DEPARTMENT OF MINES
SOUTH AUSTRALIA

RB 66/141

SECOND GEOLOGICAL & GEOCHEMICAL REPORT ON THE SELLICK HILL AREA FOR THE PERIOD JUNE TO DECEMBER, 1967

by

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S 6354	" " " 00E	
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Rept. Bk. No. 66/41
G.S. No. 3903
D.M. No. 77/67

7th February, 1968

DEPARTMENT OF MINES
SOUTH AUSTRALIA

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ABSTRACT

Stream sediment sampling has rapidly outlined a number of previously unknown zones of lead and zinc concentrations. Soil and rock sampling on grids established over these areas is being undertaken to pinpoint drill targets. Wagon drilling is in progress at the Forktree Prospect testing an extensive geochemical and geophysical anomaly.

INTRODUCTION

The present exploration programme was begun in January, 1967 to investigate geochemically the Cambrian sequence exposed southerly from Willunga to Normanville, a strike length of over 15 miles. The first six months work has been recorded in the "First Geological and Geochemical Report on the Sellick Hill Area" Wright (1967) and this report is a continuation of that work.

Stream sediment sampling has been completed in the area and a number of anomalies are indicated. Follow-up soil sampling on the ridges and spurs adjacent to these streams is being completed. Already several zones of lead and zinc concentrations in soils have been defined. One zone, the Forktree Prospect, is being tested further by wagon-drilling.

LOCATION AND ACCESS

The centre of the area lies about 35 miles south of Adelaide. Most parts can be reached by bitumen and

gravel roads from the coast road to Cape Jervis.

GEOLOGY

The reader is referred to the summary of the stratigraphy and structure of this region in the previous report.

MINERALIZATION

Five small prospects were described in the previous report. Two more have since been located and the positions of these are shown on Plan 67-874.

The Myponga Prospect, 1 mile north of Carrickalinga Hill, consists of two shafts and an adit put into the northern edge of the Black Hill Fault.

A one to three inch thick, ferruginous vein is exposed which carries small nodules of pale blue, powdery turquoise. This vein occupies a shear in the shaley fault breccia.

The Forktree Prospect, one mile north-west of the Carrickalinga Hill is also situated in the Black Hill Fault zone. Two shallow pits have been sunk into manganiferous limestone and shale breccia carrying anomalous lead and zinc values. The stream draining past these workings carries high lead and zinc values for about a mile down to the coast. Because of the richness and length of this dispersion train, soil sampling on a 100ft. interval grid was carried out over the headwaters of the stream.

GEOCHEMISTRY

Rocks samples are crushed and soil and stream samples sieved through the -80 mesh sieve and this fraction submitted for analysis to AMDEL. The samples are treated with perchloric acid and the lead and zinc content determined

by the atomic absorption spectrophotometer. To date 638 stream sediment samples, 1909 soil samples and 135 rock samples have been collected and the assay results received. In the field, sample points are temporarily marked with a numbered brass tag, yellow plastic tape, and fastened with a three inch nail. The most accessible end of each soil line is marked with a labelled white sighter peg.

Sediment Stream Sampling

The first phase of stream sediment sampling has been completed. Stream results from the southern portion of the area, between Myponga Beach and Normanville are shown on Plan 67-787. The geology of this area is shown on Plan 67-874. Stream sampling results from the northern portion of the area between Willunga and Myponga Beach, are shown, together with ridge soil sampling results, on Plan 68-90/6.

The high contrast between the stream draining past the Forktree Prospect (Plan 67-787) with those to the north and south should be noted. The two short streams north of this stream also contain anomalous lead and zinc. Soil sampling adjacent to these streams has discovered slightly anomalous soil zones of narrow width. Stream samples collected uphill from the Queen Mary Mine (Plan 67-874) indicate the presence of mineralization close to the Black Hill Fault. Preliminary soil sampling here has defined a 700 feet wide soil zone containing up to 110 p.p.m. lead and 100 p.p.m. zinc.

The other stream of interest in the southern area lies one mile east-south-east of Myponga Beach. Soil sampling on the ridges here has outlined a zone containing values above background but too low to warrant further investigation.

Soil Sampling

The results of ridge soil sampling in the northern area are shown on Plan 68-90/6. This follow-up

work in areas containing anomalous streams has located three new zones of lead and zinc concentrations. The geology map of this area (Plan 67-400) is included in the previous report.

Anomalous zinc in streams northeast of Mt.Terrible have been found to drain off a zone of soil covered by soil lines 13,14,15 and 16. The soil here contains up to 130 p.p.m. zinc overlying Proterozoic siltstones and shales. The rocks contain abundant thin ferruginous quartz veins.

Westerly from the Pipeline Prospect soil lines 21, 22, 23 and 24 show anomalous lead soil zones containing up to 340 p.p.m. lead, which are roughly aligned. These zones are underlain by Fork Tree Limestone which has been faulted in the region of line 24. A soil grid consisting of four lines 200 feet apart has been established over line 24 to outline the extent of the lead anomaly. The soil sampling has not explained the zinc concentrations in the stream draining north from the Heatherdale Hill. Further work will be done here to determine the reason.

The other area of interest is the wide lead and zinc zones on line 28. The soils here contain up to 190 p.p.m. lead and 90 p.p.m. zinc. Additional soil and rock sampling will be done in these areas to determine if significant geochemical highs exist.

A number of soil lines have been sampled in the area between Myponga Beach and Normanville and these will be recorded on a later map.

FORKTREE PROSPECT

A major part of the six months work has been concentrated about this prospect. Plan 67-903 shows the local geology and geochemical lead and zinc distribution. Cross sections along lines covered by induced polarization are shown in Plans S 6349 to S 6355. The reader is referred to the geophysical report on the Forktree Prospect by B.J.Taylor(1967)

which should be read in conjunction with this section. The geology is complicated by the cover of widespread Permian sands and structural complexities. Thus, geological boundaries, especially of the fault zone, are interpretive. The fault breccia consists of cavernous, grey limestone and yellow shale fragments cemented with abundant pyrolusite and limonite. Brecciation of the limestone fragments varies in intensity from place to place across the fault. The fault plane appears to dip at about 60 degrees southeastwards.

Anomalous lead and zinc values appear to be associated with Wangkonda Limestone on the southern edge of the fault and extend well out over the fault zone. The limestone shows a blocky jointing and some of the joints are filled with two to five inch wide, jasperized limonite-pyrolusite veins. Three of these veins were sampled and the results are shown below

Locality	Lead	Zinc
550N 400E	40 p.p.m.	200 p.p.m.
650N 550E	30	150
700N 600E	70	250

The lead anomaly in soil centred over points 500 and 400N on line 1200E was found to be due to the lead content of a ferruginous grit unit exposed at points. Results are as follows.

Locality	Lead	Zinc
400N 1200E	250	80 p.p.m.
500N 1200E	250	80
600N 1200E	200	25

The walls of the two old pits were channel sampled. The southern pit at 900N 150E carried 90 p.p.m. lead and 9,000 p.p.m. zinc across a width of four feet. Results from the northern pit are shown below

		Lead	Zinc
North Wall	0-2'	150	600 p.p.m.
	2-4	80	700
South Wall	0-2'	200	1000
	2-4	70	400

These samples were measured from west to east.

Drilling

Encouraging geochemical and geophysical results at the Forktree Prospect resulted in the testing of portion of the anomaly using the new Halco 150 Down Hole Hammer Drill. The work commenced on the 29th of November. Due to the difficult drilling conditions in the broken ground, much time was spent in freeing stuck rods and hammer. Techniques and equipment are being continually modified to overcome these problems. The steep, rugged terrain made access to the drill sites difficult. In several cases the drill was winched onto the site using a block and tackle and lashed to stakes to prevent movement downhill. It was hoped that the drill would be able to penetrate to the full 150 foot capacity of the machine as the best geophysical results occur at depth. Total footages of the holes drilled are shown below.

	Location	Footage
FW 2	665N00E	114 feet
FW 2	540N00E	55 feet
FW 3	800N00E	90 feet
FW 4A	960N390E	14 feet
4B	970N410E	18 feet
4C	950N360E	72 feet
FW 5	1020N420E	34 feet
FW 6	1085N400E	36 feet
Total Footage		433 feet
Days on site	20 Feet/day	22 feet

Assay results are shown in Plans S 6347 and S 6348. A.M.D.E.L., using Emission Spectroscopy, provided a 24-hour assay service for assays of the drill cuttings. Detailed logs of these holes will be issued in the final report.

