DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY
MINERAL RESOURCES DIVISION

GEOCHEMICAL INVESTIGATION FOR COPPER AND MOLYBDENUM AT NETLEY HILL

by

A. BELPERIO
STUDENT GEOLOGIST
Metallic Minerals Section

Rept.Bk.No. 72/124
G.S. No. 4892
D.M. No. 1039/71

5th July, 1972.

DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOCHEMICAL INVESTIGATION FOR COPPER AND MOLYBDENUM AT NETLEY HILL

OLARY

Anabama

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PLANS

Plan No.	Title	Scale
S9864 Fe	Locality Plan	1" : 110 miles
72-56 Fe	Regional Geological Map	1" : 250 000
72-303 Fe	Geology and soil sample points.	1" : 500 feet.
72-304 Fe	Copper and molybdenum values - "Greisen Complex"	As shown
72-305 Fe	Copper and molybdenum values - "Quaternary"	As shown
72-306 Fe	Soil sample points - copper and molybdenum assay results.	1" : 500 feet.
S 9865 Fe	Log - probability curves - "Greisen Complex"	As shown
S 9866 Fe	Log - probability curves - "Quaternary"	As shown

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ABSTRACT

Soil sampling on the Netley Hill Reserve was undertaken between 19th and 22nd January, 1972. Two copper anomalies were detected; one near the northeastern extremity of the complex where numerous quartz and magnetite veins were exposed, the other in the central part of Netley Hill.

INTRODUCTION

The area investigated lies within the Anabama Granite which apparently intrudes the Adelaidean sequence near the southern margin of the Olary Arc Highlands. (Fig. 2). Formerly held as S.M.L. 263 (approx. 9 sq. miles) by Asarco (Australia) Pty. Ltd. but relinquished on 30th November, 1969, the area is now reserved from the operation of the Mining Act (1930-1962).

Detailed geological mapping and mineral investigations by Asarco detected small amounts of copper and molybdenum. (Hosking, 1969).

This report covers the geochemical soil sampling of Netley Hill and shows the results of the 191 samples collected together with their interpretation. A brief description of the geology and mineralization of Netley Hill is given. An induced polarization (I.P.) survey by the Exploration Geophysics Section has recently been carried out and it will be necessary to compare the results obtained with the geochemical data before any recommendation is made.

GEOLOGY AND GEOMORPHOLOGY

The climate is semi-arid with an average annual rainfall of about eight inches. Topography of the area is mature with low, well rounded hills of Proterozoic rocks rising 200 to 300 feet above the surrounding Quaternary sediments and alluviated plains.

The Netley Hill Complex, and the geologically similar Anabama Complex, stand out as resistant, deeply dissected inselbergs projecting above the sandy flats covering the deeply weathered, less resistant unaltered parts of the Anabama granite pluton.

Geology

The Ordovician Anabama Granite occupies an area about 25 miles long and 5 miles wide. (see Fig. 2). The Netley Hill Complex is a suite of granitic rocks altered to varying degrees, ranging from normal biotite granite to greisen in which the original feldspar and biotite have been completely replaced by muscovite.

Mineralization

The source of mineralization at Netley Hill is unknown, but the higher assay results in the vicinity of the greisen suggests an association with hydrothermal alteration.

Molybdenite has not been detected in outcrops at Netley Hill. Copper occurs sparingly in the form of turquoise associated with magnetite in quartz veins. (Satkoski, 1970). Cubic pseudomorphs of limonite and goethite after pyrite are common in the greisen.

GEOCHEMICAL SAMPLING AND RESULTS

Soil Sampling

Sampling was based on a survey grid laid out by Asarco. (See Fig. 3). Samples were taken at a depth of about 6 inches at 400 feet intervals across Quaternary alluvium; and at 200 feet intervals across scree and outcrops. The samples were later dry sieved and the minus 80 mesh fraction was sent to AMDEL for analysis.

Presentation of Data

A total of 191 soil samples were analyzed for copper and molybdenum. The samples were divided into two categories.
(i) 54 samples collected on Quaternary alluvium ("Quaternary").
(ii) 137 samples collected on scree and outcrop ("Greisen Complex").
Values for each sample are shown on Fig. 6.

The arithmetic mean, standard deviation and upper limit of background (arithmetric mean + twice the standard deviation) were calculated for copper and molybdenum in each group as shown below:-

	A.M.	S.D. (parts per million)	U.L.B.
Quaternary			
Copper	35	26.5	90
Molybdenum	4.5	3.3	11
Greisen Complex			
Copper	61	44	150
Molybdenum	7.7	9.6	19

Interpretation of Data (Figs: 4;5).

From the data, it is deduced that for the 'Greisen Complex', values above 150 p.p.m. copper and above 20 p.p.m. molybdenum are anomalous. Two anomalous copper zones and an anomalous molybdenum zone are indicated. The log-probability curves show that more than one population is present (Figs. 7, 8). All four curves are interpreted as showing positive skew, which may represent an anomalous population superimposed upon a normal background population, in each case.

Interpretation is handicapped by the limited number of values, especially in the higher concentrations.

SUMMARY AND CONCLUSIONS

Surface copper and molybdenum anomalies are present at Netley Hill but the extent of mineralization cannot be accurately determined from geochemical sampling alone. The results of the I.P. survey recently completed should also be assessed before detailed recommendations are made.

AB:CMH
5th July, 1972.

A. BELPERIO
STUDENT GEOLOGIST

REFERENCES

Hosking, A.J., 1969. Special Mining Lease 263 (Netley Hill) Progress Report to 31 August, 1969. Asarco (Australia) Pty. Ltd. Technical Report No. 13 (Unpub.) Env. 1088.

