Rept. Bk. No. 60/30
G.S. No. 3081
D.M. No. 1413/64

60/30

# DEPARTMENT OF MINES
# SOUTH AUSTRALIA

GEOLOGICAL SURVEY
SEISMIC SECTION

## REPORT ON RECONNAISSANCE SEISMIC REFRACTION SURVEY IN THE SOUTH AUSTRALIAN PORTION OF THE EUCLA BASIN 1964

by

G.W. Kendall
Geophysicist

D.M. 1413/64

18th February, 1965

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# REPORT ON RECONNAISSANCE SEISMIC REFRACTION SURVEY IN THE SOUTH AUSTRALIAN PORTION OF THE EUCLA BASIN 1964

## SUMMARY

A reconnaissance seismic refraction survey was carried out in the South Australian portion of the Eucla Basin, to determine the general shape of the basin and to assess the feasibility of using seismic methods in the area.

Some of the refractors recorded were correlated with lithological units in some of the old water bores in the area.

The highest speed refractor recorded and interpreted as granitic or metamorphic basement defines a trough containing up to 6,000 feet of lower velocity formations. The axis of the trough is in a NW direction through Nullabor Homestead and plunges to the SE.

Doubt exists as to the exact interpretation of the intermediate refractors owing to the lack of geological knowledge at the depths indicated by the refractors.

Fair seismic refraction results can be obtained in the area after allowing for slow drilling rate and large explosive consumption.

## INTRODUCTION

This report presents the results of the first seismic work in the Eucla Basin, carried out from 3rd September 1964, to 7th December 1964 by the South Australian Department of Mines Seismi PartyNo. 1. The area of operations is about 750 miles from Adelaide in the South Australian portion of the Eucla Basin which as a whole occupies a total of 68,460 sw. miles. The larger part is in Western Australia and 16,460 sq. miles in South Australia.

Prior to this survey the accepted geological picture, derived largely from the few widely scattered old water bores, was of a shallow basin with a Tertiary and Cretaceous section overlying a Pre-Cambrian basement, the maximum depth of the section being of the order of 1,300 feet. Due to the widespread nature of the water bores it was conceivable there could be thicker development of sediments in the area.

The Nullabor Plain, which comprises a large proportion of the basin, is sparsely covered with saltbush and bluebush with a twenty mile strip adjacent to the coast wooded, generally sparsely, with Mallee, Acacia and Sandalwood, particularly on the old dunes which control the gently undulating surface traversed by the Eyre Highway. The two pastoral stations Nullabor and Koonalda, occupy this stretch in South Australia.

This particular stretch has the highest rainfall with the rainfall falling off towards the north away from the coast. Owing to the lack of groundwater, the supplies from the bores being saline, and the type of feed, sheep are run on the stations with a small herd of cattle at Koonalda.

## GEOLOGY

The surface of the Nullabor Plain is not absolutely level but the undulations are broad and the slopes very gentle. There is however, a general rise from the southern coastal cliffs towards the interior. On the coast the cliffs are about 200 feet in height along an unbroken line from the Head of the Bight to Wilson's Bluff at the far south-west corner of the State, and the plateau rises gradually to a height of about 500-600 feet where it is traversed by the Transcontinental Railway.

Underlying and outcropping over the whole of the basin are marine limestones deposited during the Tertiary period, ranging from hard crystalline to soft limestone, the upper section the Nullabor Limestone and the lower the Wilson Bluff Limestone.

The limestone attains a maximum known depth of 570 feet at Guinewarra Bore. The limestone is traversed by extensive cavities due to the selective solution of portion of the calcareous rock. The cavities assume various forms and may have openings to the surface to form blowholes.

The Cretaceous section is one of laminated blue-grey shales or carbonaceous siltstones with an impoverished micro-fauna of small areanaceous foraminifera and abundant pyrite and glauconite (LUDBROOK)[1]. It is absent from bores on the eastern edge of the basin, in particular Nullabor No. 6 Bore, and thickens to the west. In Albala Karoo Cretaceous sediments rest on granitic basement.

New work is being done, by the S.A. Dept. of Mines, in reviewing the information given by the water bores, W.K. Harris (personal communication) finding Permian spores in Yangoonabie bore from 1,132 to 1,387 feet below surface resting on feldspar porphyry.

At Cook Township Bore and Outback Oil No. 1C Bore Cretaceous shales rest on sediments of age yet unknown, but which may possibly be late Proterozoic, as does the Eocene at Nullabor No. 6 Bore.

## PREVIOUS GEOPHYSICAL WORK

Previous geophysical work is confined to a small amount of aeromagnetic and gravity surveys. During May 1964 the Bureau of Mineral Resources (J.H. QUILTY and P.D. GOODEVE)[2] carried out a reconnaissance airborne magnetic survey of the Eucla sedimentary basin in the States of South and Western Australia. The survey consisted of a series of traverses across the basin area, some of which were extended southward across the Great Australian Bight.

The magnetic results are all outside the seismic refraction area. The nearest flights are the Kingoonya to Kalgoorlie line along the Transcontinental Railway where in the vicinity of Cook a probable depth to basement of 2,000 feet was given. The section of flight 6 from Cook to Ceduna gave depths of

the order of 2,000 feet from Cook to the margin of the basin.

In 1954 and 1955 the Bureau of Mineral Resources (S. GUNSEN and I. Van Der LINDEN)[3] carried out two regional gravity traverses across the S.A. portion of the Eucla Basin. Part of one of these traverses is along the seismic line from Albala Karoo Bore eastward, and the Bouguer anomaly profile, qualitatively at least, is in good accordance with the seismic results.

## METHODS OF OPERATION AND INTERPRETATION

### Camp

A mobile camp containing accommodation for 23 men in four-berth and two-berth caravans, with cooking, dining, and ablution, caravans, and trailers for food and spare parts, storage, refrigeration, 240 volt power supply, mechanics' workshop and field office, was used on the survey. Camp was shifted from time to time to remain within reasonable driving distance of current drillimg and shooting operations.

Owing to the lack of other supplies, drinking water and water for cooking was obtained with the permission of the Engineering and Water Supply Department from their three rain-water tanks at intervals along the Eyre Highway. The undrinkable saline water from bores, used for ablutions etc., was obtained with the permission of the owners of Nullabor Station from bores located on the property. Whilst working near Koonalda, during the last two weeks of the survey, permission was obtained to use a fresh water dam.

### Surveying

Horizontal control of the seismic refraction lines, which had to be straight, was obtained with theodolite, compass and chain. This control on the Eyre Highway was relatively simple owing to the straight nature of the road. Markers for shot and geophone points were placed every 300 feet and levelled by Dumpy level and staff. Elevation datum of mean sea level (approximate) was obtained at the Head of the Bight.

Mines Department surveyor M. CERIC carried out the work with one to four officers from the camp when available.

## Drilling

The survey commenced with one drill only, a Failing WW1, as at the time one of the party's normal plants had suffered a major breakdown, and the other had been transferred to another project. The Failing was with the party for 6 weeks during which time numerous breakdowns were encountered. The average drilling rate for this drill during the period was 26 feet/hour as against 46 feet/hour for the Mayhew delivered later.

The repaired Mayhew 1000 arrived and commenced drilling on the 26th September 1964. The third drill to arrive, another Mayhew 1000, transferred from No. 2 party, arrived and commenced drilling on the 24th October 1964. The Failing WW1 was returned to Adelaide upon receipt of the second Mayhew. During the period when only one drill was in operation shift work was practised, the drillers working from 6 a.m. to 8 p.m. depending upon the available light.

Drilling conditions encountered by the drillers consisted of three physical zones. First a surface, hard limestone with interposed hard crystalline layers, with occasional cavities, from 20 feet to 80 feet thick, the thickest section of this zone being along the Eyre Highway. Below this hard zone a cavernous region was encountered and then below this again, the soft white chalky Wilson Bluff limestone. All the shooting along the Eyre Highway was done in the first hard limestone zone with pattern holes up to 70 feet deep being drilled to hold the required charge. The hard surface limestone zone decreased in thickness upon going northward so that near Cook, where there was only a section of about 20 feet of hard limestone, 200 ft. holes had to be drilled, with the attendant difficulties of lost circulation and stuck rods, to enable the charge in these areas to be loaded below the cavernous area.

