DEPARTMENT OF MINES

SOUTH AUSTRALIA

REPORT ON A GEOCHEMICAL SOIL SAMPLING PROGRAMME

Kenmore and Eateringinna

ALBERGA

by

A.M. PAIN
GEOLOGIST

METALLIC MINERALS SECTION

12th December, 1973

Rept.Bk.No. 73/300
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REPORT
Book

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ABSTRACT

After the discovery of apparently strata-bound copper sulphides at the Kenmore II prospect, it was recommended that the surrounding area be prospected for additional deposits of a similar nature.

Geochemical soil sample traversing has proven a comparatively cheap and rapid technique, but it can only be used in areas of suitable soil type.

Two significant anomalies were discovered in this programme, and both have associated geophysical induced polarization anomalies. Diamond drilling of each is recommended.

Since traverses were broadly spaced in comparison with the linear extent of known anomalies, it is probable that further closer spaced traversing would discover additional deposits.

INTRODUCTION

After chrysoprase was found in outcropping jasper on Kenmore in 1967, two jasper capped bodies were investigated by geochemical sampling and induced polarization surveys. A diamond drilling programme on one body (Kenmore I) revealed the presence of serpentinite, but no nickel sulphides were found. (Miller & Gerdes, 1970). The geochemical survey on the other body (Kenmore II) showed that anomalous amounts of copper occur in the soils flanking the jasper-capped ridge.

Detailed investigation in 1971-1972 included mapping, geochemistry, geophysics, diamond drilling and rotary-air drilling.

Sulphide mineralization, mainly pyrite and chalcopyrite, was discovered beneath a zone of secondary oxidation which contained chrysocolla, malachite and cupriferous biotite (Pain and Hiern, 1973). The deposit is conformable, folded with the metasediments and is consequently believed to be syn-sedimentary.

In 1972 a programme of geochemical sampling was devised to locate additional deposits of a similar nature on Kenmore and Eateringinna. The results are presented in this report.

LOCATION ACCESS AND TOPOGRAPHY

The Kenmore and Eateringinna 1-mile areas lie at the eastern end of the Musgrave Ranges in the far north of the State.

There are three main access routes to the area: via Victory Downs Homestead which is 15 miles west of the Stuart Highway at Mt. Cavenagh on the N.T. border; by the Kenmore Park-Granite Downs mail road which runs north-westerly from the Tarcoonyinna Creek crossing on the Stuart Highway; or by road running northwards from Everard Park Station.

Station tracks render a large part of the area accessible under normal conditions, but four-wheel drive vehicles are necessary for cross-country work.

Much of the area consists of gently undulating sandy grass-covered plains cut by ridges of banded gneiss, and prominent dolerite dykes. An anatectic zone characterised by rounded hills of massive adamellite extends across the north-eastern part of Kenmore.

The Marryat shear is a broad zone up to two miles wide which extends across the southern margin of Kenmore in an ESE direction. The zone is composed of intensely fractured gneisses cut by dolerite dykes, mylonites, and pseudotachylites. These are resistant to erosion

so that long ridges up to 50 feet high occur along the shear.

GEOLOGICAL SETTING

The area is underlain by a sequence of metamorphic rocks of upper amphibolite to lower granulite facies. These are referred to as the Mann Metamorphics (Thomson, 1970).

The rocks are described in Miller and Gerdes (1970) and have been the subject of a more intense study during the recent field mapping programme.

Quartz-feldspar-biotite gneisses predominate, but within the sequence interbands occur containing varying amounts of amphibole, pyroxene, garnet and sillimanite. Thin bands of pyroxene-quartzite and calc-silicate rocks also occur.

Some of the more mafic bands within the sequence have undergone deep weathering to form green clays which were subsequently silicified to form jasper. In many of the exposures, replacement by carbonate, chiefly dolomite, has preceeded silicification, which may be incomplete or entirely absent. Some jasper cappings were drilled to the south-east of Kenmore II Prospect; more details of these are given in Pain, 1973(a).

The ridge at Kenmore II Prospect is capped by siliceous jasper and dolomite. It occupies the core of a tight anticline with a gentle northerly plunge.

A period of anatexis post-dates the granulite metamorphism, and anatectic rocks, chiefly adamellite and gneissic granite, occur in a broad area a few miles north of the prospect. Swarms of basic dykes are common throughout the area.

The Marryat shear zone strikes ESE and passes a few miles south of the prospect. It is apparently the result of brittle fracturing. Pseudotachylite, mafic dyke material and epidote alteration are associated with it.

Exposures of bedrock over much of the area are comparatively fresh, but in some places, particularly towards the south-east, the rocks are deeply weathered and bleached.

Areas of silcrete and ferricrete are common.

Most of the area is covered by aeolian sands, alluvial deposits, lake deposits, and transported soils which are often deep and carry thick stands of mulga. Piedmont alluvium and modern talus slopes surround many of the ridges, and thin freshwater limestones flank some of the drainage channels.

The only areas suitable for geochemical sampling are those in which residual soils have been retained.

GEOCHEMISTRY

General

A detailed investigation including geochemistry, geophysics, mapping, diamond drilling and rotary-air drilling was carried out over the Kenmore II Prospect during 1971 and 1972 (Pain & Hiern, 1973). The mode of occurrence of this deposit suggests that sulphides were present in a bed in the premetamorphic sequence, and were largely retained within the bed during metamorphism with only small scale redistribution.

To locate other strata-bound deposits of this type on Kenmore and Eateringinna, a relatively cheap, rapid, and efficient technique was required to traverse across the strike of the gneisses.

Because of its success in discovering and delineating the anomaly at Kenmore II prospect, geochemical soil sampling was selected as the reconnaissance method.

A map showing the distribution of soil types on Kenmore and Eateringinna is currently in preparation. The only areas amenable to soil sampling are those which have a thin development of residual soil.

Such areas are limited in extent, and consequently the coverage which can be obtained by this form of geochemical sampling is limited.

Residual soils are readily recognizable on coloured aerial photographs. Basement trends are clearly visible, and a prominent "grain" can be seen in areas underlain by gneiss.

In contrast to the red colours of alluvium and aeolian sands, areas of residual soils have a marked greenish-grey hue on coloured aerial photographs; this is probably due to the proximity of bedrock and the distinctive vegetation.

The residual soil is generally thin; low rock outcrops barely protruding above plain level are common. Weathered rock debris and angular quartz and feldspar grains are widespread in the soil and may also contribute to the distinctive colour on aerial photographs.

Vegetation in these areas is quite characteristic; open grass-covered plains with scattered Hakea divaricata (cork-bark trees) and sparse stands of Acacia aneura (mulga) are characteristic of areas covered by residual soil. Dense stands of mulga are generally confined to areas of transported sandy soil. Some common species are absent from areas of residual soil; for example Eucalyptus dichromophloia (blood-wood) and Acacia estrophiolata (ironwood) are generally limited to areas of aeolian sand.

Orientation Study

Kenmore II, the only known sulphide deposit in the area, was used as the subject of an orientation study. The thin residual soil at this locality is characteristic of much of the soil on Kenmore and Eateringinna.

When sample preparation is carried out in the field much time may be taken up in sieving and cleaning of sieves. Preparation is

correspondingly slow if very fine sieves are used or if a size fraction between two mesh sizes is required.

Convenience of preparation thus effectively reduced the choice of sample material to minus 80, minus 60 or minus 32 mesh fractions; in order to select one of these, samples were taken at 50 feet intervals along line 8500N at Kenmore II. Highest copper values and greatest contrast were observed for the minus 80 mesh fraction suite of samples, so this size was chosen (See plan 73-195(a) and (b)).

In order to investigate the influence of sample depth, minus 80 mesh fractions were taken from samples at 4", 8", and 12" depths along lines 8200N and 9200N (See plan 73-195(c) and (d)). Since highest copper values and greatest contrast were obtained from samples taken from depths of 12", this depth was selected for future traversing. It proved in the event to be only slightly more time-consuming than shallower sampling.

Although location of nickel anomalies was not the prime object of this programme, nickel was included in the orientation study and the results are shown on plan 73-248. Nickel assays from the various size fractions and depths show much less variation than do the corresponding copper assays. Nevertheless the minus 80 mesh fraction from 12" deep appears quite suitable for this element.

Sampling Procedure

For convenience, the soil sampling traverses were given appropriate field names. Since their use has become established among the field personnel, these names have been retained in this report.

The occurrence of suitable soil is the main factor in limiting the distribution of the traverses. The following table lists the traverses and the reasons for selection of particular localities.

The traverses fall into three categories:-

(a) Reconnaissance traverses

(b) Traverses across areas in which the metasedimentary sequence is mineralogically similar to that at the known copper occurrence, Kenmore II

(c) Traverses further along strike from known anomalies at Kenmore II and Kenmore I prospects.

Table 1

Traverse Name	Comments
Eateringinna Regional Traverse No. 1 (sections a, b, c)	Reconnaissance Traverse designed to cross Kenmore.
Eateringinna Regional Traverse No. 2	Reconnaissance Traverse designed to cross the Western part of Eateringinna.
Eateringinna Regional Traverse No. 3	Reconnaissance Traverse designed to cross Eateringinna.
Alcurra Traverse	Similar rocks to those at Kenmore II prospect (jasper, sillimanite gneiss, intermediate granulite, basic granulite).
Gosses Bend Traverse	Similar rocks to those at Kenmore II prospect (sillimanite gneiss, intermediate granulite, quartzite, calc-silicate rock).
Dilemma Traverse	Similar rocks to those at Kenmore II prospect (sillimanite gneiss, intermediate granulite, basic granulite).

Inferiority Traverse	Similar rocks to those at Kenmore II prospect (jasper, intermediate & basic granulite).
Echidna Traverse	Similar rocks to those at Kenmore II prospect (jasper, intermediate granulite, quartzite, sillimanite gneiss) occur at the Echidna prospect and at the Kenmore I prospect.
Camel Traverse	Crosses "Camel" jasper capping and also southern margin of Kenmore I prospect.
One Stone Prospect	Traverse designed to check possible northerly extensions of Kenmore I prospect in case of change of plunge and also zone of jasper rubble at One Stone.
Kenmore II creek Traverse	Designed to check for southerly extensions of Kenmore II prospect.
Kenmore II line 200S	Designed to check for possible southerly extensions of Kenmore II prospect.
Eremophila Traverse	Designed to check for possible southerly extensions of Kenmore II prospect.

North Terrace Traverse	Designed to check for possible northerly extensions of Kenmore II prospect in case of change of plunge.
Witjuti Traverse 2	Designed to check for possible northerly extensions of Kenmore II prospect in case of change of plunge.
Witjuti Traverse No. 1	Similar rocks to those at Kenmore II prospects (jasper, quartzite, sillimanite gneiss, intermediate & basic granulite).
Ayers Range Traverse	Designed to sample across a dolerite dyke swarm.

After delineating areas of suitable soil on aerial photographs, approximate traverse locations were marked on the ground with flagging tape. Sampling was carried out by a crew of three people using two vehicles. "Line of sight" methods using pickets and ranging rods were employed to ensure that the lines were as straight as practicable. The samples were collected from depths of 12 inches, at intervals of 50 or 100 feet. Sieving to minus 80 mesh was done in the field, and the samples were then despatched to AMDEL for analysis (AMDEL scheme C1 for Cu, Ni).

After the results were received, the traverses were again inspected and additional sampling was carried out to investigate anomalous values (see appendix II). At this time sample locations were plotted accurately on aerial photographs.

Results

Assay results were plotted on "bar charts" which are presented in appendix I. For traverses, this style of plotting presents several advantages; it is quick and straightforward to do; the results can be easily scanned by eye, and anomalous values stand out from the background quite prominently.

Previous experience had shown that some rock types have higher background contents of copper than the common acid gneisses. Consequently many of the low order anomalies could be satisfactorily explained by the recognition of intermediate or basic granulite bands, ferricrete, or manganese staining.

A table showing some of the higher assays and their locations is presented in appendix II. Not every one of these has been re-sampled, but all anomalies for which no ready explanation was apparent have had additional sampling. Most of these were eliminated when further sampling failed to show a significant anomalous pattern of assay values. Results of this additional sampling are presented in appendix II.

The Eateringinna Regional Traverse No. 1, Section C (Frazers Traverse) warrants further mention. Numerous basic and intermediate granulite bands outcrop in this area and patches of ferricrete also occur. Consequently nickel and copper assays are locally high. The background value of copper was calculated at 32.5 ppm and the threshold is 74.4 ppm. For nickel, background is 34.6 ppm and threshold is 99.1 ppm.

Minor occurrences of copper carbonate staining associated with basic granulite bands had been noted previously in this area. The largest basic granulite outcrop occurs in the core of a tight, southerly plunging syncline. It was sampled geochemically (Barnes,

Conor & Pain, 1971), and drilled (Pain, 1973). Only minor traces of sulphide were found. No additional sampling was carried out in this area, but the results of inspecting some of the more prominent soil anomaly locations are presented in appendix II.

Of all the anomalies discovered by this programme only two were recommended for further work. Induced Polarization surveys were accordingly carried out at Wild Horse and Kenmore II Prospects, and following their encouraging results drilling is recommended.

