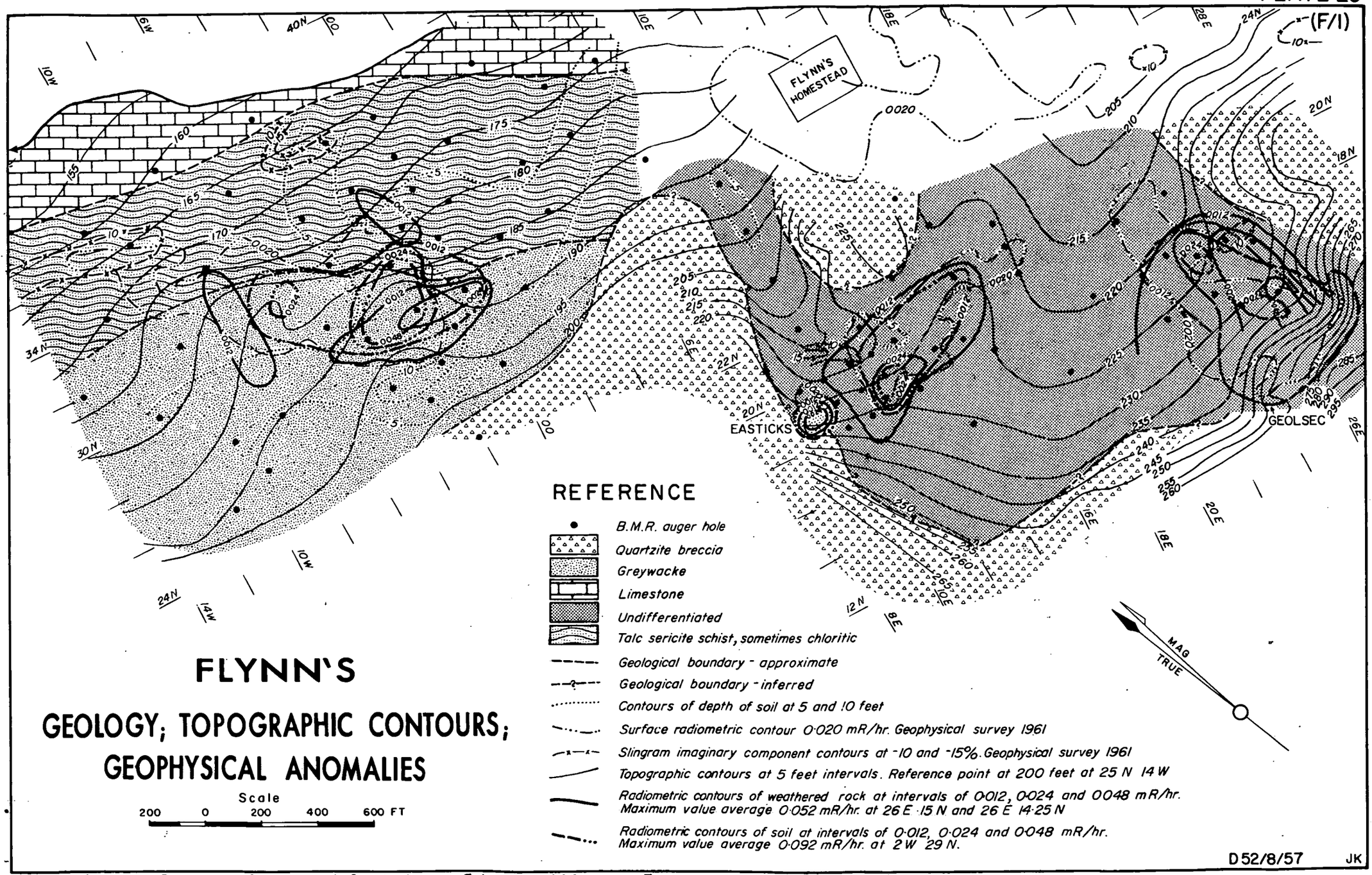
B.M.R. auger hole.