Air drilling was practised throughout the survey with dry cuttings everywhere except near Nullabor No. 6 bore where damp cuttings were found at the bottom of a 190 feet shot hole, and at D8 along the Eyre Highway which had damp cuttings at 80 feet.

## Shooting and Recording

Seismic equipment used was Texas Instruments Inc. 7000B with photographic recording only. For refraction work the equipment allows dual recording on eight inch paper with one record being at four times the amplitude of the other.

Two Hall-Sears HS-1 4.5 cycle geophone per trace were used. Twenty four traces over a total spread length of 7,200 feet with intervals of 300 feet were recorded.

Owing to the poor and variable energy return, maximum sensitivity was used for all large shots which meant firing only on windless days or during early morning or late evening, when conditions were more suitable.

It was soon determined that large charges would have to be used to obtain usable records, and that shot holes would be dry, so it was decided to use an ammonium nitrate fuel oil mixture instead of the more usual seismic explosive. The ammonium nitrate was delivered in light weight drums containing 350 lbs. of ammonium nitrate in a form known as "Nitropril", this prilled form resembling rice grains. Charges of 40 lbs. of Nitropril and $2\frac{1}{2}$ pints of distillate were mixed at the shot hole site in a small hand cement mixer to the required charge and primed with geophex and detonator.

The principle disadvantage for this particular area was that due to the cavernous nature of some of the near surface rocks and the air currents in these caverns, part of the charge was occasionally lost.

Towards the end of the survey charges up to 1000 lbs. of explosives were used.

B.G. Hackett was the Observer-in-Charge for the period of the survey.

## Procedures and Computations

At intervals of about 10 miles and at bore sites a refraction depth probe as described by Vale and Smith (4) was completed to determine the velocity and depth of all refractors present at each locality.

From weathering shots and the linearity of time distance plots of arrival times corrected for elevation, it was concluded that low velocity weathering was thin and reasonably constant along the lines shot. As the survey was of a broad reconnaissance nature only, detailed control of weathering was not obtained. A split spread with geophones at 20 feet intervals was shot at the centre of each refraction spread to determine the weathered layer which varied in depth from 4 - 10 feet and in velocity from 1,500 ft/sec. to 3,000 ft./sec.

The determination of Vo, the vertical velocity in the sub-weathering layer, or elevation correction velocity, was complicated owing to the hard crystalline limestone layer near the surface, which gave velocities up to 15,000 ft./sec. An average velocity of 11,000/sec. was assumed and used for each depth probe.

The calculation of depth and dip of the various layers in each depth probe was made by the method of Dooley (5) From the depth, the intercept times and the observed velocity of the high speed refractor, the average velocity to it was computed.

Three main refractors were recorded, the first two varying in velocity from 14,500 ft./sec. to 16,500 ft./sec. and the third from 18,500 ft./sec. to 20,000 ft./sec. Due to the interference of the surface high speed layer, velocities lower than 14,500 ft./sec. were only occasionaly located. To determine the average velocity from datum to the first refractor, the high speed refractor recorded at Albala Karoo, Guinewarra and Yangoonabie Bores was correlated with the granitic rocks encountered in these

wells, and a figure of 7000 ft./sec. derived.

Depths and dips were then determined for each refractor. From the average velocity from datum to the high speed refractor at each of these depth probes, an average of all the values gave 12,500 ft./sec. which was then used to recompute the depths of the high speed layer.

Owing to the lack of information in the low velocity area only probable directions of dip are given for the high speed refractor.

## RESULTS

Results from the survey are presented as time-distance curves and refractor depths on plans - L65-31 to 38 and 40 and 65-68 to 72. The refractor depths are shown as cross sections on plans - L65-39 and 65-74. A contour plan of the high speed refractor is shown on the plan 65-73.

The results can best be presented in tabulation form as follows, on next page.

| Refraction Line | Working Datum Feet Above M.S.L. | Refractor Velocity ft./sec. | Point at which depth determined | Depth below M.S.L. ft. |
|---|---|---|---|---|
| A6 - A2A | 220 | 14,400<br>19,600 | A2½<br>A2 | 1000 ✓<br>4760 |
| B8 - B1 | 170 | 14,800<br>19,600 | B4½<br>B4¾ | 1060 ✓<br>5140 |
| C7 - C½ | 180 | 14,400<br>15,900<br>19,500 | C3½<br>C3½<br>C4 | 1070<br>2150 ✓<br>6200 |
| D9 - D3 | 170 | 16,100<br>19,500 | D6½<br>D6 | 1260 ✓<br>5470 |
| D18 - D10 | 170 | 15,700<br>19,800 | D14½<br>D14 | 1180 ✓<br>5870 |
| D28 - D20 | 220 | 16,200<br>18,500 | D24½<br>D24 | 1400 ✓<br>4920 |
| D37 - D29 | 240 | 16,500<br>19,700 | D33½<br>D33 | 1120 ✓<br>4780 |
| D42 - D37 | 250 | 18,600 | D40½ | 980 ✓ |
| D55 - D52 | 250 | 19,000 | D53½ | 780 ✓ |
| E6 - E12 | 230 | 15,300<br>19,500 | E9½<br>E9 | 1210 ✓<br>5360 |
| E14 - E20 | 270 | 11,200<br>16,000<br>20,000 | E16½<br>E16½<br>E17 | 760<br>2180 ✓<br>5720 |
| E20 - E26 | 320 | 14,800<br>16,300<br>19,500 | E23½<br>E23½<br>E23½ | 600<br>4170 ✓<br>5350 |
| F6 - F12 | 370 | 15,100<br>20,300 | F9½<br>F9 | 420<br>3740 |
| G8 - G2 | 330 | 16,500<br>19,500 | G5½<br>G5 | 440<br>3430 |

On records, with the charge fired from the end of the detector spread, refractors with velocities below 14,500 ft./sec. were only occasionally recorded. This was because the first few traces of each record, recorded, as first arrivals, arrivals from the thin, surface, high speed layer with velocities up to 15,000 ft./sec. These arrivals masked-out refractor arrivals until, as was always the case, the energy attentuated sufficiently to allow later refractor arrivals to be recorded.

Generally two refractors were recorded, the exception being lines C7-C½, E14-E20 and E20-E26 where three were recorded. The first refractor varied in apparent velocity from 11,000 ft./sec. to 16,500 ft./sec. The deepest depth of this first refractor is at D24½ where an apparent velocity of 16,200 ft./sec. is recorded at 1400 feet below sea level. The high speed refractor, which was the most consistent, has a maximum depth of 6200 feet at C4, and minimum depth at G5, where 3430 feet below sea level was computed.

## INTERPRETATION AND CONCLUSIONS

The highest speed refractor, approximately 19,500 ft./sec. has a velocity typical of a granite basement and is directly correlatable to the basement granitic rock as noted in the Albala Karoo and Guinewarra bores. At Albala Karoo the drill log gives granitic rock at 1050' below the surface or 780 ft. below sea level. An average velocity from datum of 6,600 ft./sec. was required for the high speed refractor to agree with this depth. At Guinewarra bore the drillers' log gives granite at 1250 feet below the surface or 980 feet below sea level. An average velocity of 6,850 ft./sec. was required to correlate the high speed refractor with this intersection.

The high speed refractor dips or is faulted down to the east from Guinewarra bore to Yangoonabie bore for a total drop of nearly 4,000 feet over the distance of 10 miles. From Yangoonabie it dips with undulation to attain a maximum depth of over 6,000 feet in the vicinity of Nullabor Homestead and then becomes shallower to the east. Going northwards from D14 the basement rises again to less than 4000 feet at F9. On plan 65-73 the high speed refractor is contoured as a trough with a NW axis plunging to the S.E.

It is noted that there is no direct control over the interval velocities in the deeper part of the sections, owing to the lack of deep bores for correlation. Computed results probably give the maximum depths possible.