Satkoski, J., 1970. Special Mining Lease 263 (Netley Hill) Final Report. 30 November, 1970 Asaroo Australia) Pty. Ltd. Technical Report No. 25 (Unpub.). Env. 1088.

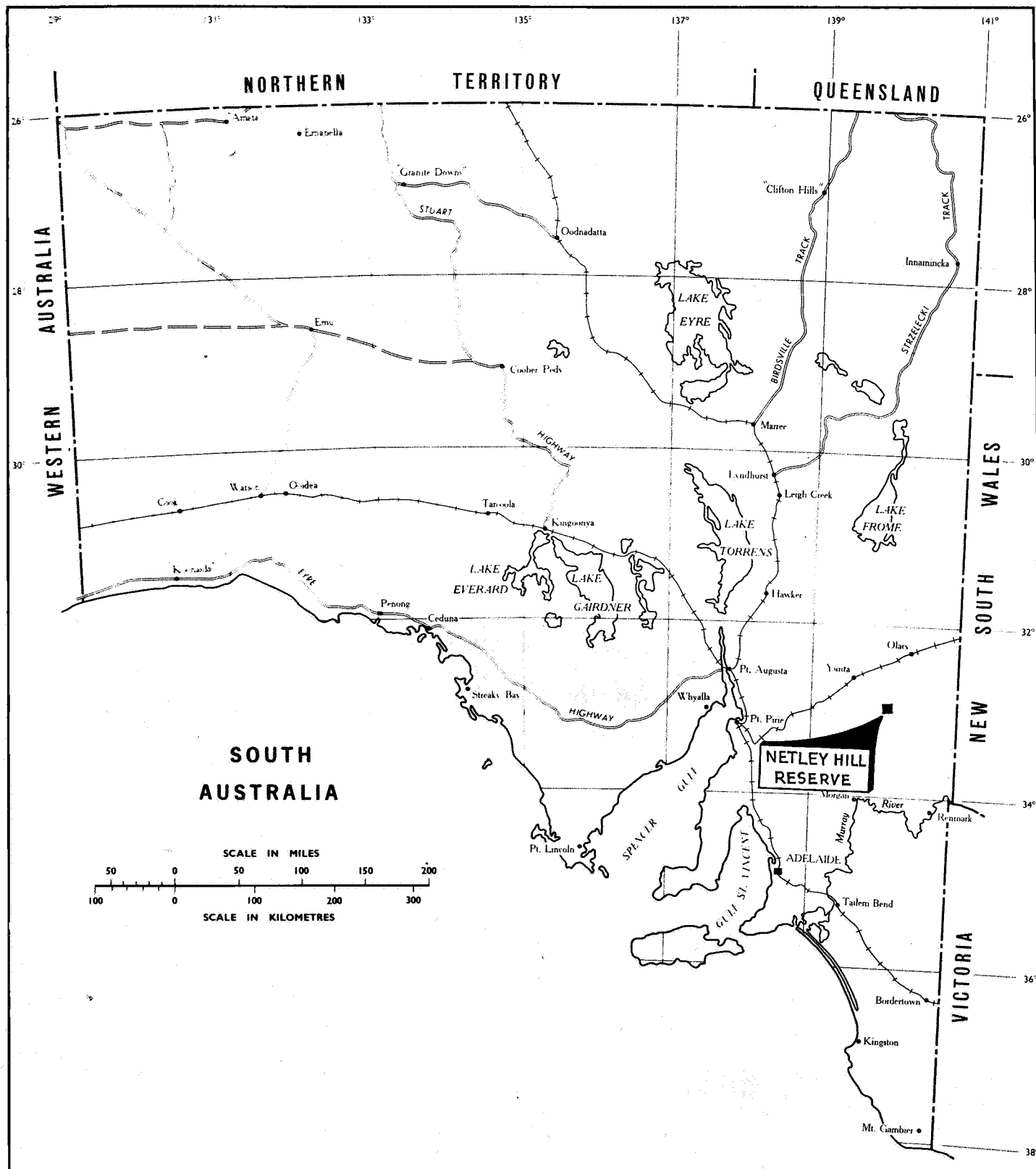


FIG. 1

DEPARTMENT OF MINES — SOUTH AUSTRALIA

Compiled. A.B.	NETLEY HILL RESERVE LOCALITY PLAN	Date: 6th JUNE 1972
Drn. A.F. Ckd.		Drg. No. S 9864 FI