D52/8/56 JK

Bureau of Mineral Resources, Geology and Geophysics. February 1963 To accompany Record No 1963/49

PLATE 20



FLYNN'S

GEOLOGY; TOPOGRAPHIC CONTOURS; GEOPHYSICAL ANOMALIES

Scale

200 0 200 400 600 FT

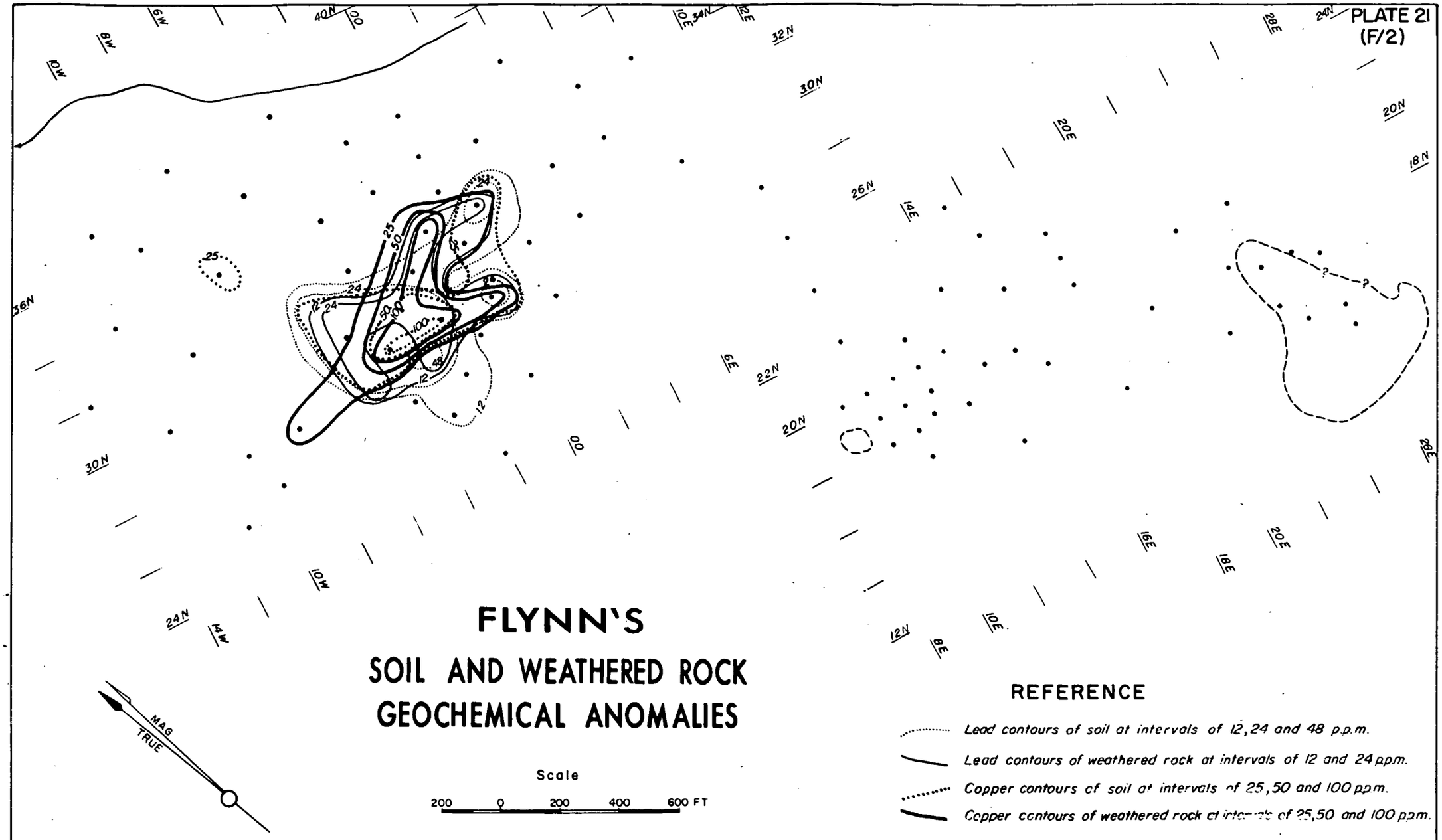
REFERENCE

- B.M.R. auger hole
- Quartzite breccia
- Greywacke
- Limestone
- Undifferentiated
- Talc sericite schist, sometimes chloritic
- Geological boundary - approximate
- Geological boundary - inferred
- Contours of depth of soil at 5 and 10 feet
- Surface radiometric contour 0·020 mR/hr. Geophysical survey 1961
- Slingram imaginary component contours at -10 and -15%. Geophysical survey 1961
- Topographic contours at 5 feet intervals. Reference point at 200 feet at 25 N 14 W
- Radiometric contours of weathered rock at intervals of 0·012, 0·024 and 0·048 mR/hr. Maximum value average 0·052 mR/hr. at 26 E 15 N and 26 E 14·25 N
- Radiometric contours of soil at intervals of 0·012, 0·024 and 0·048 mR/hr. Maximum value average 0·092 mR/hr. at 2 W 29 N.