Drill Sampling Procedures

Drill cuttings in a dry to moist state are collected in a wheat sack attached to the outlet pipe of the cyclone. A sample is taken for every six feet rod length. The sack is weighed on a clock-scale (100 lb. capacity by $\frac{1}{2}$lb) hung from a tripod made from three 8ft. star droppers. The sample, consisting of $\frac{1}{2}$" size rock chips grading down to dust

size particles is poured out onto ¼" rubber matting. The sample is quartered down to a convenient size and a representative portion placed in a labelled 9 by 16 inch linen sample bag. Another small portion is sieved through a -80 mesh sieve into a cardboard packet for analysis. The larger chips are sieved out and washed in round tobacco tins which have their ends replaced by 16 mesh gauze. Steel washers are added to help break up the clay in the sample. The tobacco tins are shaken in water in plastic buckets. The clean chips are then dried, either in the sun or on a portable hot-plate, and placed in clean plastic bags with a label and the bag then folded and stapled. Where possible, the chips are logged by the site geologist before they are placed in the bags. A binocular microscope is used to examine the chips.

CONCLUSIONS & RECOMMENDATIONS

Geochemical stream and soil sampling techniques have been used in the Sellick Hill area in a rapid appraisal of about 20 square miles of Cambrian outcrop in less than 12 months. The intermediate stage of exploration has now been reached, with soil and rock sampling being localized on lead and zinc anomalies within two main areas; around the Forktree Prospect and north of Heatherdale Hill. Additional ridge and spur soil sampling will be necessary to explain anomalous streams as yet unaccounted for.

Continued investigation of the whole area is recommended, with reconnaissance stream sampling being later extended to the Rapid Bay, Delamere, Cape Jervis region.

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RGW:CFL
7.2.1968

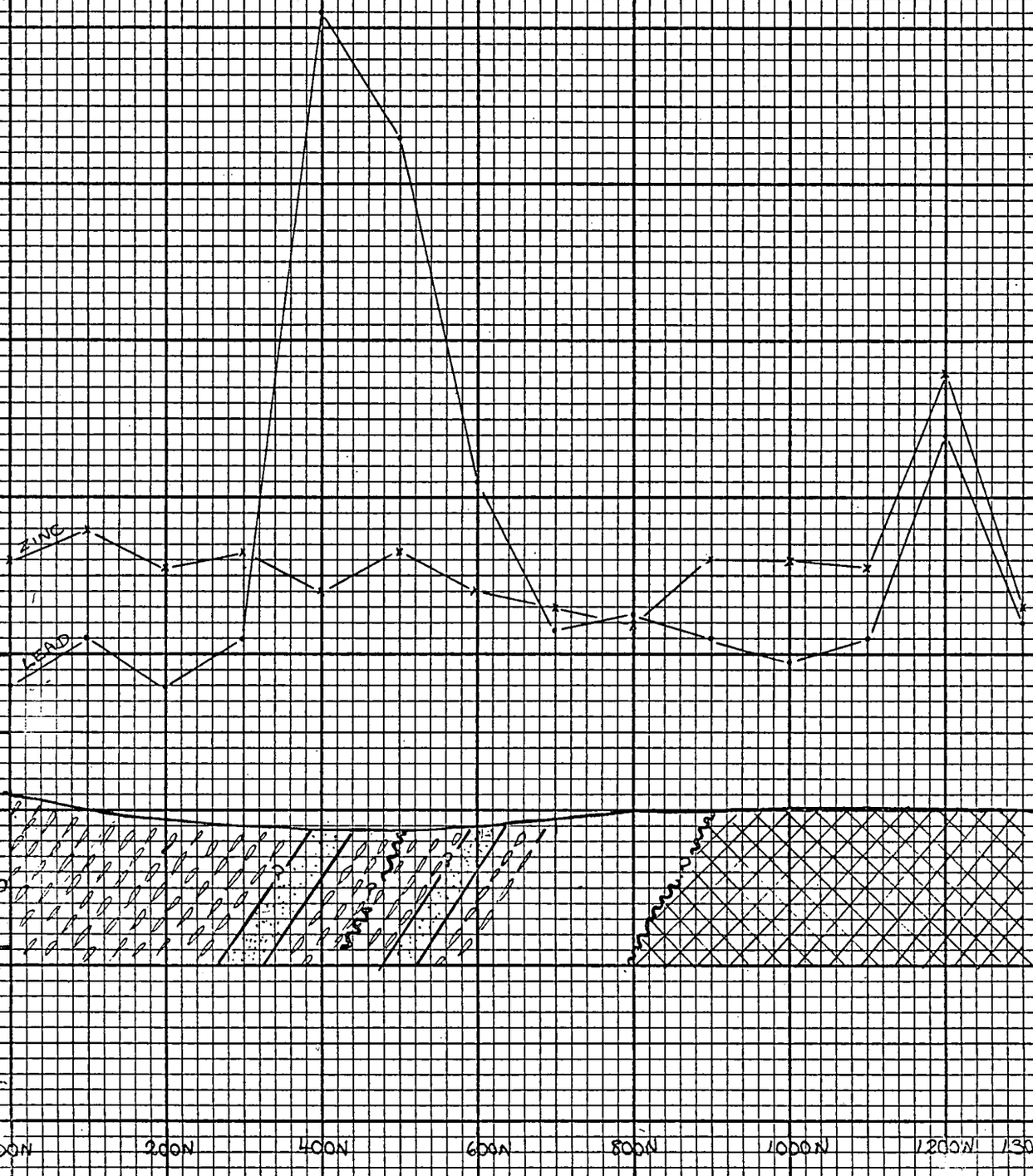
REFERENCES

TAYLOR, B.J. 1967. "Geophysical Investigations - Forktree Prospect. Geophysical Report No. 1". Dept. of Mines, S.A. Rept.Bk.No. 65/108 (Unpub.)

WRIGHT, R.G., 1967. "First Geological and Geochemical Report on the Sellick Hill Area". Dept. of Mines, S.A. Rept.Bk. 64/109 (Unpub.)

