

WCR WEST FORTESCUE-1  
VOLUME 1  
(W866)

ESSO EXPLORATION AND PRODUCTION  
AUSTRALIA INC.

WELL COMPLETION REPORT

WEST FORTESCUE-1

VOLUME 1      20 AUG 1984

**OIL and GAS DIVISION**

GIPPSLAND BASIN, VICTORIA

ESSO AUSTRALIA LIMITED

Compiled by: G.A. Nash

July, 1984

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WEST FORTESCUE-1  
WELL COMPLETION REPORT

VOLUME 1

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ESSO AUSTRALIA LTD

1.

WELL DATA RECORD

WELL : WEST FORTESCUE-1

LOCATION : Latitude : 38° 21' 56.33" S  
Longitude : 148° 14' 23.74" E  
X = 608,322.06 ME  
Y = 5,752,872.31 MN  
Map Projection: AMG ZONE 55  
Geographical Location: Gippsland Basin  
Field:

PERMIT : VIC/P1

ELEVATION : K.B. 21m A.S.L.

WATER DEPTH : 65m

TOTAL DEPTH : 2671m

PLUG BACK TYPE : Balanced plug

REASONS FOR PLUGGING BACK : Plug and Abandonment

MOVE IN : 27th April, 1984

RIG UP : 30th April, 1984

SPUDED : 30th April, 1984

RIG DOWN COMPLETE : 16th May, 1984

RIG RELEASED : 16th May, 1984

OPERATOR : Esso Australia Ltd.

PERMITTEE OR LICENCEE : BHP Petroleum Pty. Ltd.

ESSO INTEREST : 50%

OTHER INTEREST : 50%

CONTRACTOR : South Seas Drilling Company

RIG NAME : Southern Cross

EQUIPMENT TYPE : Oilwell E-2000

TOTAL RIG DAYS : 19.5

DRILLING AFE NO. : 308234003

TYPE COMPLETION : Plug and Abandonment

WELL CLASSIFICATION : Before Drilling Extension/Development  
After Drilling New Pool Discovery

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OPERATIONS SUMMARYWEST FORTESCUE-1Move and Moor

The rig departed the Australian Aquitaine farmout location under tow by the workboat Lady Sally and returned to the field and Esso payroll at 0245 hrs on 27 April, 1984. The rig arrived at the West Fortescue-1 location at 0730 hrs the same day. High wind and seas (40 knots/3m) prevented running anchors, so the rig remained under tow while W.O.W. The rig was towed to leeward to the platform area. At 1611 hours, the strop (nylon tow rope) on the Lady Sally parted, setting the rig adrift. Weather conditions at the time were 50 knot winds with 7m swells. Rig position at the time was Lat.  $38^{\circ} 19' S$  / Long.  $148^{\circ} 55' E$ , or approximately 39km east of the Flounder platform. By midnight the rig drifted to Lat.  $38^{\circ} 9.8' S$  / Long.  $149^{\circ} 22.2' E$ , or roughly 35km from its 1615 position. The rig was advised by the Lady Sally at 1945 hours that she could only turn her rudder  $10^{\circ}$  maximum using hand gear. The workboats Bass Tide and Herdentor (released from Shell) were dispatched to the rig and arrived at 2200 and 2130 hours respectively. The rig was ballasted down to 27'1" survival draft at 2045 hours. Attempts to reestablish the tow were unsuccessful due to the vessel yaw, adverse weather and sea conditions, and poor visibility.

At 0750 hours on 28 April, the workboat Atlas Dampier arrived at the rig. The tow was reestablished at 0955 hours. Rig position at this time was Lat.  $37^{\circ} 56.2' S$  / Long.  $149^{\circ} 49.5' E$ , roughly 42km south of Mallacouta. The rig drifted 90km in 17-3/4 hours, at an average speed of 5kph (2.7 knots). The rig continued a slight eastward drift in the heavy weather while being deballasted up to towing draft. The furthest position was Lat.  $37^{\circ} 51' S$  / Long.  $150^{\circ} 1.3' E$ , or 170km from the well location. The nearest landfall was approximately 29km, although at no time was the rig's course coincident with the coast line.

No significant progress was made until late PM on 28 April, when the high winds and seas began to subside. The rig was then towed to the West Fortescue-1 location, arriving at 0200 hours on 30 April.

Anchor No. 8 was dropped by the rig and the remaining seven anchors run by the workboats Bass Tide and Atlas Dampier. All anchors were successfully pretensioned to 200 kips.

Actual Location

Latitude :  $38^{\circ} 21' 56.33'' S$   
 Longitude:  $148^{\circ} 14' 23.74'' E$   
 X: 608,322.06 mE  
 Y: 5,752,872.31 mN

AMG Zone 55, Universal Transverse Mercator  
 Projection, Australian Geodetic Datum.

The wellhead was 42m at  $277^{\circ}$  from the called location and 57km at  $158^{\circ}$  from Lakes Entrance, Victoria.