D52/8/57 JK

Bureau of Mineral Resources, Geology and Geophysics February 1963 To accompany Record No 1963/49

PLATE 21
(F/2)



FLYNN'S

SOIL AND WEATHERED ROCK GEOCHEMICAL ANOMALIES

MAG
TRUE

Scale

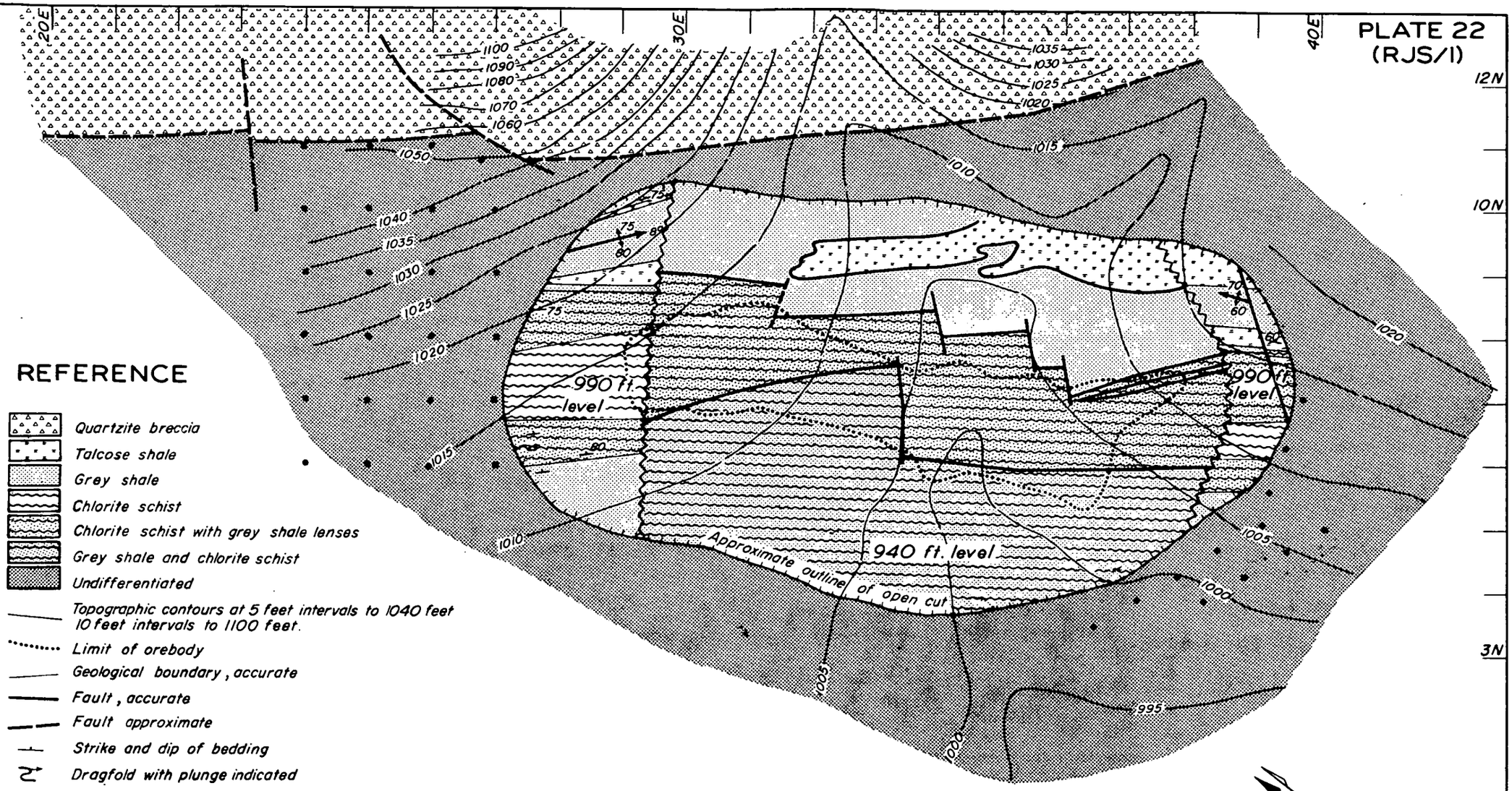
200 0 200 400 600 FT

REFERENCE

- Lead contours of soil at intervals of 12, 24 and 48 p.p.m.
- Lead contours of weathered rock at intervals of 12 and 24 p.p.m.
- Copper contours of soil at intervals of 25, 50 and 100 p.p.m.
- Copper contours of weathered rock at intervals of 25, 50 and 100 p.p.m.
- B.M.R. auger hole.

