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D.M. 716/52.
Rept. Bk. No. 37-28

DEPARTMENT OF MINES

SOUTH AUSTRALIA

L E I G H C R E E K C O A L F I E L D.

EXPLORATION OF THE NORTH-EASTERN MARGIN - TELFORD BASIN AREA 'TELFORD OPENCUT - EXTENSION EAST'.

Report No. LC 1/54

by

R.K. JOHNS.

Geologist.

DEPARTMENT OF MINES

SOUTH AUSTRALIA

EXPLORATION OF THE NORTH EASTERN MARGIN - TELFORD BASIN

AREA "TELFORD OPENCUT - EXTENSION EAST".

SUMMARY.

The area under discussion in this report is that lying between co-ordinates 0000 and 3000 which lies to the east of Telford Opencut, and immediately west of 'K' opencut (K - north - north).

The suggested extension to these opencuts, previously delineated by boring operations on this margin, is 3,000 feet in length from which 1,620,000 tons of coal will be recoverable in opencut mining operations to 110 feet maximum overburden thickness with an overall ratio of overburden to coal of 3.17.1. If the railway line is diverted from its present route, and the coal now under easement is made available for mining, a further 147,000 tons will be added to this reserve; the additional coal occurs in a thick seam free of partings but some further drilling is desirable forfault definition in this section.

Between coordinates 0000 and 1100 the coal occurs in a thick seam but easterly to coord. 3000 the presence of shale partings detract from its merit as a potential open cut site.

The overall weighted average ash content of the coal is 20.96%, with a sulphur content of 0.39% and a calorific value of 7,755 B.T.O./lb, (these and other analyses quoted elsewhere in this report are referred to a 12% moisture basis.)

INTRODUCTION.

The area "Telford Opencut Extension East" extends along the edge of a low partially dissected tableland near the northeastern margin of Telford Basin. Two hundred and thirty six bores have been drilled on a grid pattern with 100 ft. centres except in the western end, where the spacing is irregular and not

so close because of the regular nature of the seam and towards the east, where they have been more closely sited for accurate fault definition.

PLANS ACCOMPANYING REPORT.

1. Locality plan (1 inch = 500 feet)
2. Surface contour plan (1 inch = 100 ft.)
3. Plan showing the structure of the coal seam (1 inch = 100 ft.)
4. Plan showing the suggested open cut limits and overburden isopachytes (1 inch = 100 ft.)
5. Diagrammatic longitudinal section (1 inch = 40 ft.)
6. Cross sections on scale 1 inch = 20 ft. along coordinates spaced at 100 ft. intervals have been prepared to show the disposition of the coal seam, deformation of the seam by faulting and suggested open cut limits. The ash contents of the various plies of coal and the areas which have been taken into consideration for estimation of reserves are indicated in each section.

GEOLOGY.

The Triassic coal measures in this area are similar to those explored elsewhere along the northern and eastern margins of Telford Basin. The Triassic shales and interbedded coal seams dip towards the structural centre of the basin at 6° - 16° and these are unconformably overlain by a flat lying formation of Recent(?) age.

OVERBURDEN.

1) Recent(?) - The tableland formation has an average thickness of 25 feet and is made up of clays and gravels. The gravels have been cemented in part to form a massive coarse conglomerate which occurs as a sheet extending along the tableland westwards from 'K'-north cut to coord. 1100 with only several isolated occurrence west of this line. It occurs at depths of 1-11 feet below the surface and attains a maximum recorded thickness of 14 feet but averages 7 ft. thick, with a general thinning towards the west. The conglomerate is similar to that encountered elsewhere on the eastern margin and its removal will present similar difficulties.

(2) Triassic - Sediments immediately overlying the coal seam consist of shales, with minor ironstone bands, grey, and weathered brown in the upper part. Intercalations within the coal seam consist chiefly of grey shales with some sand and 'dirty' coal.

THE COAL SEAMS.

The Main (or Telford) seam here explored deteriorates gradually towards the east from a seam up to 45 ft. thick, free of intercalated shale partings, to one divided into three main components which have been taken into consideration in computing coal reserves. Other thin seams occur but because of their poor quality, thinness or limited lateral extent, have not been taken into consideration in these reserves.

The seam carries an 'upper' thin lenticular shale parting easterly from coord. 0300 and becoming thicker in this direction until 600 feet away it extends throughout the depth of the Section. The other main split occurs in the lower part of the coal seam and appears first as a thin lens on line 0800 and finally extends the depth of the Section 400 feet further east. The upper shale parting is generally to uniform thickness in any one section and attains to a maximum of 10 ft., but over the area as a whole it is not continuous whereas the lower shale band, easterly from section 1200, retains its identity throughout though it is markedly lenticular and thins at depth. This rapid thinning of the parting is an encouraging feature should the coal be mined to a depth greater than the present 110 ft. of overburden limit.

The lowermost and the top plies of coal vary little throughout the area in thickness and in ash contents but the middle ply deteriorates in thickness and consequently in quality east of coord. 1500, the worsening being marked in the upper reaches of the seam. The overall weighted average ash content is 20.96%, those of the individual components being top ply 20.22% middle 25.22% and bottom ply 20.54% - thus it is little different in this respect from coal of the main seam tested elsewhere.

FAULTING.

Displacement of the Triassic strata by faulting has generally taken place in such a manner as to increase the coal recoverable to a given depth of overburden. A normal high angle fault with 5-30 ft. throw is the high wall limiting factor for 600 feet along the extreme western end of the suggested open cut. Parallel to this and situated a short distance to the north, is another having a 20-30 feet throw and which extends from coord. 0600 westerly beyond the area under review; the net effect is a relative upward displacement of the central block.

A low angle dip slip fault extends from coord. 0900 easterly to coord. 2100 where it divides into two and these extend a further 500 feet. These has been displacement with up to 55 feet throw on this fault plane which dips northerly at 20°-30°.

Other local small scale faulting is indicated on the plans and sections and though other small movements may have taken place the regular configuration of the coal contours precludes any other major displacement.

RESERVES OF COAL AND OVERBURDEN ESTIMATES.

1) The high wall limiting factor is determined on some sections by faulting but elsewhere by 110 ft. maximum overburden thickness.

2) The low wall has been fixed mostly at the point where the edge of the erosion surface meets the top surface of the bottom ply of coal. Towards the western end of the area where a thick unbroken seam of coal occurs the limit was fixed having regard to the thickness of the seam and ash content where deterioration due to weathering near the surface has occurred.

3) The volumes were calculated from geometric measurement of areas of successive cross sections by the writer and checked from areas obtained by planimeter. Under the direction of the Chief Draftsman, these volumes were further checked by

(i) coal reserves - by using the same areas and an adaption of the prismoidal formula and by multiplication of the area of the coal seam by the mean thickness as revealed in boring.

(ii) Overburden estimates - by measurement of areas of successive isopachytes multiplied by their means plus adjustment for batters and for "Confusion" at faults which cannot be calculated by this method.

4) The weight of 1 cub. yard of coal is assumed to be 1 ton. Below are summarised the areas of successive cross sections and consequent volumes of coal, partings and overburden.

Cross Section	Area (sq. ins.)		
	Coal	Partings	Overburden
0000	43.0	-	63.0
0100	43.0	-	64.0
0200	45.3	-	76.0
0300	45.0	0.6	52.0
0400	52.7	0.3	73.2
0500	52.8	1.4	88.1
0600	58.8	2.8	92.4
0700	55.5	4.7	93.7
0800	49.6	6.3	90.3
0900	53.7	10.5	88.7
1000	41.4	12.2	81.5
1100	44.0	13.8	66.1
1200	39.4	19.1	78.3
1300	39.4	23.5	79.5
1400	38.9	21.1	86.7
1500	39.0	30.4	87.1
1600	34.5	33.3	99.2
1700	37.2	37.4	89.3
1800	32.1	35.6	94.2
1900	29.3	35.9	98.1
2000	32.7	33.1	101.1
2100	31.7	33.7	96.8
2200	28.1.	35.1	93.1
2300	31.4	37.6	111.6
2400	35.2	34.0	102.4
2500	29.8	24.4	109.2
2600	35.6	27.6	107.6
2700	31.1	31.9	121.9
2800	36.7	29.8	120.6
2900	36.1	24.3	115.2
3000	38.0	25.0	103.2
Sum of means (squ. ins.)	1200.5	622.9	2742.0
X 5 (spacing of sections)	6002.5	3114.5	13710.0
Volume (c. yds.) X $\frac{203}{27}$	1,778,000	923,000	4,062,000

CONCLUSIONS.

The main seam between coordinates 0000 and 3000 contains 1,778.000 tons of coal from which it is estimated that 1,620,000 tons will be recoverable, on the assumption that there will be a 6 inch loss of coal at the top and bottom of each ply

of coal involving 3 ft. in say 36 ft., or 8½%.

The ratio of overburden to coal (recoverable)

$$= \frac{4,062,000 + 923,000 + 158,000}{1,620,000} : 1$$

$$= 3.17 : 1$$

The thickness of partings decreases rapidly in depth so that there would be an improvement in this ratio should the coal be mined to a greater depth than the present limit.

The tonnage of coal lying between coordinates 0000 and 1100 is 649,000 tons with ratio of overburden to coal 1.73 : 1 and between coordinates 1100 and 3000 there are 971,000 tons of coal recoverable with ratio of overburden to coal 3.92 : 1.

The coal proved in this area to a depth of 110 ft. on the high wall, brings the total tonnage of the main seam available for mining by opencut methods on the eastern margin of Telford Basin to 5.69 million tons with an overall ratio of overburden (cub. yds.) to coal (tons) of 2,29 : 1.

(R.K. JOHNS)
GEOLOGIST.

RKJ:AGK
3/3/54.

FIGURES

Figure 1	CC 54.19
Figure 2	CC 54.18
Figure 3	CC 54.16
Figure 4	CC 54.15
Figure 5	L 54.30
Figures 6	L 54.14 – 54.29

APPROXIMATE MARGIN OF BASIN

EXISTING TELFORD OPEN CUT

SUGGESTED OPEN CUT

TELFORD - 379M

EXISTING K. CUT

(K NORTH-NORTH)

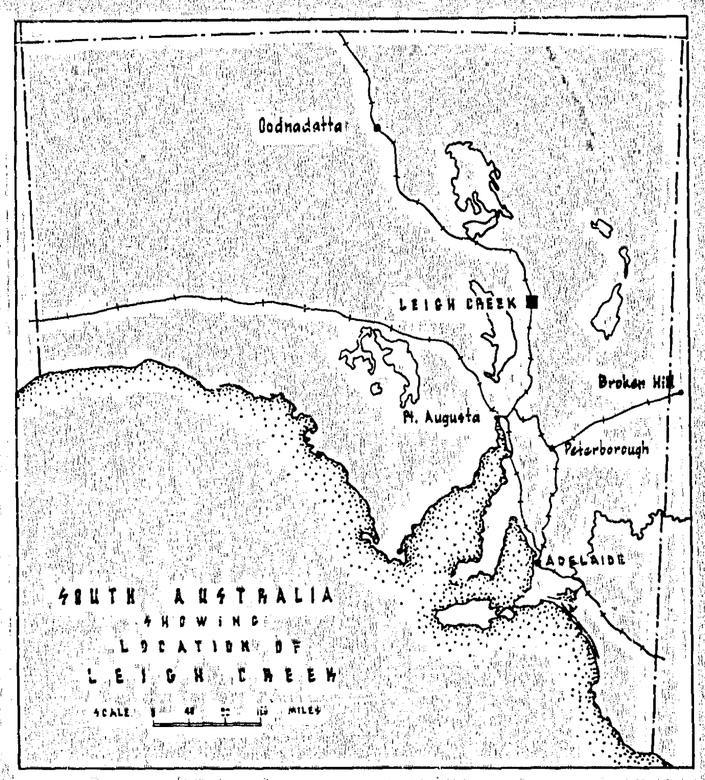
LEIGH CREEK TOWNSHIP

RAILWAY

N

SCALE : 500 FT TO 1 INCH

NOTE : OPEN CUTS AS AT DECEMBER 1953.