KENMORE I PROSPECT

The soil copper anomaly at this locality was revealed by small anomalous "kicks" on the Echidna traverse and the Eateringinna traverse No. 1(b).

Geology

After the discovery of chrysoprase in a jasper capping on Kenmore I prospect in 1967, a programme of geochemistry, geophysics and drilling was undertaken in the search for nickel sulphides, no anomalous copper concentrations were found.

Inspection of gneissic banding in the metasediments revealed that the jasper cap occupies the core of a fold structure, probably a northerly-plunging syncline. This part of the structure was mapped by P.G. Miller (Miller & Gerdes, 1970).

The geochemical anomaly occurs along the eastern limb of the fold to the north of the jasper capped area.

Detailed mapping of the whole area has not been undertaken because the geological setting is fairly well known from the detailed work on Kenmore II prospect, 2½ miles to the east. The lithological assemblages at each locality are very similar, with exposures of siliceous jasper, glassy quartzite, sillimanite gneiss, intermediate granulite and calc-silicate rocks.

Geochemistry

Results of the geochemical soil sampling programme are presented on plan 73-102. The anomalous zone appears to be closed at each end and extends for more than a mile along strike. Sampling failed to detect a corresponding anomaly on the western side of the structure.

Geophysics

When an Induced Polarization survey was carried out over this zone, frequency effect anomalies of the order of 5% were found to coincide with the geochemical anomaly. The results of this survey are presented in Wightman & Taylor, 1973.

Drilling Recommendations

It is recommended that a hole inclined at 45°E be drilled from 8400N 200E to test for the presence of mineralization similar to that at Kenmore II prospect.

WILD HORSE PROSPECT

The geochemical anomaly in this area was revealed when anomalous copper assays were returned from samples G10438/72 to G10440/72 on Eateringinna Regional Traverse No. 3.

Geology

The prospect is situated near the south eastern edge of the broad, arcuate Kokatarra Shear. It is 12 miles SSW along strike from the Kenmore II prospect, but is separated from it by a major structural feature, the Marryat Shear.

Outcrop in the area is generally poor, but reasonable exposure occur at the prospect due to the presence of hard, dense dolerite dykes which are resistant to weathering.

Metasediments in the area consist predominantly of acid gneisses but interbands of basic granulite occur. Some of these have

minor copper carbonate staining on joint and fracture surfaces. Gneissic banding in the metasediments at the prospects dips westerly at about 55°.

The area in the immediate vicinity of the anomaly on the soil sample traverse was mapped at a scale of 1" represents 100 feet, but no mapping has yet been undertaken to trace this band further along strike.

Geochemistry

Closely spaced geochemical sampling was carried out on a grid over the area, and results are shown on plan 73-19. Sampling was not extended far enough to close the anomaly at either end.

Geophysics

Induced polarization traverses were done on lines OON, 800N & 1400N and in each case frequency effect anomalies of over 4% were detected at depths of around 100 feet.

The I.P. anomalies appear to be displaced westwards from the geochemical anomaly, which is consistent with the 45° to 65° westerly dips measured in surface exposures.

Drilling Recommendations

In view of the location of this area relative to the Kenmore II prospect and of the coincidence of geochemical and geophysical anomalous results, two 400 ft diamond drill holes are recommended as follows:-

(a)	WHD1	1400N	550W	Inclined 45°E	Depth:	400 feet
(b)	WHD2	800N	400W	" "	"	300 feet

CONCLUSIONS AND RECOMMENDATIONS

Geochemical soil sample traversing has proven a relatively cheap and rapid technique for locating anomalous copper occurrences in the Kenmore and Eateringinna areas.

The technique is limited to areas which have a development of thin residual soils and no attempt has been made to prospect the large areas where bedrock is overlain by thick alluvial sediments or aeolian sands. The Kenmore I and II anomalies appear to pinch out along strike and traverse spacing is broad compared with their linear extent.

Consequently it is likely that additional copper occurrences remain undiscovered in the area.

Metasediments in the vicinity of the Kenmore I anomaly are similar to those near the Kenmore II sulphide deposit, 2½ miles to the east. A drill hole is recommended on the coincident I.P. and geochemical anomaly at Kenmore I, in the hope of intersecting a similar sulphide zone.

The coincident I.P. and geochemical anomaly at Wild Horse prospect has not been closed at either end. No attempt has been made to trace the basic granulite band along strike, but large exposures of this rock type have been mapped 15 miles south west along strike. Two diamond drill holes have been recommended. Should these holes disclose the presence of sulphide mineralization, it will be possible to recommend a programme of mapping, geochemical sampling and geophysics to trace this horizon along strike in the hope of locating other occurrences of a similar nature.

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12th December, 1973
AMP:IA

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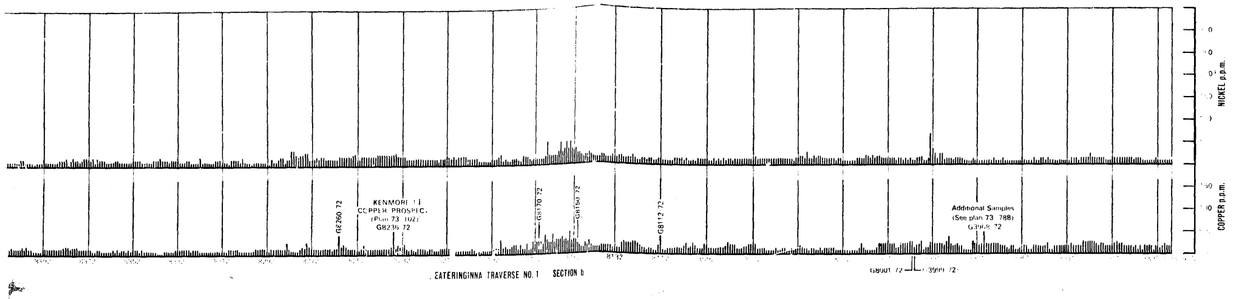
A P P E N D I X I

Results of Geochemical Soil Sampling Programme

(Graphical representation; plans L73-63 and 73-788a)



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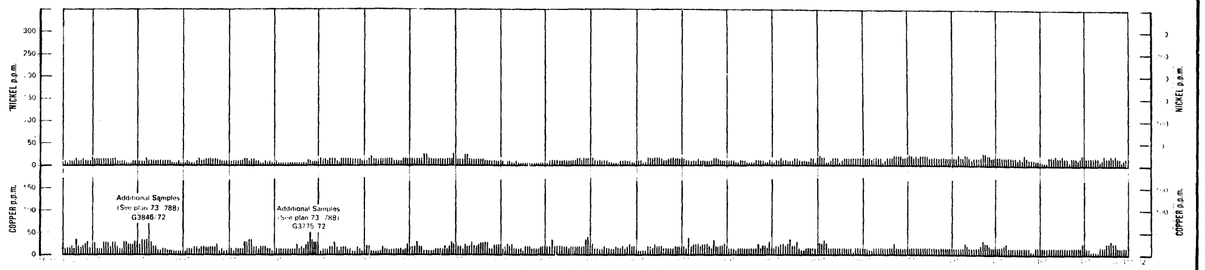

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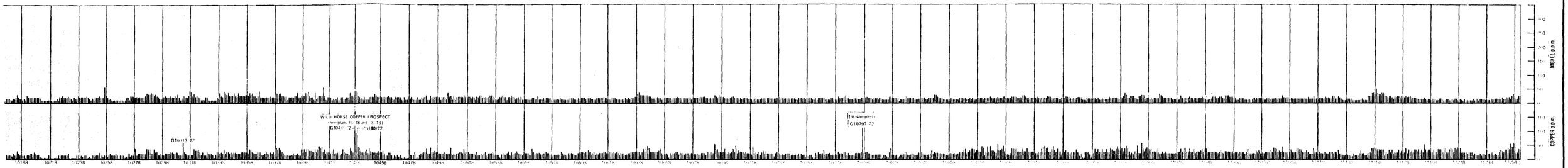
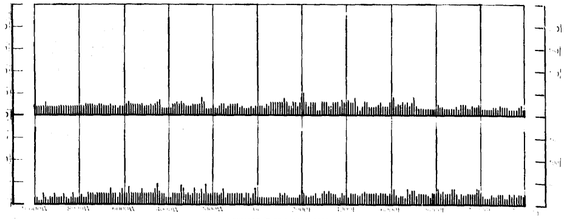


TRAVERSE NO. 3

EATERINGINNA TRAVERSE NO. 3



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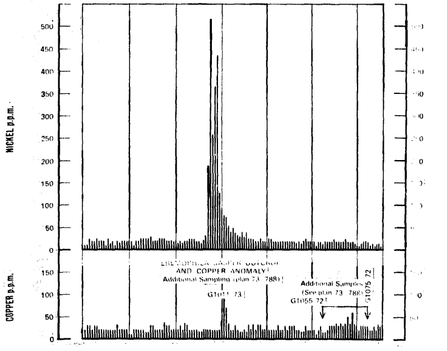

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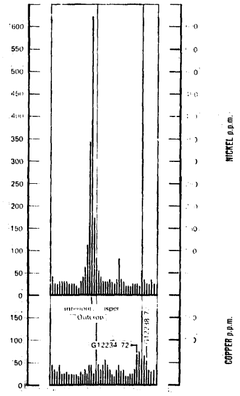

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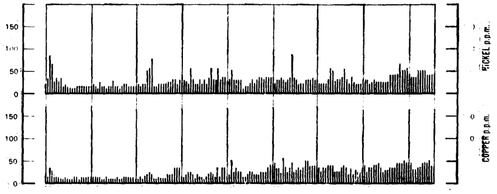

AYERS RANGE TRAVERSE

SCALE

FEET 0 2000 4000 6000 8000 10000 12000 14000 16000 18000 20000 FEET

METRES 0 1000 2000 3000 4000 5000 6000 METRES

Soil samples were taken from depths of 12 inches
Minus 80 mesh sieve fractions were analysed by Atomic Absorption Spectroscopy (AMDEL analytical code: C1)
Sample interval 100 feet

DEPARTMENT OF MINES — SOUTH AUSTRALIA

GEOCHEMICAL SOIL SAMPLING PROGRAMME
EATERINGINNA 1:100 000 MAP SHEET AREA
(Kenmore and Eateringinna 1:63 360 Areas)

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		AMP	
		BSG	DATE

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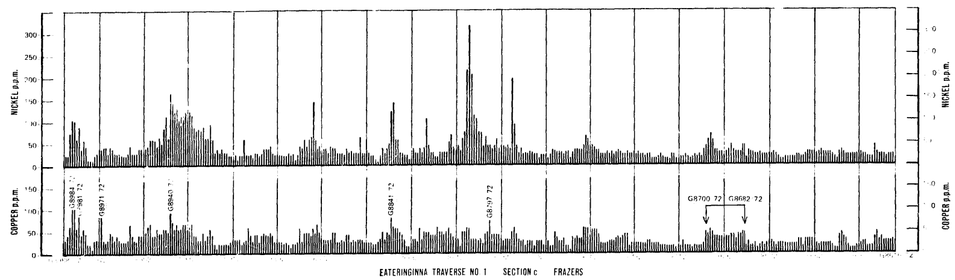

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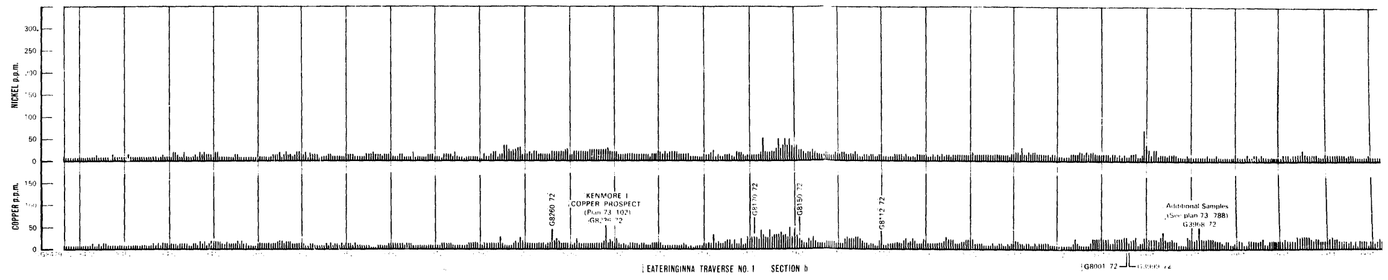

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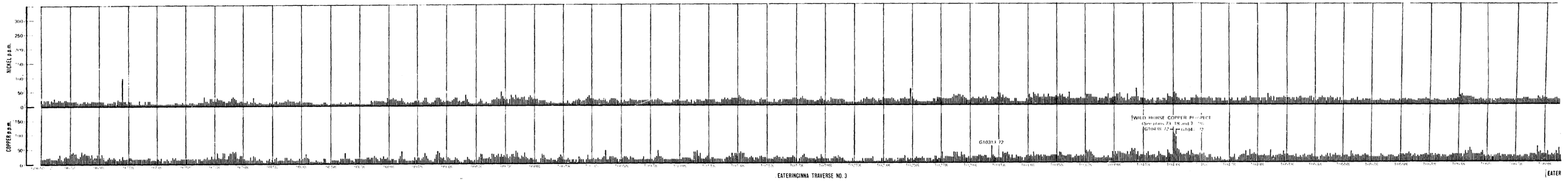