P.F. No 55850 994.2

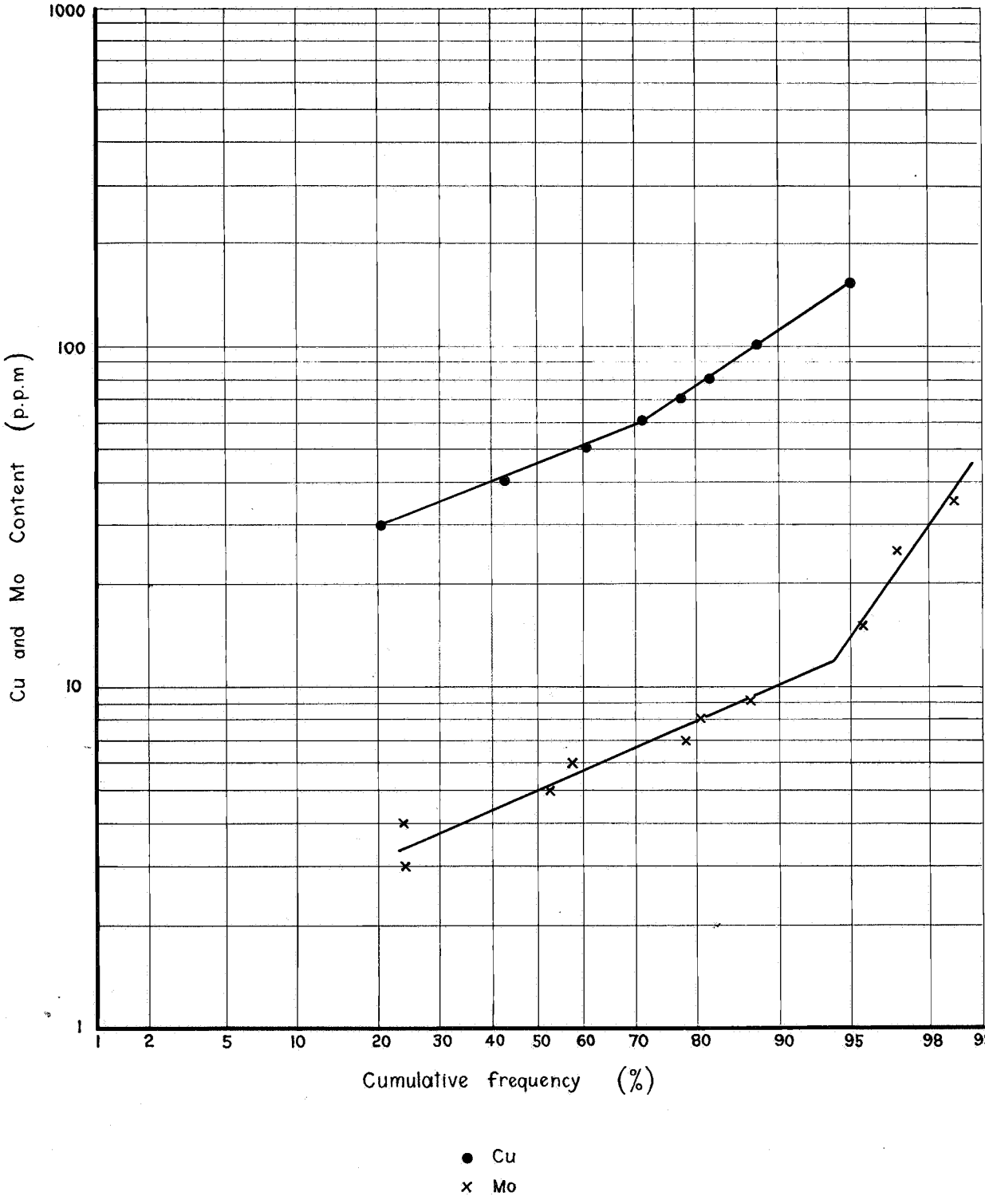


FIG. 7

Compiled: A.B Drn. A.F. Ckd.	DEPARTMENT OF MINES – SOUTH AUSTRALIA NETLEY HILL RESERVE LOG – PROBABILITY CURVES "GREISEN COMPLEX"	Scale: Date: 6TH JUNE 1972 Drg. No. S 9865 F1