26" Hole for 20" Conductor

The drilling template was run and landed at a seafloor depth of 86m RKB. The 26" hole was drilled to 223m with seawater and high viscosity gel slugs. The hole was displaced at TD with high-vis mud and a wiper trip made to the seafloor.

Drag was experienced at 154m coming out of the hole and a bridge tagged at 134m when running in. After reaming down to 157m, the bit was run to the bottom with no drag or fill. Another wiper trip was made before pulling out to run casing.

The 18-3/4" wellhead and 20" casing were run and cemented at a shoe depth of 208m RKB. The BCP stack and riser were run, and the casing and collet connector tested against the shear rams to 500 psi.

#### 17-1/2" Hole for 13-3/8" Casing

The 20" casing shoe was drilled out and the 17-1/2" hole drilled to 816m using seawater and high viscosity gel slugs. The 13-3/8" casing was run and cemented at a shoe depth of 799m RKB. The 13-3/8" seal assembly was then set and pressure tested along with the BCP stack to 200/3500/5000 psi. The cement plugs and cement were drilled out to 787m where a Phase I PIT was conducted to 1500 psi.

#### 12-1/4" Hole

The remaining cement and 6m of new hole were drilled to 822m, where a Phase II PIT was conducted to 1500 psi (20.0 ppg EMW) without leak off. The 12-1/4" hole was then drilled to TD at 2671m. Three bits, two J-1's and one J-22, were used with respective bit runs of 1042, 557, and 256m. The hole was drilled with mud weights of between 9.2 and 9.4 ppg. The 9.2 ppg mud weight was programmed as the practical minimum required to obtain the desired rheology and filtration control. This mud weight also provided a 445 psi overbalance into the top of Latrobe Formation where the pore pressure is 8.2 ppg.

Final logs including 3 RFT's, a sidewall coring run, and a velocity survey were then run. A multishot survey was also taken on a wiper trip.

#### Plug and Abandonment

An open hole balanced plug was set across the top of Latrobe from 2475 to 2366m, where it was tagged with 15 kips. The second plug was set across the 13-3/8" casing show from 850 to 750m. After running a gauge ring/junk basket to 720m, the plug was pressure tested to 1500 psi. AN EZSV bridge plug was then set at 700m.

The 13-3/8" casing was cut with a Pengo explosive cutter at 178m and pulled to surface. After a 9-1/2 hour delay due to an AWU mass meeting, the casing was laid down. A plug was then set across the stub from 208 to 118m, with 18bbls squeezed into the 20" x 13-3/8" annulus. The plug was pressure tested to 500 psi before unlatching and pulling the BCP stack and riser.

The 20" casing was then cut with a mechanical cutter at 98m and retrieved along with the wellhead, four post guidebase, and drilling template.

#### Pulling Anchors

The rig was deballasted and the eight anchors pulled by the workboats Atlas Dampier, Bass Tide, and Lady Vera. Under tow by the Atlas Dampier, the rig departed for the Tuna-4 location at 1425 hrs on 16 May 1984.







WELL: WEST FORTESCUE-1

5. SAMPLES, CONVENTIONAL CORES, SIDEWALL CORES

<u>INTERVAL</u>	<u>TYPE</u>
208 - 800m	3 sets of washed and oven dried cuttings in plastic bags every 10m. 3 sets of washed and air dried cuttings in cloth bags every 10m. 1 tinned sample unwashed every 15m.
800 - 2671	3 sets of washed and oven dried cuttings in plastic bags every 5m. 3 sets of washed and air dried cuttings in cloth bags every 5m. 1 tinned sample unwashed every 15m.
2569.2 - 2366m	Sidewall Cores (shot 5l - recovered 5l)

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WELL: WEST FORTESCUE-1

6. WIRELINE LOGS AND SURVEYS

	<u>Type and Scale</u>	<u>From</u>	<u>To</u>
			<u>Suite 1</u>
BHC-GR	1:200 1:500	2656	799m
LDL-CNL-NGT	1:200 1:500	2644	2350m
DLL-MSFL-NGT	1:200 1:500	2656	799m
NGS QUICKLOOK	1:200	2634	2350m
NGS	1:200	2634	2350m
CST	1:200	2569.2	2366m

Shot: 51  
Recovered: 51

RFT Recording

Pretests:

Run 2:	25 attempted 20 successful	2632.0	2424.9
Run 1:	sample at	2434.0	
Run 3:	attempted sample - filled too slowly @ 2 samples at	2437.0 2436.9	