S.A. DEPT. OF MINES

LEIGH CREEK COALFIELD

MAIN BASIN

NORTH EASTERN MARGIN

TELFORD OPEN CUT - EXTENSION EAST

LOCALITY PLAN

Associated Drawing No.

No. Amendment Exd. Date

Req. No.

D.M.

Compiled from H.H. Johns Originals

Approved Passed

Director of Mines

Drn. K

Tcd.

Ckd. A.R.

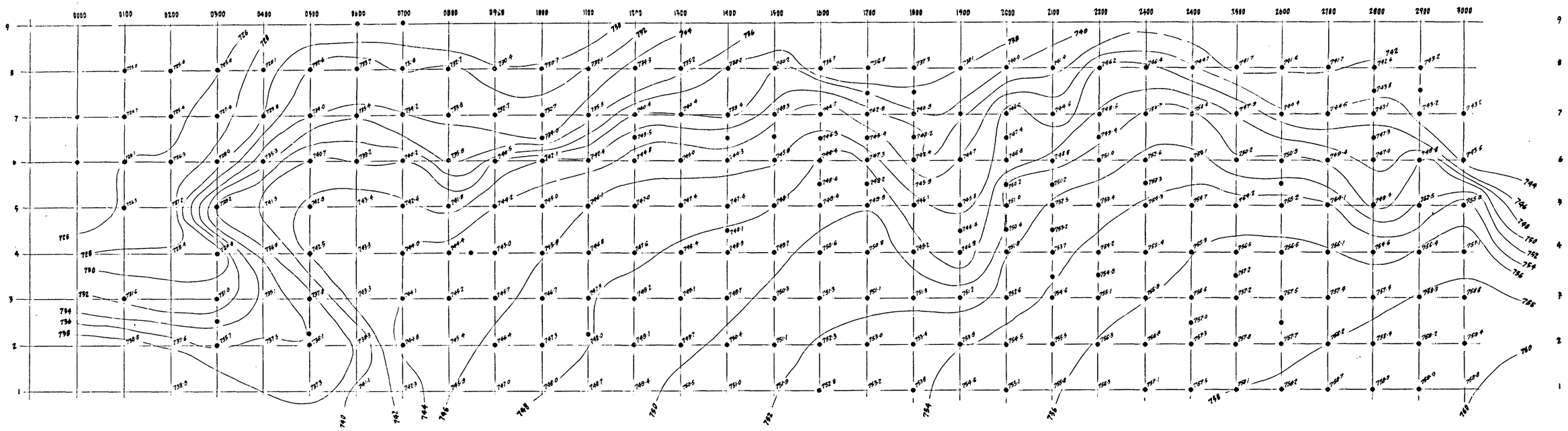
Exd.

Scale: 500 FT TO 1 INCH

54-19

Cc

Date 3 · 2 · 54



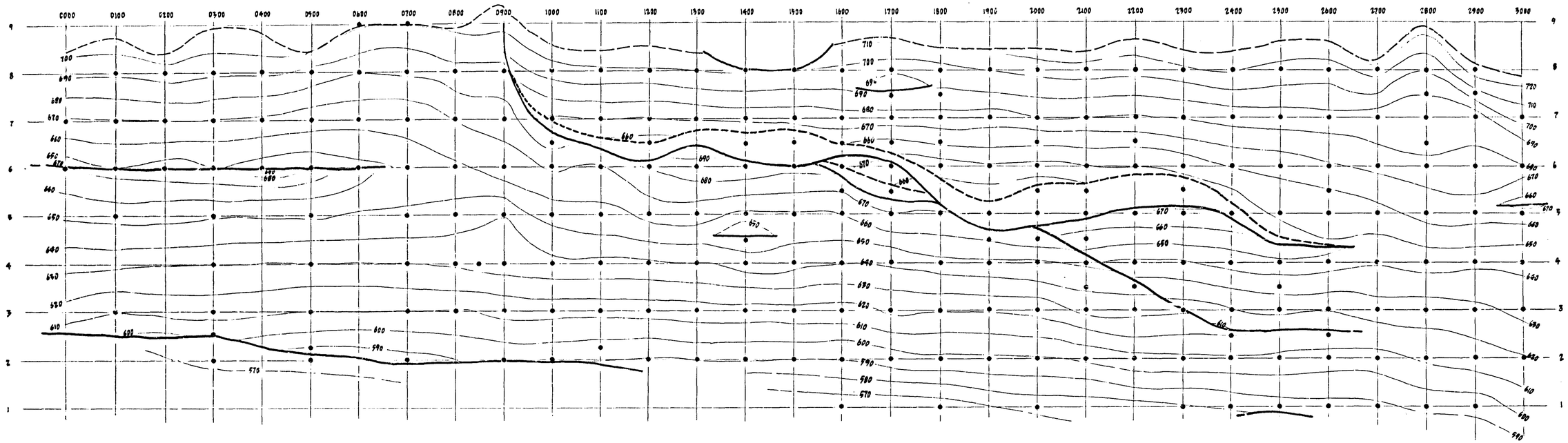
LEGEND

SURFACE CONTOURS ——— 732

R.L. AT BORE COLLAR ●753·2

SCALE : 100 FT TO 1 INCH

S.A. DEPARTMENT OF MINES							
Associates Drawing No.	No.	Amendment	Ext. Init.	Req. No. D.M. Compiled from R.H. Johns Originals	LEIGH CREEK COALFIELD MAIN BASIN NORTH EASTERN MARGIN SURFACE CONTOURS	Approved Director of Mines	Passed M.
						Drn. K Tcd. Ckd. Ext. M.M.	Scale: 100 FT TO 1 INCH 54·18 Cc Date 4.2.54



LEGEND

MARGIN OF COAL SEAM .....

CONTOUR OF FLOOR OF MAIN SEAM 670

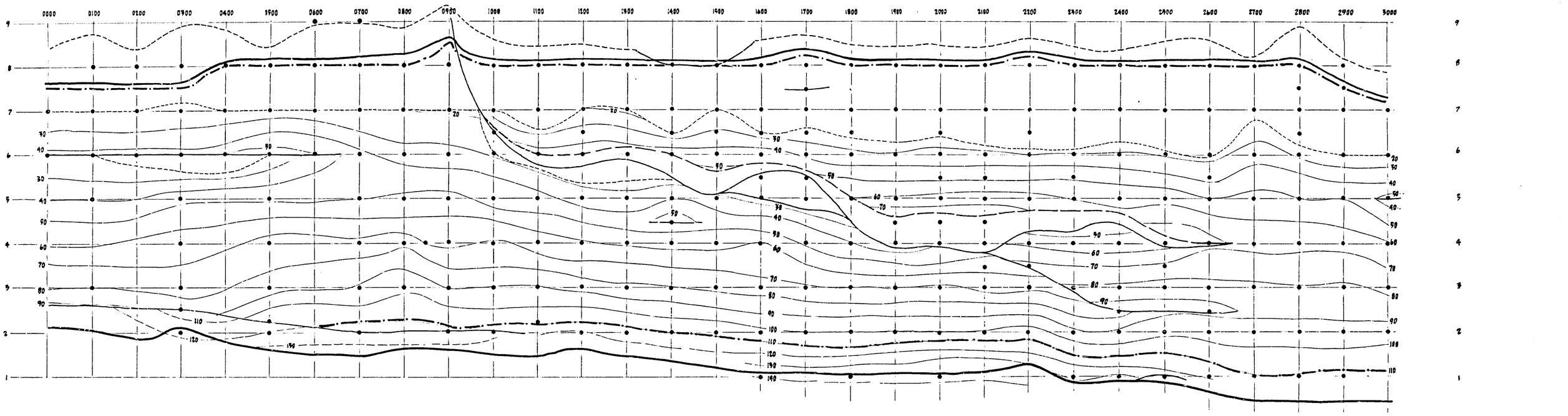
FAULT (INTERSECTION WITH LOWER COAL SURFACE - PROJECTED) .....

BORE .....

SCALE

100 FT. TO 1 INCH

S.A. DEPARTMENT OF MINES									
Associated Drawing No.	No.	Amendment	Exd.	Date	Req. No. D.M. Compiled from B.H. Johns Originals	LEIGH CREEK COALFIELD MAIN BASIN NORTH EASTERN MARGIN STRUCTURE OF MAIN SEAM CO-ORDS 0000 - 3000	Approved Director of Mines	Passed	Drn. K Tcd. Ckd. Exd.	Scale: 100 FT. TO 1 IN 54·16 Cc Date 3. 2. 54



LEGEND

TOP OF BATTER ..... ———

TOE OF BATTER ..... ——·——

EROSION SURFACE ..... ~~~~

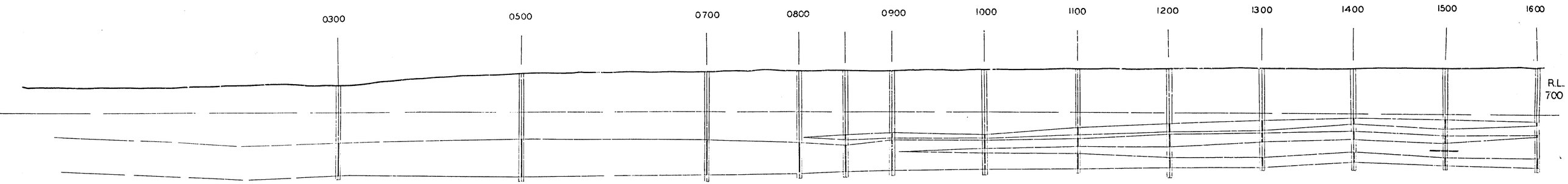
OVERBURDEN ISOPACHYTES (FT) ..... —— 50 ——

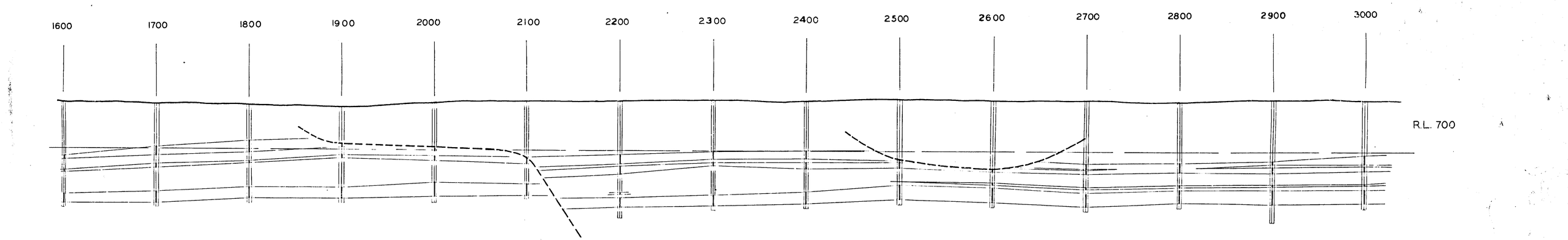
FAULT (INTERSECTION WITH UPPER COAL SURFACE) ..... ——<——