FORKTREE PROSPECT

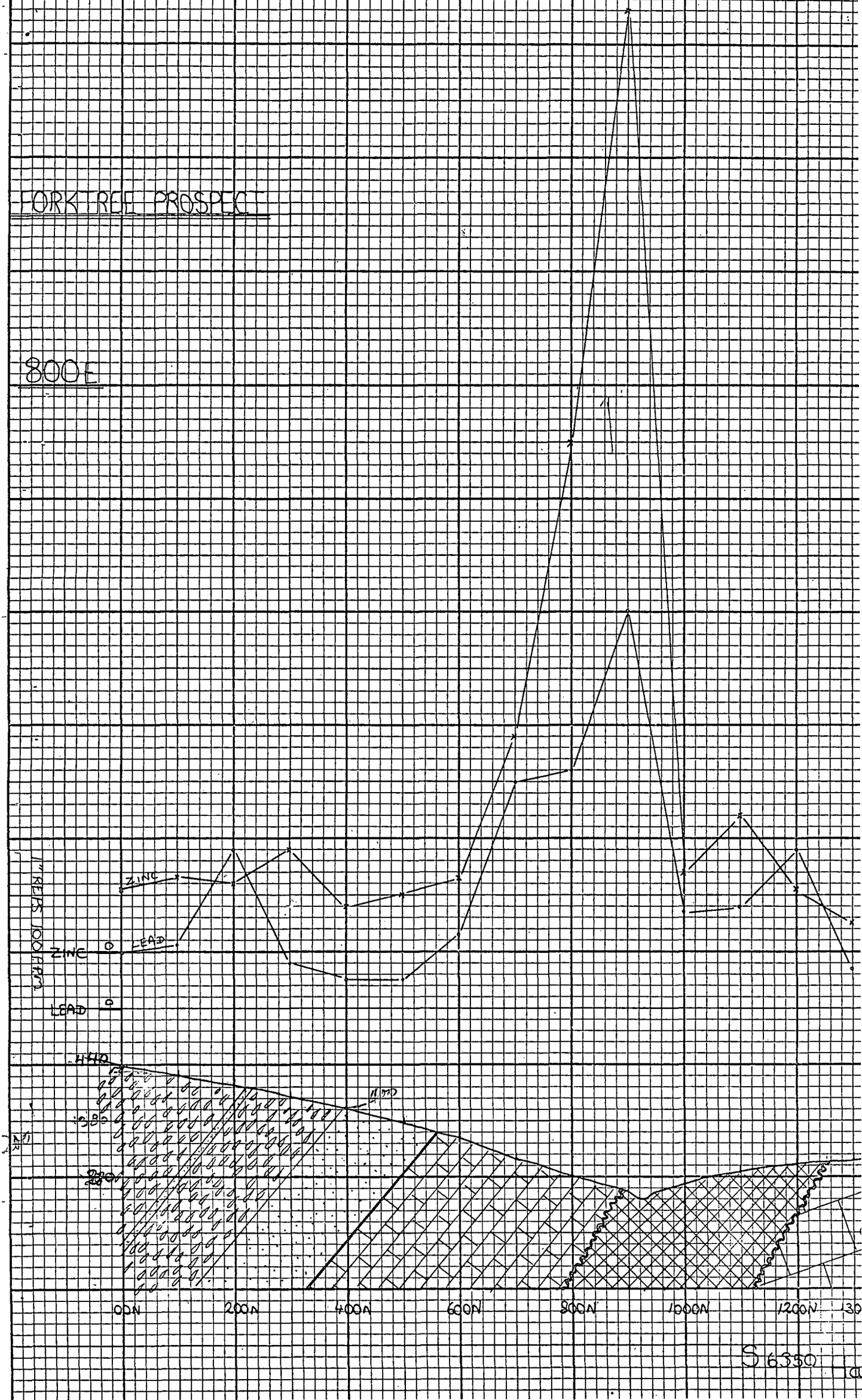
1200E



S6349

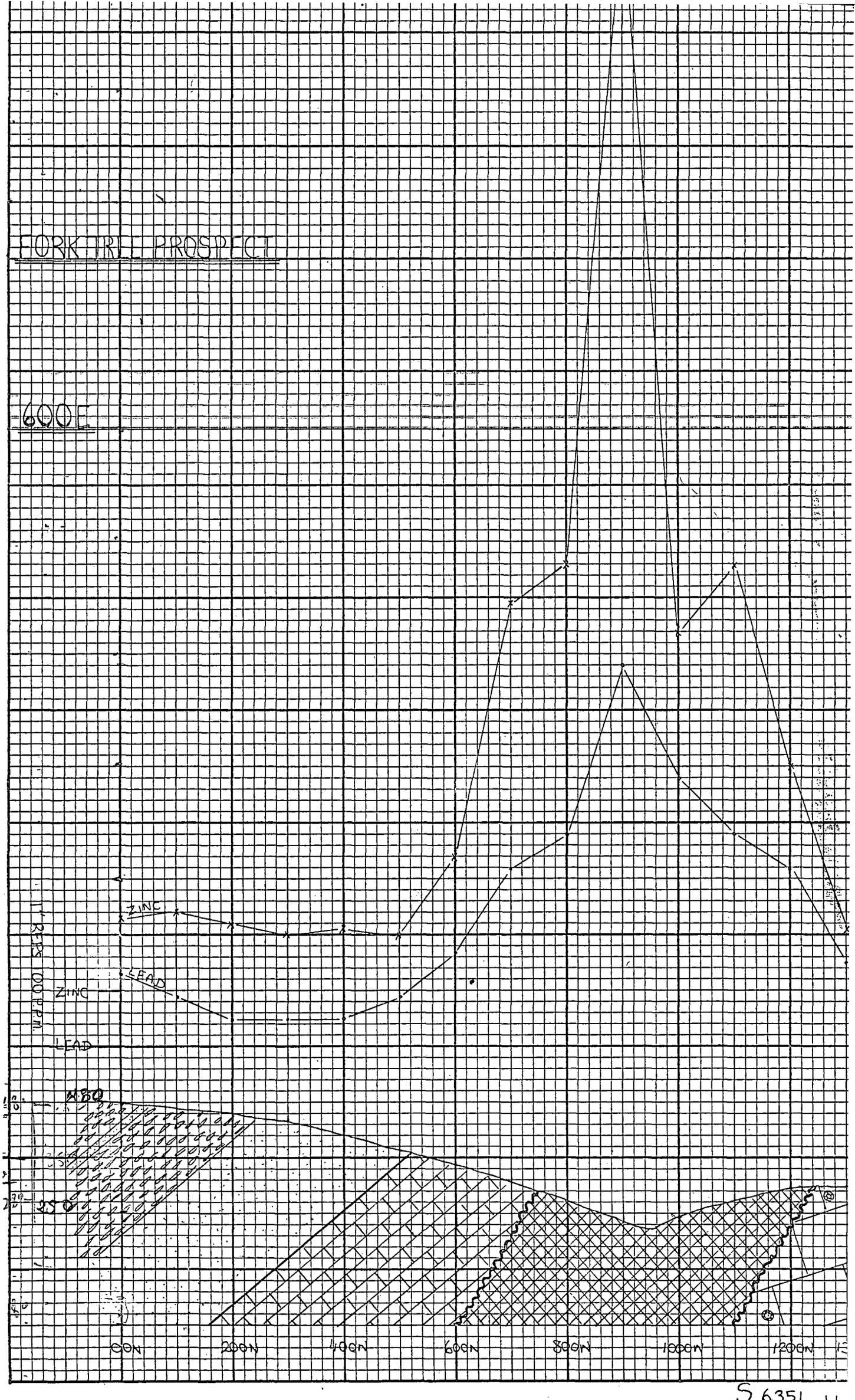
FORK TREE PROSPECT

800E



FORK TREE PROSPECT

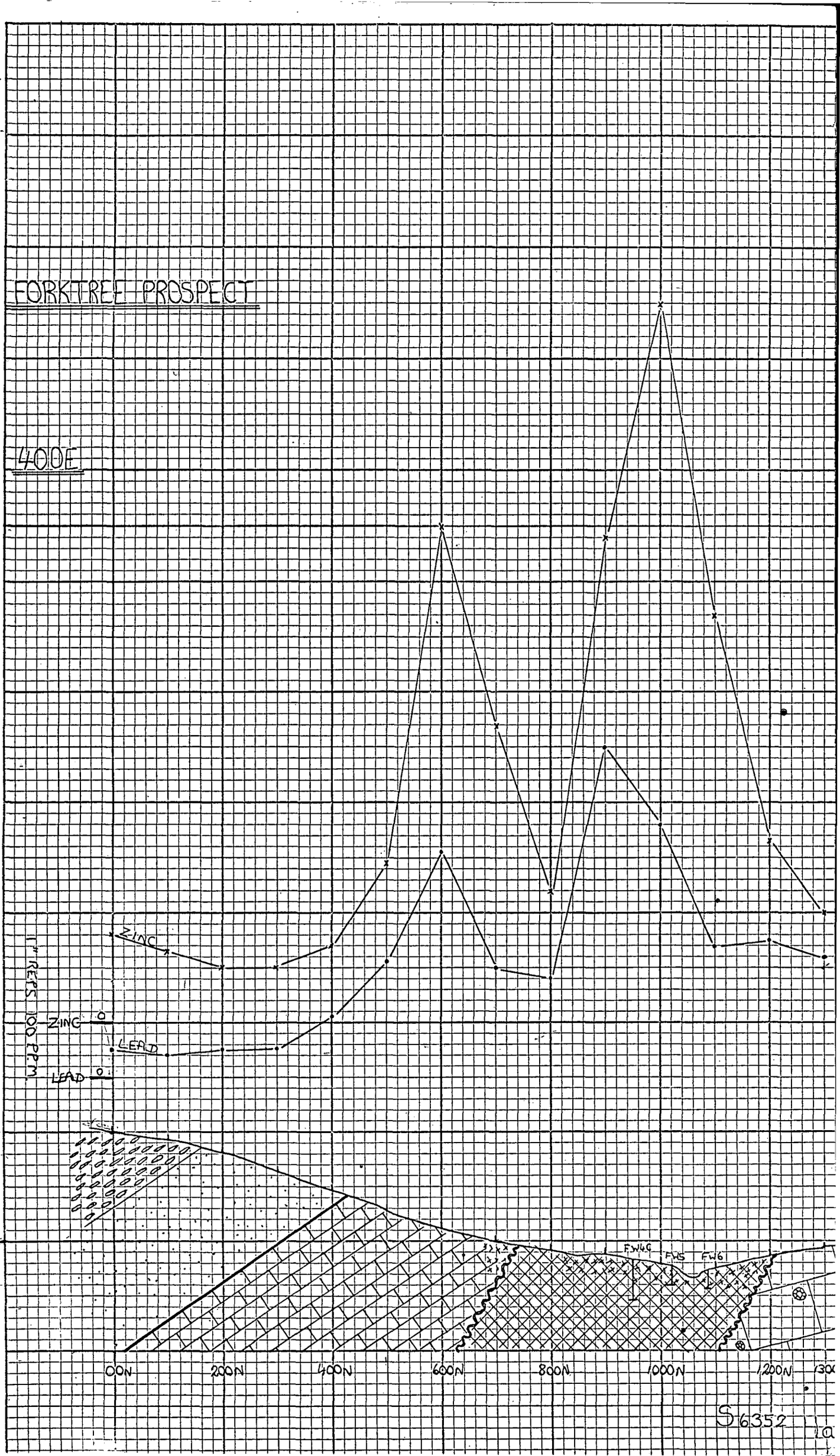