HP Pressure Record 2632.0 2424.9

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TEST	SEAT	DEPTH (METRES) K.B.	CHAMBER	RECOVERY (LITRES)			HEWLETT-PACKARD FORMATION PRESSURE		HEWLETT-PACKARD HYDROSTATIC PRESSURE		REMARKS
				OIL	COND.	GAS	MPaa	Psia	MPaa	Psia	
				Litres	Litres	m <sup>3</sup>	Litres	Litres			
1	1	2434.0	22.7	17.6	0.1034	1.75	23.42	3400.1	26.79	3883.05	Valid
2	2	2632.0	Pretest				25.10	3638.7	28.94	4195.1	Valid
	3	2627.0	Pretest				25.05	3630.4	28.88	4185.5	Valid
	4	2616.7	Pretest				24.92	3612.2	28.75	4166.7	Partial Plugging - Valid
	5	2585.0	Pretest				24.26	3516.0	28.39	4115.4	Valid
	6	2564.0	Pretest				23.56	3415.5	28.15	4080.7	HP Could Not Stabilize N.B. Change in Hydrostatic
	7	2558.0	Pretest				23.26	3372.3	28.11	4075.2	Valid
	8	2544.0	Pretest				23.19	3362.0	27.96	4053.1	Valid
	9	2535.0	Pretest				23.11	3350.0	27.88	4040.8	Valid
	10	2516.5	Pretest				22.97	3330.0	27.68	4012.2	Valid
	11	2512.5	Pretest				22.98	3331.15	27.62	4003.9	Valid?
	12	2512.0	Pretest				22.99	3333.20	27.62	4003.6	Tight - Valid?
	13	2498.0	Pretest				23.63	3424.8	27.47	3981.2	Valid
	14	2475.0	Pretest				23.40	3392.0	27.22	3845.1	Valid
	15	2457.5	Pretest				23.24	3368.4	27.02	3917.2	HP Slow to Stabilize - Valid
	16	2452.5	Pretest				23.18	3359.8	26.97	3909.3	Valid
	17	2445.2	Pretest						26.88	3896.4	Tight
	18	2445.3	Pretest						26.89	3898.0	Tight
	19	2445.2	Pretest						26.89	3898.0	Tight - Gave Up
	20	2441.7	Pretest				23.52	3409.5	26.85	3891.6	Valid
	21	2440.0	Pretest				23.51	3407.8	26.83	3888.7	Valid
	22	2437.0	Pretest				23.48	3403.6	26.79	3883.6	Valid
	23	2434.0	Pretest				23.46	3401.1	26.76	3879.2	Valid - HP Slow to Stabilize
	24	2431.0	Pretest				23.44	3397.7	26.74	3875.8	Valid
	25	2429.8	Pretest						26.66	3864.2	Tight
	26	2424.9	Pretest						26.68	3867.6	Tight
27	2437.0	45.4							27.02	3917.0	Filling too Slowly - Retracted and went to 2436.9m
	28	2436.9	45.4	30.6	0.0138	13.75	23.48	3404.0	27.02	3917.0	Filled both 45.4 litre & 10.4 litre chambers in 15 & 5 minutes respectively

8.

TEMPERATURE RECORD - WEST FORTESCUE-1

LOGGING RUN	THERMOMETER DEPTH (m)	MAX. RECORDED TEMPERATURE (C°)	CIRCULATION TIME (t <sub>k</sub> ) (hours)	TIME AFTER CIRCULATION STOPPED (t)	HORNER TEMPERATURE (C°)	GEOHERMAL GRADIENT (C°/km)
<u>Suite 1</u>						
LDL-CNL-NGT	2661m	81.1	1.5	6.0 hrs		
BHC-GR	2661m	91.1	1.5	13.5 hrs		

FIGURES

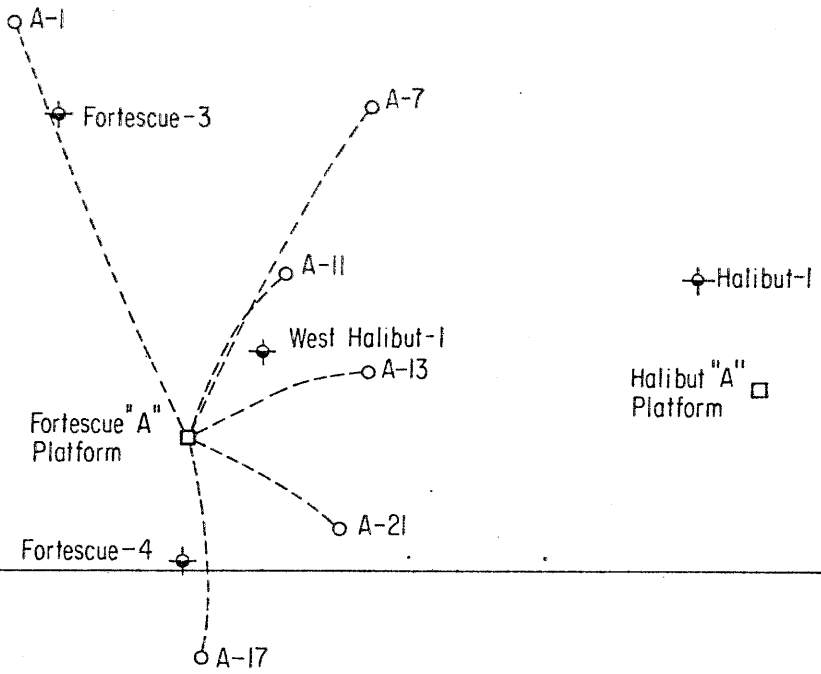
# LOCALITY MAP WEST FORTESCUE-1

SCALE 1:50 000



West Fortescue-1  
T.D. 2671m

Fortescue-1



38°25'

Fortescue-2

CF-1

CF-2

CF-3

CF-5

CF-13

CF-21

A-9

Cobia "A" Platform

Rockling-1

Cobia-1

Cobia-2

VIC/PI VIC L5

Figure 1.