BORE ..... ⊕

SCALE : 100 Feet to 1 Inch

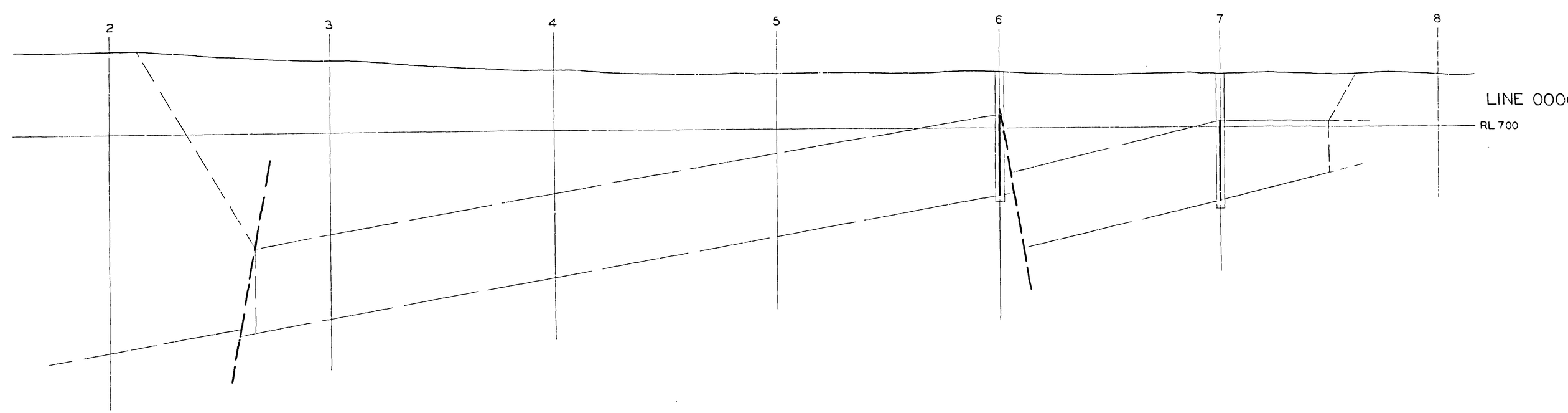
S.A. DEPARTMENT OF MINES						
Associated Drawing No.	No. Amendment Ext. Date	Req. No. D.M. Compiled from W.H. JENNY ORIGINALS	LEIGH CREEK COALFIELD MAIN BASIN NORTH EASTERN MARGIN SUGGESTED OPEN CUT OPEN CUT LIMITS FAULTS AND OVERBURDEN ISOPACHYTES	Approved Director of Mines	Passed	Drn. K Tcd. Ckd. Ext. A.A.	Scale 100 FT. TO 1 INCH 54·15 Cc Date 29·1·54

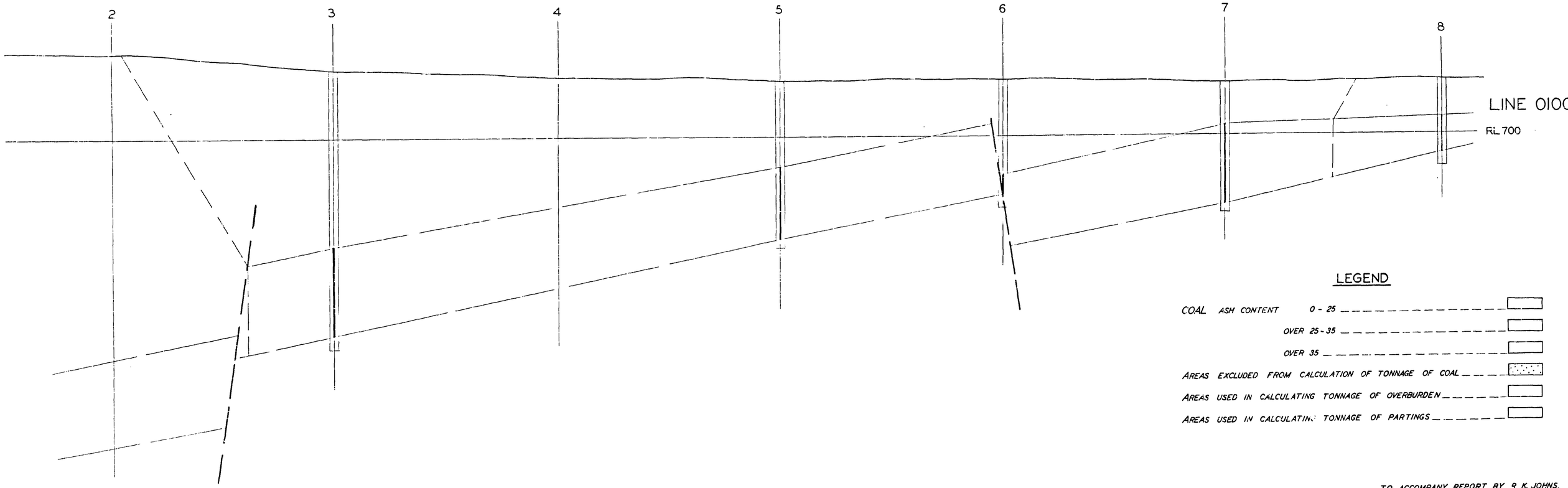




S. A. DEPT. OF MINES

Approved	Passed		
Director of Mines		LEIGH CREEK COAL FIELD MAIN BASIN - NORTH EASTERN MARGIN DIAGRAMMATIC LONGITUDINAL SECTION - CO-ORD 4	Scale 40 FEET TO 1 INCH L 54-30 Cc. Data 23-3-54





LEGEND

COAL ASH CONTENT 0 - 25

OVER 25 - 35

OVER 35

AREAS EXCLUDED FROM CALCULATION OF TONNAGE OF COAL

AREAS USED IN CALCULATING TONNAGE OF OVERBURDEN

AREAS USED IN CALCULATING TONNAGE OF PARTINGS

TO ACCOMPANY REPORT BY R. K. JOHNS, GEO

S.A. DEPT. OF MINES

Approved	Passed
Director of Mines	

LEIGH CREEK COAL FIELD

MAIN BASIN - NORTH EASTERN MARGIN

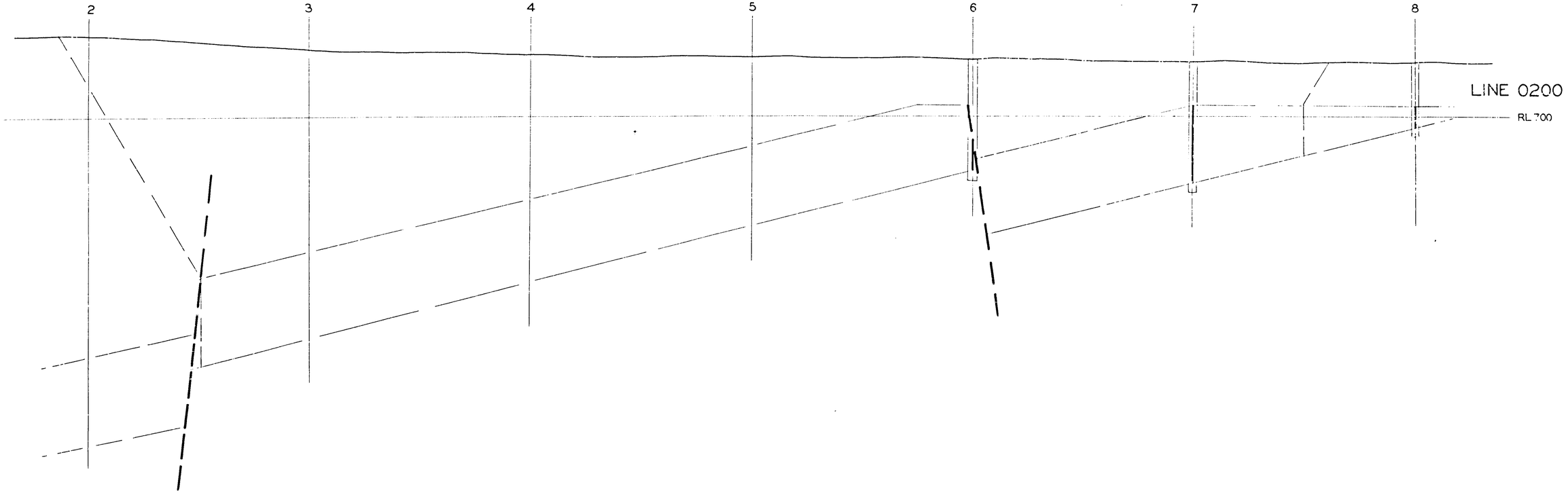
CROSS SECTION ON CO-ORDS 0000 - 0100

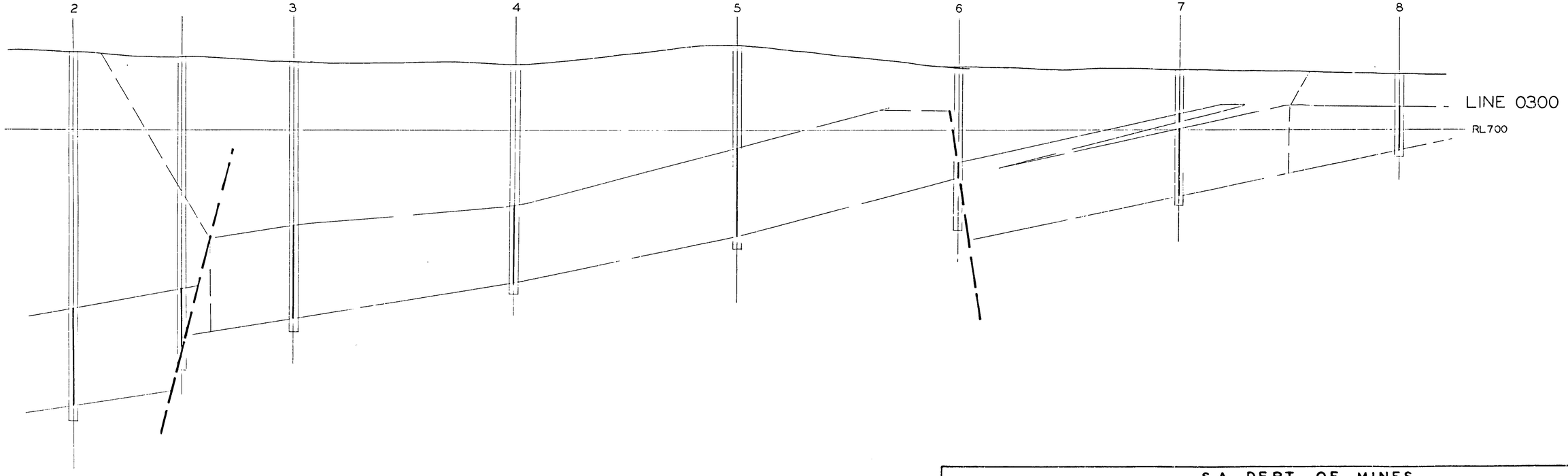
Scale 1 INCH = 20 F

L-54.14

Cc.