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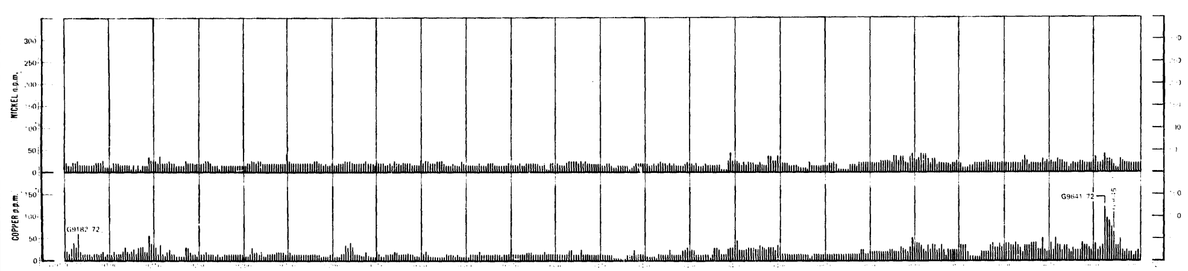

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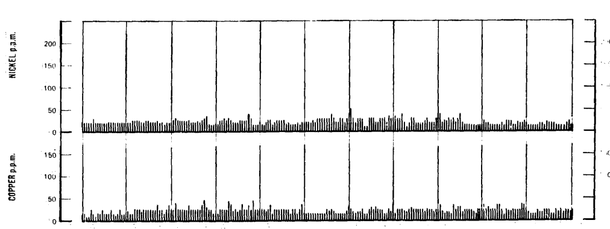
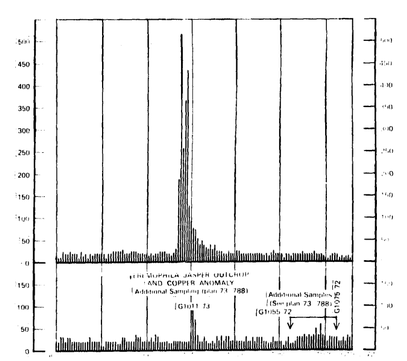


KENMORE II GRID LINE 200S



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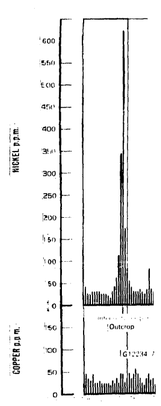
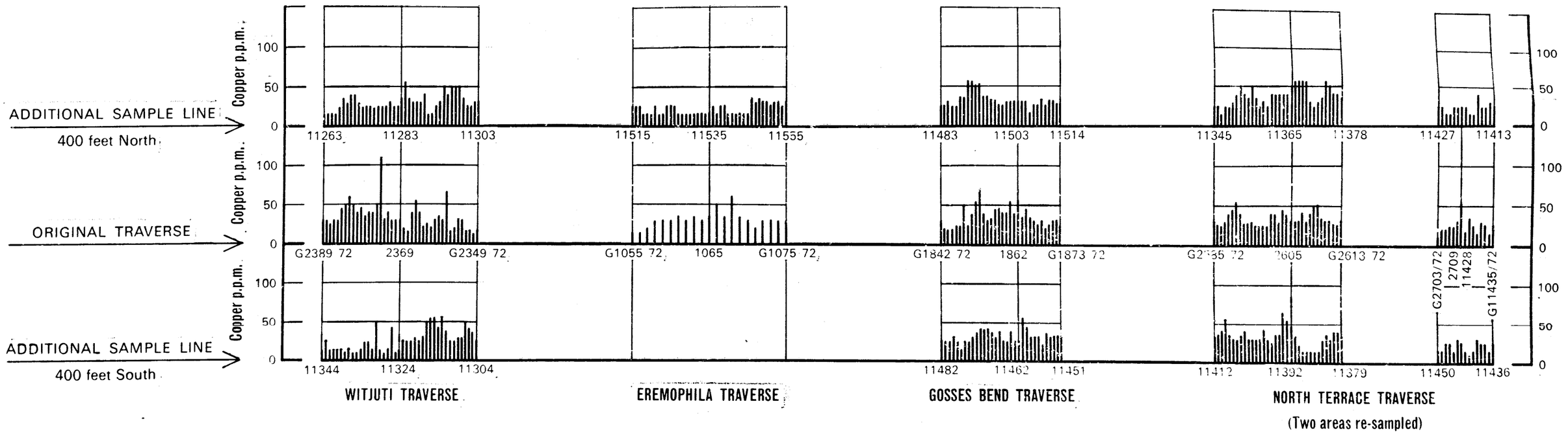
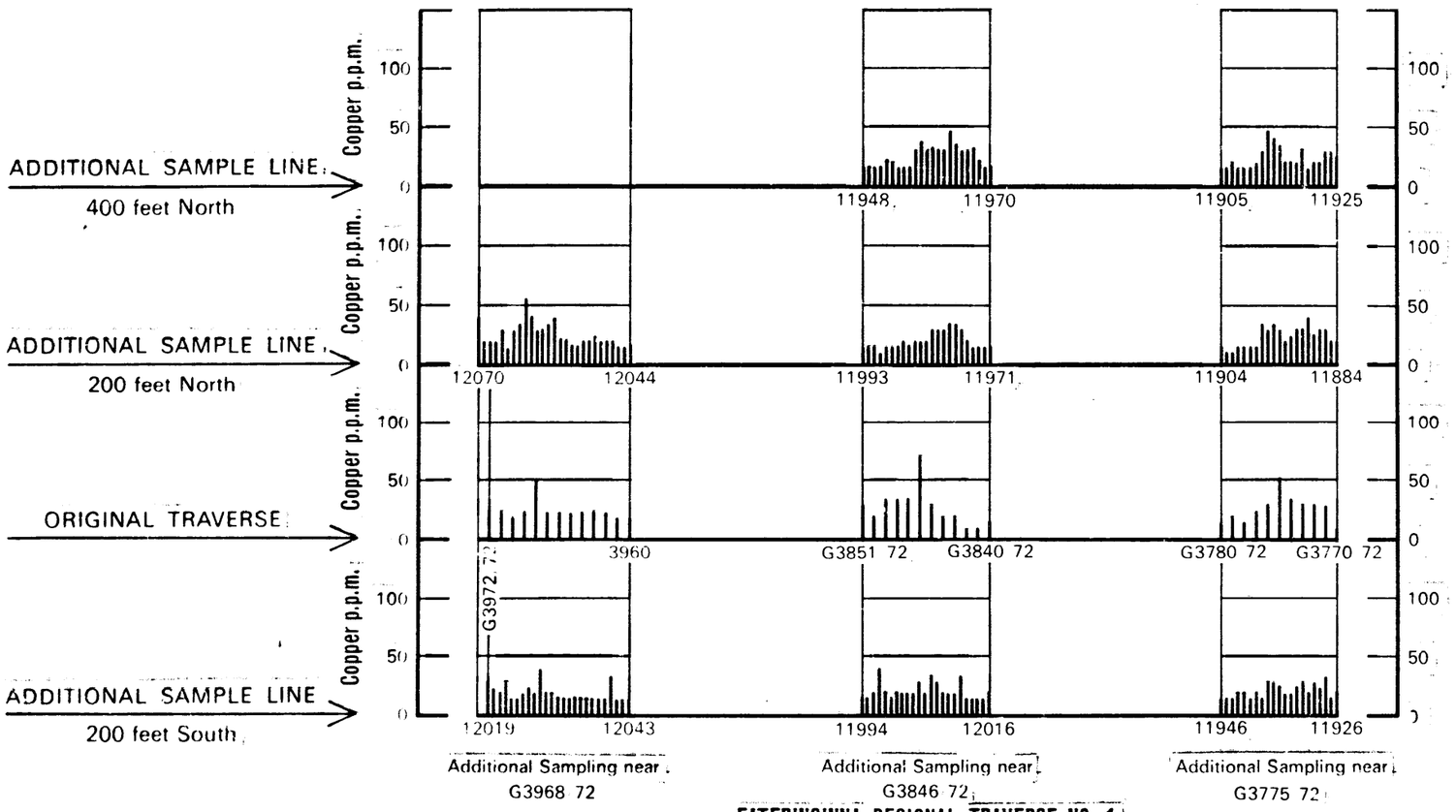


INFERIORITY TRAV

Reduce to 11 inches

F 2



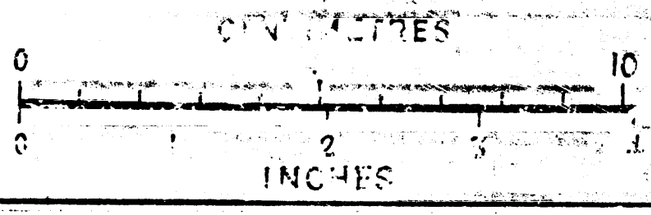


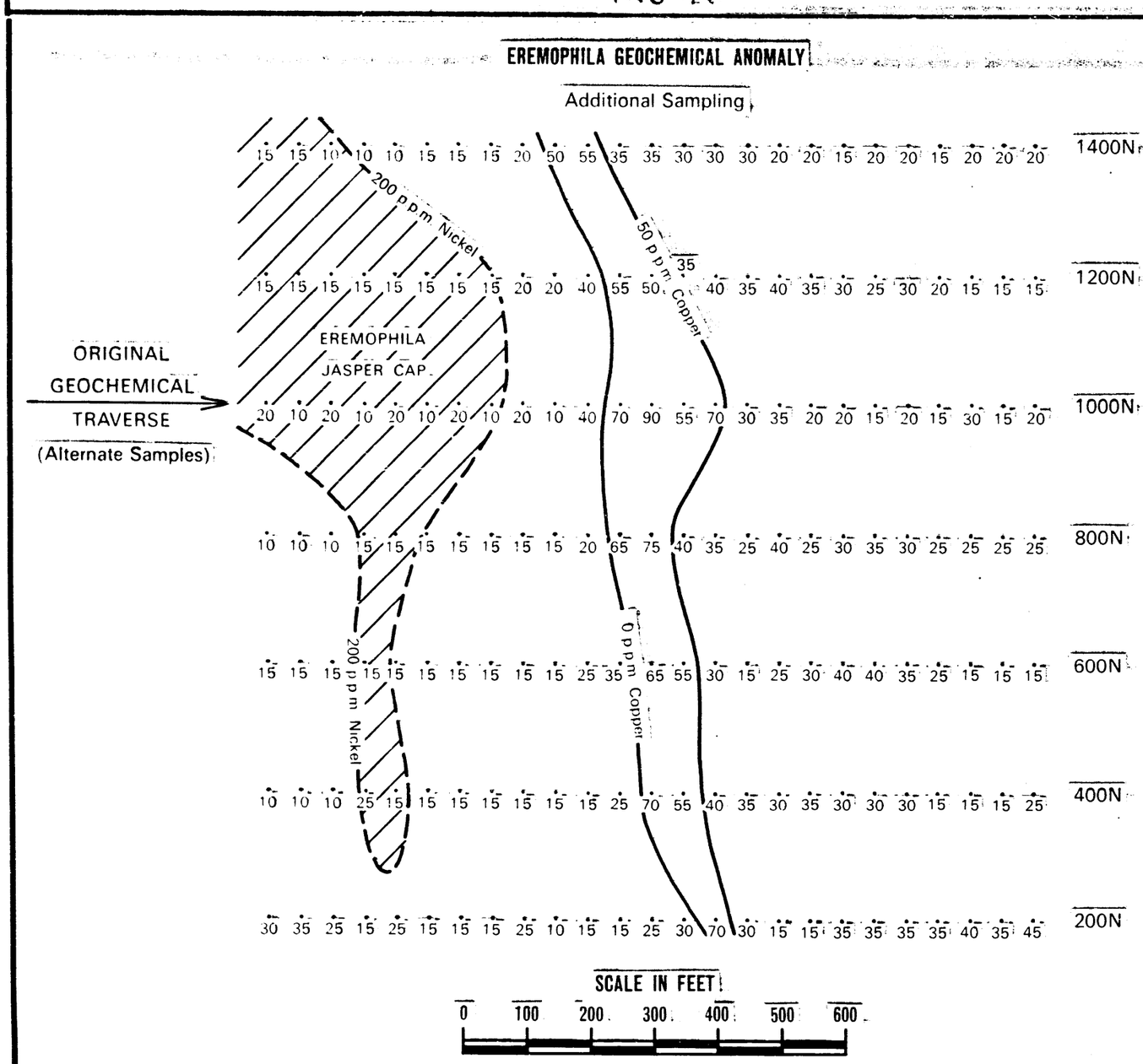
NOTE: Results of additional sampling at KENMORE I and WILD HORSE Prospects are presented on plans 73–102 and 73–19 respectively.