Dwg 2218/OP/4

FIGURE 2

# WELL PROGRESS CURVE

WELL WEST FORTESCUE-1

RIG: SOUTHERN CROSS

LITHOLOGY

PROJECTED

ACTUAL

CASING SEAT	
DESIGN	ACTUAL
20" CSG	208
13 3/8" CSG	799
TD	2671

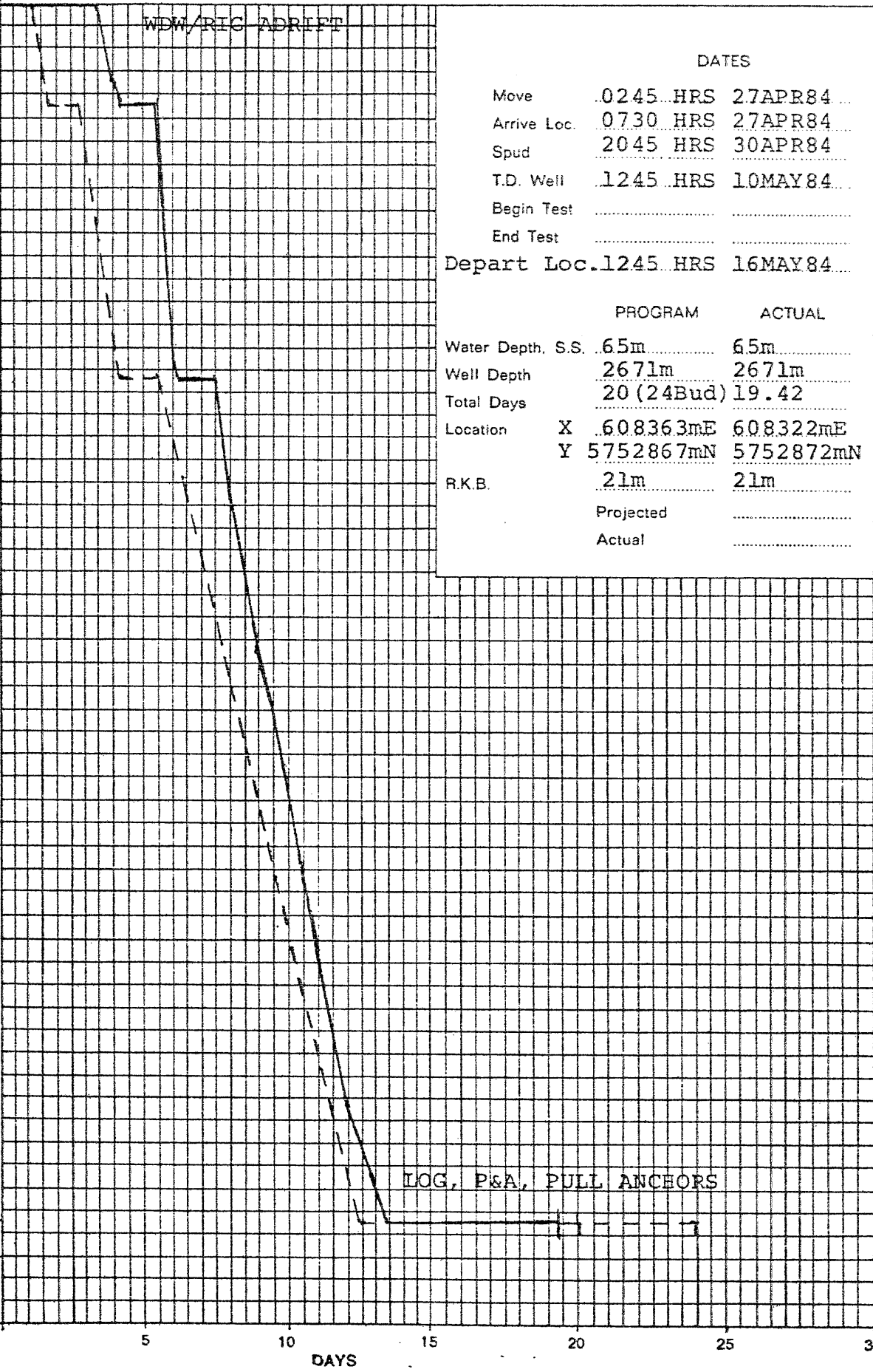
WDM/RIG ADRIPT

DATES

Move	.0245 HRS	27APR84
Arrive Loc.	0730 HRS	27APR84
Spud	2045 HRS	30APR84
T.D. Well	.1245 HRS	10MAY84
Begin Test	.....	.....
End Test	.....	.....
Depart Loc.	.1245 HRS	16MAY84

PROGRAM ACTUAL

Water Depth, S.S.	.65m	65m
Well Depth	2671m	2671m
Total Days	20 (24Bud)	19.42
Location	X .608363mE	608322mE
	Y 5752867mN	5752872mN
R.K.B.	21m	21m
	Projected	.....
	Actual	.....