The Bouguer anomaly profile from the Bureau of Mineral Resources gravity traverse along the Eyre Highway in 1954-1955 is shown on plan L65-39 and shows fair correlation with the seismic results. The difference of 30 milligals from Albala Karoo to Yangoonabie Bore agrees well with the total drop in basement of nearly 4000 feet and to the east the gravity increase agrees with the basement rise, but too little is known of the actual geology to make a quantitive interpretation of the gravity results.

Tertiary and Cretaceous formations intersected in bores are assumed to give refractor velocities of the order of 7,000 ft./sec. as used in the computations.

The refractor arrivals between 14,000-16,5000 ft./sec. suggest older sediments possibly Proterozoic. The 16,500 ft./sec. refractor at Yangoonabie Bore is correlated with the felspar porphyry at a depth of 1120 feet below sea level. A refractor at F9 of 15,100 ft./sec. seems to be related to pre-Cretaceous sediments of the Cook Township Bore and the 16,500 ft./sec. refractor at G5 again seems to be related to the pre-Cretaceous sediments of the Outback Oil Bore. At Nullabor No. 6 Bore a 14,400 ft./sec. refractor is computed at 1,000 ft. below sea level whereas the end of the bore at 770 feet below sea level is in decomposed purple and grey shales of what is thought to be Late Proterozoic (Marinoan) age. Marinoan is thought to start at 420 feet below sea level at Nullabor No. 6 Bore and although indications of a refractor from this horizon are present on the records, possibly due to the interference of the surface high speed layer, the horizon is not clearly recorded.

If the trough as shown by the basement surface were filled with the felspar porphyry of Yangoonabie then the density contrast between the porphyry and the granite would probably be insufficient to give rise to the low gravity values associated with the basement trough.

Thus it appears that the 14,000-16,500 ft./sec re-

fractor is related to late Proterozoic sediments, with at Yangoonabie a felspar porphyry sill being present at the top of these sediments.

More information by the re-interpretation of present bores, by drilling new deep bores, and then more geophysical work to tie into the new information, must first be completed before a final interpretation of the area can be given.

## ACKNOWLEDGEMENTS

Acknowledgements are due to Mr. K.R. Seedsman who initiated the project and supervised the field work and for criticism of the manuscript. Also members of the Petroleum Geology and Palaeontology Sections for help in the geological interpretation of the area.

GWK:YJP:AWK
18.2.65

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GEOPHYSICIST

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# APPENDIX

## STATISTICS - SEISMIC OPERATIONS

| | |
|---|---|
| STARTING DATE | 3rd Sept., 1964 |
| COMPLETION DATE | 7th Dec., 1964 |

| | |
|---|---|
| NO. OF RECORDING DAYS | 50 |
| NO. OF RECORDS SHOT | 119 |
| NO. OF DRILL HOURS | 440 |
| NO. OF HOLES DRILLED | 276 |
| TOTAL FOOTAGE | 16,296 |
| AVERAGE FOOTAGE PER HOUR | 37 |
| GEOPHEX USED (lbs.) | 20,330 |
| NITROPRIL USED (lbs.) | 24,400 |
| AVERAGE CHARGE SIZE (lbs.) | 380 |
| NO. OF CAPS USED. | 541 |

# LIST OF ILLUSTRATIONS


| Title | | | | Map No. |
|---|---|---|---|---|
| Location of Seismic Lines and Locality Plan. | | | | L64-202 / 65-73 |
| Time Distance Curves and Interpretations. | | | | |
| Line A | 6 | - | 2A | L65-38 |
| B | 8 | - | 1 | 65-72 |
| C | 7 | - | ½ | L65-37 |
| D | 9 | - | 3 | L65-36 |
| D | 18 | - | 10 | L65-35 |
| D | 28 | - | 20 | L65-34 |
| D | 37 | - | 29 | L65-33 |
| D | 42 | - | 37 | 65-69 |
| D | 55 | - | 52 | 65-68 |
| E | 6 | - | 12 | L65-40 |
| E | 14 | - | 20 | 65-71 |
| E | 20 | - | 26 | 65-70 |
| F | 6 | - | 12 | L65-32 |
| G | 8 | - | 2 | L65-31 |
| REFRACTION CROSS SECTIONS Albala Karoo to Nullarbor No. 7 | | | | L65-39 |
| D14 to Cook Township Bore | | | | 65-74 |
| HIGH SPEED REFRACTOR CONTOUR PLAN | | | | 65-73 |

AUSTRALIA

WESTERN

SOUTHERN OCEAN

Fisher RS

Commonwealth Railways Cook RS

Hughes RS

Cook

Outback Oil Co. Cook No 1 Bore

Nullarbor No 1 Bore

Nullarbor No 2 Bore

Nullarbor No 3 Bore

Nullarbor No 4 Bore

Nullarbor No 5 Bore

Nullarbor No 6 Bore

Nullarbor No 7 Bore

Nullarbor No 8 Bore

Jubilee White Well Bore

Edge of Nullarbor Plain

Bail Lagoon

Head of Bight

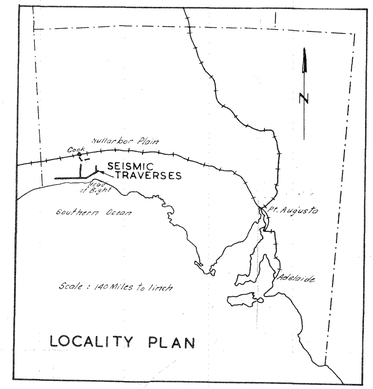
Survey Point

Shot Point

Well or Bore

SCALE

Miles 4 2 0 4 6 12 16 20 Miles




S. A. DEPT. OF MINES

# EUCLA BASIN SEISMIC SURVEY
# SHOT POINT LOCALITY PLAN

L64-202
Abc.

A3 A2 A1

N

NULLARBOR No. 6 Bore

Elev^n above M.S.L.

240'
230'
220'

DRILL LOG
0-90 HARD LIMESTONE
90-120 CAVITIES LOST CIRCULATION
120-140 HARD LIMESTONE
140-195 WHITE DAMP CHALKY LIMESTONE

DRILL LOG
0-80 HARD LIMESTONE

dw = 5'
Vw = 1500'/s

drill log
0-110 HARD LIMESTONE
110 - LOST CIRCULATION

240' Elev^n
230 above
220' M.S.L.

0

Vo = 1,000'/s

-1000'

θ = 0°

V1 = 14400'/s

Refractor depth below M.S.L.

-2000

-3000

-4000

-4780' [using Vave(datum to Refractor) = 12500'/s]

Vs = 19,600'/s

Probable small dip to the South

-5000

Time secs.

2.0
1.5
1.0
0.5
0

19,200'/s
19,500'/s
21,500'/s
20,000'/s
Ti (A6) = 0.622
Ti (A1A) = 504
Ti (A5) = 0.643
Ti (A2A) = 0.544
18,400'/s
Ti (A5) = 0.576
14,700'/s
Ti (A5) = 0.306
14,400'/s
14,500'/s
14,400'/s
13,400'/s
Ti (A4) = 0.299
Ti (A1) = 0.311
No time break control
Ti (A0) = 0.512
14,000'/s
13,700'/s
PEAKS
13,300'/s Ti = 1.58
Ti = 1.61
13,700'/s
12,000'/s
12,900'/s

A3 A2 A1

Horizontal scale 1cm = 300' Interpretation G.W. KENDALL
Vertical scales 1cm = 0.1sec.
Datum +2201cm = 200' Date Jan 1965

DEPARTMENT OF MINES — SOUTH AUSTRALIA

# SEISMIC SURVEY

EUCLA BASIN — 1964

LINE A SHOT POINTS 6-2A

## TIME DISTANCE CURVES & INTERPRETATION

L65-38
Abc

K&E STANDARD © CROSS SECTION MILLIMETER
KEUFFEL & ESSER CO MADE IN U.S.A.
K&E STANDARD © CROSS SECTION MILLIMETER

B5½ B5 NE B4

ELEVN ABOVE M.S.L. 190' 180' 170'

DRILL LOG
0-24 HARD LIMESTONE
24-50 CAVERNOUS

$d_w = 10'$
$V_w = 1,500'/s$

DRILL LOG
0-27 HARD LIMESTONE
27-50 CAVERNOUS

0

$V_0 = 7,000'/s$

-1000'

-1060

$\theta_1 = 38'$

$V_1 = 14,800'/s$

-2000'

-3000'

-4000'

-5000'

-5140' [using $V_{ave}$ (datum to Refractor) = 12,500'/s

$V_2 = 19600'/s$

Probable small dip to the South West

REFRACTOR DEPTH BELOW M.S.L.