Date 25-3-54





S.A. DEPT. OF MINES

Approved	Passed
Director of Mines	

LEIGH CREEK COAL FIELD

MAIN BASIN - NORTH EASTERN MARGIN

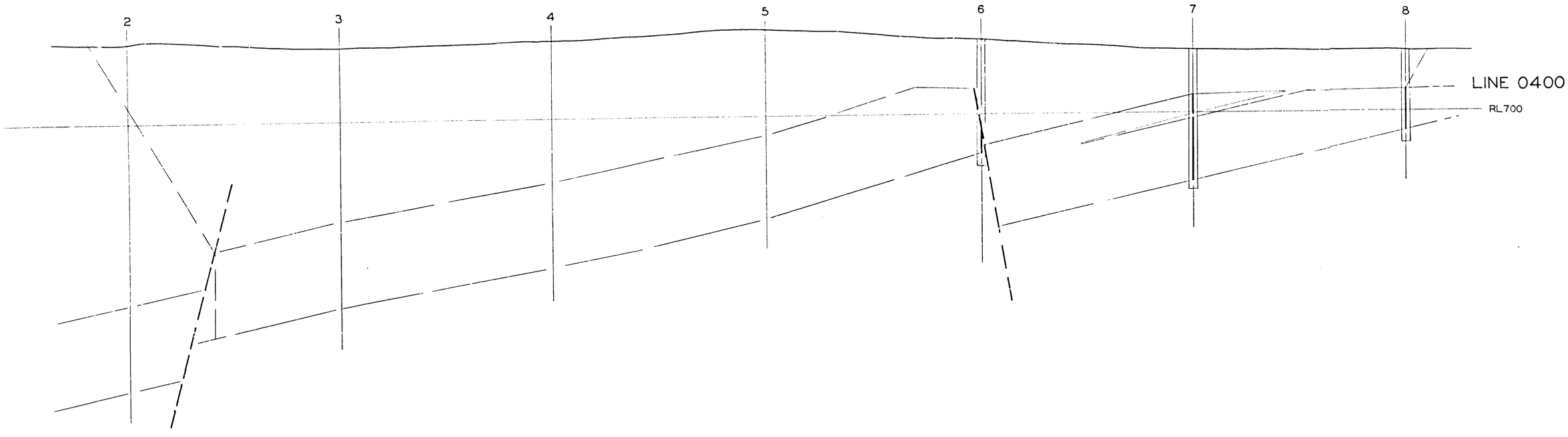
CROSS SECTION ON CO-ORDS 0200-0300

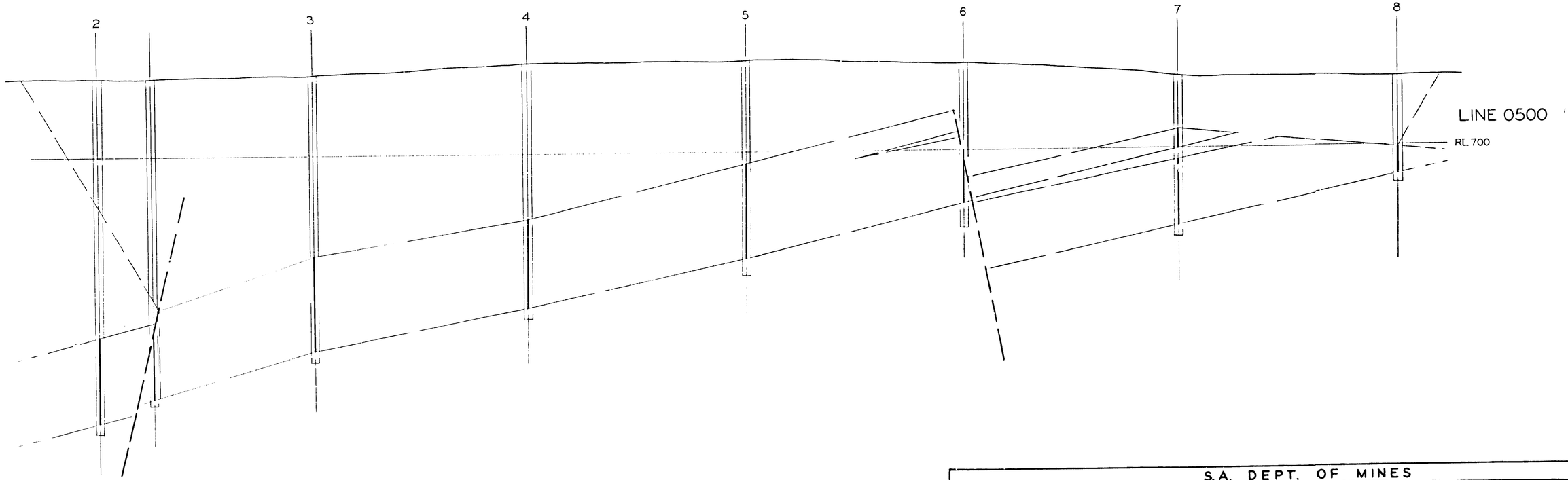
Scale 1 INCH = 20 FEET

L-54-15

Cc

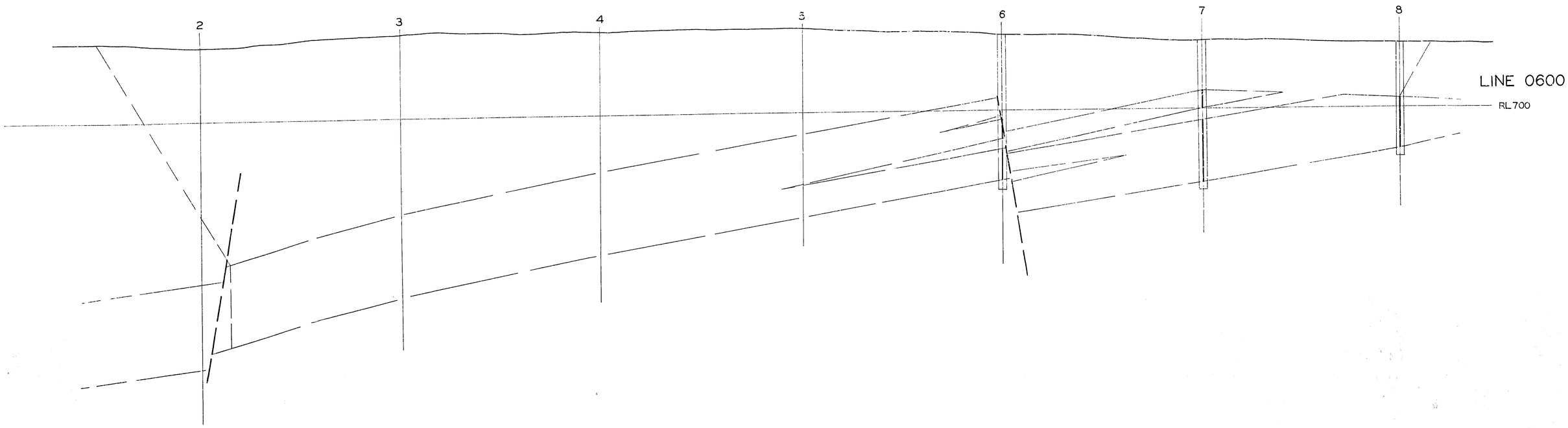
Date 25-3-54

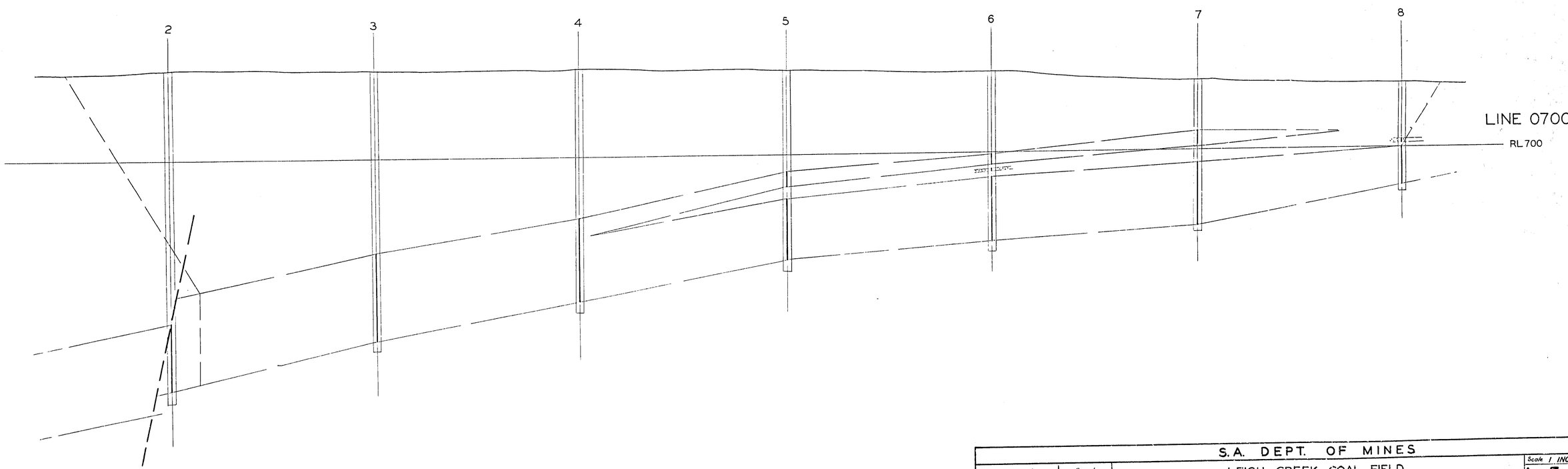




S.A. DEPT. OF MINES

Approved	Passed	LEIGH CREEK COAL FIELD MAIN BASIN - NORTH EASTERN MARGIN CROSS SECTION ON CO-ORDS 0400 - 0500.	Scale 1 INCH = 20 FEET. L 54.16 Cc Date 26-8-54
Director of Mines			





S.A. DEPT. OF MINES

Approved	Passed
Director of Mines.	C.D.

LEIGH CREEK COAL FIELD

MAIN BASIN-NORTH EASTERN MARGIN

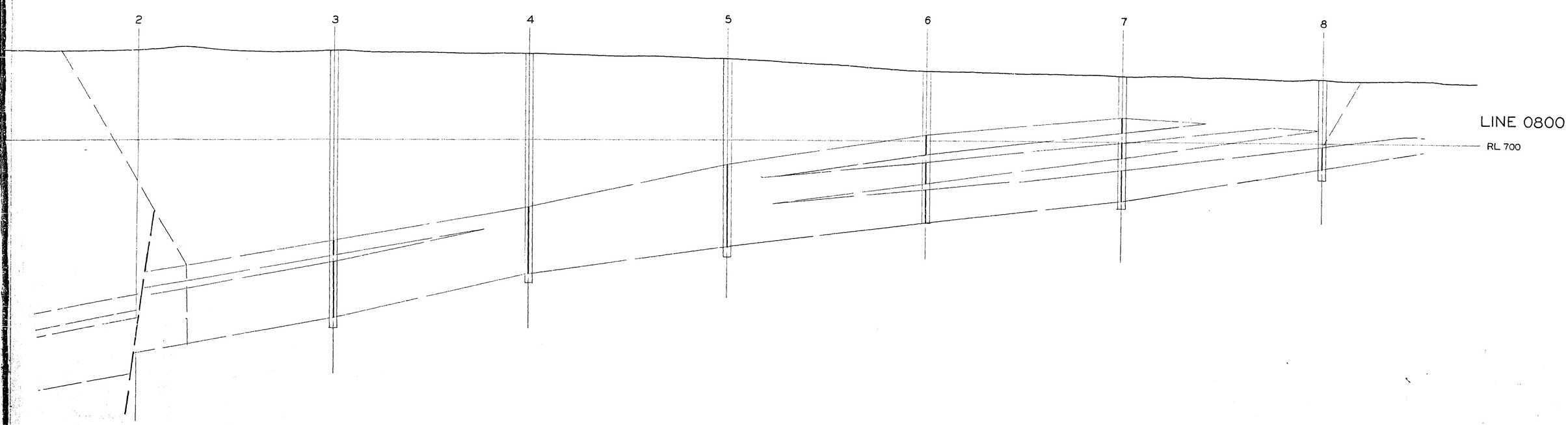
CROSS SECTION ON CO-ORDS 0600-0700

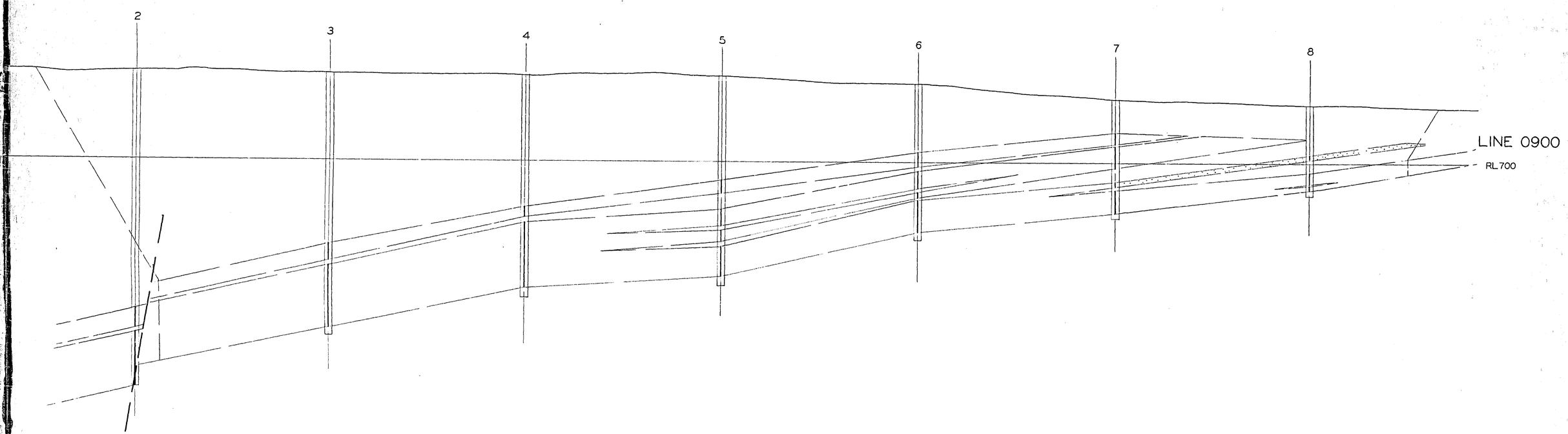
Scale 1 INCH = 20 FEET.