LOG, P&A, PULL ANCHORS

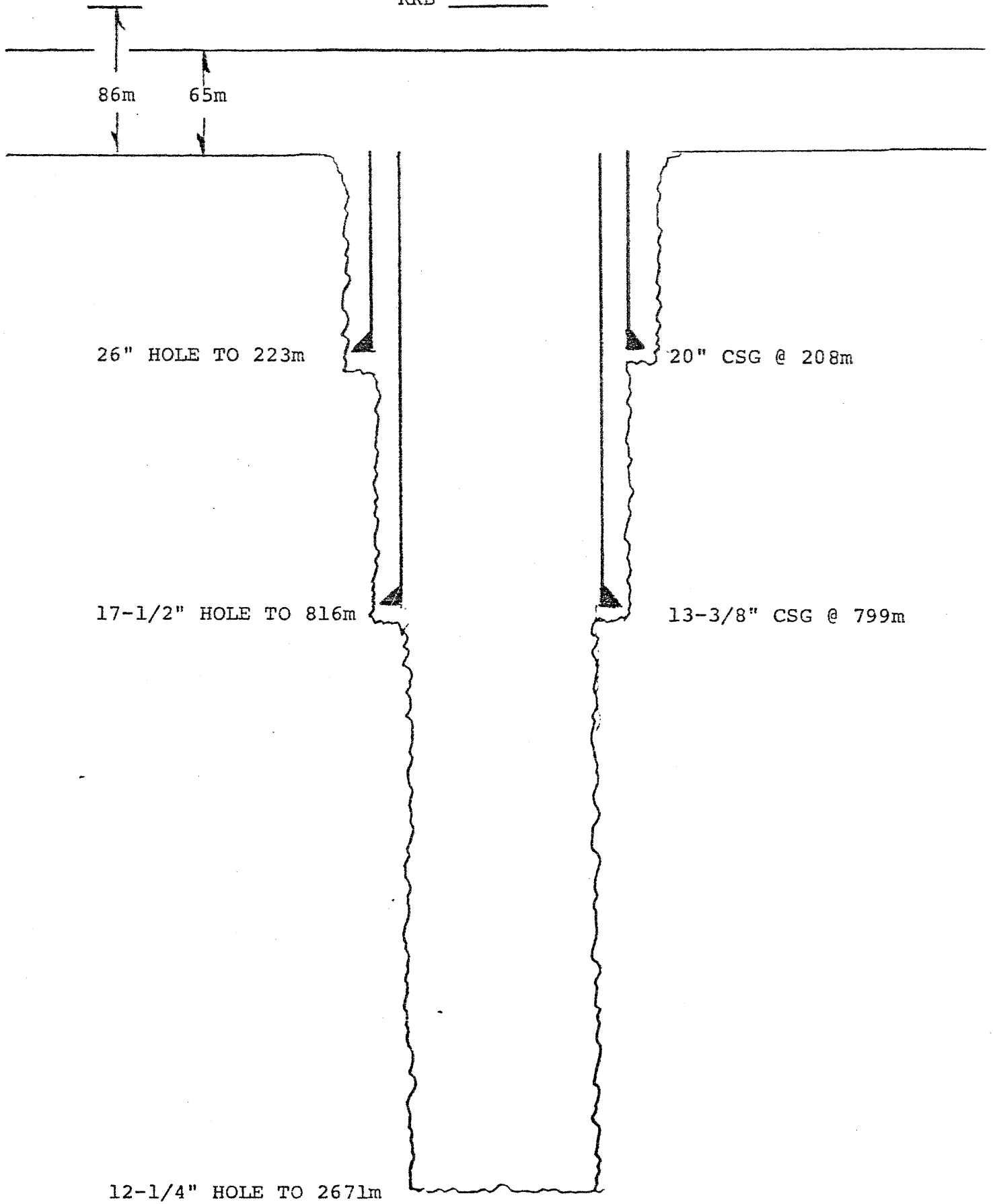
DAYS

FIGURE 3

WELLBORE SCHEMATIC

WEST FORTESCUE-1

RKB \_\_\_\_\_



26" HOLE TO 223m

20" CSG @ 208m

17-1/2" HOLE TO 816m

13-3/8" CSG @ 799m

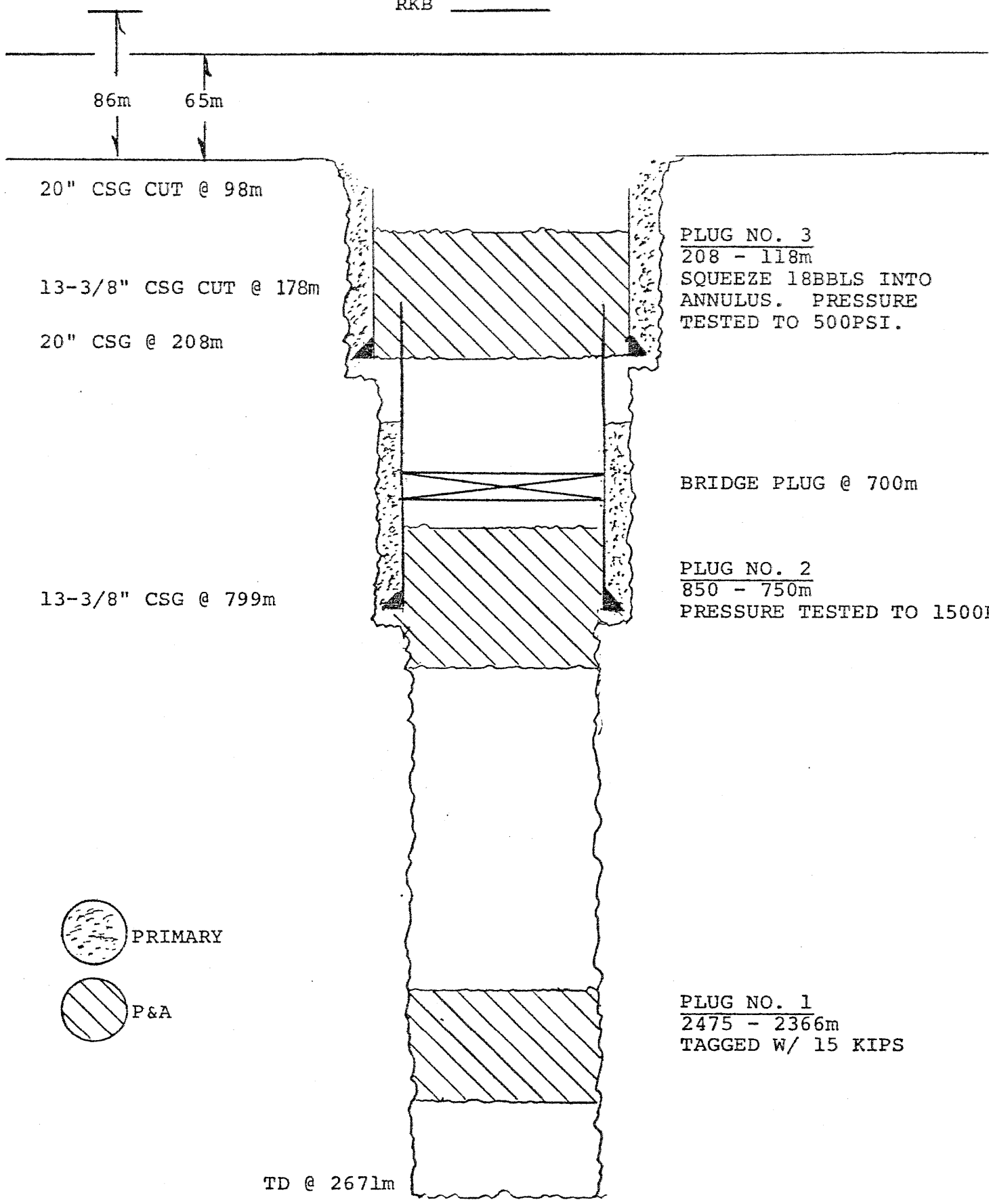
12-1/4" HOLE TO 2671m


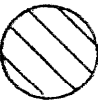
ALL DEPTHS - mRKB



FIGURE 4  
ABANDONMENT SCHEMATIC  
WEST FORTESCUE-1

RKB \_\_\_\_\_

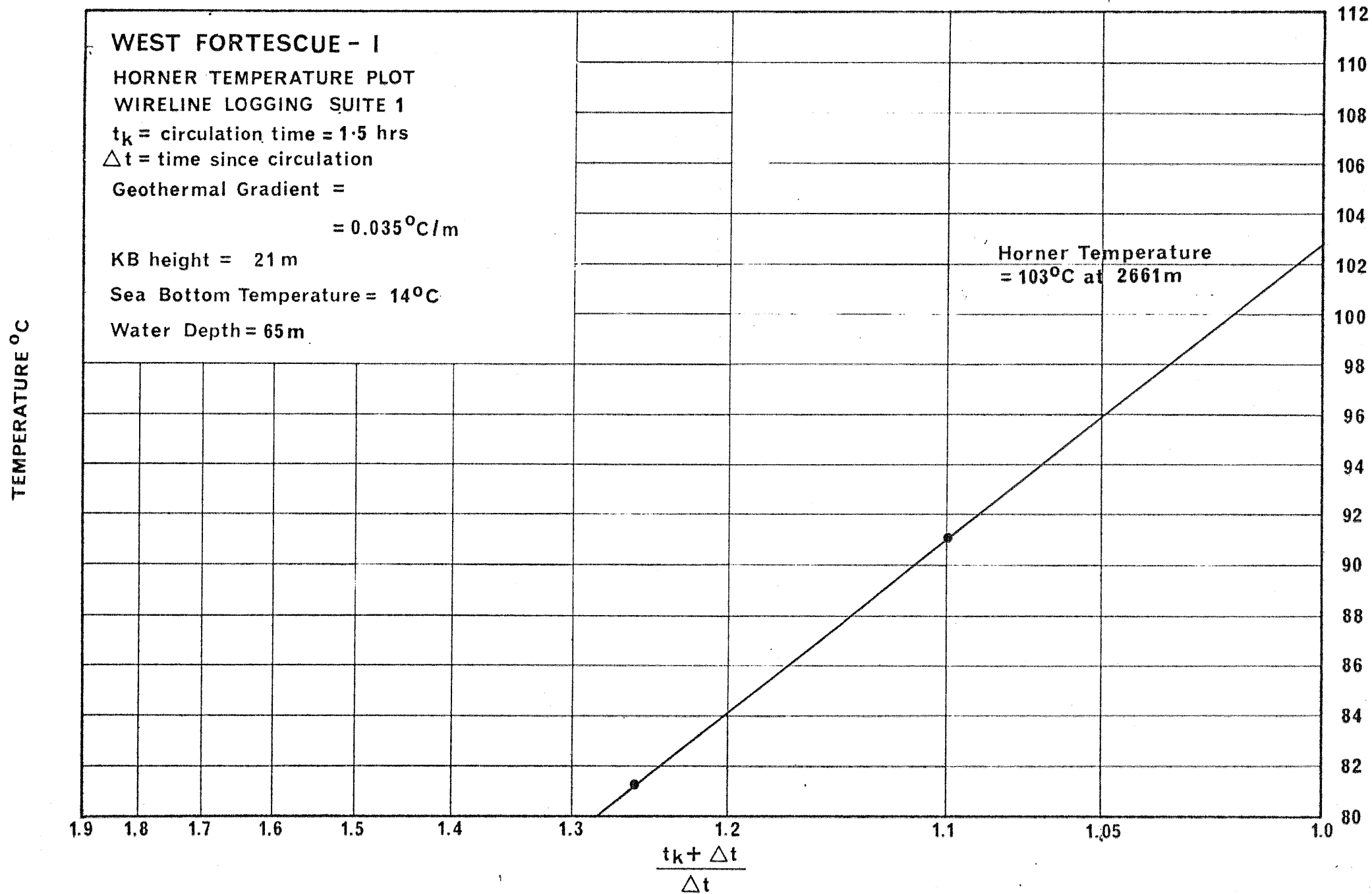


 PRIMARY  
 P&A

TD @ 2671m

ALL DEPTHS - mRKB

FIGURE 5



APPENDIX 1

WEST FORTESCUE-1

Lithology Descriptions

<u>Depth</u>	<u>%</u>	<u>Descriptions</u>
370 - 380m	90	CALCARENITE: light grey, medium to coarse grained, subrounded to subangular, moderately sorted, with calcareous cement; trace bryozoa, coral.