1M–2.70 A1810

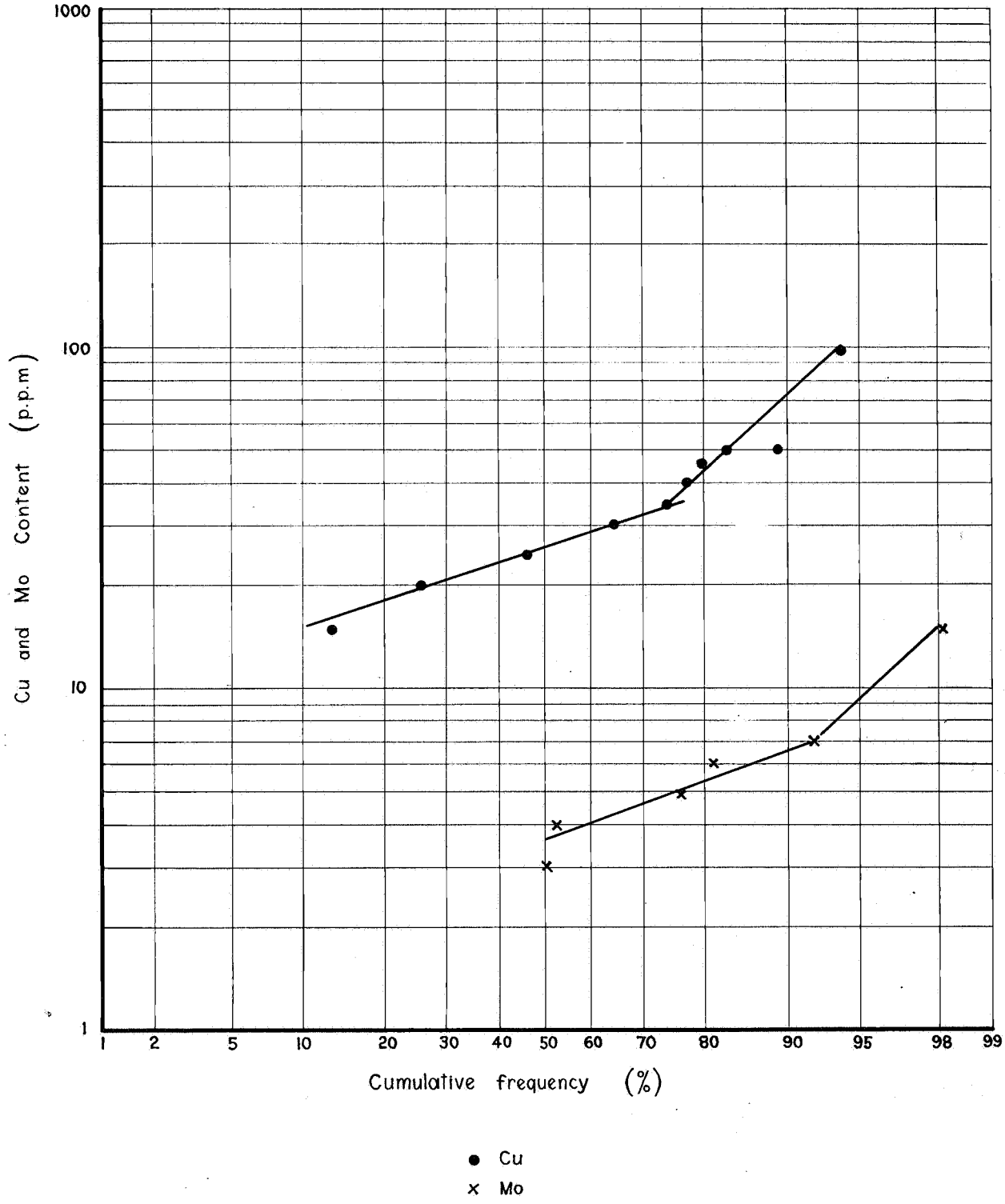
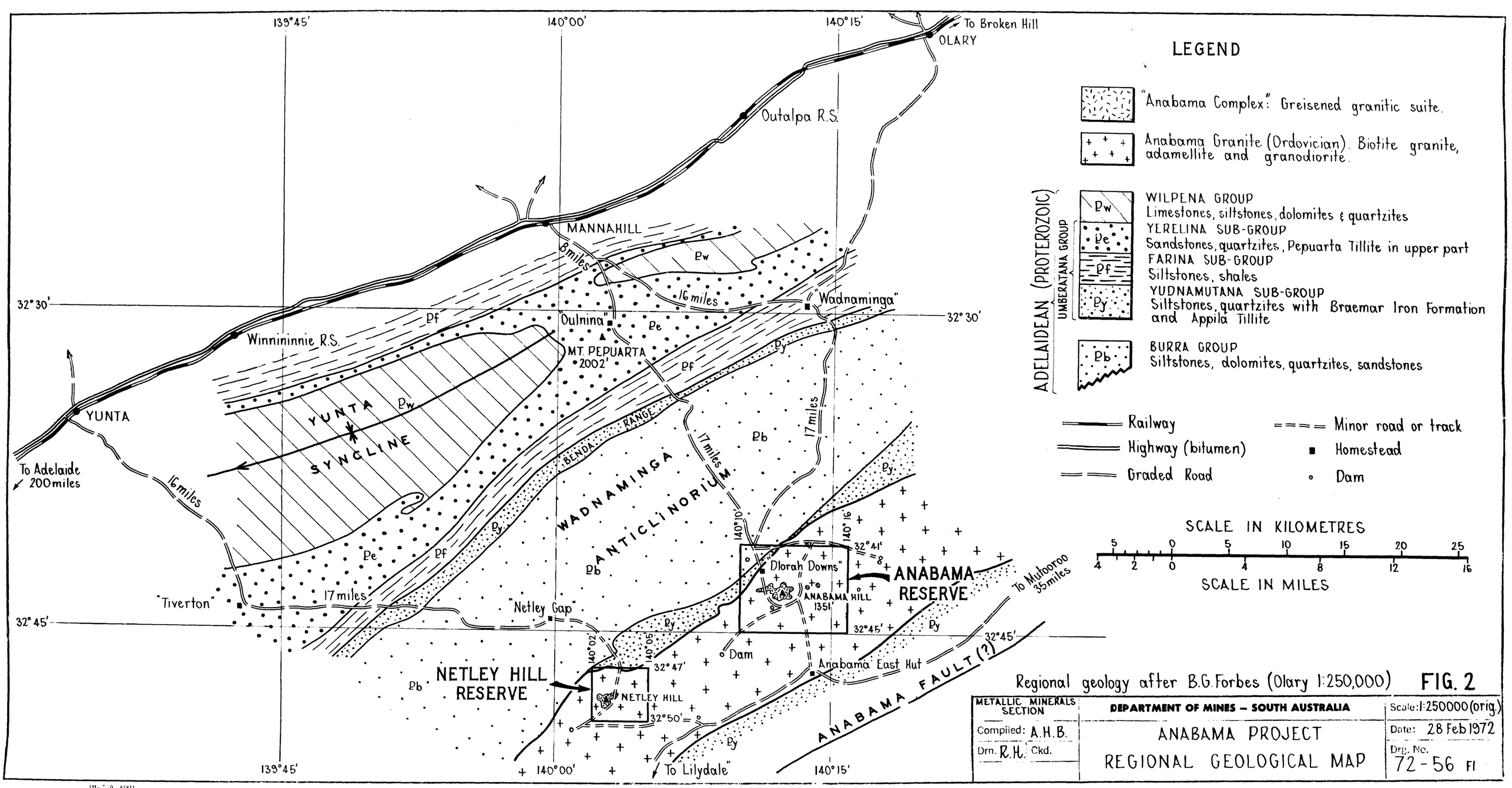