L 54.17

Cc.

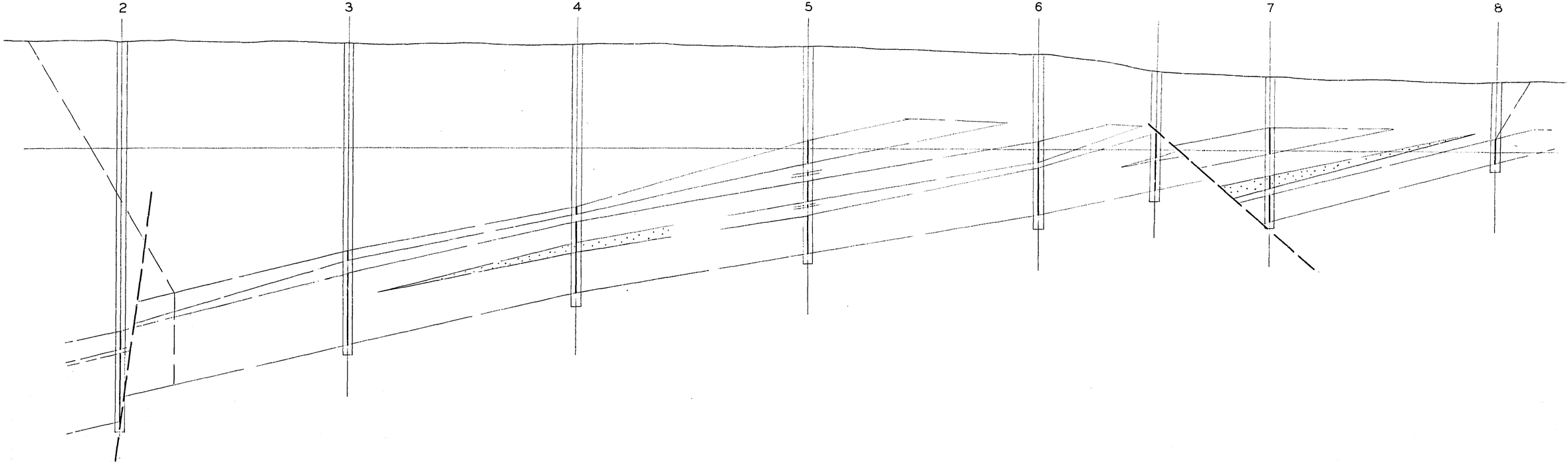
Date 25-3-54

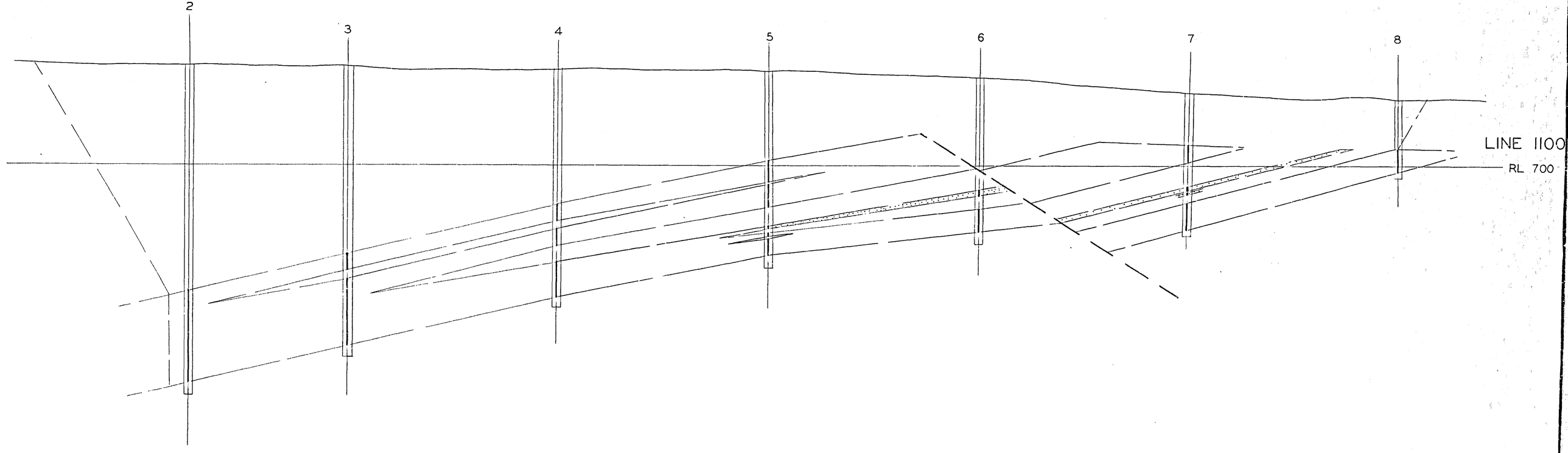




S.A. DEPT. OF MINES

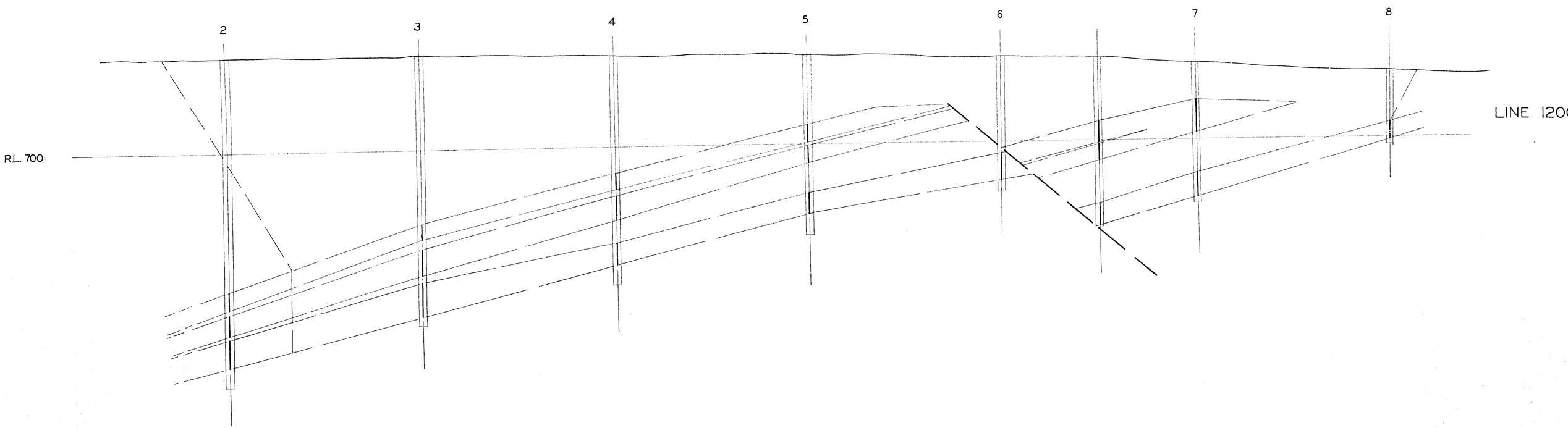
Approved	Passed	LEIGH CREEK COAL FIELD MAIN BASIN NORTH EASTERN MARGIN CROSS-SECTION ON CO-ORDS 0800-0900	Scale 1 INCH = 20 FEET.
Director of Mines			L 54.18 C.C.
			Date 25-3-54

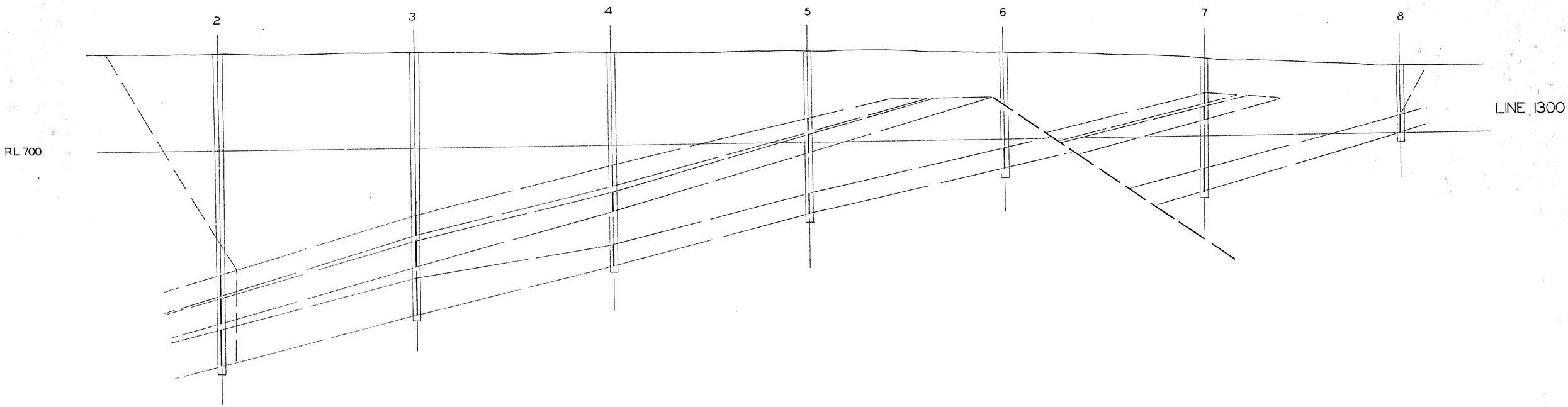




S.A. DEPT. OF MINES

Approved	Passed	LEIGH CREEK COAL FIELD MAIN BASIN - NORTH EASTERN MARGIN CROSS SECTION ON CO-ORDS 1000 - 1100	Scale 1 INCH 20 FEET L54.19 Cc Date 25-3-54
Director of Mines	G.D.		





S.A. DEPT. OF MINES

Approved	Passed
Director of Mines.	A.S.