	10	CALCITE: off white.
380 - 390m	90	CALCARENITE: as above.
	10	CALCITE: as above.
390 - 400m	95	CALCARENITE: as above.
	5	CALCITE: light grey.
400 - 410m	95	CALCARENITE: as above.
	5	CALCITE: with shell fragments.
410 - 420m	95	CALCARENITE: as above.
	5	LIMESTONE.
	Trace	CORALS.
420 - 430m	95	CALCARENITE: as above.
	5	LIMESTONE: dark grey packstone.
430 - 440m		Poor sample quality, mostly gumbo calcisiltite?.
440 - 450m	100	CALCISILTITE: light grey, sticky silty, slightly calcareous.
450 - 470m	100	CALCISILTITE: as above.
470 - 500m	100	CALCISILTITE: Silty marl: light grey, sticky, trace of gastropode.
500 - 520m	100	CALCISILTITE: as above.
520 - 550m	100	CALCISILTITE: as above; trace of bryozoa.
550 - 560m	95	CALCARENITE: light grey, medium grained, well sorted, fossiliferous, calcareous cement, relatively firm.
	5	BRYOZOAN fragments, CORALS, ECHINOIDS.
560 - 570m	70	CALCISILTITE: light grey, calcareous.
	25	CALCARENITE: as above.
	5	BRYOZOAN fragments.
570 - 580m	95	CALCARENITE: light grey, fine to medium grained, occasionally glauconitic, well cemented, subrounded.
	5	FOSSIL fragments, GASTROPODS, BRYOZOANS, CORALS.
580 - 600m	95	CALCARENITE: as above, medium to coarse grained, glauconitic, firm.
	5	LIMESTONE: with fossil fragments.
600 - 610m	70	CALCARENITE: as above.
	30	CALCISILTITE: light grey, fine to very fine grained with calcareous clay matrix.
	Trace	BRYOZOANS and CORAL fragments.
610 - 620m	80	CALCARENITE: light grey to light cream, buff, otherwise as above.
	20	CALCISILTITE: as above.