600E



S 6351 Hc

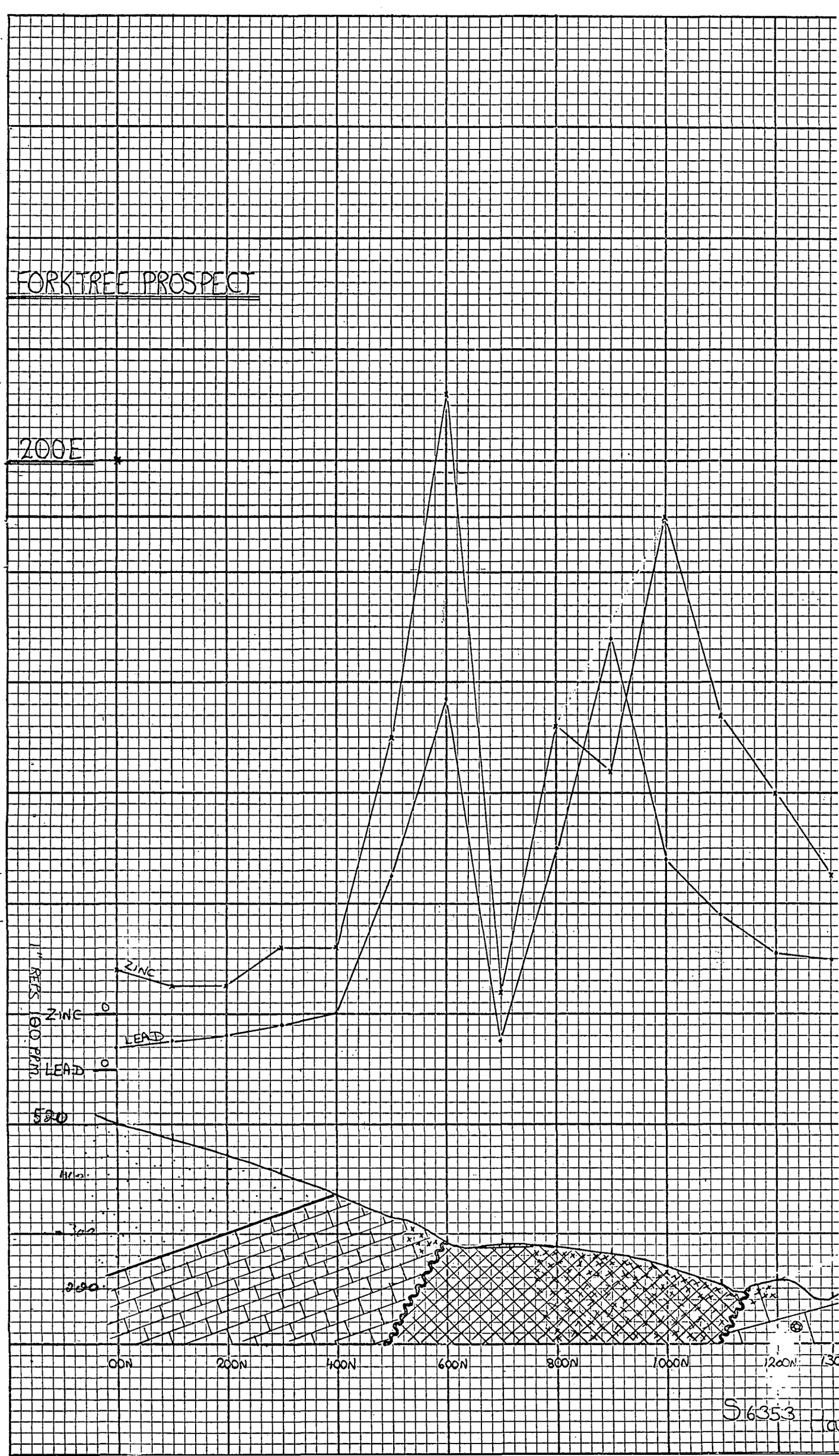
FORKTREE PROSPECT

400E



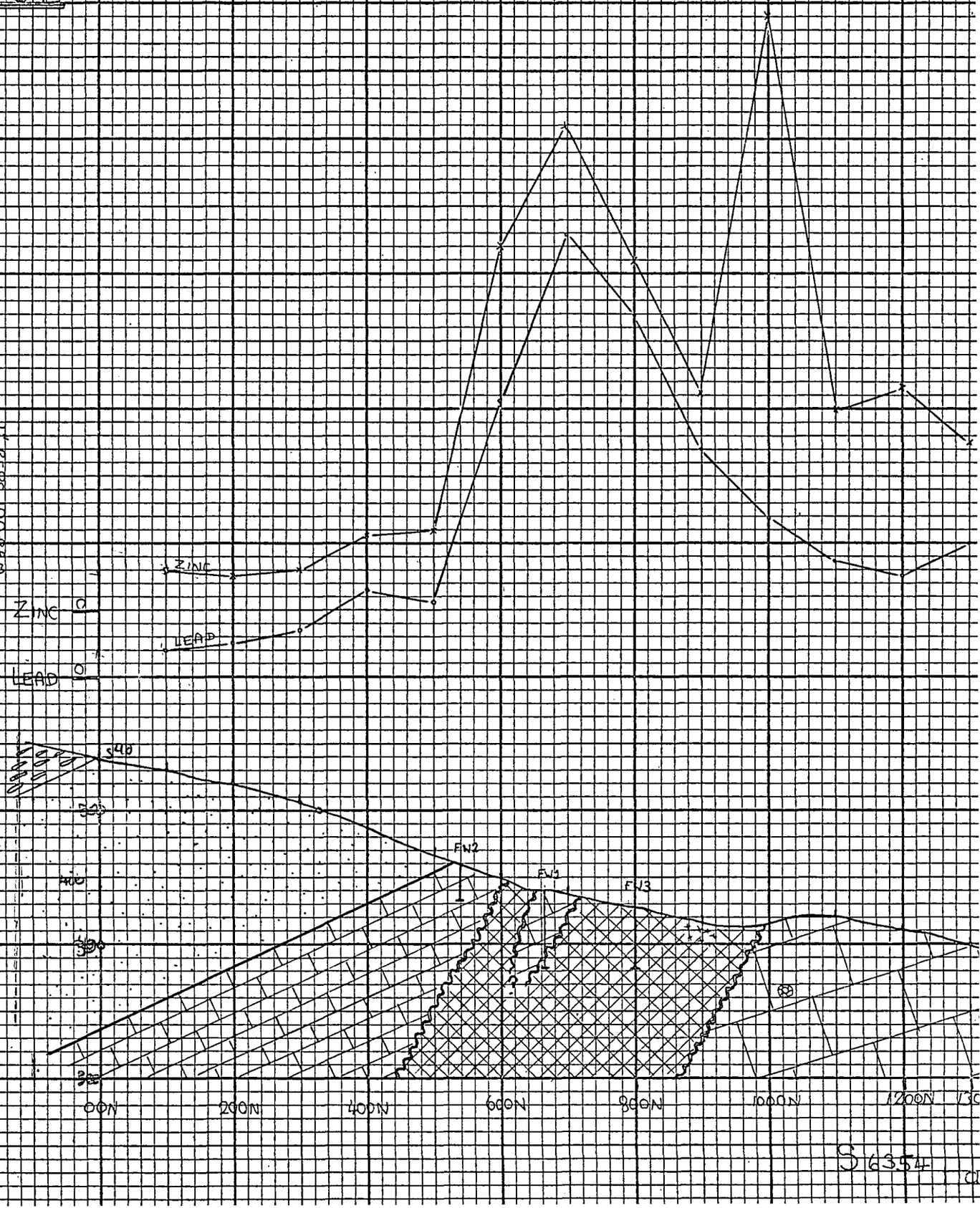
S6352 1a

FORKTREE PROSPECT



ORKIRK E PROSPECT