Bureau of Mineral Resources, Geology and Geophysics. January 1963 To accompany Record No 1963/49 D52/8/58 JK

PLATE 22
(RJS/1)



REFERENCE

- Quartzite breccia
- Talcose shale
- Grey shale
- Chlorite schist
- Chlorite schist with grey shale lenses
- Grey shale and chlorite schist
- Undifferentiated
- Topographic contours at 5 feet intervals to 1040 feet 10 feet intervals to 1100 feet.
- Limit of orebody
- Geological boundary, accurate
- Fault, accurate
- Fault approximate
- Strike and dip of bedding
- Dragfold with plunge indicated
- Axis of anticline with plunge indicated
- Limit of area mapped on 990 ft. level by B.M.R. 1961
- Limit of area mapped on 940 ft. level by Territory enterprises Pty. Ltd. 1961-2.
- B.M.R. auger hole

RUM JUNGLE CREEK SOUTH

GEOLOGY AND TOPOGRAPHIC CONTOURS

Scale
100 0 100 200 300 FT.

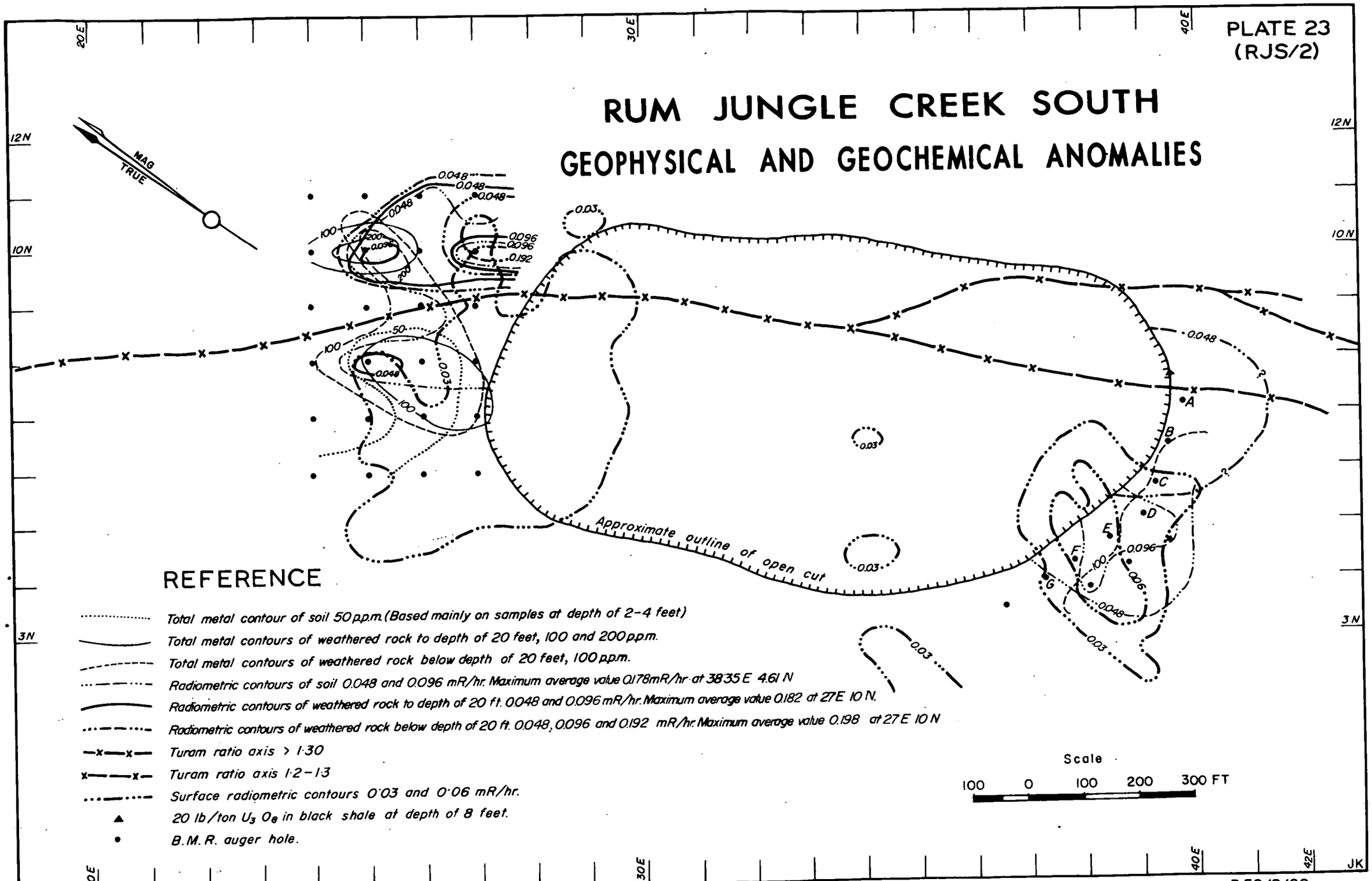
Bureau of Mineral Resources, Geology and Geophysics. January 1963 To accompany Record No 1963/49