FIG. 8

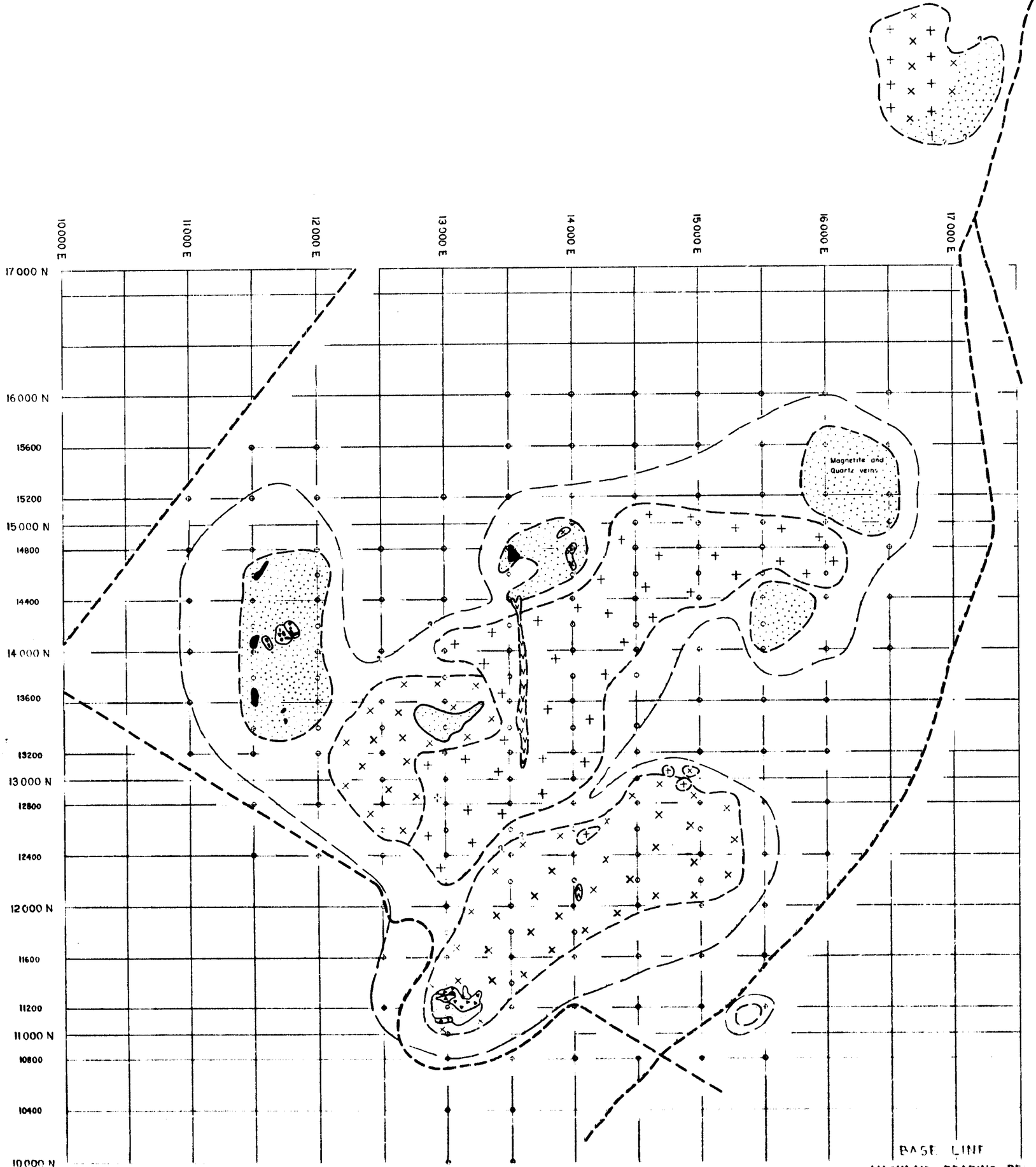
	DEPARTMENT OF MINES — SOUTH AUSTRALIA	Scale:
Compiled: A.B.	NETLEY HILL RESERVE	Date: 6TH JUNE 1972
Drn. A.F. | Ckd.	LOG — PROBABILITY CURVES "QUATERNARY"	Drg. No. S 9866 FI

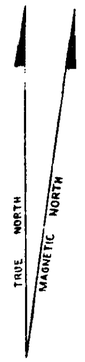
IM—2,70 A1810



Regional geology after B.G. Forbes (Olary 1:250,000) **FIG. 2**

METALLIC MINERALS SECTION	DEPARTMENT OF MINES — SOUTH AUSTRALIA	Scale: 1:250000 (orig.)
Compiled: A.H.B.	ANABAMA PROJECT	Date: 28 Feb 1972
Drn. R.H. Ckd.	REGIONAL GEOLOGICAL MAP	Drg. No. 72-56 FI





LEGEND

- Biotite granite, (normal ANABAMA GRANITE).
- Muscovite granite, (altered ANABAMA GRANITE).
- Quartz-muscovite rock (Greisen).
- Quartz porphyry.
- Quartz-feldspar porphyry
- Quartz blows.
- Brecciated granite and greisen.
- Outcrop boundary
- Outcrop boundary (interpreted)
- Scree boundary
- Soil sample point
- Main track

For grid position see plan 72-56

SCALE IN METRES

100 0 200 400 600

50 1000

SCALE IN FEET

(Geology after J.J. Satkoski, 1970)