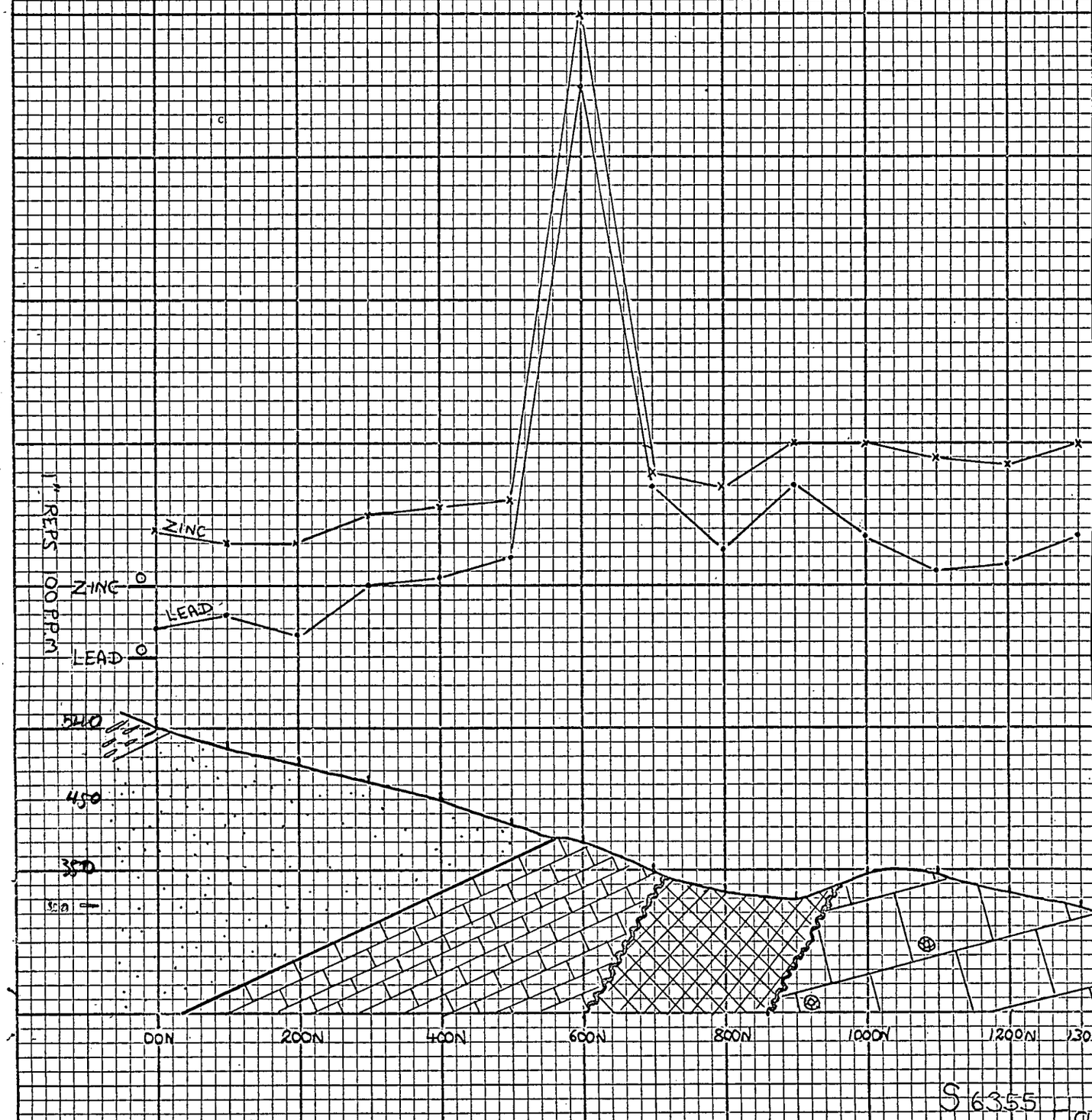
00 E



S 6354

FORKTREE PROSPECT

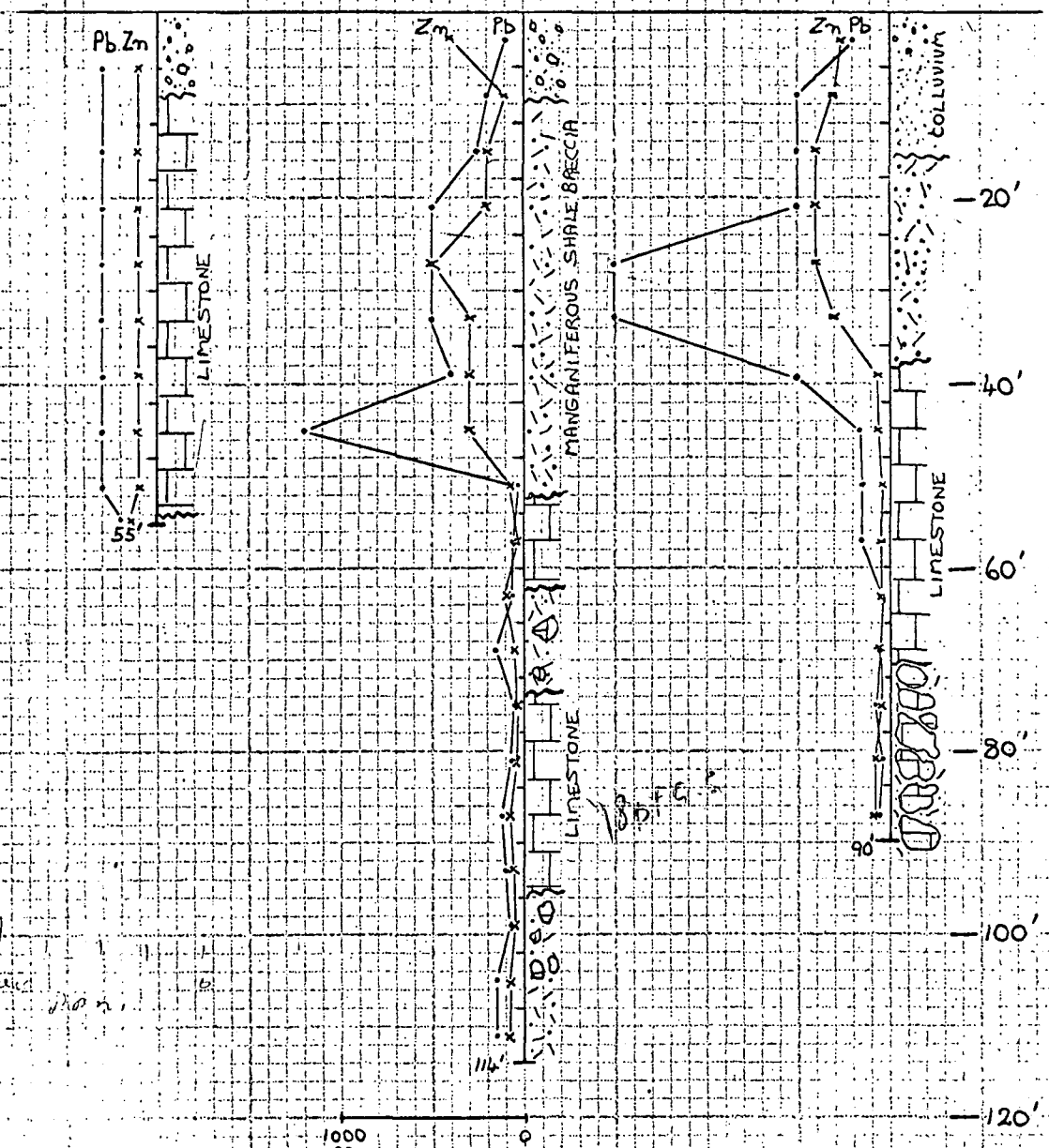
200W



S6355

FORKTREE PROSPECT

00E

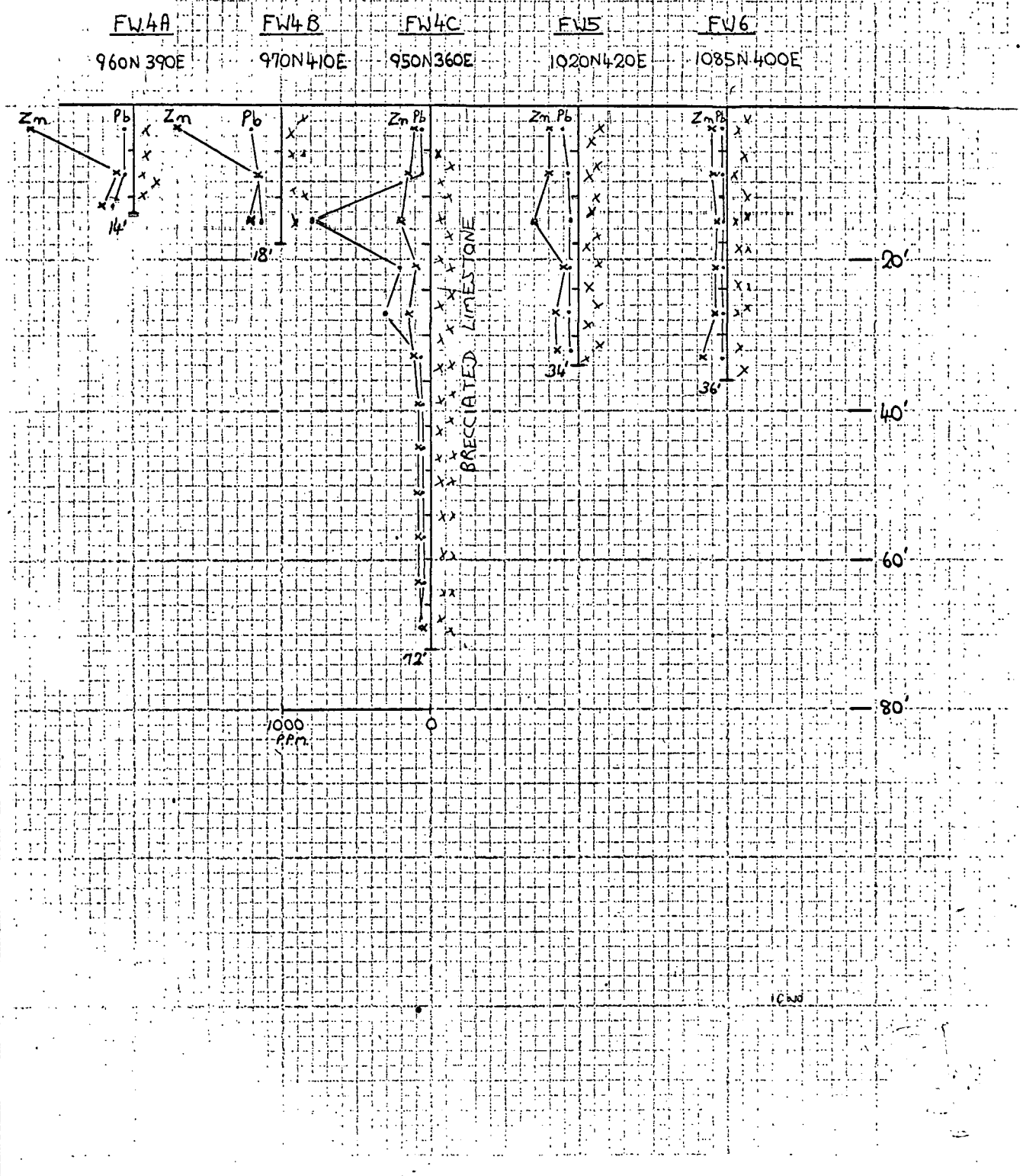


DEPARTMENT OF MINES — SOUTH AUSTRALIA

	Drn.	ASSAY RESULTS OF WAGON DRILLING FORKTREE PROSPECT	SCALE: 1 INCH REPS. 20 FT.
	Tcd.		S 6347 Ha+c
	Ckd.		
	Exd.		DATE: 22 JANUARY 1968