D 52/8/59

PLATE 23
(RJS/2)

RUM JUNGLE CREEK SOUTH

GEOPHYSICAL AND GEOCHEMICAL ANOMALIES



REFERENCE

- Total metal contour of soil 50 p.p.m. (Based mainly on samples at depth of 2–4 feet)
- Total metal contours of weathered rock to depth of 20 feet, 100 and 200 p.p.m.
- Total metal contours of weathered rock below depth of 20 feet, 100 p.p.m.
- Radiometric contours of soil 0.048 and 0.096 mR/hr. Maximum average value 0.178 mR/hr at 3835 E 4.61 N
- Radiometric contours of weathered rock to depth of 20 ft. 0.048 and 0.096 mR/hr. Maximum average value 0.182 at 27E 10 N.
- Radiometric contours of weathered rock below depth of 20 ft. 0.048, 0.096 and 0.192 mR/hr. Maximum average value 0.198 at 27 E 10 N
- Turam ratio axis > 1·30
- Turam ratio axis 1·2–1·3
- Surface radiometric contours 0·03 and 0·06 mR/hr.
- ▲ 20 lb/ton U_3O_8 in black shale at depth of 8 feet.
- • B.M.R. auger hole.

JK

Bureau of Mineral Resources, Geology and Geophysics. January 1963 To accompany Record No 1963/49