19,400'/s
16,800'/s
$T_i(B1) = 0.935$
$T_i(B8) = 0.695$
$T_i(B1) = 0.935$
19,800'/s
15,600'/s
$T_i(B7) = 0.370$
15,100'/s
14,500'/s
$T_i(B8) = 0.522$
14,500'/s
$T_i(B3) = 0.795$
15,000'/s
15,000'/s
14,000'/s
8,000'/s

TIME SECS

2.0 1.5 1.0 0.5 0

B5½ B5 B4

Horizontal scale 1cm = 300' Interpretation G.W. KENDALL
Vertical scales 1cm = 0·1secs
Datum +170 1cm = 200' Date Jan. 1965

DEPARTMENT OF MINES — SOUTH AUSTRALIA

# SEISMIC SURVEY

EUCLA BASIN — 1964

LINE SHOT POINTS 8-1

## TIME DISTANCE CURVES & INTERPRETATION

65-72
Abc

K&E STANDARD © CROSS SECTION MILLIMETER
KEUFFEL & ESSER CO. MADE IN U.S.A.

C5 | C4 | ROBERTS WELL N 2400' C3

ELEV^N ABOVE M.S.L. 200' 190' 180'

DRILL LOG
0-70 HARD LIMESTONE

DRILL LOG
0-28 HARD LIMESTONE
28-33' CAVITY
33-50' LIMESTONE HARD LAYERS

$du = 10'$
$Vu = 1,500'/s$

DRILL LOG
0-18' HARD LIMESTONE
18-30 HONEYCOMB CAVITY LIMESTONE

ELEV^N ABOVE M.S.L. 200' 190' 180'

$V_0 = 7,000'/s$

0

-1000

-1070'
$\theta = 46'$
$V_1 = 14,400'/s$

-2000

-2150'
$\theta_2 = 31'$
$V_2 = 15,900'/s$

-3000

-4000

-5000

-6000

-6200' [USING VAVE (DATUM TO REFRACTOR) = 12,300'/s
$V_3 = 18,500'/s$

PROBABLE SMALL DIP TO THE WEST

REFRACTOR DEPTH (FT) BELOW M.S.L.

2.5

2.0

1.5

1.0

0.5

0

TIME SECS.

19,200'/s
$T_i(C\frac{1}{2}) = 0.756$

$T_i(CT) = 0.311$
19,800'/s

$T_i(C6) = 0.774$
19,400'/s

15,200'/s
$T_i(CB) = 0.406$
16,500'/s
$T_i(C2) = 0.360$

14,100'/s
$T_i(C3) = 0.396$
$T_i(C4) = 0.319$
14,800'/s

11,400'/s
11,000'/s

C5 C4 C3

KEUFFEL & ESSER CO.
MADE IN U.S.A.

K&E STANDARD MILLIMETER CROSS SECTION

Horizontal scale 1cm = 300'
Vertical scales 1cm = 200'
Datum + 180 1cm = 0·1sec

Interpretation G.W. KENDALL
Date Jan 1965

DEPARTMENT OF MINES — SOUTH AUSTRALIA

# SEISMIC SURVEY

EUCLA BASIN — 1964

LINE C SHOT POINTS 7 — ½

## TIME DISTANCE CURVES & INTERPRETATION

L65-37
Abc

D7 D6 E D5

+190 +180 +170

$d_w$ = 10'
$V_w$ = 1600'/s

Elev" above M.S.L.

+190' +180' +170'

0

$V_0$ = 7000'/s

-1260'

$\theta_1$ = 0

$V_1$ = 18,000'/s

-2000' -2000"

Depth of refractor below M.S.L.

-4000' -4000'

-5470' [ using $V_{ave}$ (datum to refractor) = 12,500'/s ]

$V_2$ = 19,500'/s

Probable small dip to the West

-6000' -6000'

2.5 2.5

2.0 2.0

1.5 1.5

1.0 1.0

0.5 0.5

0 0

Time in secs

18,700'/s $T_i$(D3) = .670 $T_i$(D9) = .713 $T_i$(D3) = .681 19,700'/s Peaks 20,300'/s

17,200'/s $T_i$(D4) = .558

16,000'/s peaks 16,200'/s $T_i$(D8) = .417 - .080 = .377 (1st breaks - corr.)

16,000'/s $T_i$(D5) = .350

16,000'/s 8,800'/s $T_i$ = .050

$T_i$ = .374 16,500'/s 16,500'/s

14,900'/s $T_i$ = .000

D7 D6 D5

Horizontal scale 1cm = 300' Interpretation G.W. KENDALL
Vertical scales 1cm = 200'
Datum +170 1cm = 0·1sec Date Jan 1965

DEPARTMENT OF MINES – SOUTH AUSTRALIA

# SEISMIC SURVEY

EUCLA BASIN – 1964

LINE D SHOT POINTS 9-3

## TIME DISTANCE CURVES & INTERPRETATION

L 65-36
Abc

K&E STANDARD @ CROSS SECTION MILLIMETER
KEUFFEL & ESSER CO. MADE IN U.S.A.
K&E STANDARD @ CROSS S MILLIMETER

D15 D14 D13 D12

Wigunda gate & dog fence

E

dw = 13'
Vw = 3,000 f/s

V0 = 7,000 f/s

= 1180'
θ = 27'
V1 = 15,700 f/s

Elevations
to
M.S.L.

REFRACTOR DEPTH
BELOW
M.S.L.

[USING VAVE (DATUM TO REFRACTOR) = 12,500 f/s]

.5870

½ = 17,800 f/s

PROBABLE SMALL DIP TO THE EAST

20,700 f/s — PEAKS — T1(D10) = 637

16,780 f/s — T1(D11) = 522

16,100 f/s — T1(D12) = 395

15,500 f/s — T1(D16) = 350 — T1(D13) = 230

16,000 f/s — 21,000 f/s

15,600 f/s — T1 = 336 — T1 = 245

17,200 f/s — T1 = 18 — 17,000 f/s

T1 = 000

19,100 f/s — PEAKS — T1(D18) = 764

19,900 f/s — PEAKS — T1(D17) = 780

TIME IN SECS

D15 D14 D13

KEUFFEL & ESSER CO.
MADE IN U.S.A.

K&E STANDARD @ CROSS SECTION MILLIMETER

KEUFFEL & ESSER CO.
MADE IN U.S.A.

K&E STANDARD @ CROSS SECTION MILLIMETER

Horizontal scale 1cm = 300'
Vertical scales 1cm = 200'
Datum +170' 1cm = 0·1 sec

Interpretation G.W. KENDALL
Date JAN 1965

DEPARTMENT OF MINES — SOUTH AUSTRALIA

# SEISMIC SURVEY

EUCLA BASIN — 1964

LINE D SHOT POINTS
18 — 10

## TIME DISTANCE CURVES & INTERPRETATION

L 65 — 35
Abc

D25 D24 D23

E

+250'
+240'
+230'
+220'
0
-2000'
-4000'
-6000'

Elevations above M.S.L.

dw = 4'
Vw = 1500'/s

V0 = 7,000'/s

-1400'

θi = 01°41'

V1 = 16,200'/s

-4320' [using Vave(datum to Refractor) = 12,500'/s]

V2 = 18,500'/s

probable small dip to the East

Refractor depth below M.S.L.