FORKTREE PROSPECT

400E



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	Drn.	ASSAY RESULTS OF WAGON DRILLING FORKTREE PROSPECT	SCALE: 1 INCH REPS 20 FT.
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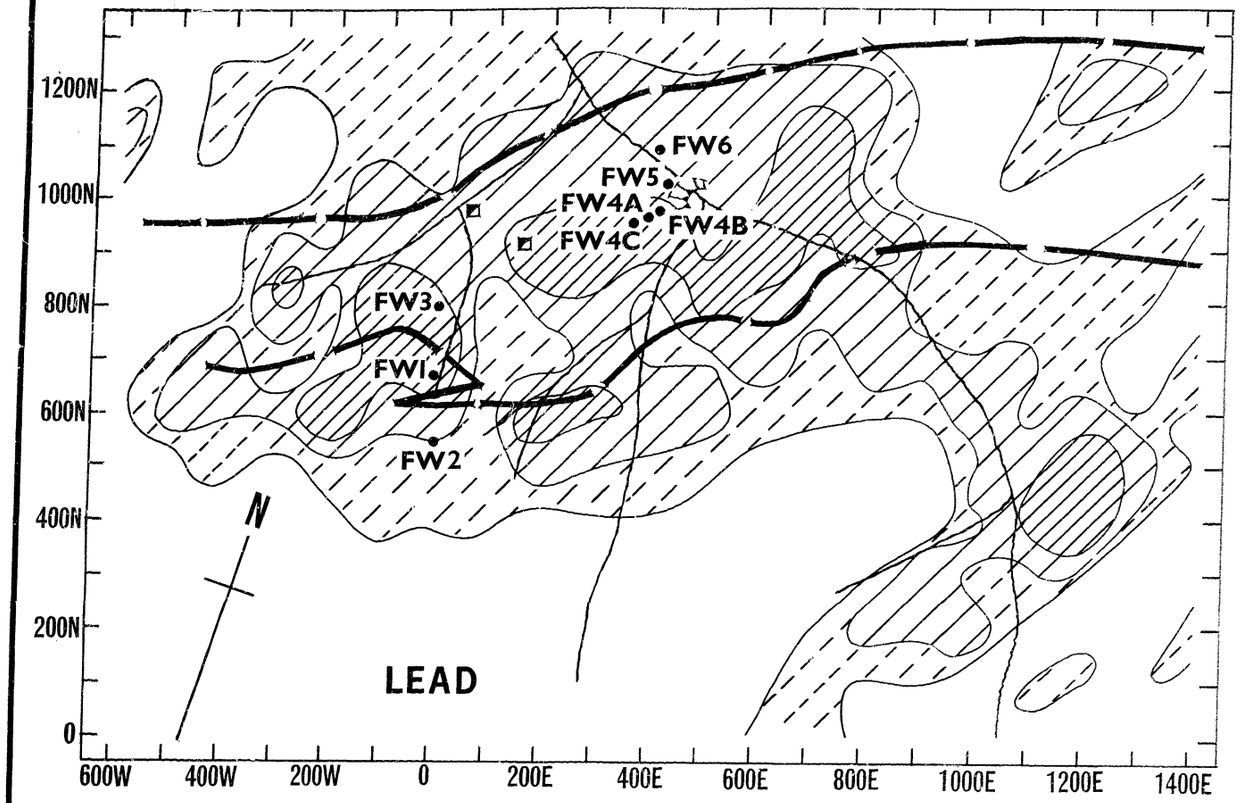
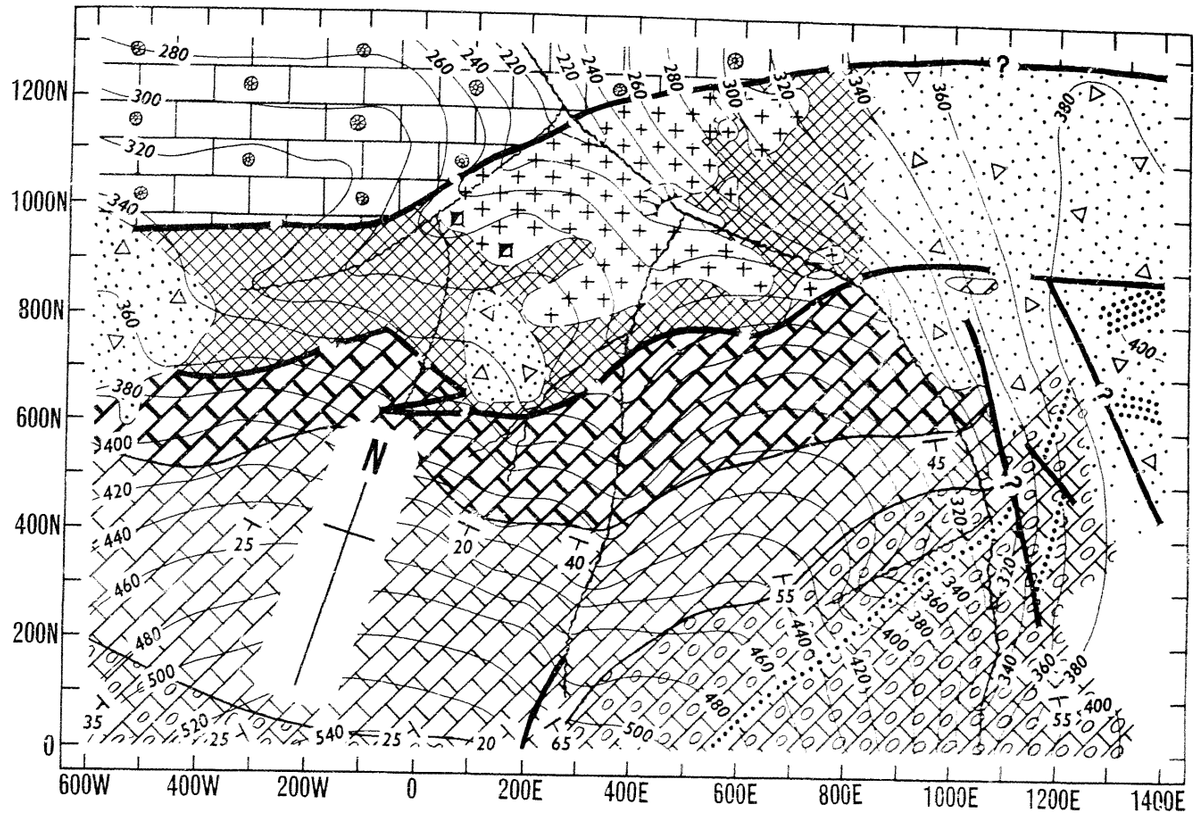
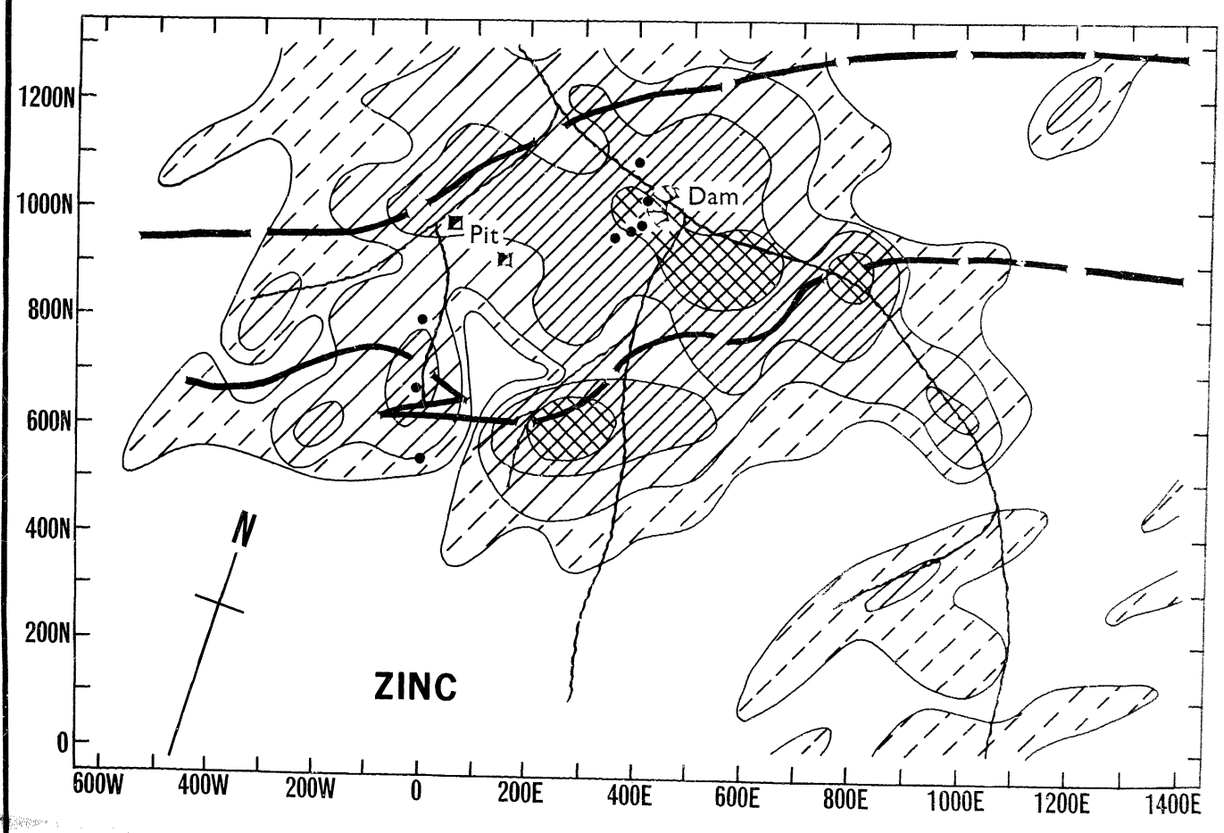
	Ckd.		DATE: 22 JANUARY 1968
	Exd.		







LEGEND

PERMIAN

Sands and clays

CAMBRIAN

FORKTREE LIMESTONE

SELLICK HILL LIMESTONE

WANGKONDA LIMESTONE

Edge of fault zone

PROTEROZOIC

WILPENA GROUP quartzites

Brecciated limestone

Fault breccia

Strike and dip of bedding — 65

Contours, interval 20 ft. — 540

Borehole — FW4B

	LEAD	ZINC
>16 x Background		>560ppm.
8–16 x Background	>240ppm.	280–560ppm.
4–8 x Background	120–240ppm.	140–280ppm.
2–4 x Background	60–120ppm.	70–140ppm.
<Threshold 2 x Background	<60ppm.	≤ 70ppm.