SCALE

FEET 0 1000 2000 3000 4000 5000 6000 7000 FEET

METRES 0 500 1000 1500 2000 METRES





Soil samples were taken from depths of 12 inches.

Minus 80 mesh sieve fractions were analysed by Atomic Absorption Spectroscopy. (AMDEL analytical code CI)

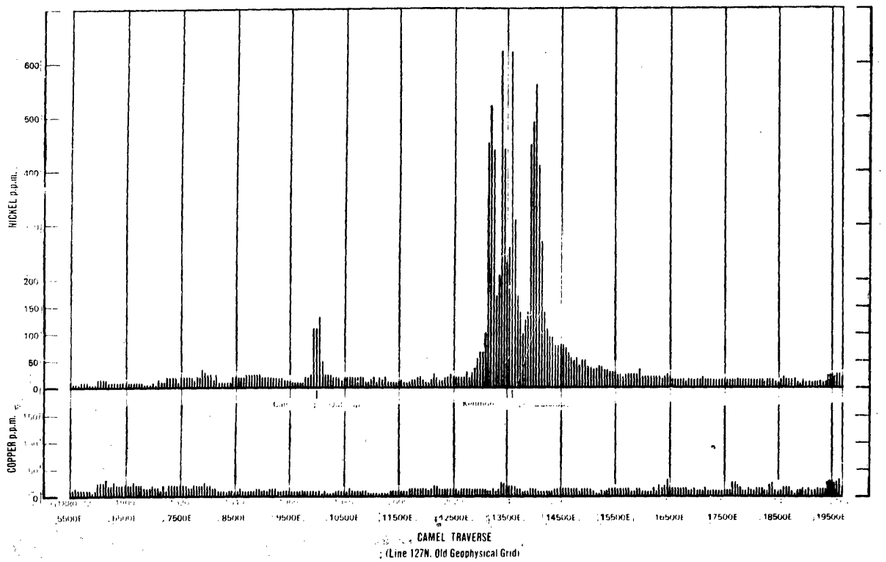
Sample intervals are as indicated. (usually 50 feet.)

DEPARTMENT OF MINES—SOUTH AUSTRALIA

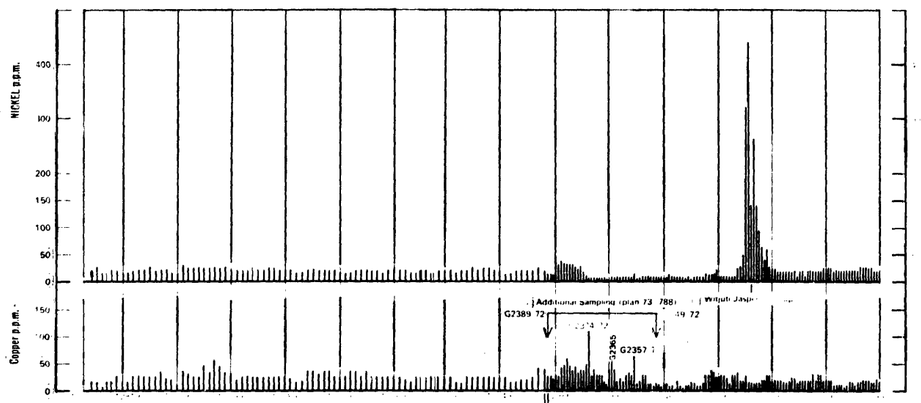
GEOCHEMICAL SOIL SAMPLING PROGRAMME
EATERINGINNA 1:100 000 MAP SHEET AREA
(Kenmore and Eateringinna 1:63 360 Areas)
ADDITIONAL SAMPLING

Drn. A.M.P. SCALE: AS SHOWN
Tcd. C.R.S. 73-788/4 Aa
Ckd. A.M.P.
Exd. B.S.G. DATE: 21-12-73

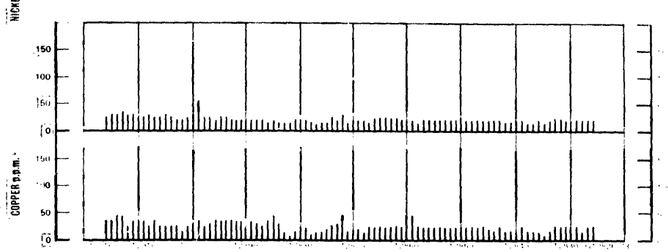
for Director of Mines



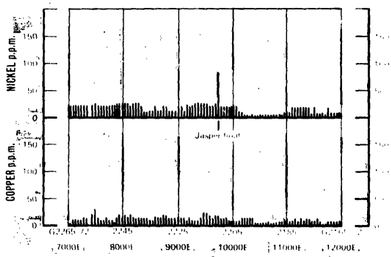
CAMEL TRAVERSE
(Line 127N. Old Geophysical Grid)



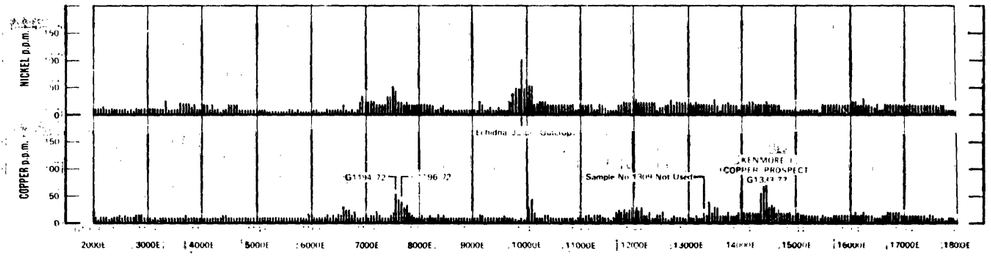
WITJUTI TRAVERSE NO 1



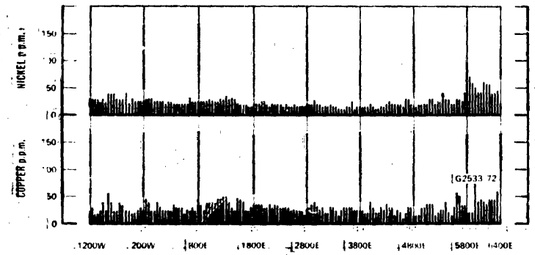
WITJUTI TRAVERSE NO. 2



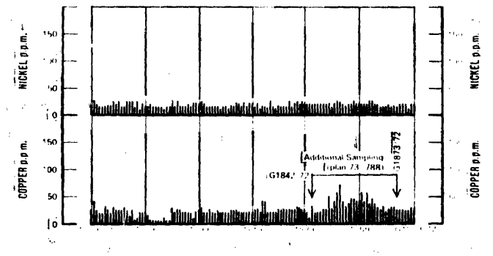
ONE STONE TRAVERSE



ECHIDNA TRAVERSE



ALCURRA TRAVERSE

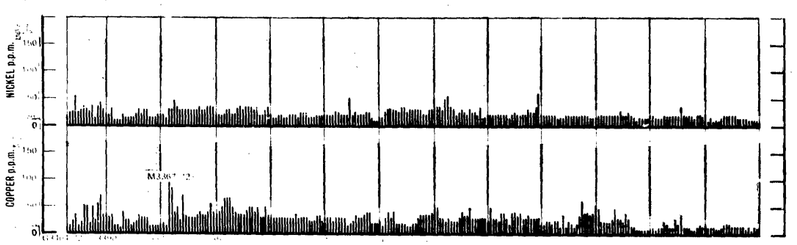


GOSSE'S BEND TRAVERSE

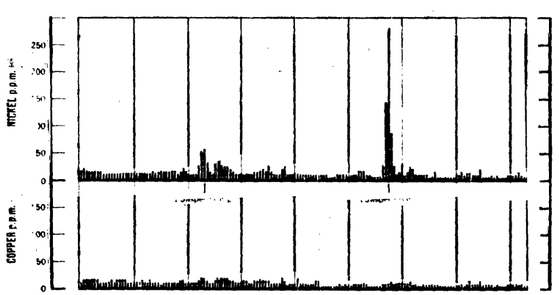
SCALE

FEET 0 1000 2000 3000 4000 5000 6000 7000 FEET

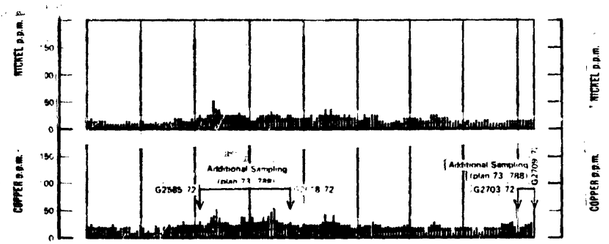
METRES 0 500 1000 1500 2000 METRES



DILEMMA TRAVERSE



KENMORE II CREEK TRAVERSE



NORTH TERRACE TRAVERSE

Soil samples were taken from depths of 12 inches
Minus 80 mesh sieve fractions were analysed by Atomic Absorption Spectroscopy (AMDEL analytical code C1)
Sample intervals 50 feet except where shown

DEPARTMENT OF MINES SOUTH AUSTRALIA			
GEOCHEMICAL SOIL SAMPLING PROGRAMME EATERINGINNA 1:100 000 MAP SHEET AREA (Kenmore and Eateringinna 1:63 360 Areas)			
		AMP	SCALE
		CRS	73-788a/4 Aa
		AMP	
		BSG	DATE

A P P E N D I X II

Results of Investigation of Anomalous Assays

(Including some additional sampling; plan 73-788)

Eateringinna Traverse No. 1 Section a

G3775/72 Biotite gneiss fragments from a 2 foot deep pit assayed 75 ppm Cu. Sampling lines 200 feet north and south of original traverse showed no improvement in assays, and no further work appears warranted. See below

G3846/72 Intermediate granulite float nearby. Weathered granulite sample from 2 feet depth assayed 100 ppm Copper. Lines of sampling 200 feet either side of original traverse show no improvement in assays, and no further work appears warranted. See below

Eateringinna Traverse No. Section b

G3968/72 No obvious reason for this anomalous value was apparent. Additional sampling 200 feet either side of the traverse revealed nothing significant. Weathered gneiss sample from 2 feet deep assayed 55 ppm Copper. See below

G8112/72 Bands of sillimanite gneiss and basic granulite outcrop nearby. No further sampling done.

G8150/72 - G8170/72 Numerous basic granulite occurrences in this area. No further sampling done.

G8236/72 Sampling on "Echidna Traverse" and additional sampling confirmed anomaly - KENMORE I COPPER PROSPECT. See plan 73-102

G8260/72 Evidence of shearing nearby - quartz-epidote fragments in sample pit. No continuation along strike in "Echidna traverse" or "Camel traverse".

Eateringinna Traverse No. 1 Section c "Frazers Traverse"

G8682/72 - G8700/72 Abundant ferricrete float in this area, and a large zone of ferricrete outcrops further north. Ferricrete probably covered this area and has since been eroded.

G8797/72 Weathered intermediate granulite in pit. Intermediate granulite outcrops nearby.

G8841/72 Basic granulite band outcrops nearby and rubble occurs near sample pit.

G8940/72 Intermediate and basic granulite float occurs near sample pit.

G8971/72 . Some evidence of shearing with pseudotachylite, dolerite and acid gneiss nearby.

G8973/72) Abundant ferricrete float nearby.
G8974/72) Large areas of ferricrete outcrop
) occur to the west.

Eateringinna Traverse No. 2

G9182/72 Gabbro dyke outcrop nearby was sampled and analysis showed 180 ppm copper.

G9641/72 - G9645/72 Gabbro dyke rubble in pits and outcrop nearby. Analysis showed 200 ppm in the rock.

Eateringinna Traverse No. 3

G10313/72 Near Western edge of Kokatarra shear. Some granulite, pseudotachylite, float nearby.

G10438/72 - G10440/72 Copper staining in Basic Granulite at WILD HORSE COPPER PROSPECT. Additional sampling on a grid. See plan 73-19

G10797/72 Deep aeolian sands. Re-sampled and assayed at only 25 ppm Cu. Original sample probably contaminated.

Kenmore II Grid line 200S

Southerly extensions of Kenmore II Copper prospect were not detected. No further work done.

"Eremophila" Traverse

G1011/72 Eremophila Copper Anomaly. Additional geochemical sampling showed that this small anomaly extends for at least 1200 feet along strike of the western limb of the Kenmore II structure. An I.P. traverse revealed an anomaly of insufficient magnitude to warrant further testing. See below

G1055/72 - G1075/72 Epidotized gneiss and intermediate granulite bands outcrop adjacent to the traverse in this area. An additional line to the north of this traverse disclosed nothing worth further investigation. No extensions of the Eastern limb of the Kenmore II Prospect were found. See below

"Inferiority" Traverse

G12344/72 - G12348/72 Large areas of outcropping basic granulite occur adjacent to this zone. no further work done.

Ayers Range Traverse

No further work done.

"Camel" Traverse

No further work done. Southerly extension of Kenmore I geochemical anomaly not intersected. See plan 73/102

Witjuti Traverse No. 1

G2357/72 Intermediate granulite outcrops nearby.