FIG. 3

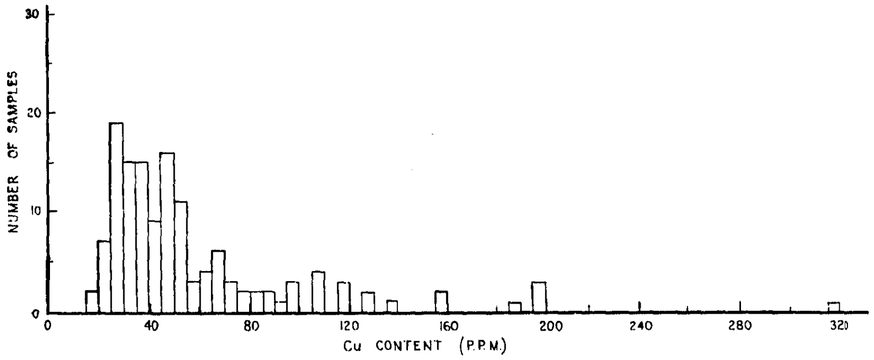
DEPARTMENT OF MINES – SOUTH AUSTRALIA

NETLEY HILL RESERVE

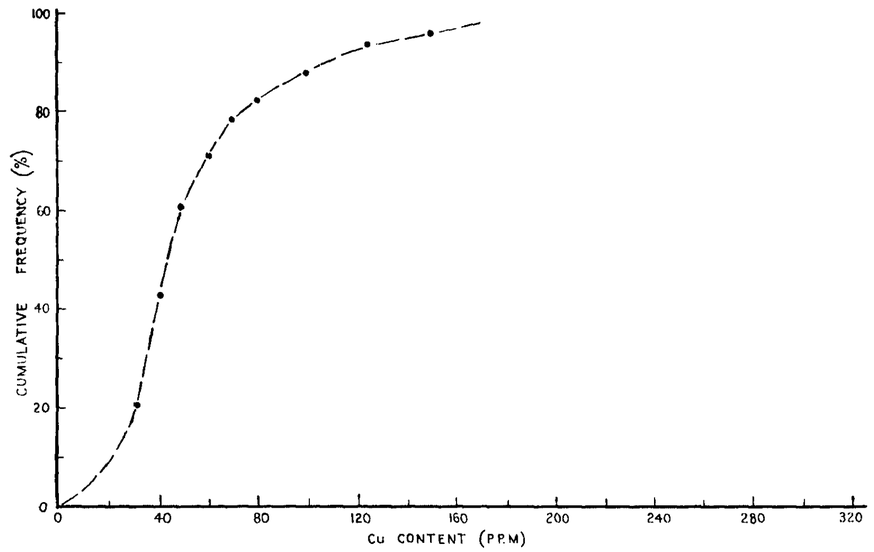
GEOLOGY AND SOIL SAMPLE POINTS

METALIC MINERALS SECTION	STUDENT GEOLOGIST	Drn A.B.	SCALE 1" = 200'
		Trd. A.F.	72-303 F1
Director of Mines	SUPERVISING GEOLOGIST	Chd.	
		Encl.	DATE 6th JUNE 1972

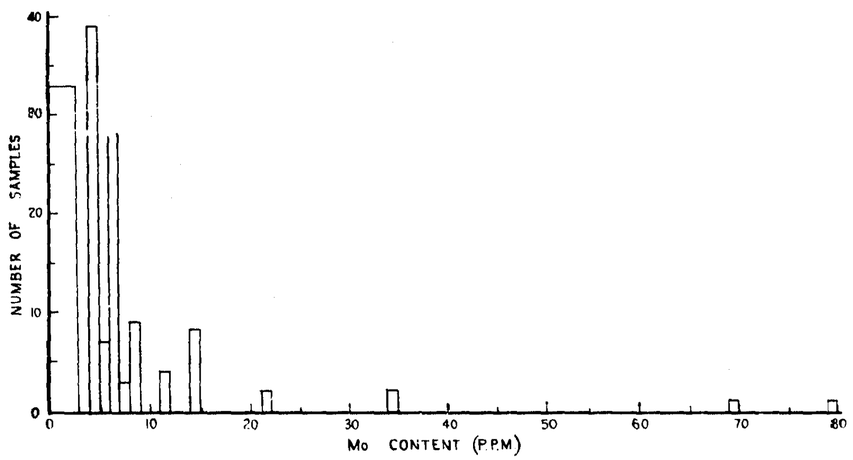
FREQUENCY DISTRIBUTION (COPPER)



CUMULATIVE FREQUENCY PLOT (COPPER)



FREQUENCY DISTRIBUTION (MOLYBDENUM)



CUMULATIVE FREQUENCY PLOT (MOLYBDENUM)