LEIGH CREEK COAL FIELD

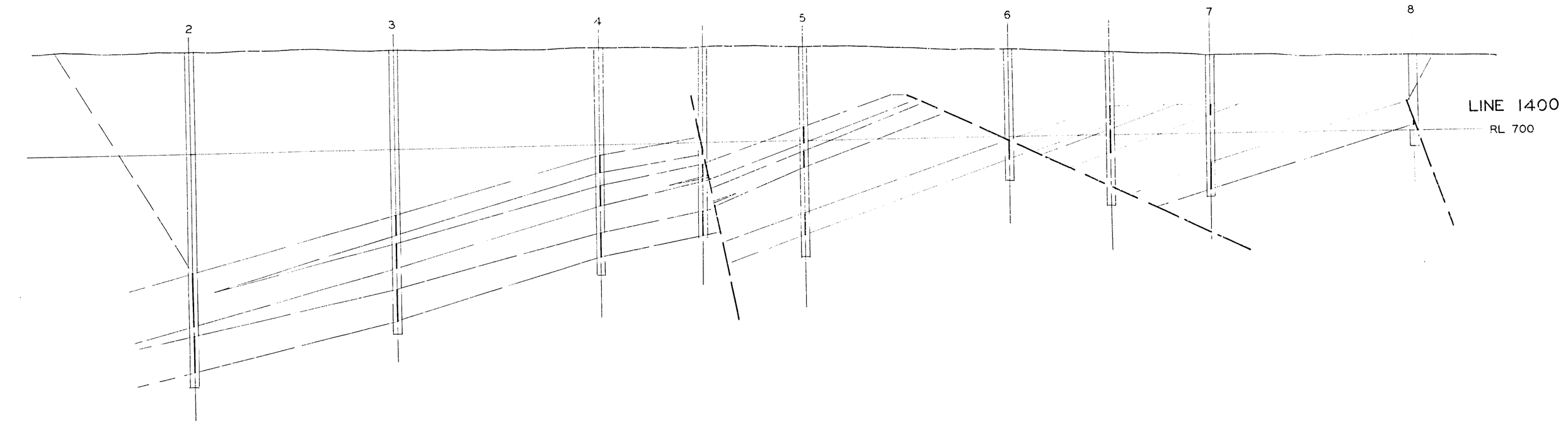
MAIN BASIN - NORTH EASTERN MARGIN

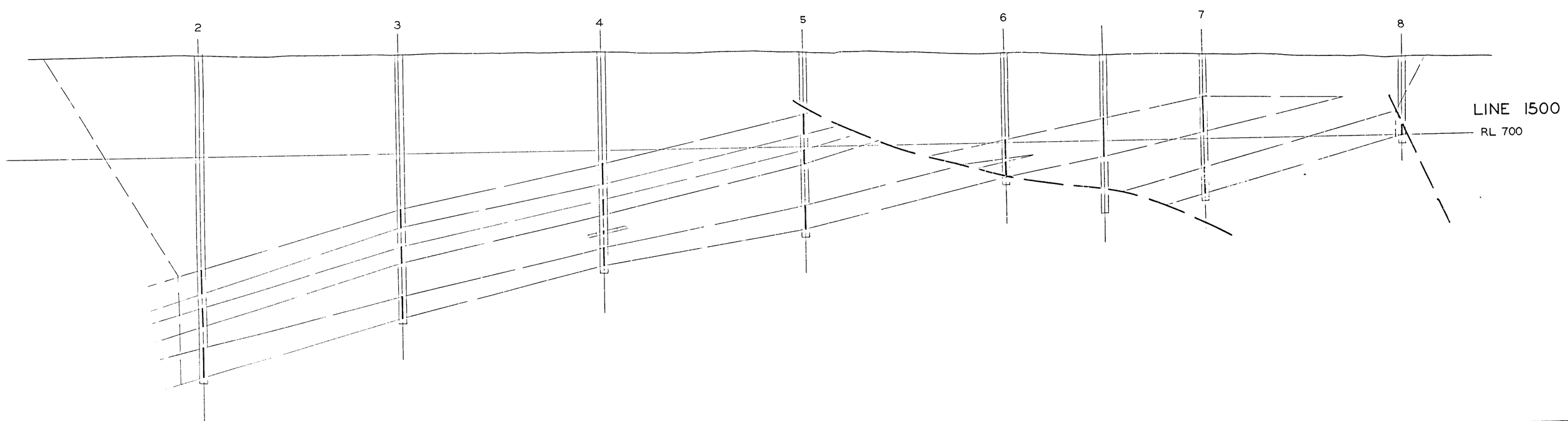
CROSS SECTION ON CO-ORDS 1200 - 1300

Scale 1 INCH = 20 FEET

L54.20

Date 25-3-54





S.A. DEPT. OF MINES

Approved	Passed
Director of Mines	

LEIGH CREEK COAL FIELD

MAIN BASIN - NORTH EASTERN MARGIN

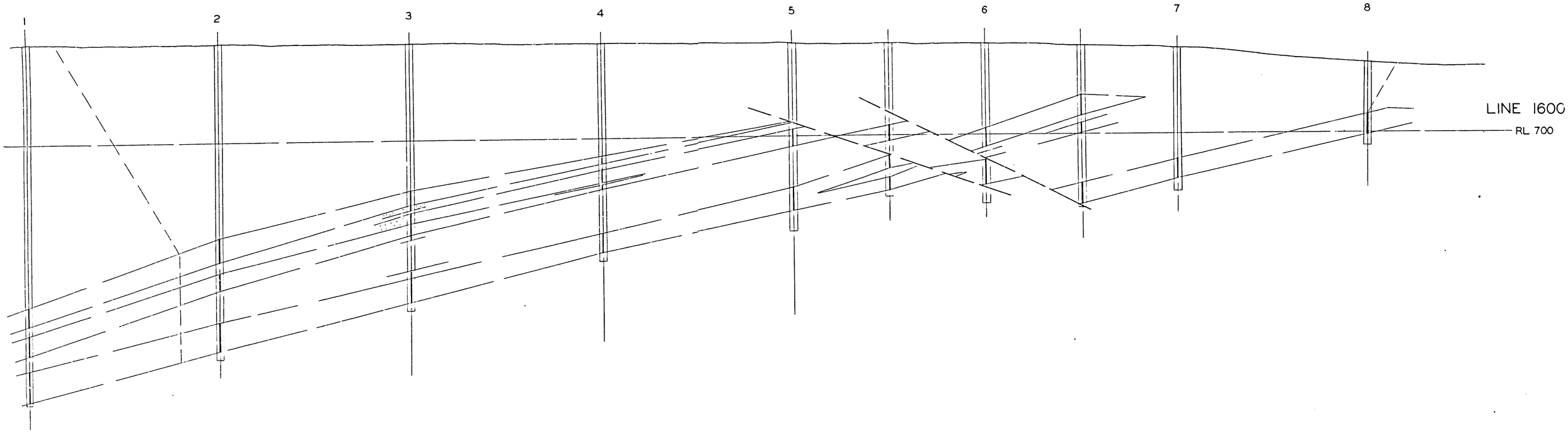
CROSS SECTION ON CO-ORDS 1400-1500

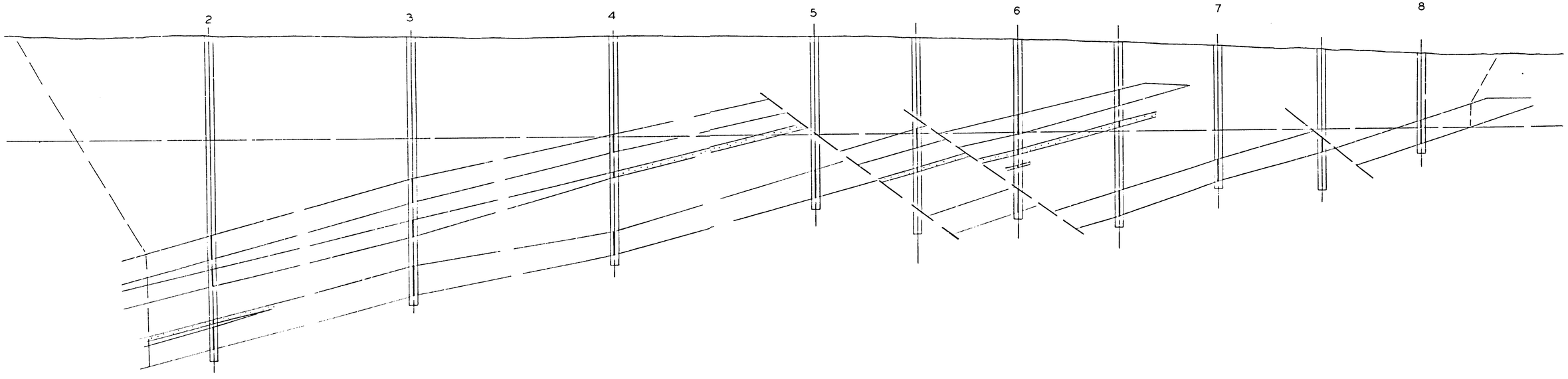
Scale 1 INCH = 20 FEET

L54.21

Cc

Date 25-8-54



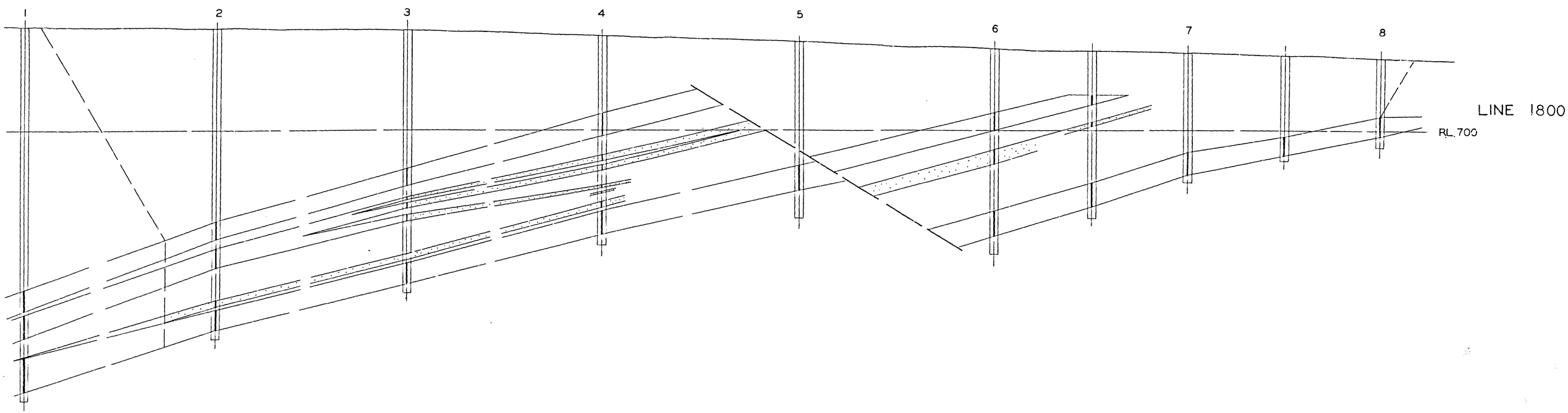


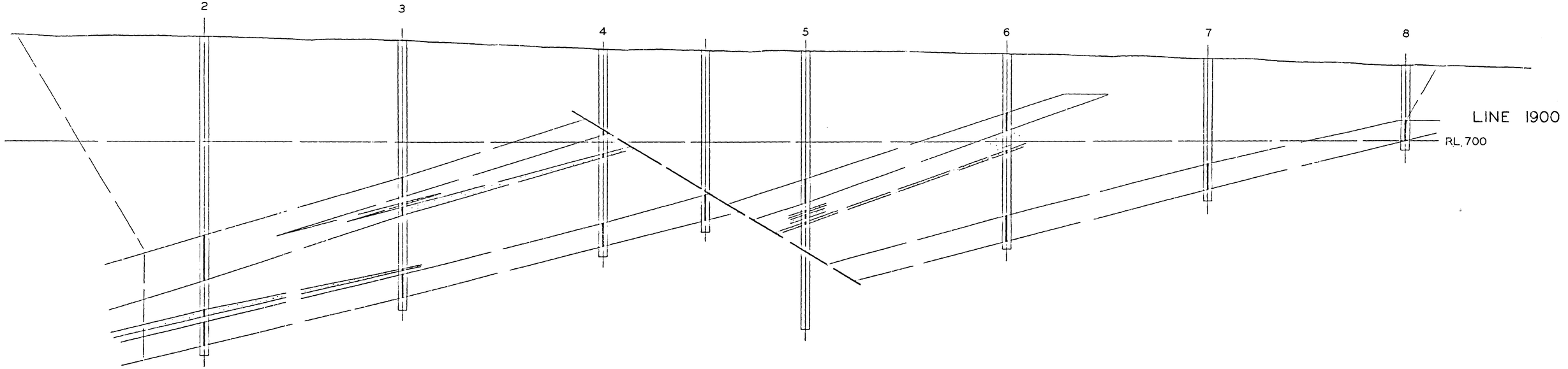
SCALE IN FEET 20 0 20 40 60 80 100
SCALE IN METRES 10 0 10 20 30