G2365/72 Intermediate granulite outcrops nearby.

G2374/72 Black manganese staining in gneiss fragments in sample pit. Additional sampling was carried out on lines 400 feet either side of the original traverse, but no further work was warranted. See below

Witjuti Traverse No. 2

No further work done.

Ore Stone Traverse

No further work done.

Echidna Traverse

G1194/72 - G1196/72 Some manganese staining. Evidence of shearing; epidote and pseudo-tachylite nearby. No further work done.

G1333/72 KENMORE I COPPER PROSPECT
Additional sampling done. See plan 73-102

Alcurra Traverse

G2533/72 Basic granulite outcrops in this area. No further work done.

Gosses Bend Traverse

G1842/72 - G1873/72 Some manganese staining observed in this area. Additional lines sampled 400 feet each side of original traverse but no further work appeared warranted. See below

Dilemma Traverse

M3367/72 Basic granulite outcrops nearby. No further work done.

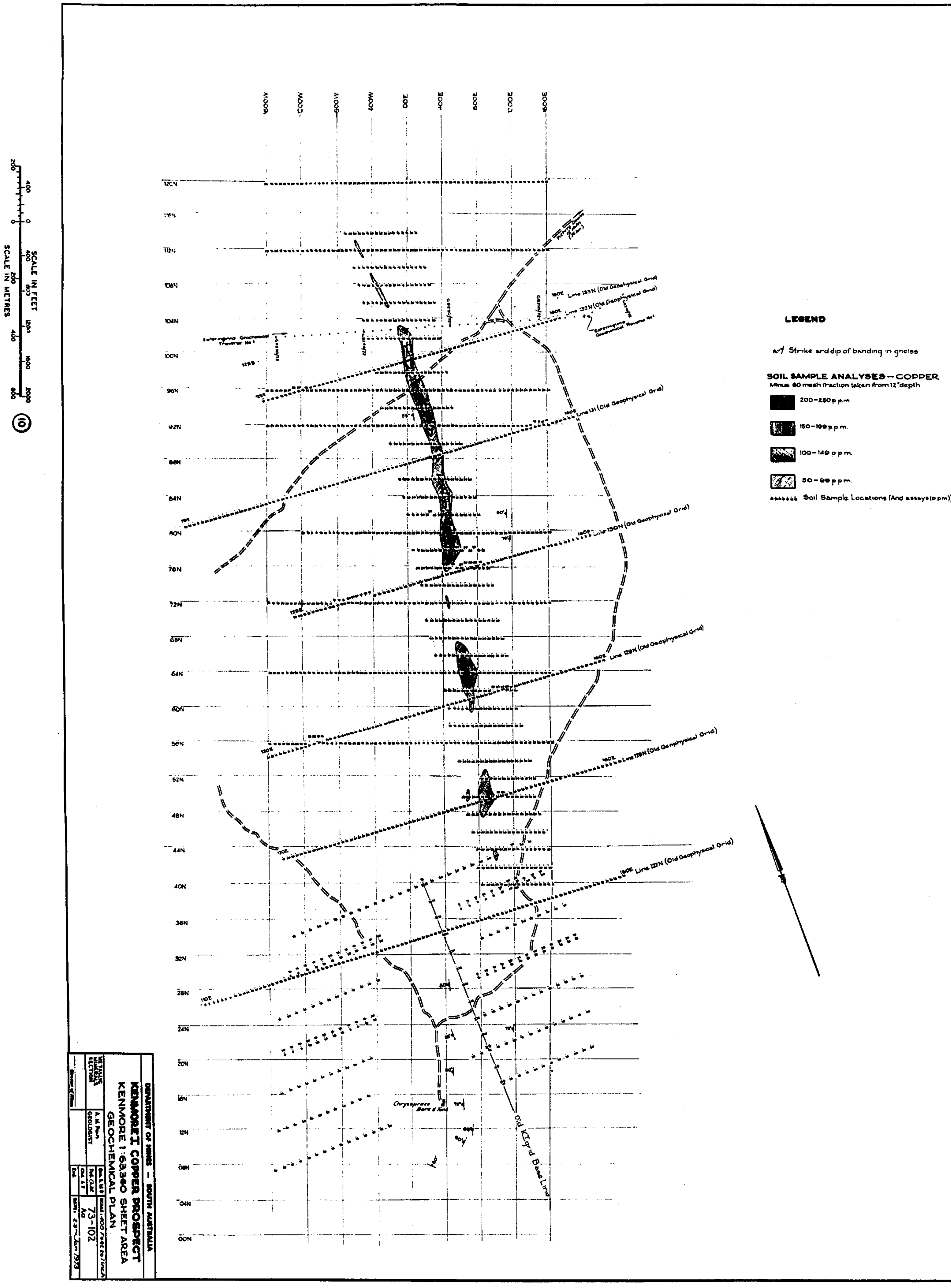
Kenmore II Creek Traverse

No southerly extensions of the Kenmore II copper prospect were detected.

"North Terrace" Traverse

G2585/72 - G2618/72 Additional lines sampled 400 feet each side of original traverse, but results did not warrant further work. See below

G2703/72 - G2709/72 This line was continued and additional lines sampled 400 feet each side of original traverse, but results did not warrant further work. See below



LEGEND
Strike and dip of banding in gneiss
SOIL SAMPLE ANALYSES — COPPER
Minus 80 mesh fraction taken from 12" depth
200–250 p.p.m.
150–199 p.p.m.
100–149 p.p.m.
50–99 p.p.m.
Soil Sample Locations (And assays (p.p.m))
SCALE IN FEET
SCALE IN METRES
Line 133N (Old Geophysical Grid)
Line 132N (Old Geophysical Grid)
Line 131 (Old Geophysical Grid)
Line 130N (Old Geophysical Grid)
Line 129N (Old Geophysical Grid)
Line 128N (Old Geophysical Grid)
Line 127N (Old Geophysical Grid)
Old KI grid Base Line
Chrysoprase
DEPARTMENT OF MINES — SOUTH AUSTRALIA
KENMORE T. COPPER PROSPECT
KENMORE 1:63360 SHEET AREA
GEOCHEMICAL PLAN
METALLIC MINERALS SECTION
GEOLOGIST
73-102

[137]

NOTE: GRID COORDINATES IN FEET

1600W 1200W 800W 400W 00 400E 800E 1200E 1600E

12000N 11600N 11200N 10800N 10400N 10000N 9600N 9200N 8800N 8400N 8000N 7600N 7200N 6800N 6400N 6000N 5600N 5200N 4800N 4400N 4000N 3600N 3200N 2800N 2400N 2000N 1600N 1200N 800N 400N 00N

To Victor Downs 26 km

N

EATERINGINNA GEOCHEMICAL TRAVERSE No. 1

G8240/72 G8220/72

LINE 132N (OLD GEOPHYSICAL GRID)
LINE 131N (OLD GEOPHYSICAL GRID)
LINE 130N (OLD GEOPHYSICAL GRID)
LINE 129N (OLD GEOPHYSICAL GRID)
LINE 128N (OLD GEOPHYSICAL GRID)
LINE 127N (OLD GEOPHYSICAL GRID)

125E 115E 120E 110E 160E 165E

Track

55 60 70 80 85 75 65

1800N 1600N 1400N 1200N 1000N 800N 600N 400N 200N 00 200S 400S 600S

Chrysoprase Bore and Tank

OLD KENMORE 1 BASE LINE

SCALE
0 100 200 300 400 500
METRES

LEGEND

Strike and dip of banding in gneiss 60

SOIL SAMPLE ANALYSES
COPPER
MINUS 80 MESH FRACTION
TAKEN FROM 12 INCH DEPTH

200—250 p.p.m.
150—199 p.p.m.
100—149 p.p.m.
50—99 p.p.m.

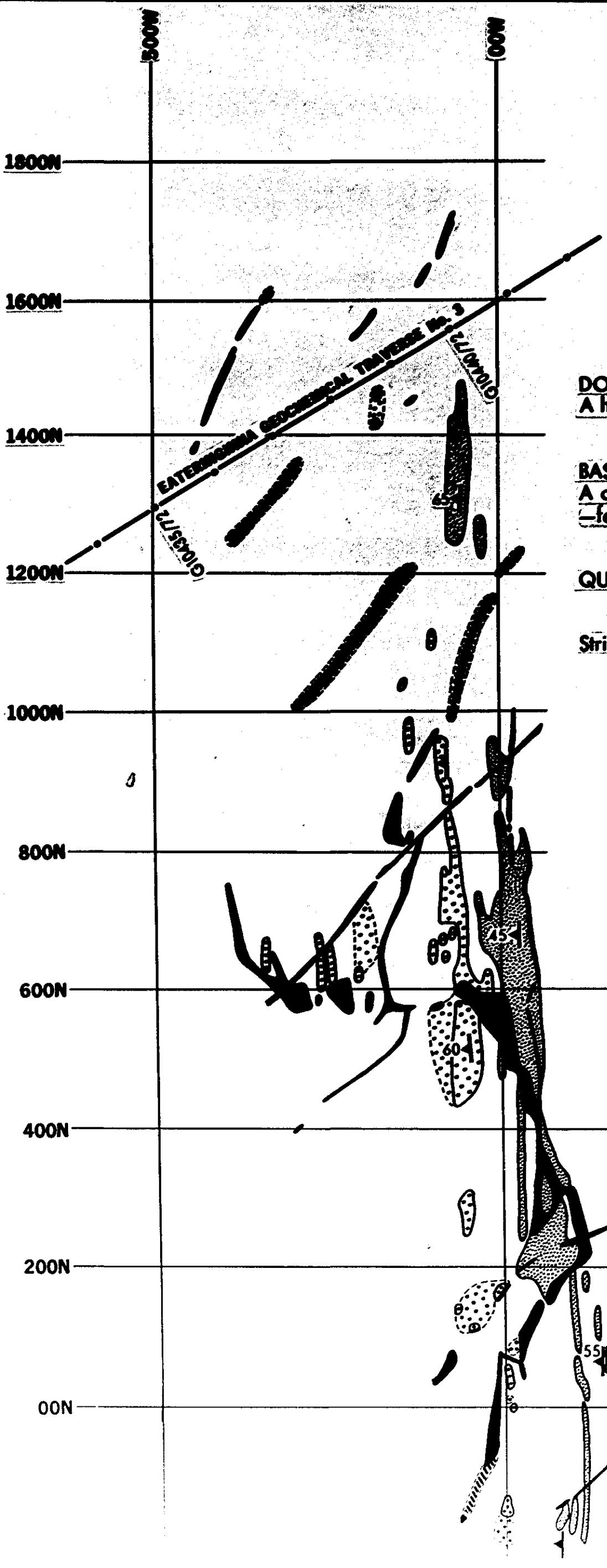
Soil sample locations less than 50 p.p.m.

73—102 MRR 140 Del. T.S. A.M. Pain Geologist S.A. Department of Mines

73-102

10 CENTIMETRES ON ORIGIN. DRA.

NOTE: GRID COORDINATES IN FEET



LEGEND

DOLERITE DYKE, outcrop and rubbly float.
A hard dense dark grey to black rock

BASIC GRANULITE, outcrop and float.
A coarse grained pyroxene—amphibolite
—feldspar—rock