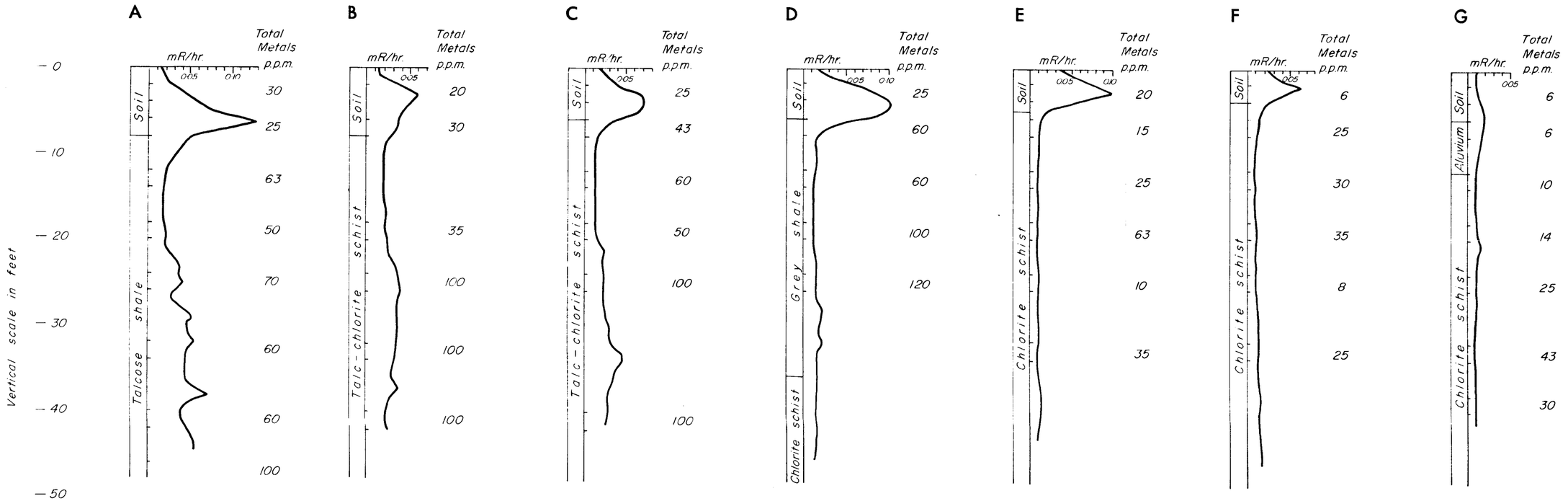
D 52/8/60

PLATE 24
(RJS/3)

RUM JUNGLE GEOCHEMICAL SURVEY N.T., 1961

RUM JUNGLE CREEK SOUTH

AUGER HOLE SECTIONS AND LOGS



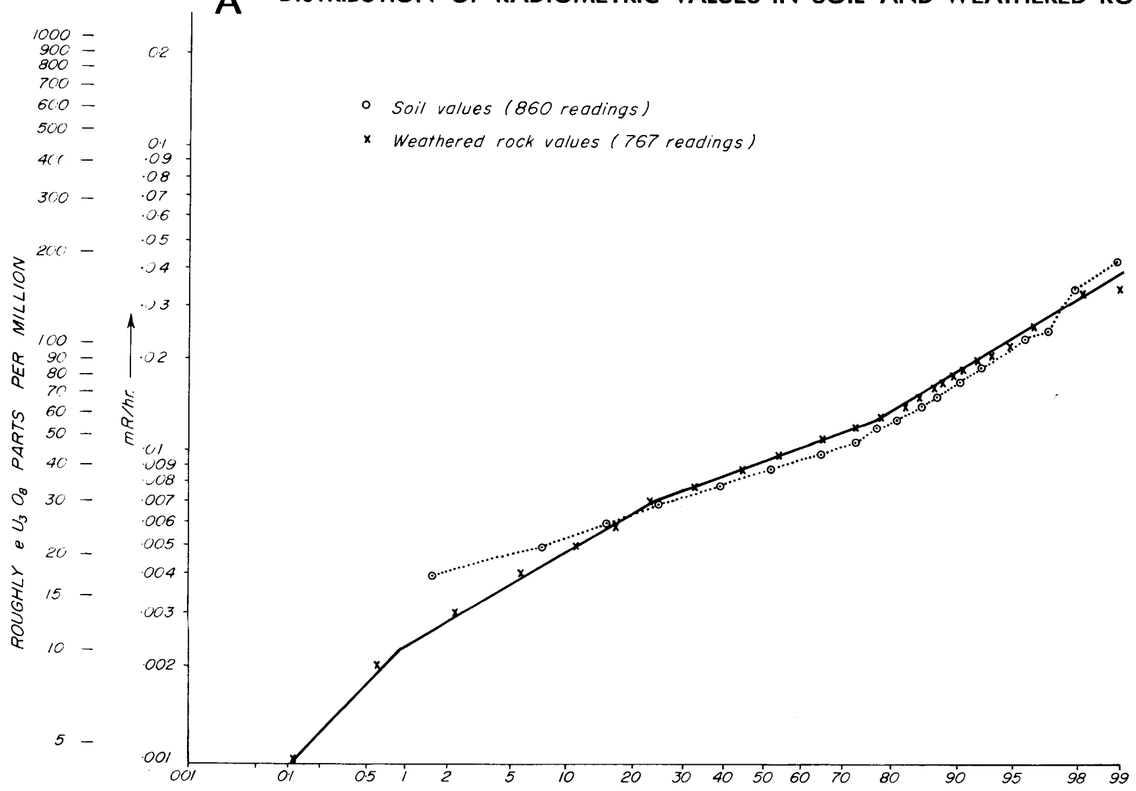
Bureau of Mineral Resources, Geology and Geophysics. April 1963 To accompany Record No 1963/49