4

S. A. DEPT. OF MINES

Approved	Passed	LEIGH CREEK COAL FIELD MAIN BASIN - NORTH EASTERN MARGIN CROSS SECTION ON CO-ORDS 1600 - 1700	Scale 1 INCH = 20 FEET L 54·22 Cc Date 25-5-54
Director of Mines			





S.A. DEPT. OF MINES

Approved	Passed
Director of Mines	

LEIGH CREEK COAL FIELD

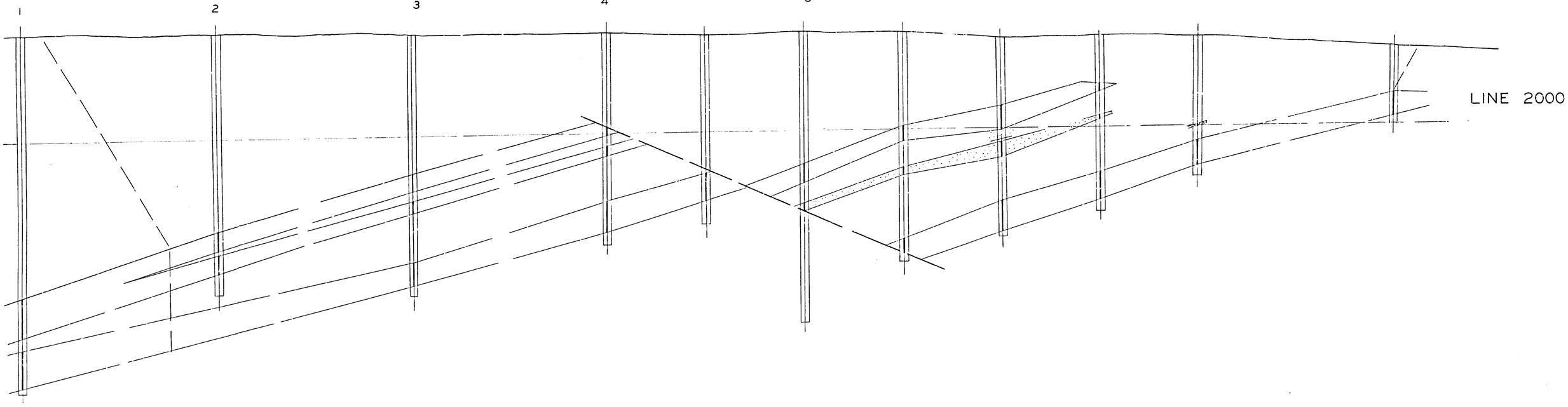
MAIN BASIN - NORTH EASTERN MARGIN

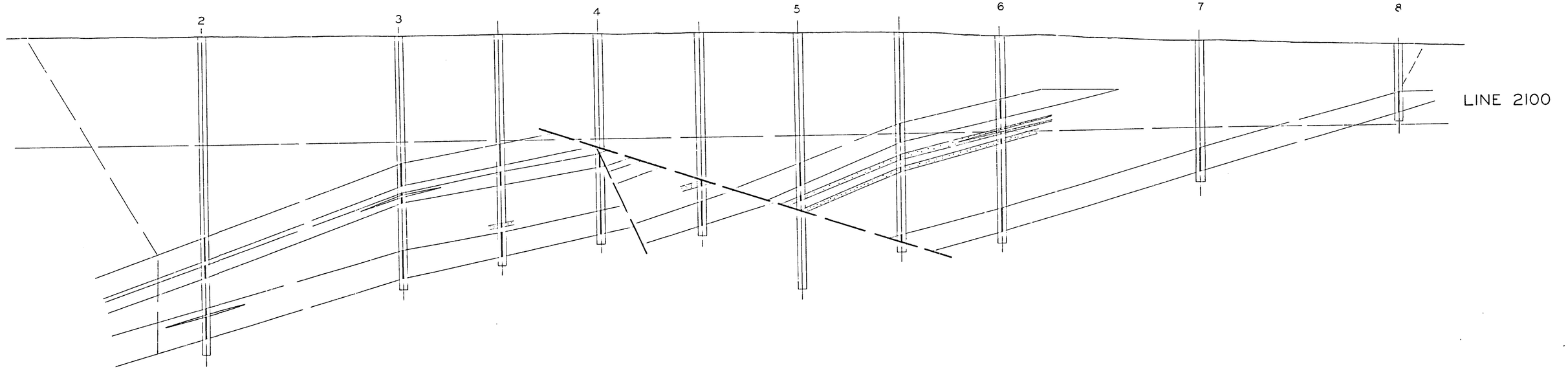
CROSS SECTION ON CO-ORDS 1800 - 1900

Scale 1 INCH = 20 FEET

L 54·23 Cc

Date 15 5 54





S. A. DEPT. OF MINES

Approved	Passed
Director of Mines	

LEIGH CREEK COAL FIELD

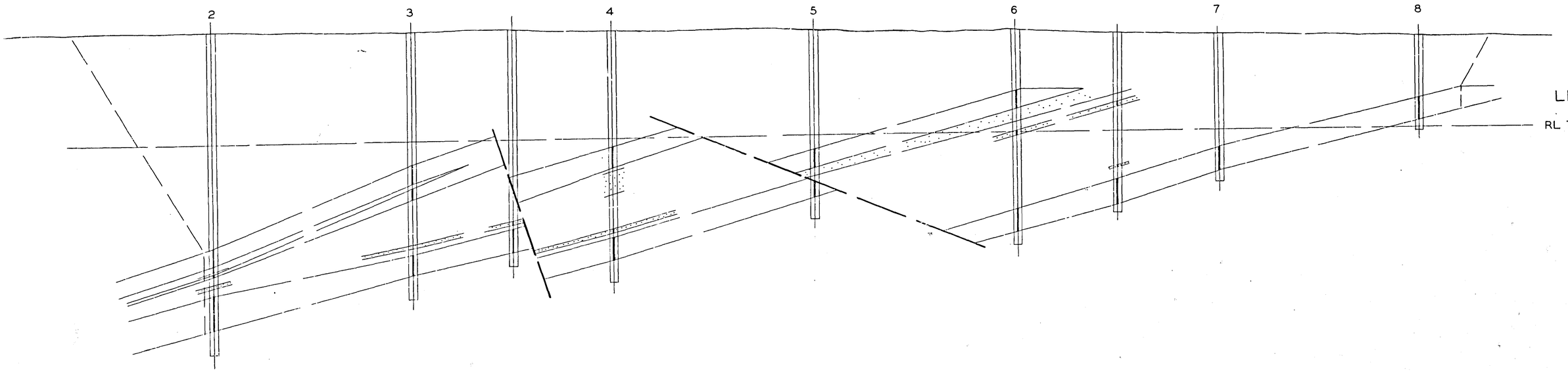
MAIN BASIN - NORTH EASTERN MARGIN

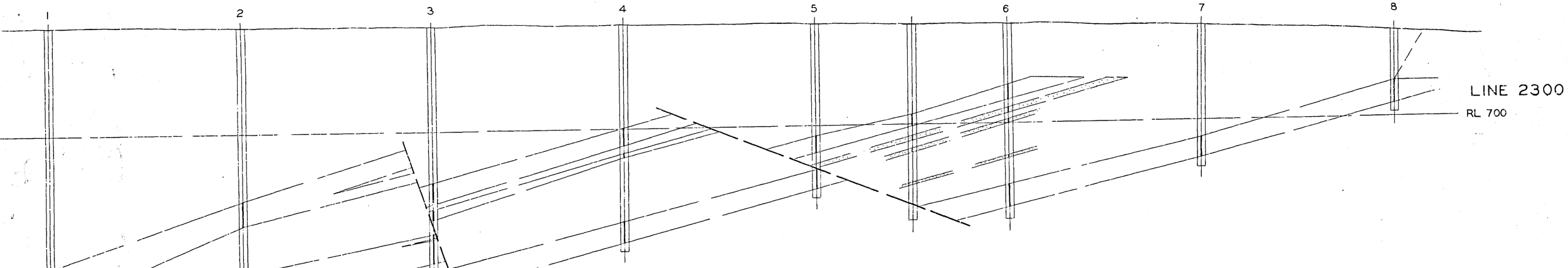
CROSS SECTION ON CO-ORDS 2000 - 2100

Scale 1 INCH = 20 FEET

L 54.24 Cc

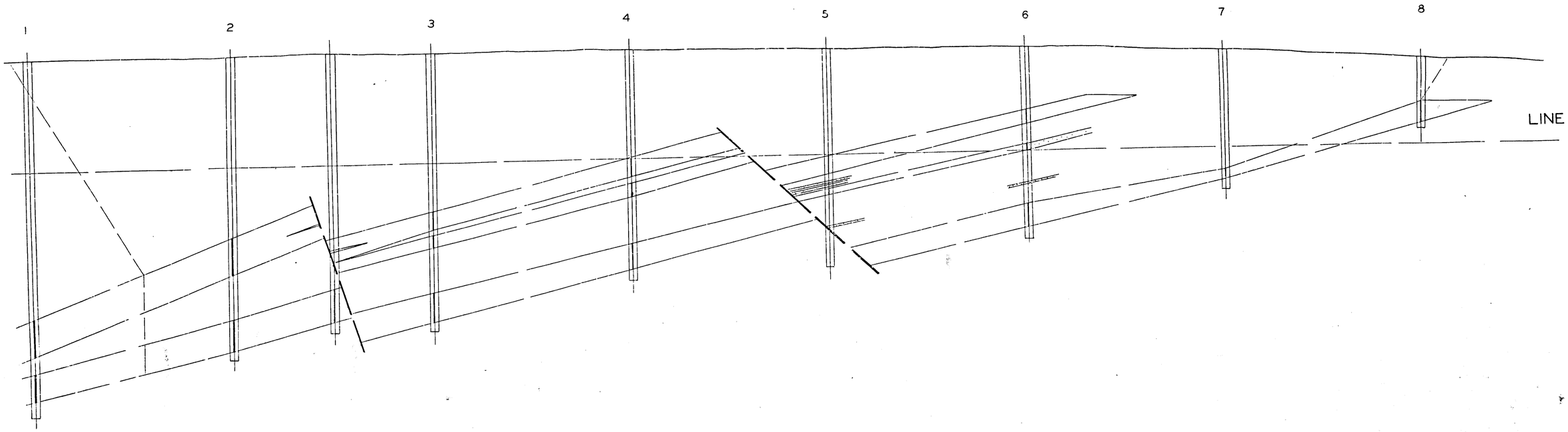
Date 25-3-54

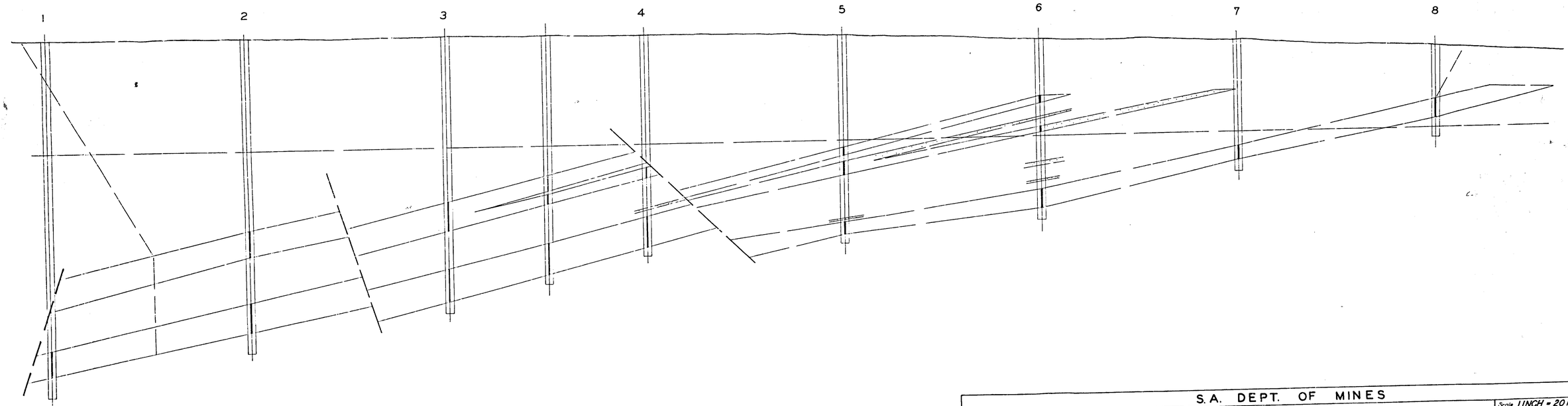




S.A. DEPT. OF MINES

Approved	Passed	LEIGH CREEK COAL FIELD MAIN BASIN - NORTH EASTERN MARGIN CROSS SECTION ON CO-ORDS 2200 - 2300	Scale 1 INCH = 20 FEET L54·25 Cs Date 24-8-54
Director of Mines.	C.D.		