QUARTZO—FELDSPATHIC GNEISS, outcrop

Strike and dip of (faint) gneissic banding 65

SCALE

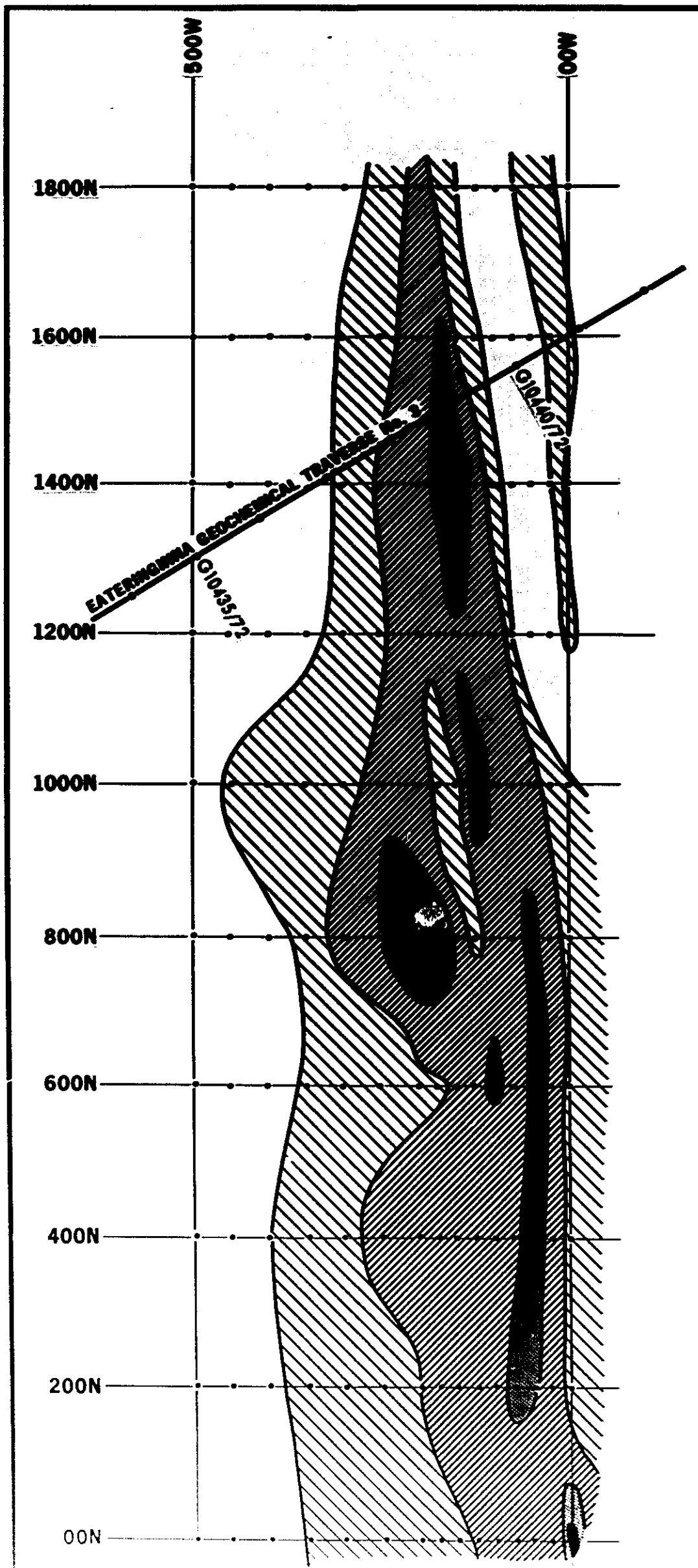
0 50 100 150

METRES

N

A.M. Pain Geologist

73-18



NOTE: GRID COORDINATES IN FEET

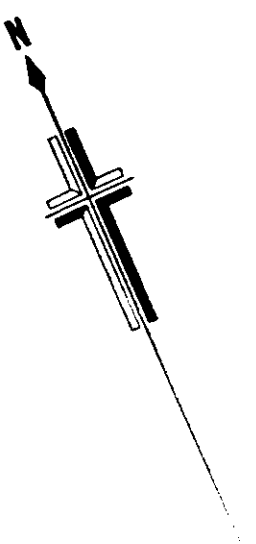
LEGEND

SOIL SAMPLE ANALYSES
COPPER
MINUS 80 MESH FRACTION
TAKEN FROM 12 INCH DEPTH

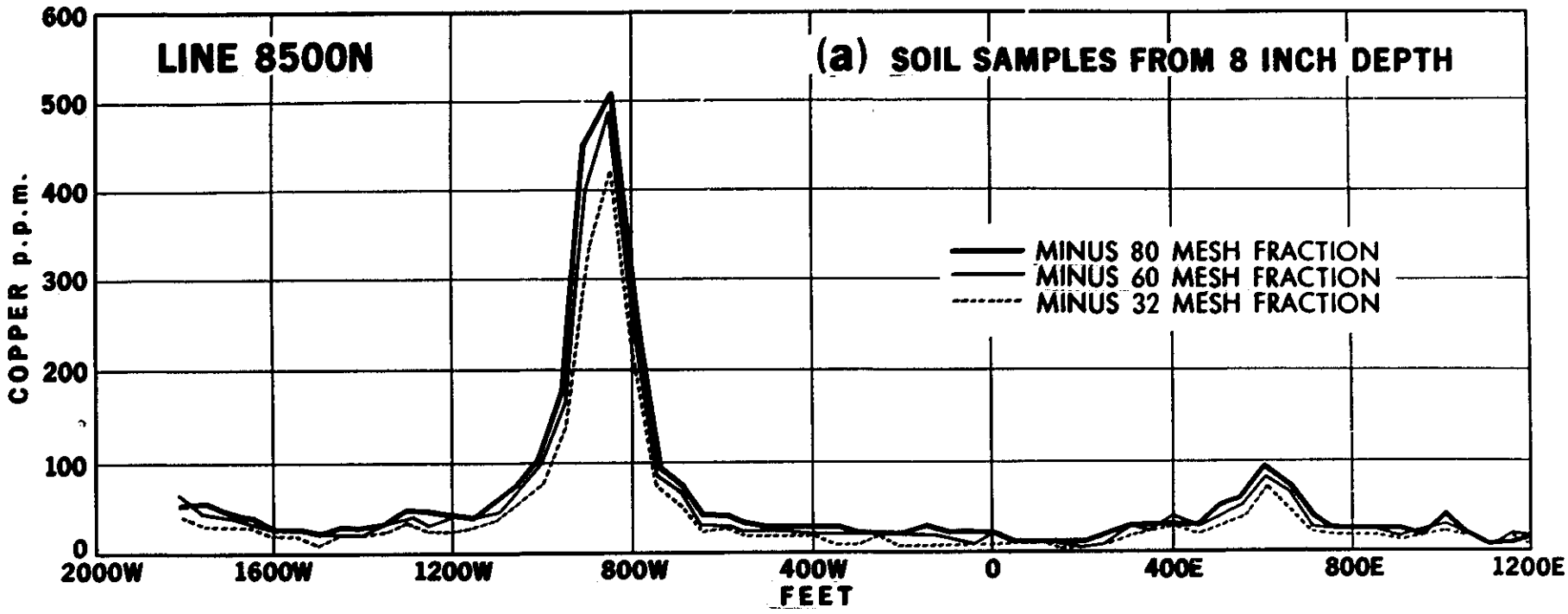
- ≥300 p.p.m.
- 200—299 p.p.m.
- 100—199 p.p.m.
- 50—99 p.p.m.
- <50 p.p.m.

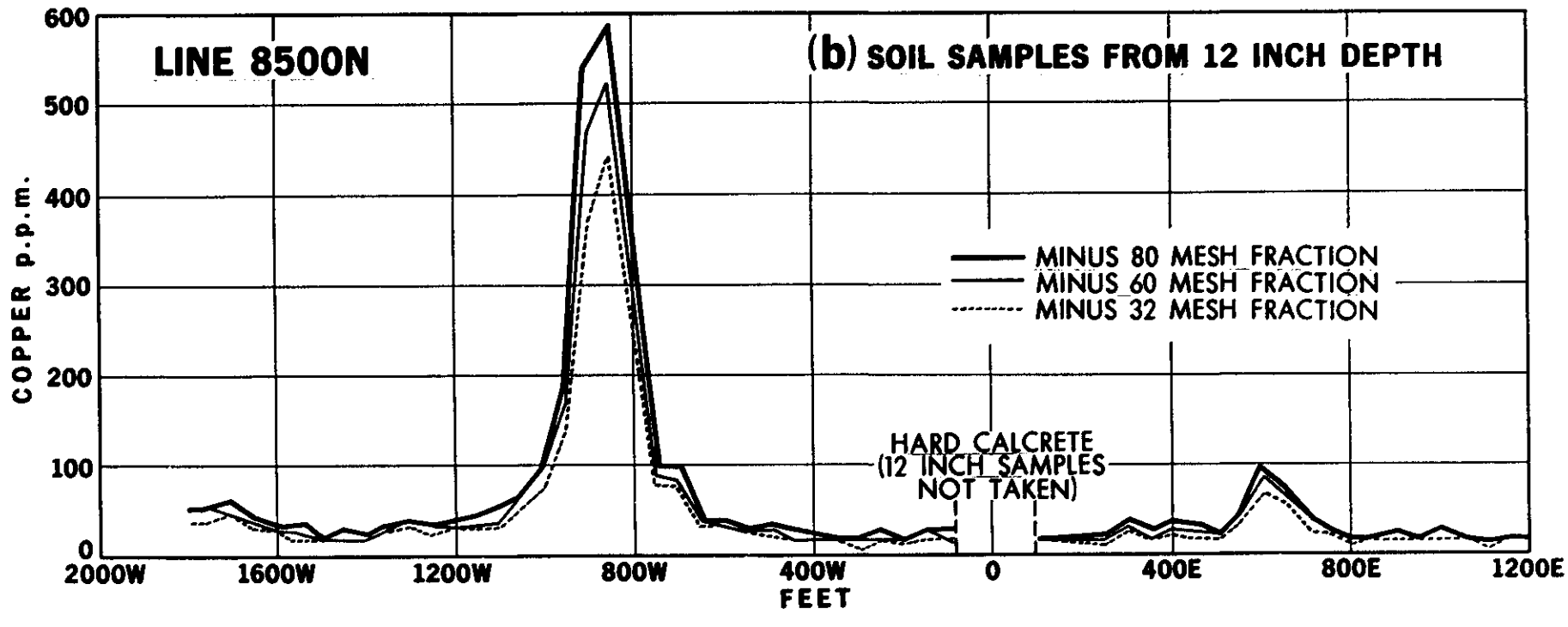
Soil sample location for Copper and Nickel_____•
(Nickel concentration ranged from 20 p.p.m. to 85 p.p.m.)