D 52/8/61 JK

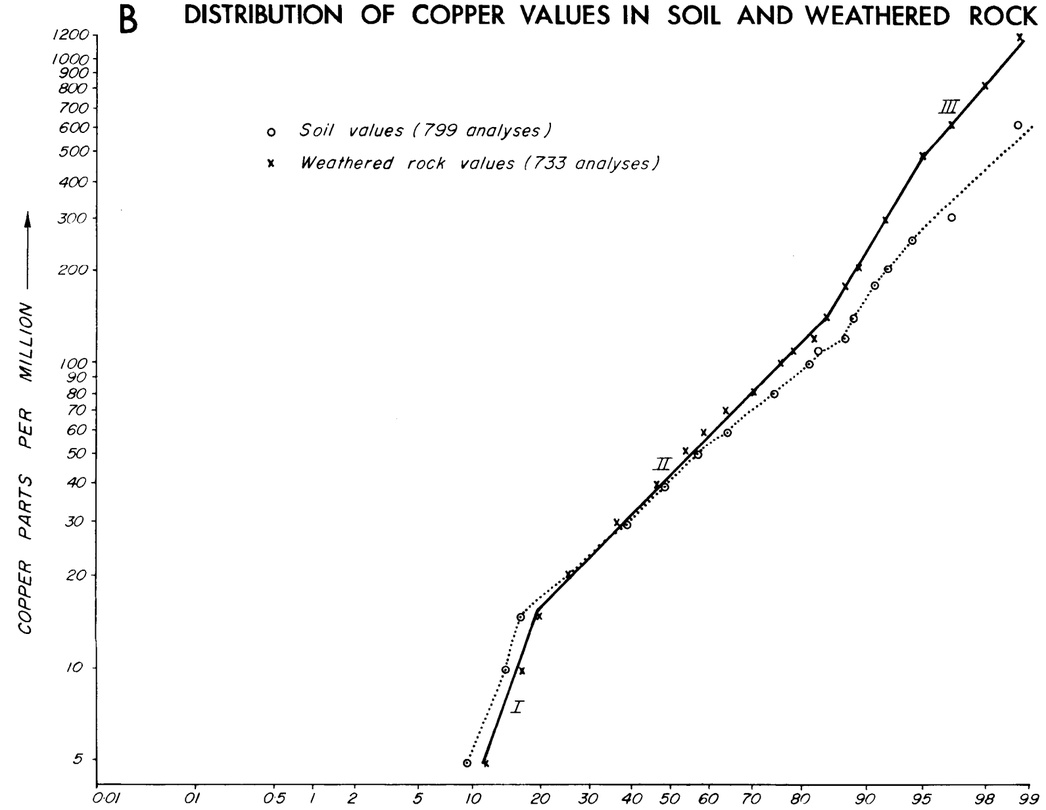
RUM JUNGLE GEOCHEMICAL SURVEY N.T., 1961