S.A. DEPT. OF MINES

Approved	Passed
Director of Mines	E.G.

LEIGH CREEK COAL FIELD

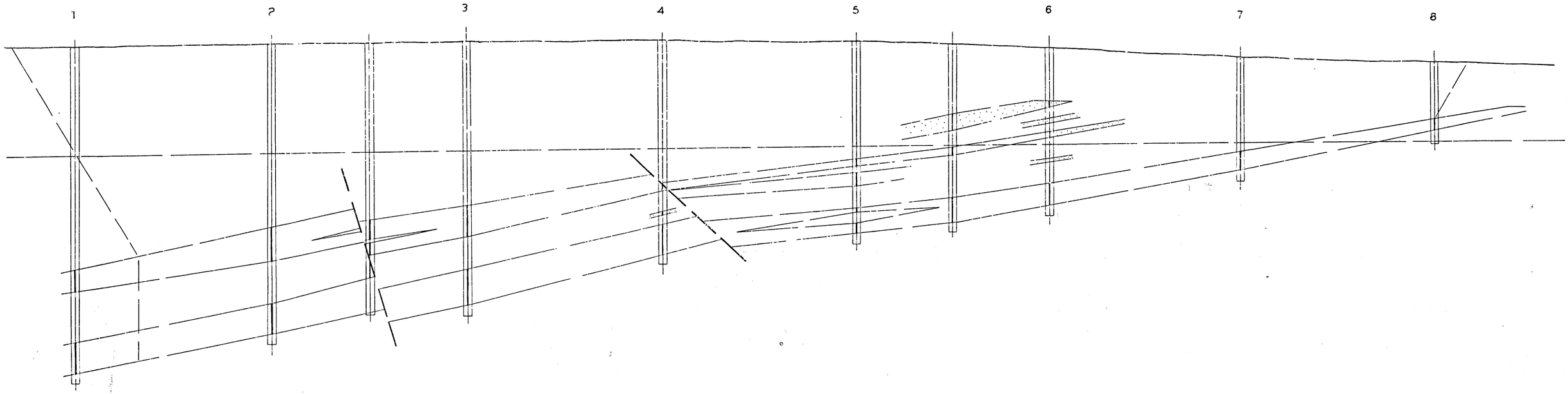
MAIN BASIN - NORTH EASTERN MARGIN

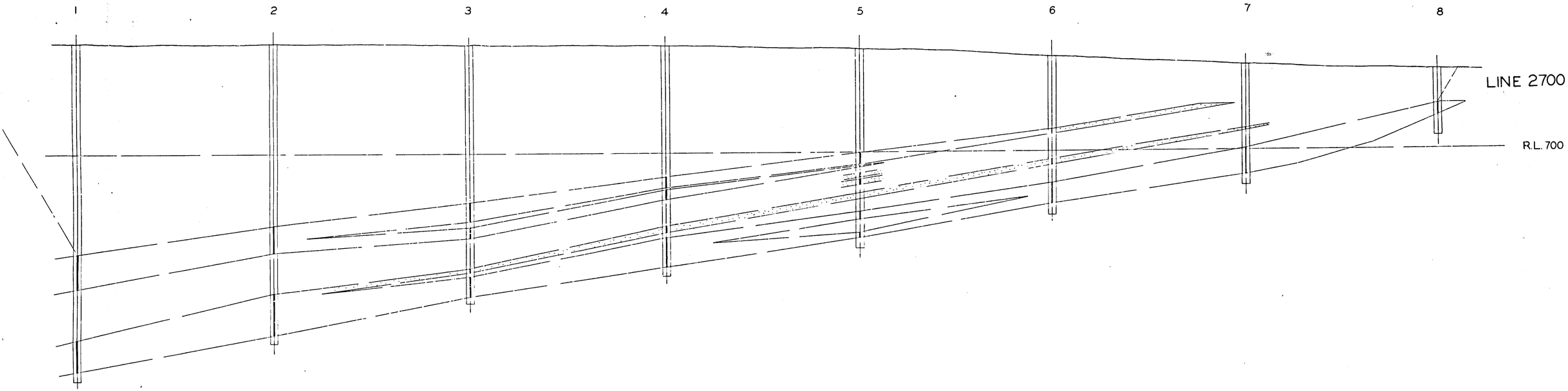
CROSS SECTION ON CO-ORDS 2400 - 2500

Scale 1 INCH = 20 FEET

L-54-26

Date 25-3-54





S.A. DEPT. OF MINES

Approved | Passed | Drawn

LEIGH CREEK COAL FIELD

MAIN BASIN - NORTH EASTERN MARGIN

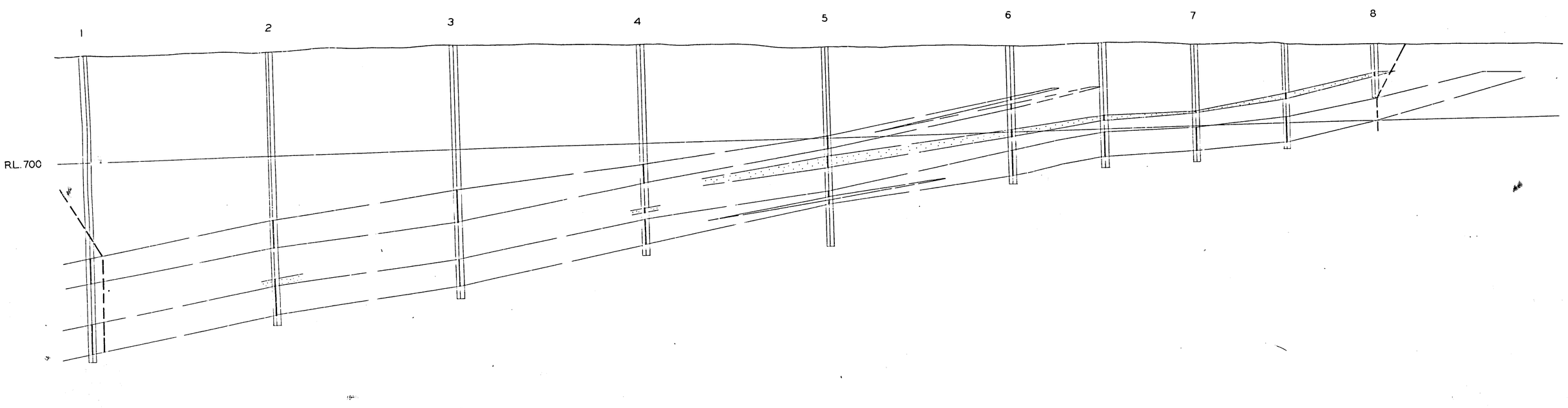
CROSS SECTION ON CO-ORDS 2600-2700

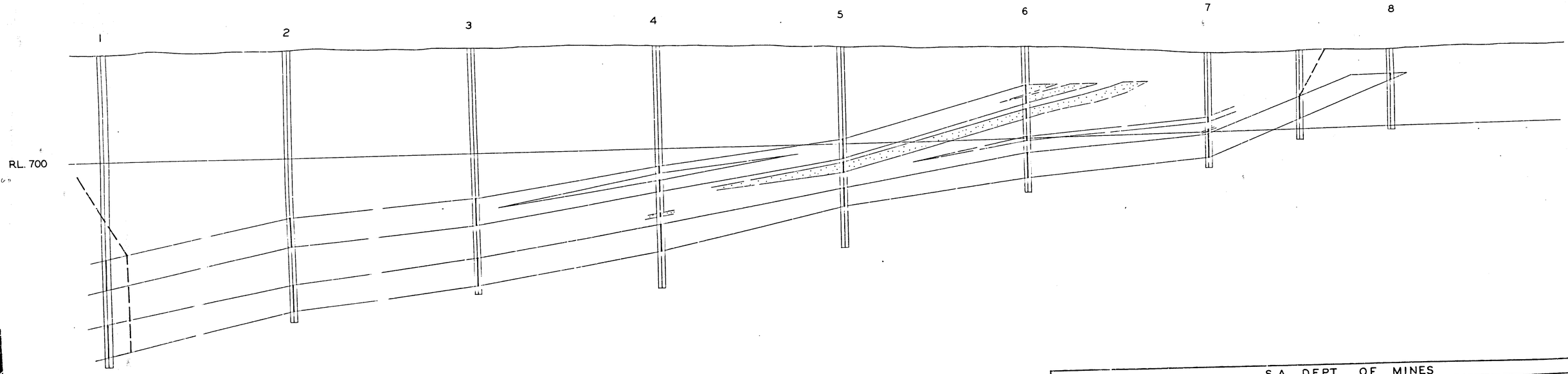
Scale 1INCH = 20 FEET

L-54-27

Cc

Date 13-5-54





S.A. DEPT. OF MINES

LEIGH CREEK COAL FIELD

MAIN BASIN NORTH EASTERN MARGIN

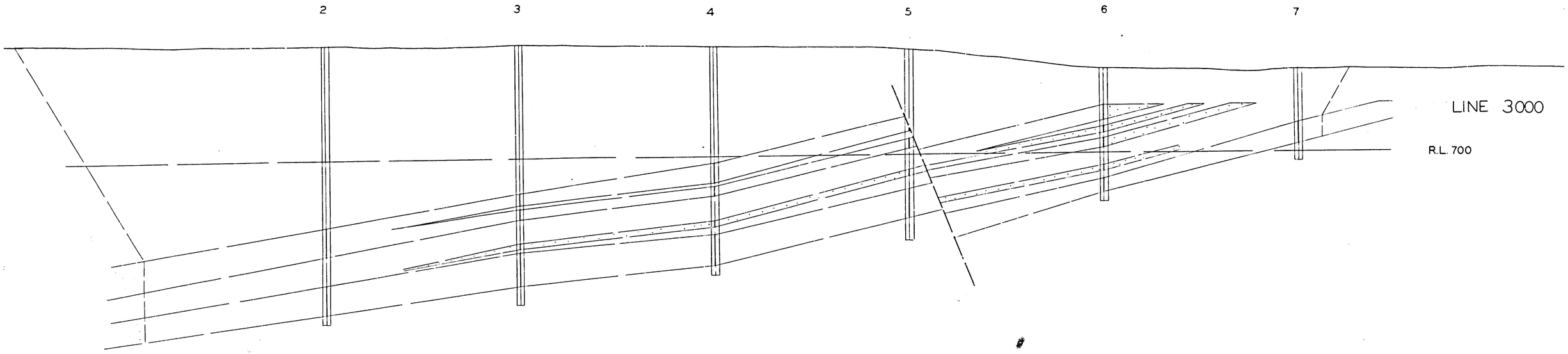
CROSS SECTION ON CO ORDS 2800-2900

Approved | Passed | Drafter

Scale 1 INCH = 20 FEET

L-54-28

Date 22 - 3 - 54



S.A. DEPT. OF MINES

Approved	Passed	LEIGH CREEK COAL FIELD MAIN BASIN - NORTH EASTERN MARGIN CROSS SECTION ON CO-ORD 3000	Scale 1 INCH = 20 FEET L54-29 Cc. Date 26-2-54
Director of Mines			