18,700'/s
16,100'/s
15,600'/s
15,300'/s
15,300'/s
8,300'/s
11,800'/s
18,200'/s
17,300'/s
17,300'/s

Ti (D20) = .554
Ti (D21) = .395
Ti (D22) = .376
Ti (D23) = .344
Ti (D25) = .488
Ti = .009
Ti = .040
Ti (D28) = .558

2.5
2.0
1.5
1.0
0.5
0

Time in Secs

D25 D24 D23

Horizontal scale 1cm = 300'
Vertical scales 1cm = 200'
Datum +220' 1cm = 0·1sec

Interpretation G.W. KENDALL
Date JAN 1965

DEPARTMENT OF MINES — SOUTH AUSTRALIA

# SEISMIC SURVEY

EUCLA BASIN — 1964

LINE D SHOT POINTS 28 — 20

## TIME DISTANCE CURVES & INTERPRETATION

L65-34

Abc

K+E STANDARD @ CROSS SECTION MILLIMETER
KEUFFEL & ESSER CO. MADE IN U.S.A.
K+E STANDARD MILLIMETER

D34 D33 EAST D32

YANGOONABIE CREEK

$d_w$ = 0 (assumed)

+250' +240' +230' +220' 0 -2000' -4000' -6000'

Elevation above M.S.L.

$V_0$ = 7400'/s

-1120'

$\theta_1$ = 02° 55'

$V_1$ = 16,500'/s

-4750' [using Vave(datum to refractor) = 12,500']

$V_2$ = 19,700'/s

Probable small dip to the East

Refractor depth below M.S.L.

20,400'/s $T_i$(D29) = .732

19,300'/s $T_i$(D30) = .604

19,600'/s $T_i$(D31) = .520

15,500'/s $T_i$(D37) = .510

19,200'/s

$T_i$(D36) = .141

18,400'/s

15,000'/s $T_i$(D32) = .429

$T_i$(D35) = .208

16,300'/s $T_i$ = .366

$T_i$ = .295

13,800'/s

8,200'/s 8,300'/s

$T_i$ = .058 $T_i$ = .053

D34 D33

2.5 2.0 1.5 1.0 0.5

Time in secs.

Horizontal scale 1cm = 300' Interpretation G.W. KENDALL
Vertical scales 1cm = 200'
Datum +240 1cm = 0·1sec Date Jan 1964

DEPARTMENT OF MINES — SOUTH AUSTRALIA

# SEISMIC SURVEY

EUCLA BASIN 1964
LINE D SHOT POINTS 37-29

## TIME DISTANCE CURVES & INTERPRETATION

L65-33
Abc

K&E STANDARD © CROSS SECTION MILLIMETER
KEUFFEL & ESSER CO. MADE IN U.S.A.
K&E STANDARD © CROSS SECTION MILLIMETER

D41

EAST

D40

+280'
+270'
+260'
+250'

ELEV^N ABOVE M.S.L.

$d_w$ = 9'
$V_w$ = 1,500'/s

0

$V_0$ = 6,850'/s

- 980'

$\theta_1$ = 22°

$V_1$ = 18,600'/s

-1000'

-2000'

-3000'

-4000'

-5000'

-6000'

Refractor depth below M.S.L.

20
15
10
05
0

19,600'/s
$T_i$ (D37) = .405
19,200'/s
$T_i$ (D39) = .322
18,900'/s
18,300'/s
$T_i$ (D42) = .332
$T_i$ (D39) = .336
21,300'/s
$T_i$ (D44a) = .365
$T_i$ (D41) = .347
18,700'/s
8,900'/s
11,000'/s

time in secs

D41 D40

KEUFFEL & ESSER CO.
MADE IN U.S.A.

Horizontal scale 1cm = 300'  Interpretation G.W. KENDALL
Vertical scales 1cm = 200'
Datum +250  1cm = 0·1sec  Date Jan. 1965

DEPARTMENT OF MINES — SOUTH AUSTRALIA

# SEISMIC SURVEY

EUCLA BASIN — 1964
LINE D SHOT POINTS

## TIME DISTANCE CURVES & INTERPRETATION

65-69
Abc

D54 — East — D53

+280'
+270'
+260'
+250'
0
-1000'
-2000'
-3000'

Surface elevation above M.S.L.

Refractor depth below M.S.L.

$dw = 0$ (assured)

$V_0 = 6{,}600$'/s

$-700$

$\theta_1 = 01°50'$

$V_1 = 19{,}000$'/s

15

1·0
0·5
0

20,600'/s
17,600'/s
$T_i$ (D52) = 360
$T_i$ (D55) = 230
21,700'/s
$T_i$ (D53) = 360
$T_i$ (D54) = 301
18,200'/s
14,000'/s

time in Secs.

D54 — D53

Horizontal scale 1cm = 300'
Vertical scales 1cm = 200'
Datum +250' 1cm = 0·1sec

Interpretation G.W. KENDALL
Date Jan. 1965

DEPARTMENT OF MINES — SOUTH AUSTRALIA

# SEISMIC SURVEY

EUCLA BASIN — 1964

LINE D SHOT POINTS 55–52

## TIME DISTANCE CURVES & INTERPRETATION

65 – 68
Abc

KEUFFEL & ESSER CO.
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E8 E9 NORTH E10

+260 +250 +240 +230

$d_w$ = 10'
$V_w$ = 2000'/s

+250' +240' +230' Surface elevation above M.S.L.

0 0

$V_0$ = 7000'/s

-1000' -1210' -1000'

$\theta_1$ = 68°
$V_1$ = 15,300'/s

-2000' -2000'

REFRACTOR DEPTH BELOW M.S.L.

-3000' -3000'

-4000' -4000'

-5000' -5000'

-5360 [using Vave (datum to Refractor) = 12,500'/s]

$V_2$ = 19,500'/s

Probable small dip to the North

6000' 6000'

2.5 2.5

19,300'/s

$T_i$ (E12) = .700

$T_i$ (E6) = .418

18,000'/s

$T_i$ (E6) = .672

19,100'/s

2.0 2.0

15,000'/s

$T_i$ (E7) = .419

15,400'/s

15,200'/s

1.5 1.5

Time Secs.

$T_i$ (E8) = .360

15,400'/s

$T_i$ (E10) = .371

$T_i$ (E11) = .369

$T_i$ (E9) = .345

14,600'/s

1.0 1.0

0.5 0.5

14,200'/s

0 0

E8 E9 E10

Horizontal scale 1 cm = 300' Interpretation G.W. KENDALL
Vertical scales 1 cm = 200'
Datum +230 1 cm = 0·1 sec Date JAN 1965

DEPARTMENT OF MINES — SOUTH AUSTRALIA

# SEISMIC SURVEY

EUCLA BASIN — 1964

LINE E SHOT POINTS 6 - 12

## TIME DISTANCE CURVES & INTERPRETATION

L65-40
Abc

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KEUFFEL & ESSER CO. MADE IN U.S.A.

E18 E17 NORTH

+290 +280 +270

dw = 9'
Vw = 2000'/s

+300' +290 +280 +270

Surface elevation above M.S.L.

0

Vo = 7000'/s

-760'

$\theta_1$ = 01°01'

$V_1$ = 11,200'/s

-1000'

-2000'

-2180'

$\theta_2$ = 10'

$V_2$ = 16,000'/s

-2000'

Refractor depth below M.S.L.

-3000'

-4000'

-4000'

-5000'

-5720' [using Vave (datum to Refractor) = 12,500'/s]

$V_3$ = 20,000'/s

Probable small dip to the North

-6000'

-6000'

2·5

2·5

20,400'/s

19,500'/s

2·0

2·0

$T_i$ (E20) = .775

$T_i$ (E14) = .721

17,400'/s

time in secs.

1·5

1·5

$T_i$ (E19) = .595

15,600'/s

16,400'/s

1·0

$T_i$ (E15) = .435

$T_i$ (E18) = .458

10,900'/s

11,400'/s

$T_i$ (E16) = .241

$T_i$ (E17) = .217

1·0

0·5

0·5

15,000'/s

15,000'/s

0

E16

E17

Horizontal scale 1cm = 300' Interpretation G.W. KENDALL
Vertical scales 1cm = 200'
Datum +270' 1cm = 0·1sec Date Jan 1964

DEPARTMENT OF MINES — SOUTH AUSTRALIA

# SEISMIC SURVEY

EUCLA BASIN 1964

LINE E SHOT POINT 14–20

## TIME DISTANCE CURVES & INTERPRETATION

65-71
Abc

K&E STANDARD ® CROSS SECTION MILLIMETER

KEUFFEL & ESSER CO. MADE IN U.S.A.