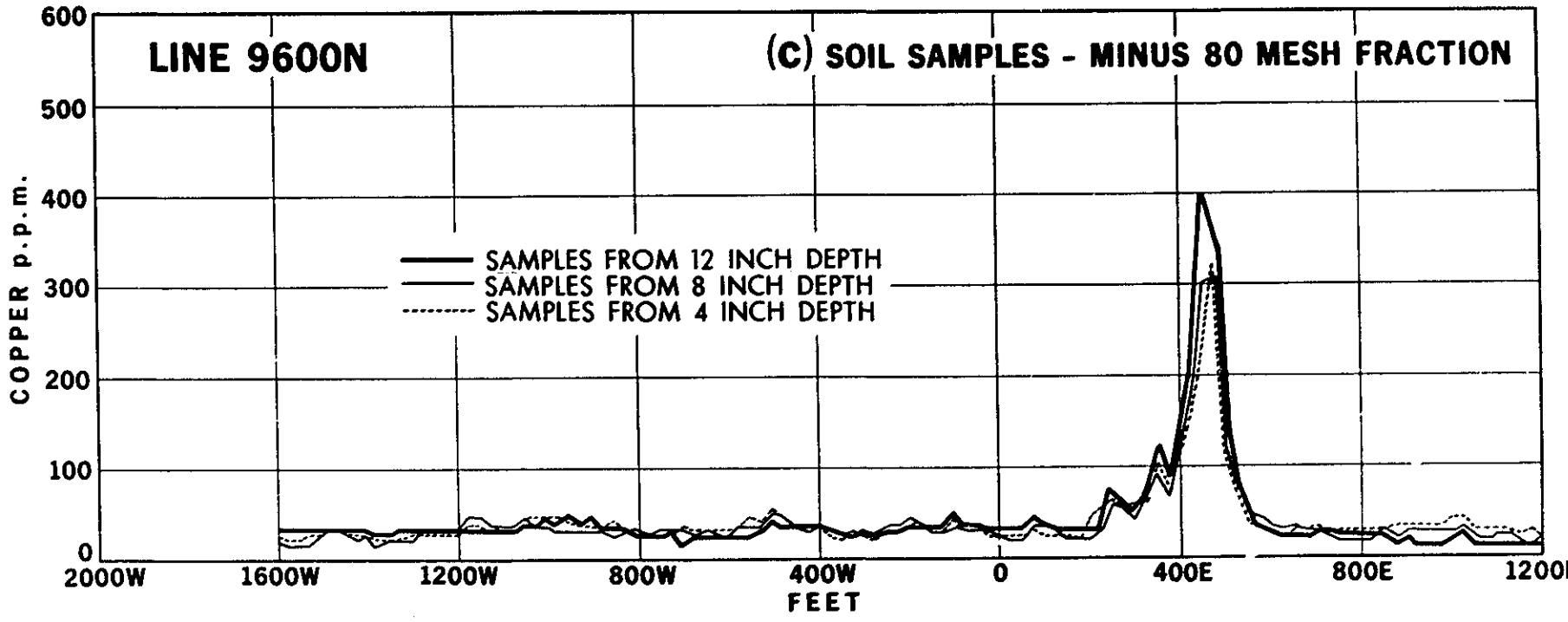
SCALE
0 50 100 150
METRES

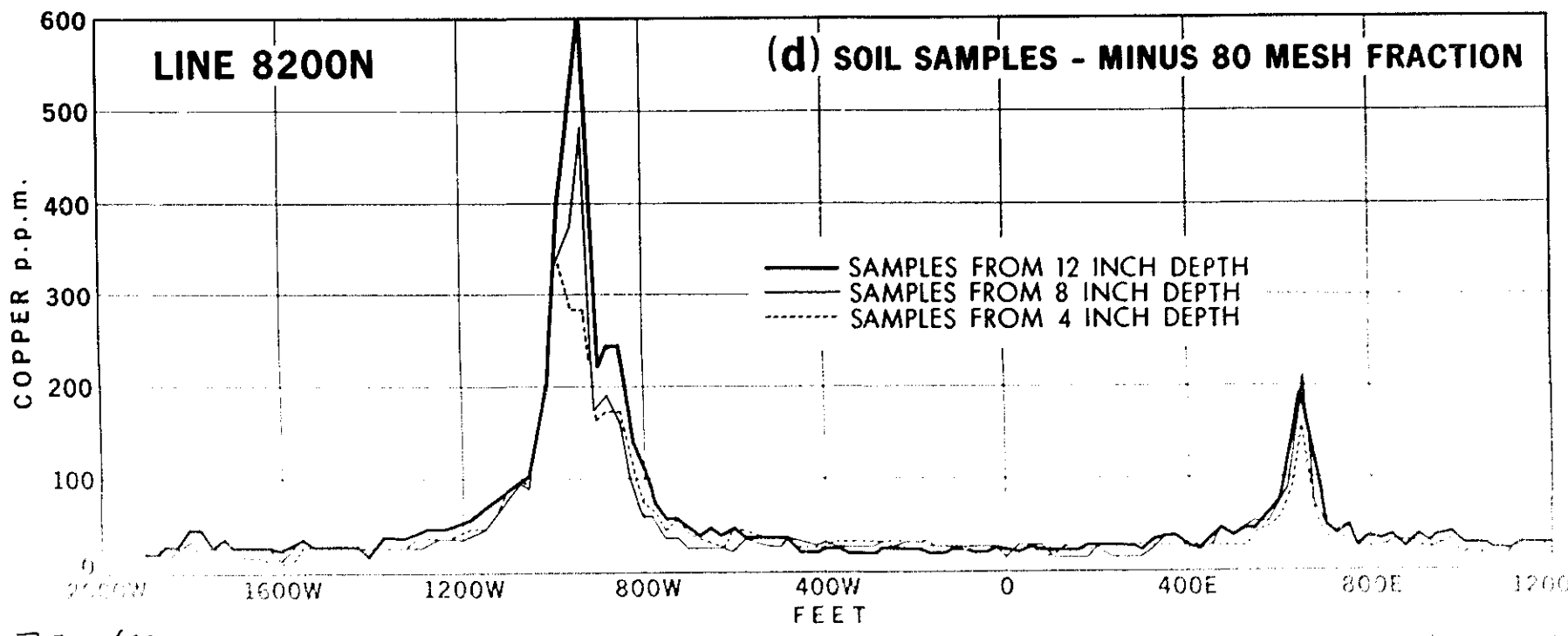


73-16

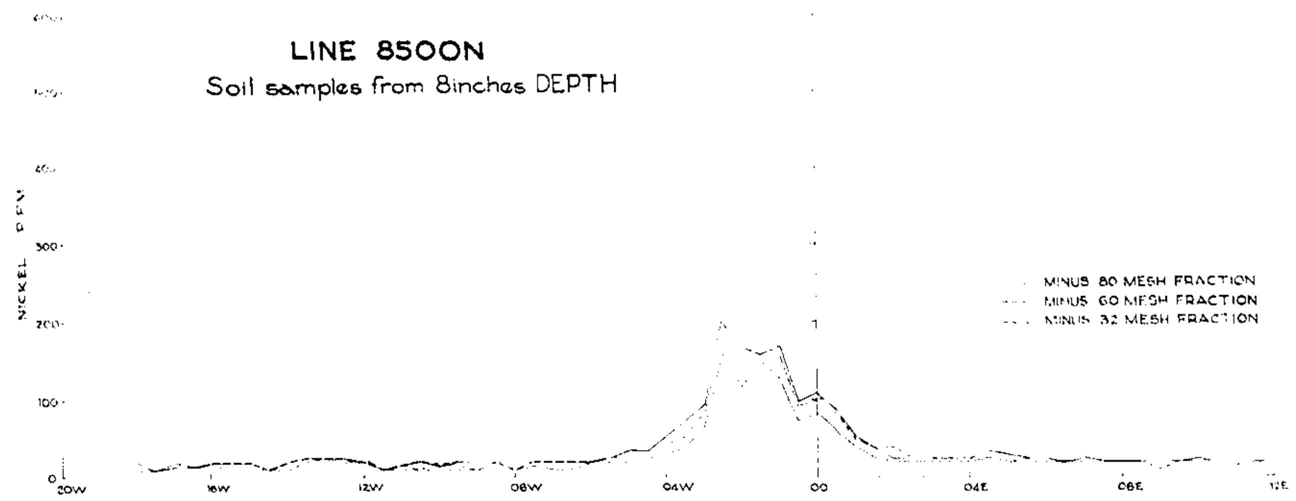

LINE 8500N
(a) SOIL SAMPLES FROM 8 INCH DEPTH
COPPER p.p.m.
600
500
400
300
200
100
0
MINUS 80 MESH FRACTION
MINUS 60 MESH FRACTION
MINUS 32 MESH FRACTION
2000W
1600W
1200W
800W
400W
0
400E
800E
1200E
FEET

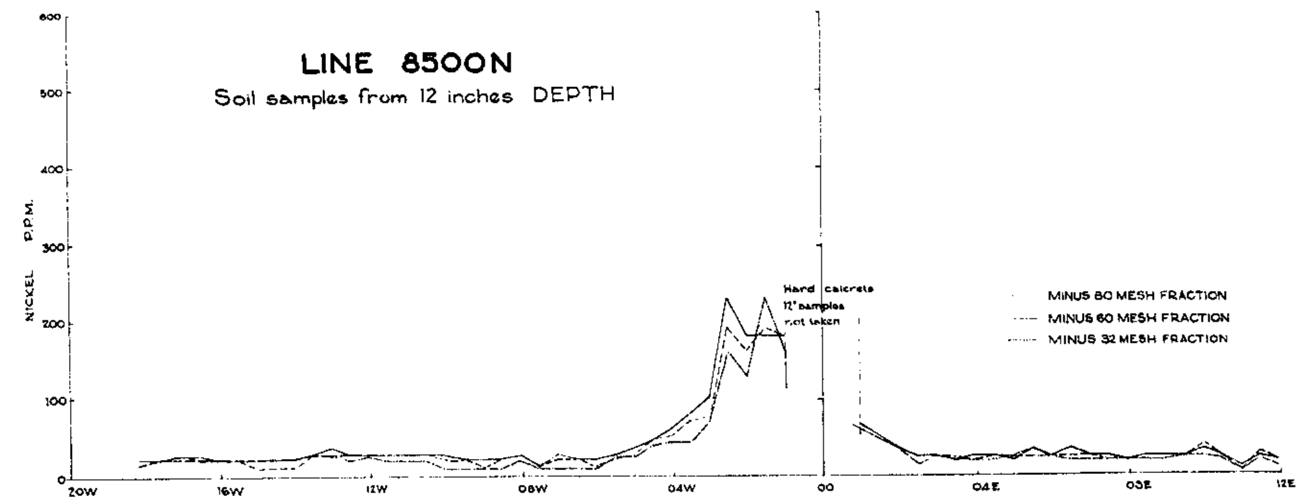

LINE 8500N
(b) SOIL SAMPLES FROM 12 INCH DEPTH
COPPER p.p.m.
600
500
400
300
200
100
0
MINUS 80 MESH FRACTION
MINUS 60 MESH FRACTION
MINUS 32 MESH FRACTION
HARD CALCRETE
(12 INCH SAMPLES
NOT TAKEN)
2000W
1600W
1200W
800W
400W
0
400E
800E
1200E
FEET

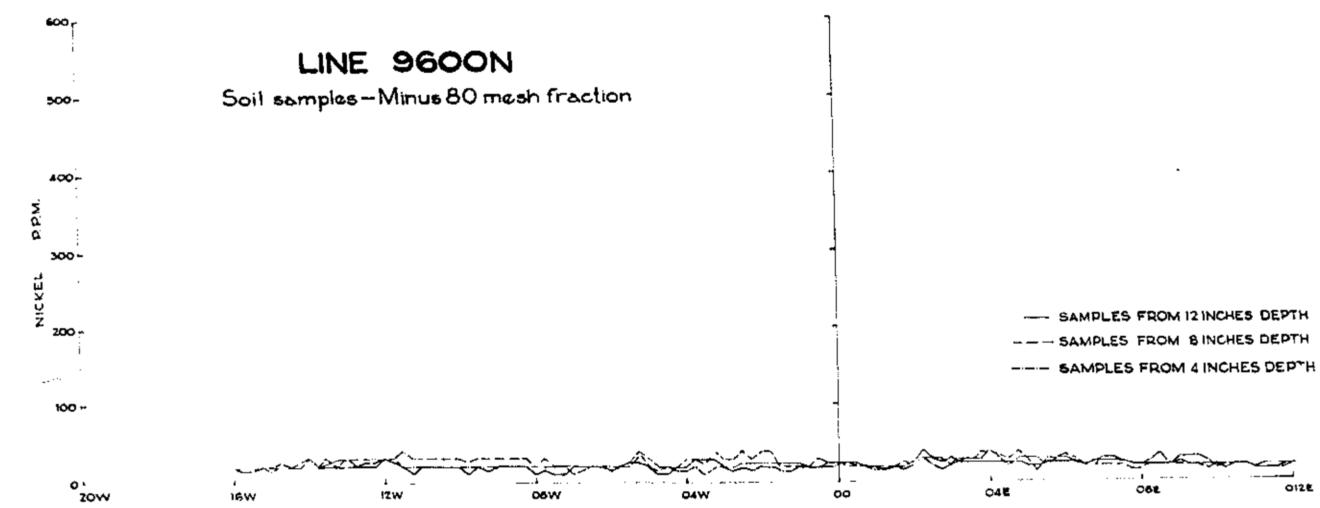

LINE 9600N
(c) SOIL SAMPLES - MINUS 80 MESH FRACTION
COPPER p.p.m.
600
500
400
300
200
100
0
SAMPLES FROM 12 INCH DEPTH
SAMPLES FROM 8 INCH DEPTH
SAMPLES FROM 4 INCH DEPTH
2000W
1600W
1200W
800W
400W
0
400E
800E
1200E
FEET

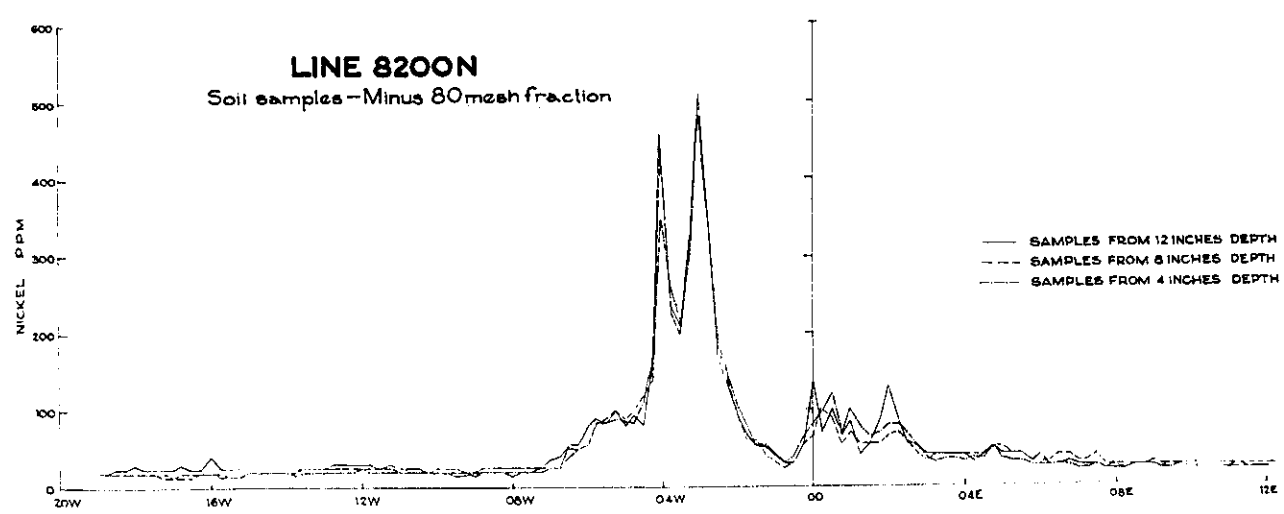

LINE 8200N
(d) SOIL SAMPLES - MINUS 80 MESH FRACTION
COPPER p.p.m.
600
500
400
300
200
100
0
SAMPLES FROM 12 INCH DEPTH
SAMPLES FROM 8 INCH DEPTH
SAMPLES FROM 4 INCH DEPTH
1600W
1200W
800W
400W
0
400E
FEET