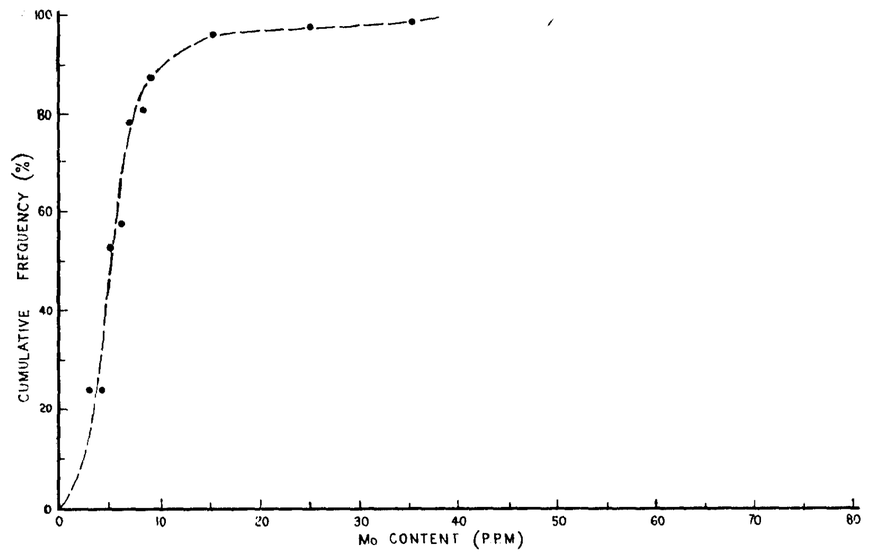


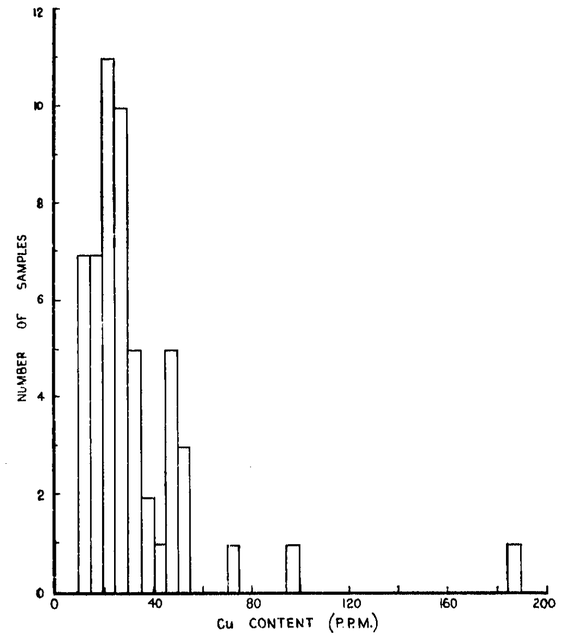
FIG. 4

DEPARTMENT OF MINES — SOUTH AUSTRALIA

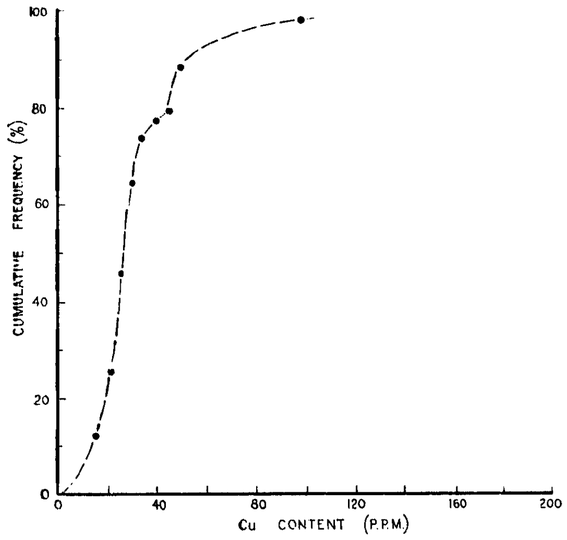
NETLEY HILL RESERVE
COPPER AND MOLYBDENUM VALUES
"GREISEN COMPLEX"

METALIC MINERALS SECTION	STUDENT GEOLOGIST	Drn. A B	SCALE:
		Tcd. A F	72-304 F1
		Ckd.	
Director of Mines	SUPERVISING GEOLOGIST	Exd.	DATE: 6TH JUNE 1972

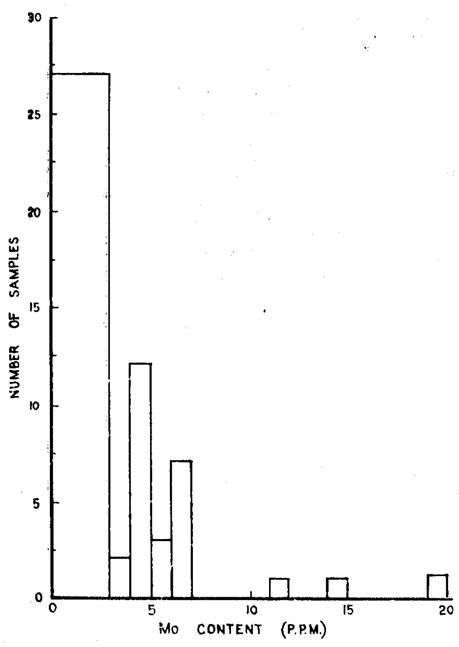
FREQUENCY DISTRIBUTION (COPPER)



CUMULATIVE FREQUENCY PLOT (COPPER)



FREQUENCY DISTRIBUTION (MOLYBDENUM)



CUMULATIVE FREQUENCY PLOT (MOLYBDENUM)