SCALE IN FEET 20 0 20 40 60 80 100

SCALE IN METRES 10 0 10 20 30

SCALE

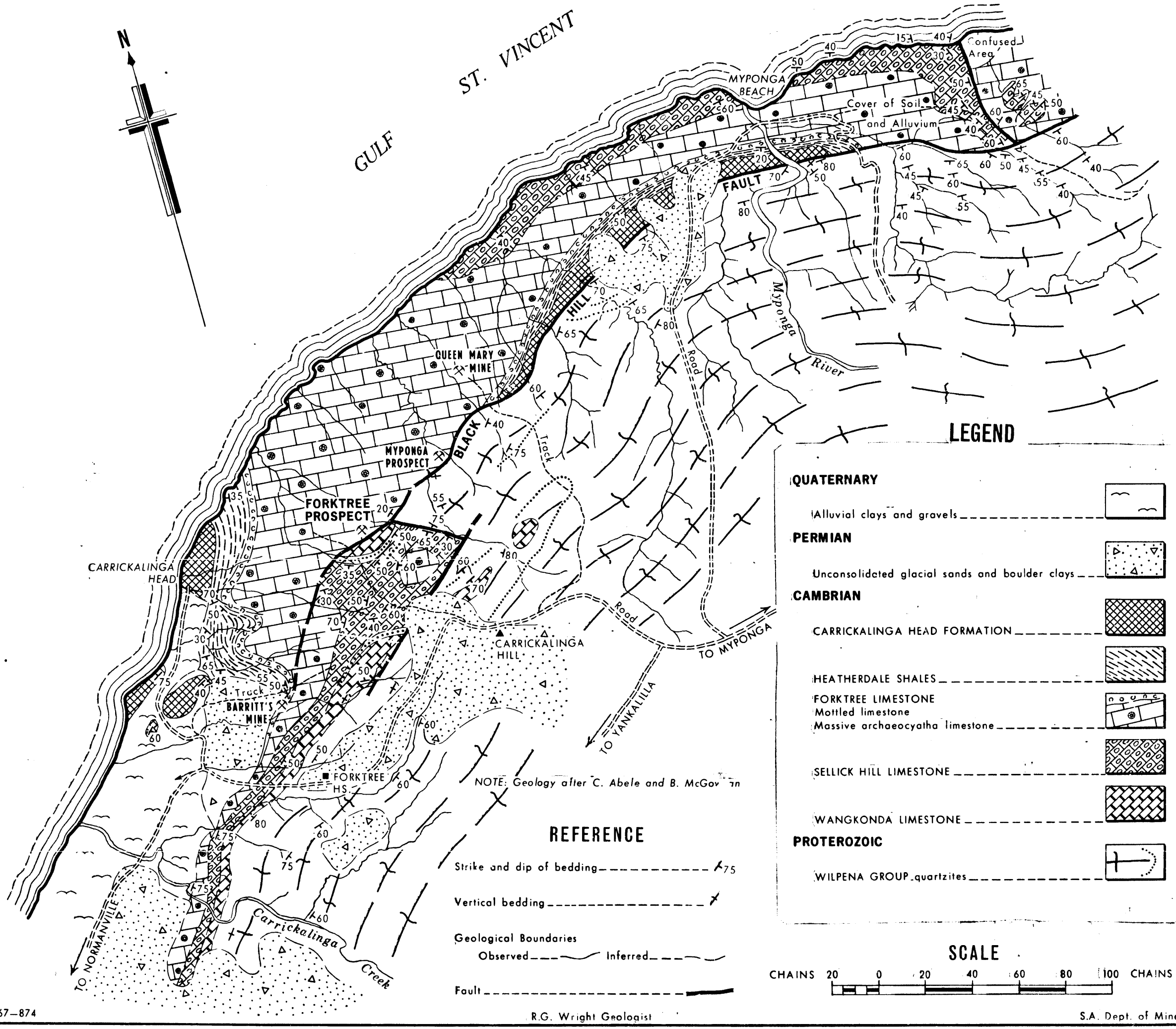
FEET 0 200 400 600 800 1000 FEET

67-903

4

R. G. Wright Geologist

S.A. Dept. of Mines.



67—874

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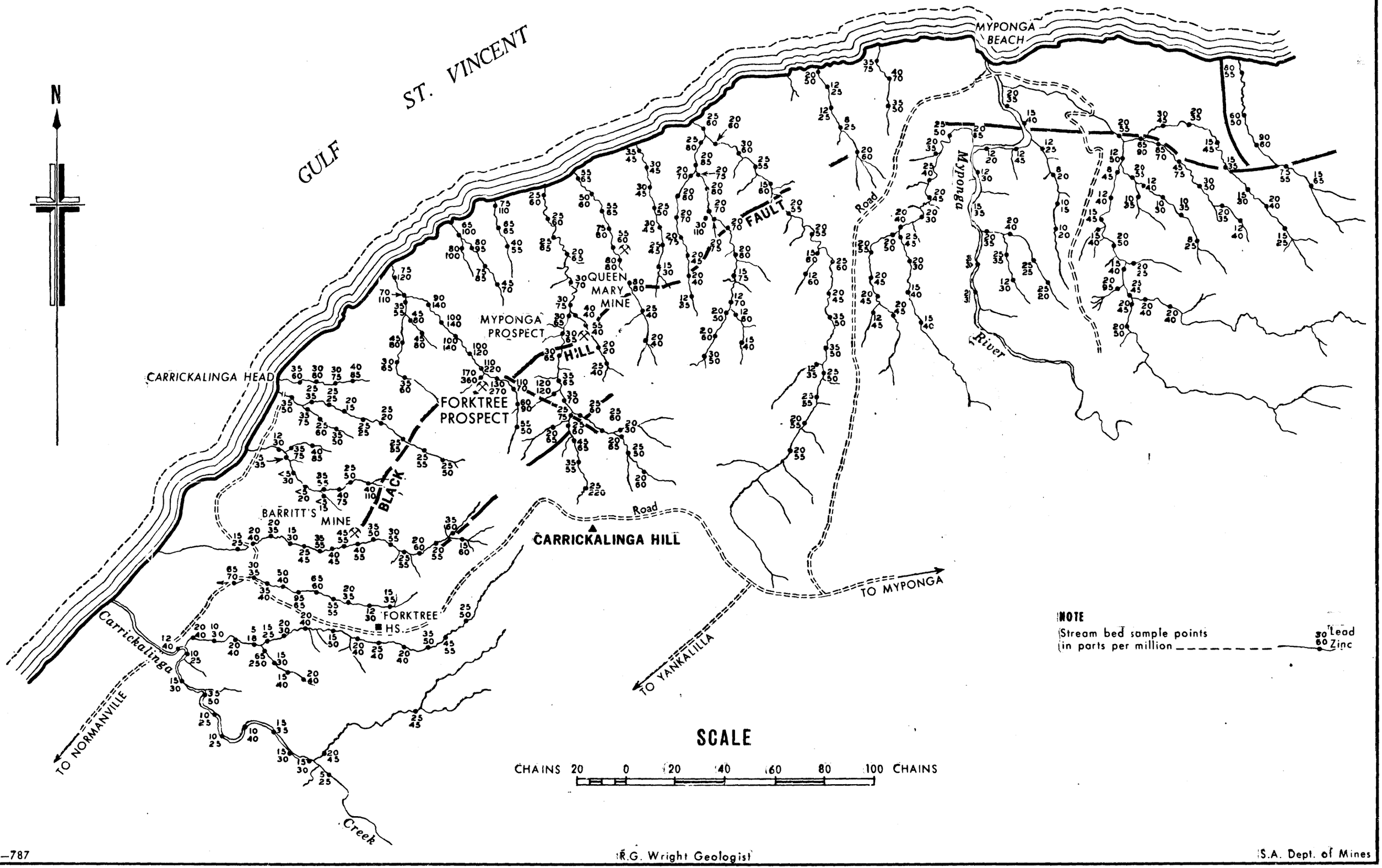
S.A. Dept. of Mines



67—787

R.G. Wright Geologist

S.A. Dept. of Mines

PLAN SHOWING LEAD AND ZINC IN STREAM GRAVELS AND RIDGE SOILS IN SELLICK HILL AREA

R 128

Reduced to 8 inches

2437/12452

REFERENCE

Geochemical Soil Sampling Line — LINE 44

Anomalous Zones — LINE 11: Lead >60p.p.m., Zinc >70p.p.m.

Stream bed sample points
(For values see Mining Review 126)

N

To ADELAIDE

Loud Hill

LINE 13

LINE 14

LINE 15

LINE 16

LINE 3

SELLICK HILL

MT. TERRIBLE

SELLICK BEACH

Road

LINE 8

LINE 9

LINE 10

LINE 2

LINE 11

LINE 1

SELLICK HILL PROSPECT

Hill

Mt. Terrible Gully

LINE 17

Sellick

LINE 18

LINE 19

Old

PIPELINE PROSPECT Pb, Ag

LINE 4

LINE 5

LINE 20

LINE 21

LINE 22

LINE 23

LINE 24

LINE 25

LINE 26

LINE 27

LINE 28

LINE 29

LINE 44

LINE 45

MYPONGA BEACH

RIVER

MYPONGA

BLACK HILL

HEATHERDALE

Heatherdale Pastoral Pty. Ltd.

Hill Road

To Willunga

To Myponga

GULF ST. VINCENT

ENLARGEMENT OF LINES
(8, 9, 1, 10, & 11

LINE 8
LINE 9
LINE 1
LINE 10
LINE 11

SELLICK HILL PROSPECT

SCALE

CHNS. 80 60 40 20 0 ½ 1 MILES

SCALE IN CHAINS
20 0 20 40 60 80 100
1000 0 1000 2000
SCALE IN METRES

68—90

R.G. Wright Geologist

S.A. Dept. of Mines

(15)

Director of Mines	Plan No.
Drawn: A.M.	68-90/4
Traced: LJ	
Date: 3-4-69	Init. c