E25

NORTH

E24

+330'
+340'
+320'
0
-1000'
-2000'
-3000'
-4000'
-5000'
-6000'

+350'
+340'
+330'
+320'
0
-1000'
-2000'
-3000'
-4000'
-5000'
-6000'

Surface elevation above M.S.L.

Refractor depth below M.S.L.

$d_w = 4'$
$V_w = 1500'/s$

$V_0 = 7000'/s$

$-600'$

$\theta_1 = 14°$
$V_1 = 14,800'/s$

$-4170'$

$\theta_2 = 04°11''$
$V_2 = 16,300'/s$

$-5350'$ [ using Vave (datum to Refractor) = 12,500'/s ]

$V_3 = 19,500'/s$

Probable small dip to the South

2.5
2.0
1.5
1.0
0.5
0

2.5
2.0
1.5
1.0
0.5
0

time in secs

19,700'/s
$T_i$ (E20) = 6.96
19,500'/s
19,600'/s
$T_i$ (E22) = 6.98
$T_i$ (E26) = 6.94
15,700'/s
16,300'/s
$T_i$ (E22) = 4.63
$T_i$ (E25) = 4.45
14,700'/s
14,900'/s
$T_i$ (E24) = 2.27
$T_i$ (E25) = 2.35
13,500'/s
15,700'/s

E23
E24

Horizontal scale 1cm = 300'
Vertical scales 1cm = 200'
Datum +320' 1cm = 0·1sec

Interpretation G.W.KENDALL
Date Jan 1965

DEPARTMENT OF MINES — SOUTH AUSTRALIA

# SEISMIC SURVEY

EUCLA BASIN-1964

LINE E SHOT POINTS 20-26

## TIME DISTANCE CURVES & INTERPRETATION

65-70

Abc

K+E STANDARD MILLIMETER CROSS SECTION

KEUFFEL & ESS MADE IN U.S.

F8 | F9 → NORTH | F10

+400' +390' +380' +370'

Surface elevation above M.S.L.

dw = 1.0
Vw = 2,500'/s

0'

V2 = 7,000'/s

-420'

0 = 34'

V1 = 15,100'/s

-1000'

-2000'

REFRACTOR DEPTH BELOW M.S.L.

-3000'

-3740' [using Vave(datum to Refractor) = 12,500'/s]

V2 = 20,300'/s

Probable small dip to the North

-4000'

-5000'

-6000'

20,600'/s

Ti(F12) = 1.533

Ti(F8) = 1.502

19,900'/s

19,900'/s

Ti(F12) = 1.695

2.0

1.5

1.0

0.5

0

Time in secs.

15,900'/s

14,800'/s

Ti(F8) = 1.255

15,400'/s

PEAKS

Ti(F10) = 1.352

Ti(F11) = 1.221

Ti(F9) = 1.232

PEAKS

14,800'/s

7,900'/s

F8 | F9 | F10

Horizontal scale 1 cm = 300 Interpretation G.W. KENDALL
Vertical scales 1 cm = 200
Datum +370 1 cm = 0·1 sec. Date Jan 1965

DEPARTMENT OF MINES — SOUTH AUSTRALIA

# SEISMIC SURVEY

EUCLA BASIN — 1964

LINE F SHOT POINTS 6-12

## TIME DISTANCE CURVES & INTERPRETATION

L65-32

Abc

K&E STANDARD ® CROSS SECTION MILLIMETER
KEUFFEL & ESSER CO. MADE IN U.S.A.
K&E STANDARD ® CROSS SECTION MILLIMETER

G6 G5 EAST G4

+360'
+350'
+340'
+330'
SURFACE ELEVATION ABOVE MSL

$dv = 10'$
$Vw = 3,000'/s$

0

$V_0 = 7,000'/s$

$-440'$

$Q_1 = 06'$

$V = 16,500'/s$

-1000'

REFRACTOR DEPTH BELOW M.S.L.

-2000'

-3000'

$-3430'$ [USING VAVE (DATUM TO REFRACTUM) = 12,500'/s

$V_2 = 19,500'/s$

PROBABLE SMALL DIP TO THE EAST

-4000'

-5000'

-6000'

2.0
1.5
1.0
0.5
0

TIME IN SECS

20,000'/s
PEAKS
Ti (C.2) = .549

Ti (G.8) =
PEAKS
13,000'/s

15,000'/s
Ti (G.7) = .160

16,400'/s
16,600'/s
PEAKS
PEAKS
Ti (G.3) = .235

Ti (G6) = .237
16,600'/s

16,400'/s
Ti (G.4) = .194
6,600'/s
Ti = .185
16,400'/s

G5 G4

KEUFFEL & ESSER CO.
MADE IN U.S.A

K+E STANDARD ⊗ CROSS SECTION MILLIMETER

KEUFFEL & ESSER CO. MADE IN U.S.A.

Horizontal scale 1cm = 300' Interpretation G.W. KENDALL
Vertical scales 1cm = 200'
Datum: +330 1cm = 0·1secs Date Jan 1965

DEPARTMENT OF MINES — SOUTH AUSTRALIA

# SEISMIC SURVEY

EUCLA BASIN — 1964

LINE G SHOT POINTS 8-2

## TIME DISTANCE CURVES & INTERPRETATION

L65-31
Abc

D531a
Elevn +271'

NULLARBOR No3
ALBALA KAROO
Elevn +270'

D40½
Elevn +265'

NULLARBOR No4
GUINEWARRA
Elevn +266'

D33
Elevn +260'

NULLARBOR No8
YANGOONABIE
Elevn +256

D24
Elevn +229'

D14
Elevn +201'

D6
Elevn +191'

C4
Elevn +197'

NULLARBOR No1
ROBERTS
Elevn +190'

B5
Elevn +185'

A2
Elevn +225'

NULLARBOR No6
Elevn +231'

NULLARBOR No7
Elevn +190

REFRACTION
DEPTH PROBE LOCATION
ELEVATION ABOVE SEA LEVEL

BORE No.
NAME
ELEVn ABOVE SEA LEVEL

+1000'

M.S.L. 0

SURFACE ELEVATIONS
ABOVE MEAN SEA LEVEL
0 M.S.L.

LIMESTONE CARBONACEOUS CLAYS AND SANDS (TERTIARY)

SHALES (CRETACEOUS)

DECOMPOSED PYRITIC AND GREY SHALES (NEOCOMIAN?)

GRANITE

LIMESTONE CARBONACEOUS CLAYS AND SANDS (TERTIARY)

SHALES (CRETACEOUS)

LIMESTONE CLAY AND SANDS (TERTIARY)

BLUE SHALE (PERMIAN?)

TELESCOPE TOO SMALL

LIMESTONE CARBONACEOUS CLAYS AND SANDS (TERTIARY)

SHALES (CRETACEOUS)

LIMESTONE CARBONACEOUS CLAYS AND SANDS (TERTIARY)

DECOMPOSED PYRITIC AND GREY SHALES (NEOCOMIAN?)

LIMESTONE CLAY AND SANDS (TERTIARY)

GRANITE

19,700½

18,300½

19,800½

19,500½

19,500½

19,600½

19,600½

15,900½

16,700½

16,200½

15,700½

14,400½

14,800½

14,400½

REFRACTOR
DEPTH
BELOW
M.S.L.

+1000'
0
-10
-20
-30
-40
-50
MILLIGALLS

BOUGUER ANOMALY PROFILE (B.M.R.)