LOGARITHMIC PROBABILITY CURVES OF DATA FROM GEOCHEMICAL SURVEY

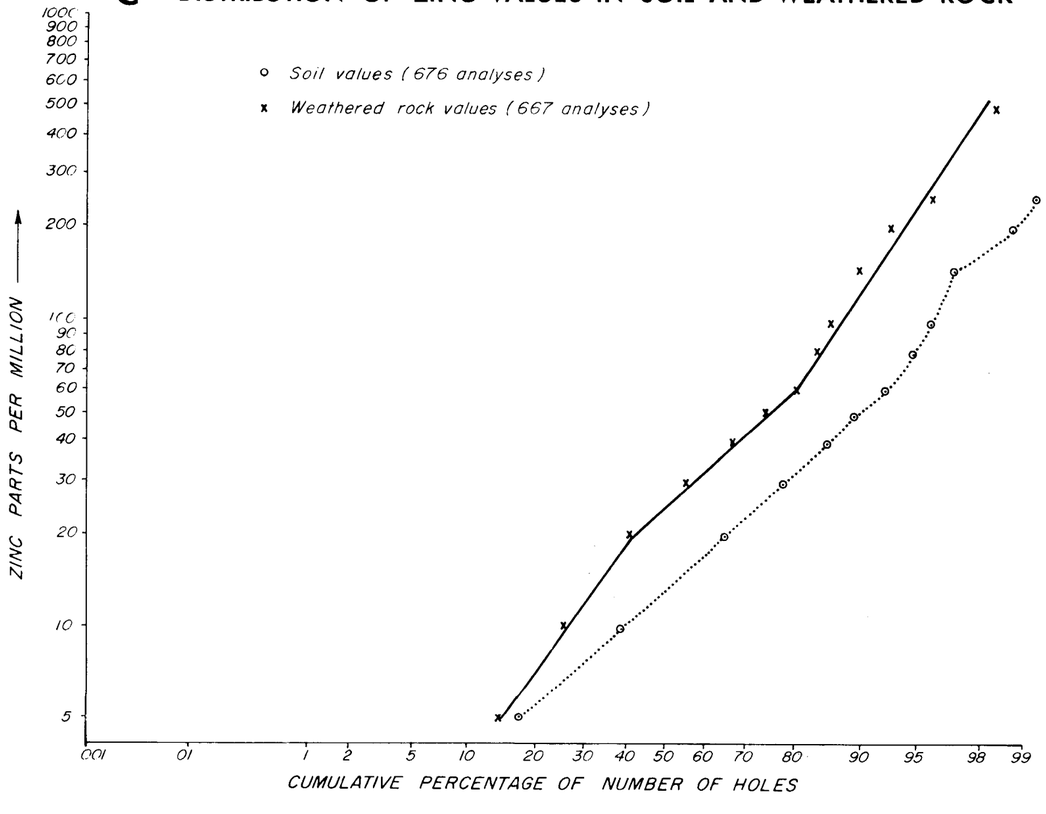
A DISTRIBUTION OF RADIOMETRIC VALUES IN SOIL AND WEATHERED ROCK



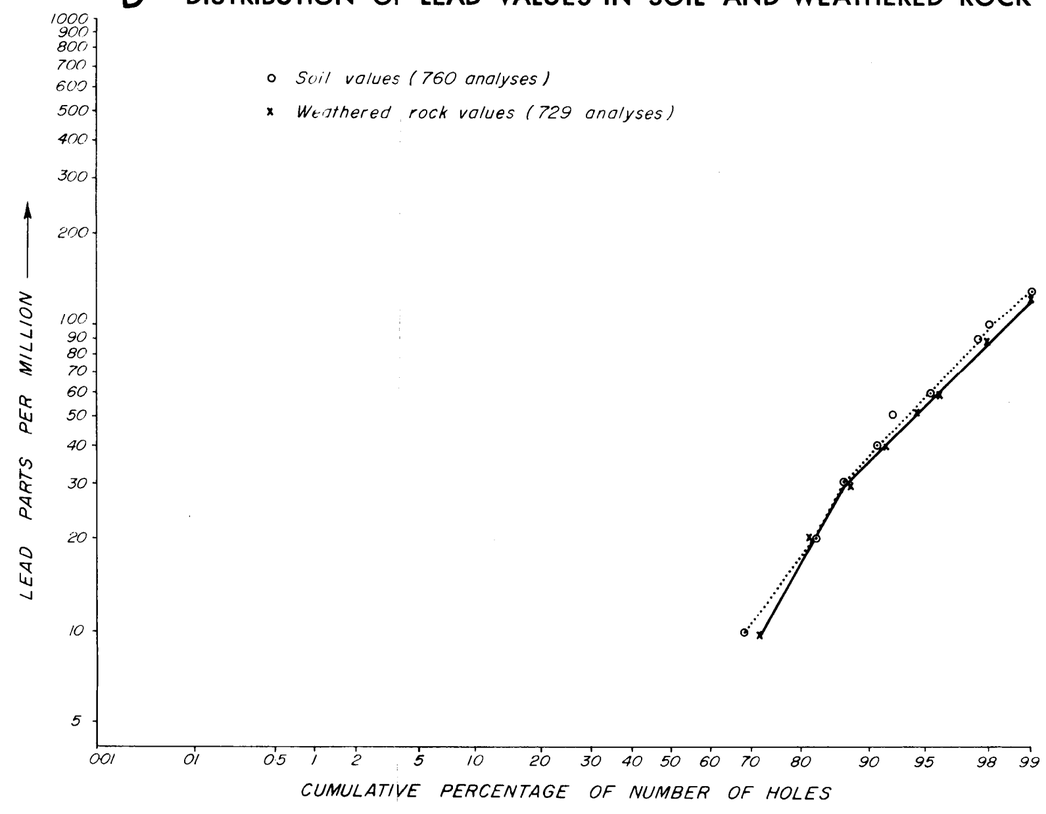
B DISTRIBUTION OF COPPER VALUES IN SOIL AND WEATHERED ROCK



C DISTRIBUTION OF ZINC VALUES IN SOIL AND WEATHERED ROCK



D DISTRIBUTION OF LEAD VALUES IN SOIL AND WEATHERED ROCK



Bureau of Mineral Resources, Geology and Geophysics, April 1963 To accompany Record No 1963/49