73-195









DEPARTMENT OF MINES – SOUTH AUSTRALIA

KENMORE II COPPER PROSPECT

KENMORE 1:63,360 SHEET AREA

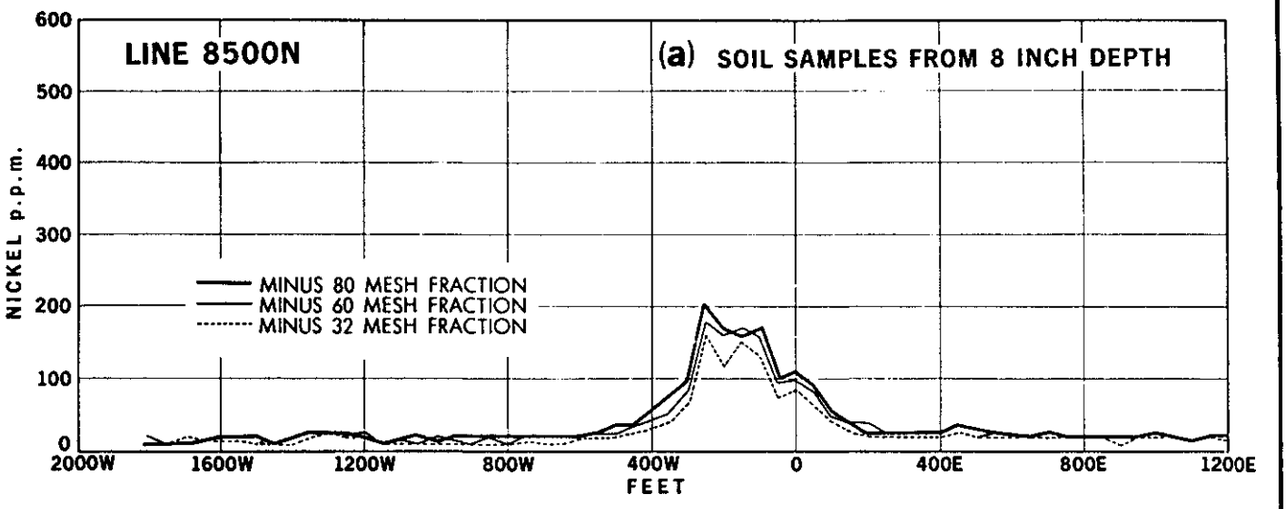
GEOCHEMICAL SOIL SAMPLING-ORIENTATION STUDY

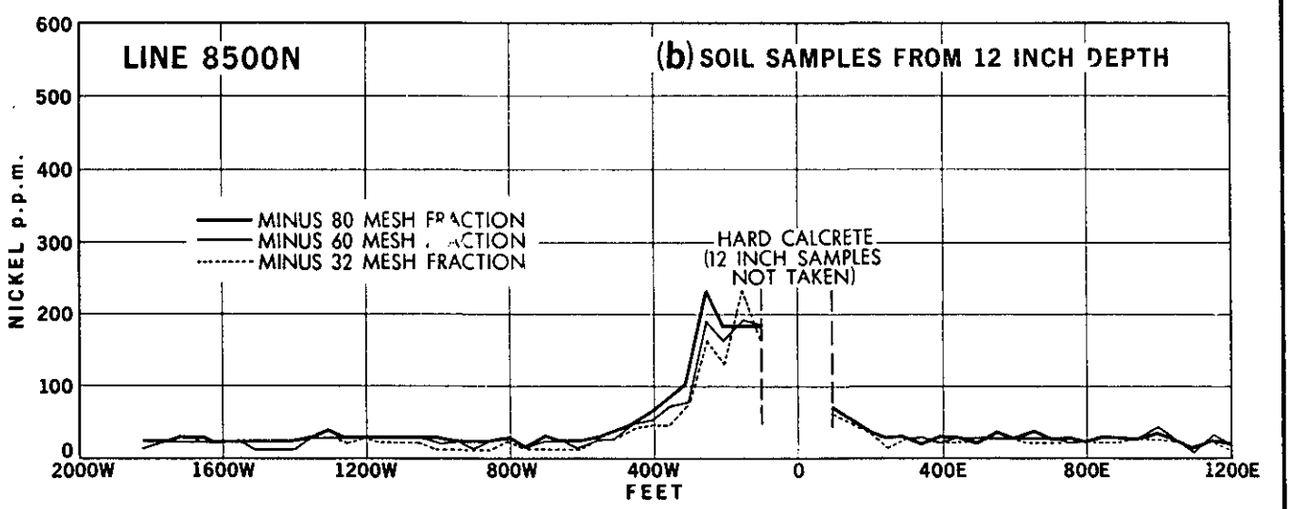
NON-METALLIC MINERALS SECTION	GEOLOGIST	Drn. A.M.P.	SCALE Graphic
		Tcd. G.M.	73-248 A4
Director of Mines		Chd. A.F.	
		Exd.	DATE: 9 April 1973

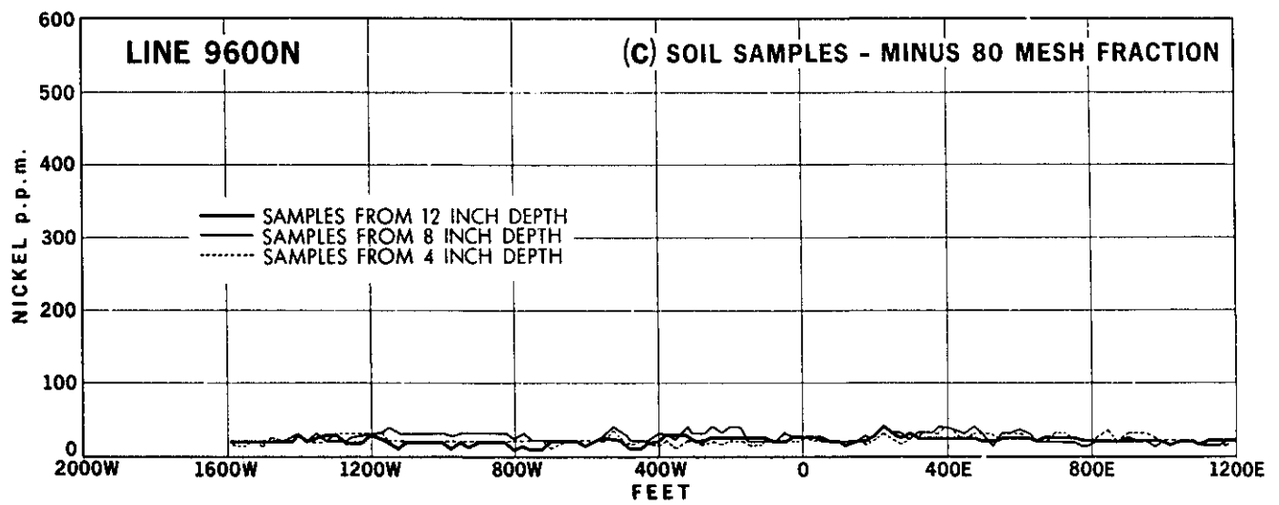
SCALE IN FEET

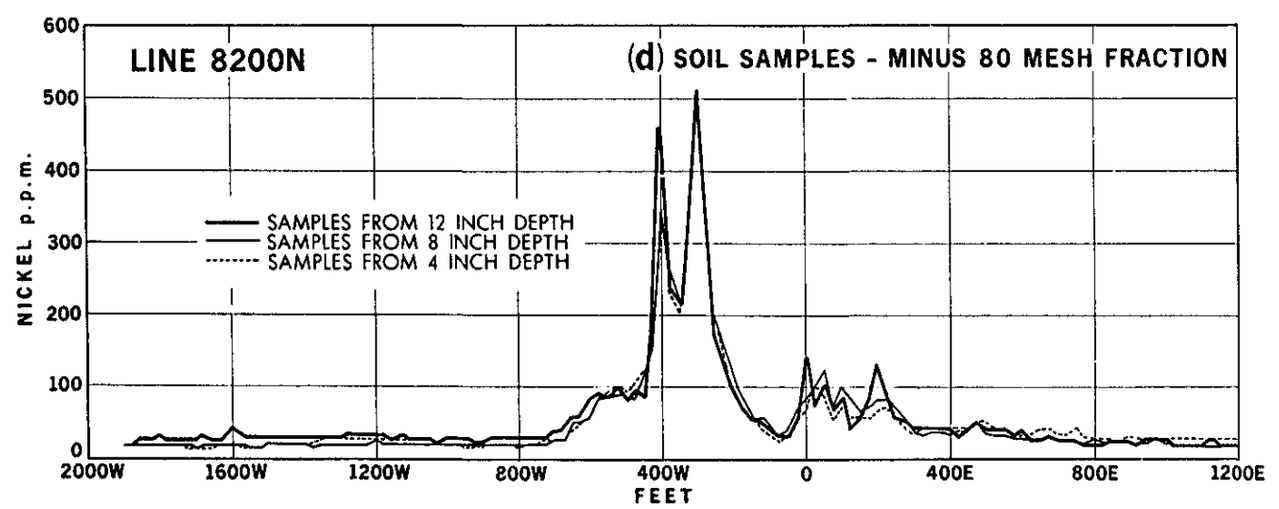
(10)

Reduce to 9 inches









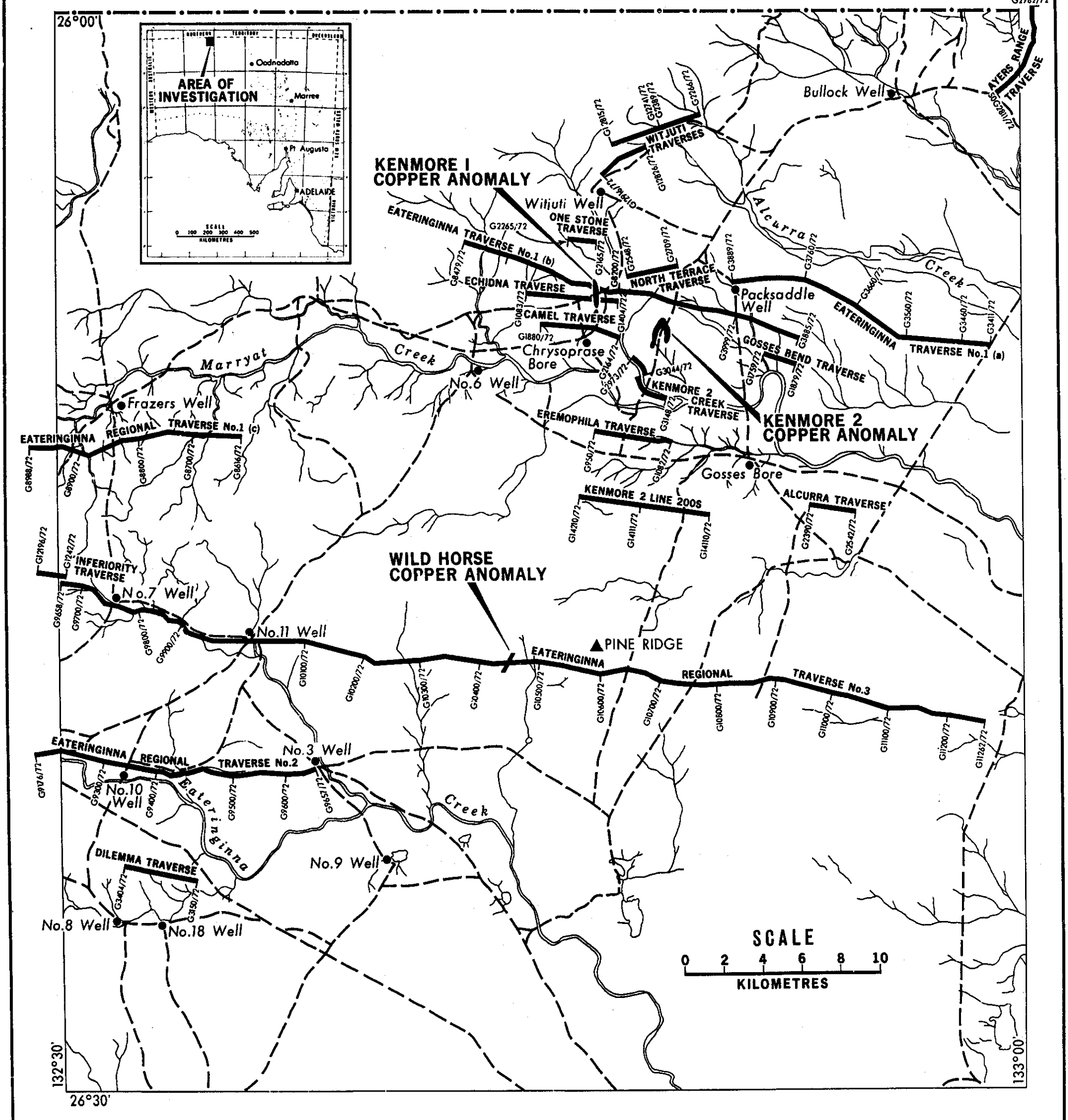
73–248 MRR 140 Del. T.S. A.M. Pain Geologist S.A. Dept. of Mines

NICKEL
GEOCHEMICAL SOIL SAMPLING — KENMORE 1:63,360 SHEET
KENMORE 2 COPPER PROSPECT

MRR 140

Z.S. 73-248/4

NORTHERN TERRITORY



73—650 MRR 140 Del. T.S. A.M. Pain Geologist S.A. Department of Mines

Reduce to 6½ inches

LOCATION OF GEOCHEMICAL SOIL SAMPLING
ALBERGA AREA
(KENMORE & EATERINGINNA 1 MILE SHEETS)

MRR 140

T.S. 73-650/4
Aai
27 May '75