S.A. DEPT. of MINES

REFRACTION SEISMIC SURVEY ——— EUCLA BASIN 1964

CROSS SECTION — ALBALA KAROO BORE TO NULLARBOR No7 BORE

Horizontal Scale : 4 miles = 1 inch

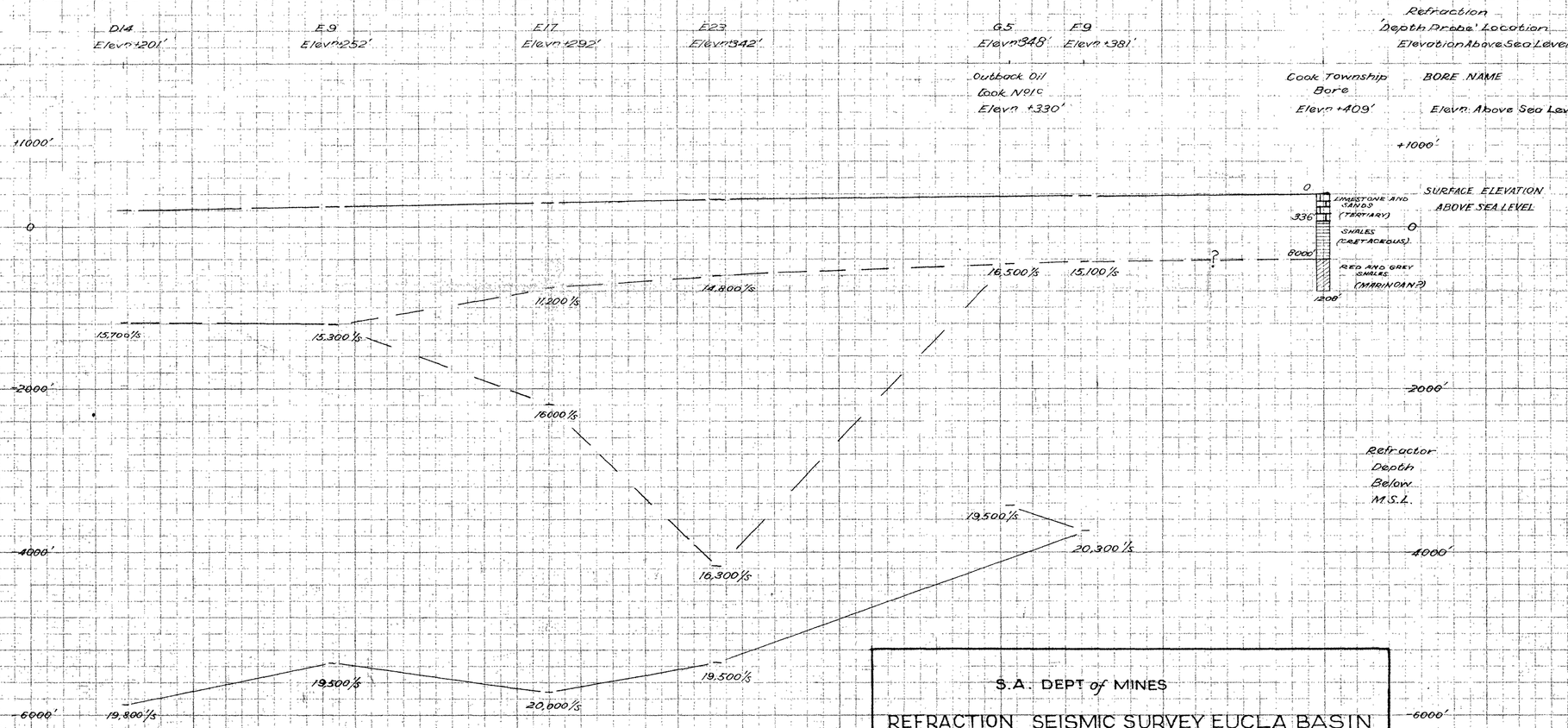
Vertical Scales : as shown

Interpretation : By G.W. Kendall

Date : Jan. 1965

L65-39
Abc

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KEUFFEL & ESSER CO.
MADE IN U.S.A.
K&E STANDARD © CROSS SECTION MILLIMETER




S.A. DEPT of MINES

REFRACTION SEISMIC SURVEY EUCLA BASIN
1964

CROSS SECTION - D14 to COOK TOWNSHIP BORE

HORIZONTAL SCALE : 4 MILES = 1 INCH

VERTICAL SCALES : AS SHOWN

INTERPRETATION by G.W. KENDALL

DATE JAN 1965

65-74
Abc

2·8"
131° = 0·8" + 2·0"

129° 30' 130° 30' 131° 30' 132°

30°

31°

32°

Hughes R.S.

Cook R.S.

Fisher R.S.

Watson R.S.

Oodla R.S.

WESTERN AUSTRALIA

-3500

Outback Oil Co
Cook N°1c Bore

-4000

-4500

Nullarbor N°6

Edge of Nullarbor Plain

-5000

Nullarbor Str. II

-5500

Albala Karroo Bore

Guinewarra Bore

Tangaanabie Bore

MALLABIE #1

-6000

HEAD OF BIGHT

S O U T H E R N O C E A N

SCALE

Miles 0 4 0 8 16 24 32 40 Miles

Traverses shown .....
Contour Interval 500 ft.

Interpretation by G. W. Kendall.

# S.A. DEPT. OF MINES

# REFRACTION SEISMIC SURVEY
# EUCLA BASIN 1965
## HIGH SPEED REFRACTOR – CONTOUR PLAN

Shot Point Locations LG4202
Associated Drawing No.

No. Amendment Exd. Date

Req. No.
D.M.
Compiled from

Approved Passed

Director of Mines

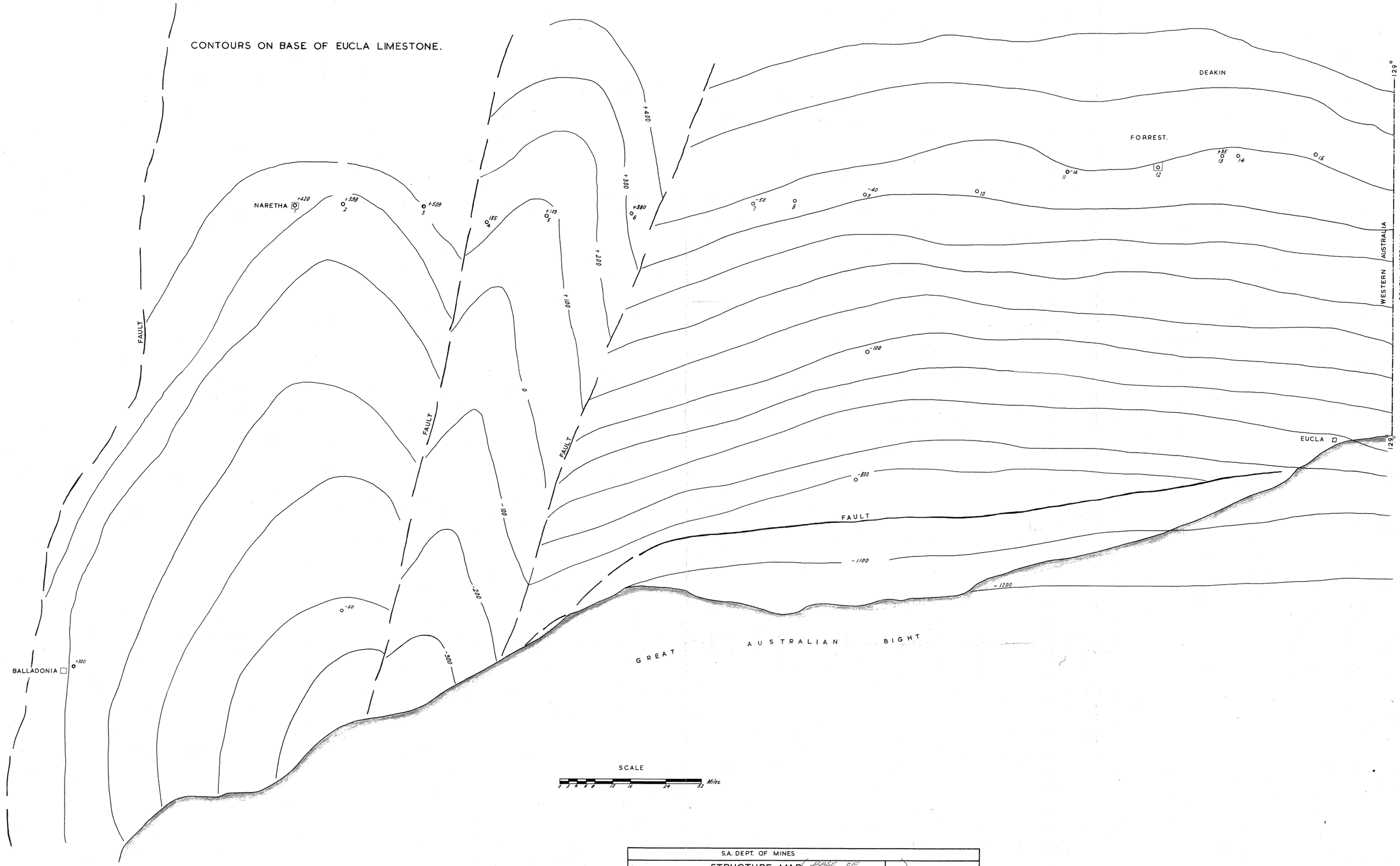
Drn.
Tcd. B.L.S.
Ckd.
Exd.