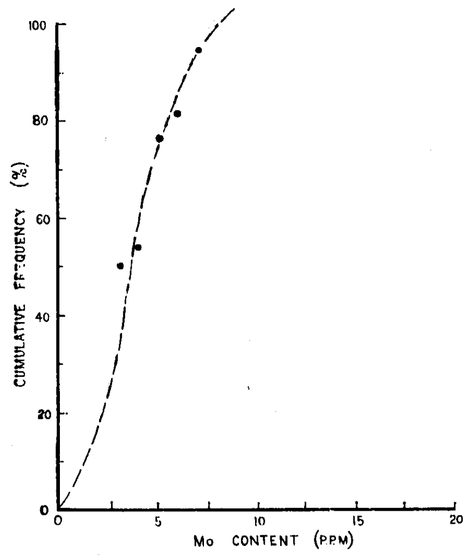
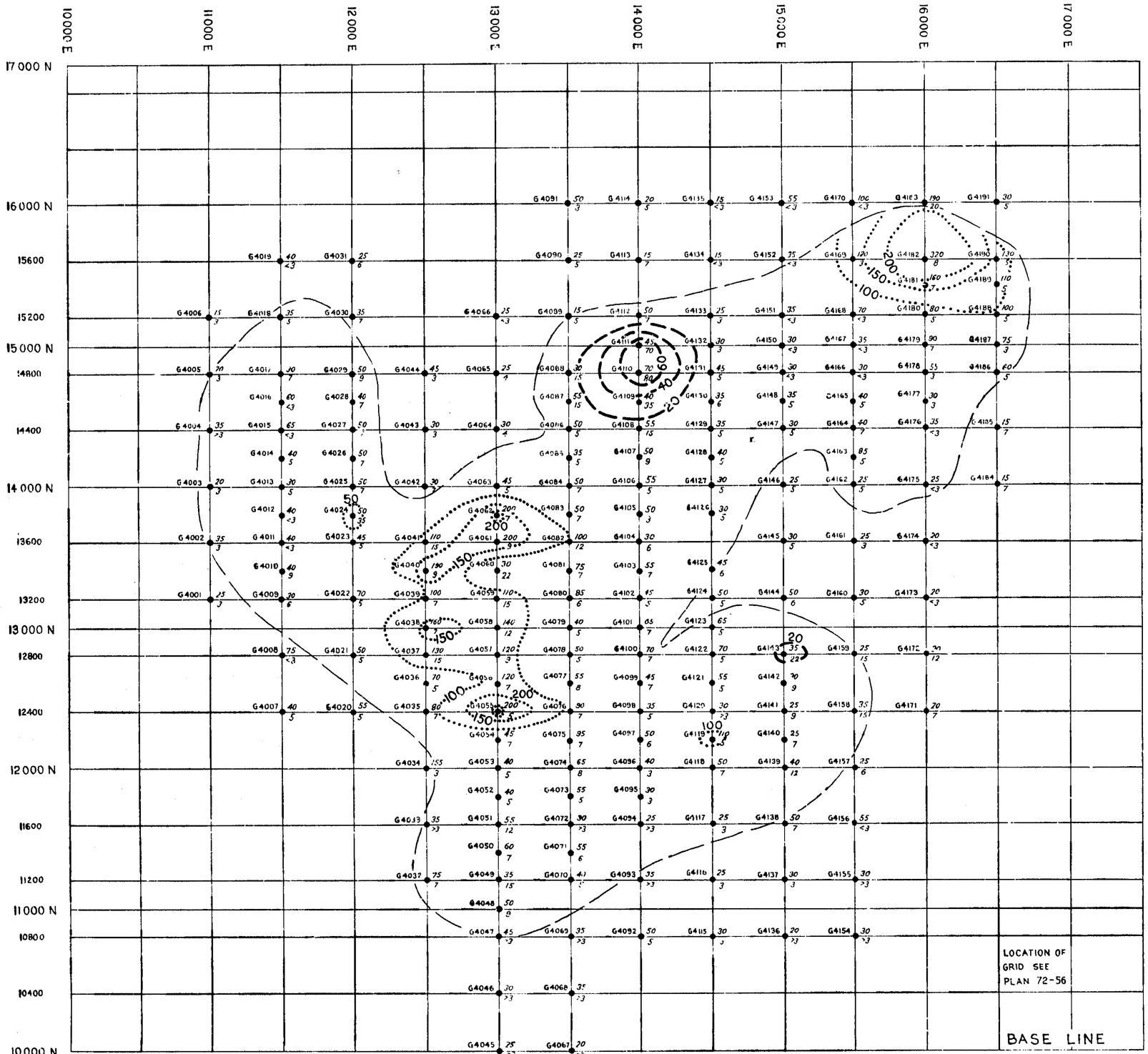


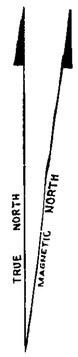
FIG. 5

DEPARTMENT OF MINES — SOUTH AUSTRALIA

NETLEY HILL RESERVE
COPPER AND MOLYBDENUM VALUES "QUATERNARY"

METALIC MINERALS SECTION	STUDENT GEOLOGIST	Drn. A B	SCALE:
		Tcd. A.F.	72-305 F1
Director of Mines	SUPERVISING GEOLOGIST	Ckd.	
		Exd.	DATE: 6TH JUNE 1972





LEGEND

- Boundary of scree and alluvium.
- G4080 — Soil sample point.
- 110 / 15 — Copper (p.p.m.). Molybdenum (p.p.m.).
- ·····200····· — Copper (p.p.m.).
- – –20– – – — Molybdenum (p.p.m.).

SCALE IN METRES

100 0 200 400 600

$500 0 500 1000 1500 2000

SCALE IN FEET

FIG. 6

DEPARTMENT OF MINES — SOUTH AUSTRALIA

NETLEY HILL RESERVE

SOIL SAMPLE POINTS
COPPER AND MOLYBDENUM ASSAY RESULTS

METALIC MINERALS SECTION	STUDENT GEOLOGIST	Drn. J.B.	SCALE: 1" = 500 FT
		Tcd. A.F.	72-306 F1
Director of Mines	SUPERVISING GEOLOGIST	Ckd.	
		Exd.	DATE: 6TH JUNE 1972