Scale 8 Miles to 1 inch

65–73
Abc

Date 15-2-65

CONTOURS ON BASE OF EUCLA LIMESTONE.




S.A. DEPT. OF MINES

STRUCTURE MAP ("BASE OF "EUCLA LIMESTONE") OF SOUTHERN PART OF EUCLA BASIN.
WESTERN AUSTRALIAN PORTION.

L62-13
994.1

AFTER HJ EVANS. JUNE 1954.

APPROXIMATE LIMIT OF MAIN BASIN OUTCROP

SAND DUNES

EUCLA BASIN

AUSTRALIA WESTERN

+200
0
-200
-400
-600
-800
-1000
-1200
?

600
400
200

HUGHES
EAST - WEST RAILWAY
COOK
COOK BORE
Bedrock 800'
R.L. -390'
FISHER
WATSON
BOLDEA
IMMARNA
BARTON
Bedrock 220'
R.L. +320'

TIETKENS WELL (Bore 3A)
Bedrock 230'
R.L. +330'

MARALINGA N° 9
Bedrock 470'
R.L. +320'
Bedrock 460'
R.L. +390'
MARALINGA N° 12
MARALINGA N° 16
Bedrock 80'
R.L. 370'

PIDINGA R.H.
201' Lighthouse

NULLARBOR N° 7
Bedrock 360'
R.L. -170'
NULLARBOR
Bedrock 650' N° 6
R.L. -480'

ALBALA KAROO BORE
Bedrock 1050'
R.L. -870'
GUINEWARRA BORE
Bedrock 1250'
R.L. -1070'
YANGOONABIE BORE
Bedrock 1390'
R.L. -1200'

Bedrock 90'
R.L. +60'
Bedrock 20'
R.L. +60'

PENONG Railway

129° 130° 131° 132° 133°
30° 31° 32°

Basement contour ---------- -600-
Natural Surface contour ---------- ·····400·····
(Contour interval 200' - Datum - Mean Sea Level)
Basement outcrop (granite & Archaean metasediments) ----
Borehole ---------- o

NOTE :- Basement Contours are approximate only being inferred from a limited amount of surface & borehole data.

# S.A. DEPT. OF MINES

SKETCH PLAN

## S.A. PORTION OF EUCLA BASIN

BASEMENT CONTOURS

Req. No.
D.M.
Compiled from

Associated Drawing | No. | No. | Amendment | Exd. | Date

Approved | Passed
Director of Mines

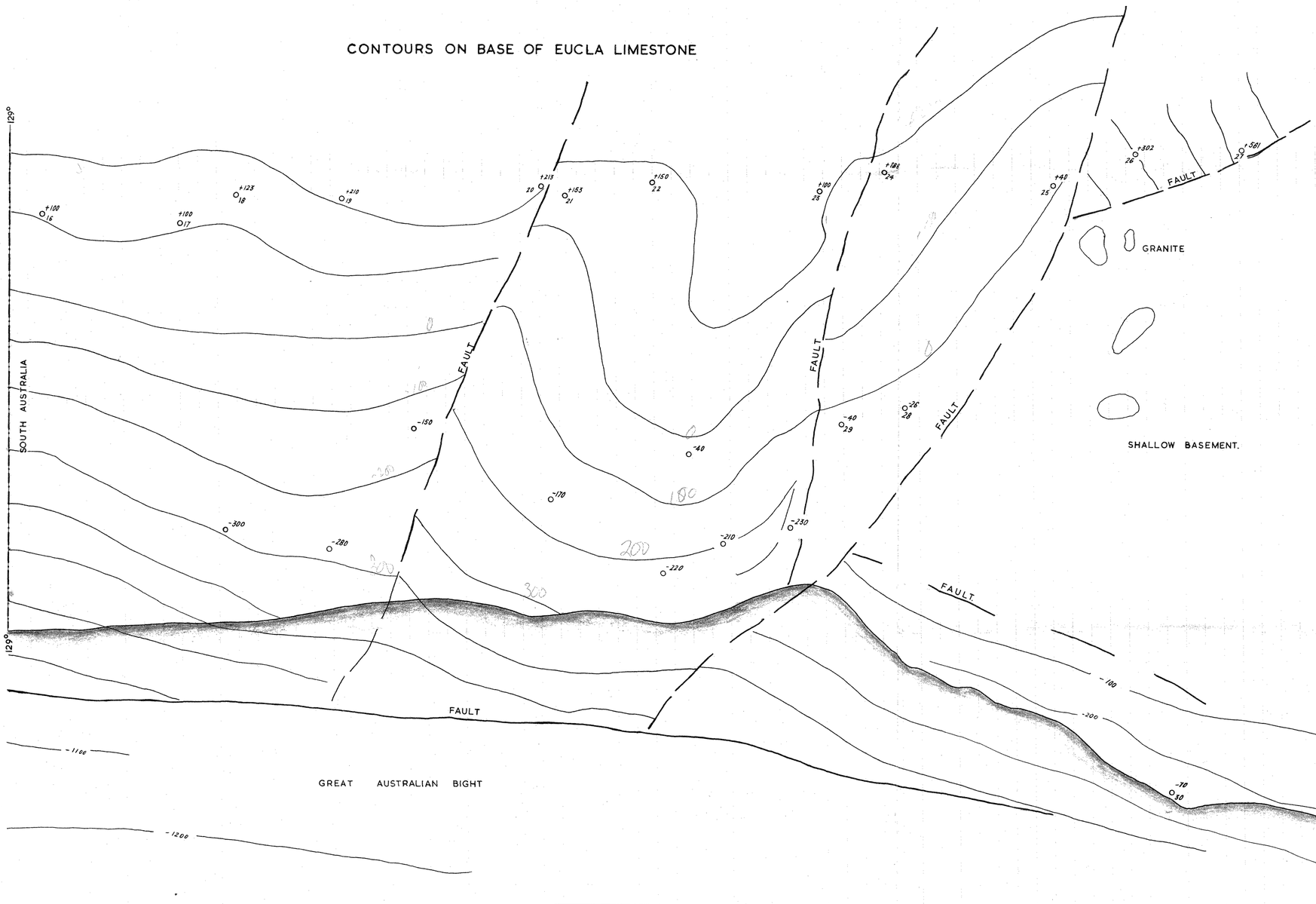
Drn.
Tcd.
Ckd.
Exd.

Scale 8 Miles to 1 inch.

62 - 112

Date 1 · 3 · 62

CONTOURS ON BASE OF EUCLA LIMESTONE




AFTER H.J EVANS. JUNE 1954.

# S.A. DEPT. OF MINES

STRUCTURE MAP OF SOUTHERN PART OF EUCLA BASIN. SOUTH AUSTRALIAN PORTION. ("BASE OF "EUCLA LIMESTONE")

Req. No.
D.M.
Compiled from

Approved | Passed

Director of Mines

Drn.
Tcd. G.K.W.
Ckd.
Exd.

Scale 8 Miles to 1 inch.

62-122
Ab

Date 8-3-62

Associated Drawing No. | No. | Amendment | Exd. | Date

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