620 - 630m	80 20	CALCARENITE: light grey otherwise as above. CALCISILTITE: very light grey otherwise as above.
630 - 640m	95 5	CALCARENITE: as above, occasionally glauconitic. LIMESTONE: Packstone: dark grey.
640 - 650m	95 5	CALCARENITE: as above. LIMESTONE: as above.
650 - 660m	90 10	CALCARENITE: as above. CALCISILTITE: light grey, slightly glauconitic, silty.
660 - 680m	100	CALCISILTITE: Silty marl: light grey, silty, sticky, with calcareous clay matrix slightly glauconitic.
680 - 690m	70 20	CALCISILTITE: as above. CALCARENITE: as above.
690 - 700m	70 30	CALCARENITE: light grey, medium grained, subangular, well cemented. CALCISILTITE: white to light grey, soft sticky.
700 - 710m	100	CALCARENITE: light grey to buff grey, fine to medium grained, well sorted, subangular to angular, well cemented.
710 - 720m	100	CALCARENITE: light grey otherwise as above.
720 - 730m	90 10 Trace	CALCARENITE: as above. CALCISILTITE: light grey to white otherwise as above. BRYOZOAN and GASTROPOD fragments.
730 - 750m	100	CALCARENITE: as above.
750 - 760m	95 5	CALCARENITE: light grey, medium grained, well sorted, well cemented, subangular, slightly glauconitic with calcareous matrix. LIMESTONE: buff to grey packstone.
760 - 770m	60 40	CALCARENITE: as above. CALCISILTITE: light grey, relatively soft, with calcareous clay matrix, trace shell fragments.
770 - 790m	80 20	CALCARENITE: very fine to fine grained, occasionally medium grained, subangular, moderately sorted and cemented. CALCISILTITE: as above.
790 - 810m	90 10	CALCARENITE: light grey, with trace of glauconite, otherwise as above. CALCISILTITE: as above.
810 - 816m	100	CALCARENITE: as above.
816 - 820m	100	CALCARENITE: light grey to grey, very fine to fine grained, subrounded, moderately well sorted, well cemented with finely disseminated glauconite.

820 - 850m		There is more than 50% cement cuttings mixed with formation cuttings.
850 - 895m		Most of the cuttings are either caving or cement.
905 - 910m	100	CALCARENITE: as above.
910 - 915m	100	CALCARENITE: very fine to fine grained otherwise as above.
915 - 925m	100	CALCARENITE: as above.
925 - 935m	100	CALCARENITE: as above.
935 - 940m	60 40	CALCARENITE: as above. CALCISILTITE: light grey, fine grained, moderately soft.
940 - 945m	70 30	CALCISILTITE: as above. CALCARENITE: as above.
945 - 950m	80 20	CALCISILTITE: as above. CALCARENITE: as above.
950 - 955m	90 10	CALCISILTITE: as above. CALCARENITE: as above.
955 - 960m	100	CALCISILTITE: light grey, very fine to fine grained, soft.
960 - 965m	100	CALCISILTITE: light grey, fine grained with calcareous clay matrix.
965 - 970m	100	CALCISILTITE: as above.
970 - 975m	80 20	CALCISILTITE: as above. CALCARENITE: light grey, very fine grained, well sorted, moderately well cemented with clay matrix.
975 - 980m	50 50	CALCISILTITE: as above. CALCARENITE: as above.
980 - 985m	50 50	CALCISILTITE: as above. CALCARENITE: as above.
985 - 995m	70 30	CALCARENITE: as above. CALCISILTITE: as above.
995 - 1005m	90  10	CALCARENITE: grey, very fine to fine grained, well sorted, well cemented, slightly glauconitic and fossiliferous. CALCISILTITE: very light grey, otherwise as above.
1005 - 1010m	95 5	CALCARENITE: grey, otherwise as above. FOSSILS (gastropods and fragments of bryozoans).
1010 - 1015m	90 10	CALCARENITE: as above. LIMESTONE: fossiliferous; Packstone.
1015 - 1020m	80  20	CALCARENITE: light grey to grey, well cemented, fossiliferous. CALCISILTITE: very light grey to white.
1020 - 1025m	100	CALCARENITE: very fine to fine grained, well sorted, very well cemented with partial dolomitic matrix.

1025 - 1035m	80	LIMESTONE: Wackstone: dark grey, dolomitic, hard (Type (I), (A), Archie Classification).
	20	CALCARENITE: as above.
1035 - 1040m	50	CALCARENITE: light grey, very fine grained.
	40	LIMESTONE: as above.
	10	CALCILUTITE: (probably caving).
1040 - 1050m	80	CALCARENITE: as above.
	20	LIMESTONE: Packstone: light grey to cream, fossiliferous.
1050 - 1055m	100	CALCARENITE: as above.
1055 - 1060m	100	CALCARENITE: light grey, very fine grained, well sorted, well cemented.
1060 - 1070m	50	CALCARENITE: very fine grained as above.
	50	CALCILUTITE: (silty marl) light grey.
1070 - 1075m	70	CALCARENITE: as above.
	20	CALCILUTITE: as above.
	10	LIMESTONE: Packstone: white to light grey.
1075 - 1085m	80	CALCILUTITE: light grey, sticky (silty marl).
	20	CALCARENITE: as above.
1085 - 1090m	50	CALCILUTITE: as above.
	50	CALCARENITE: as above.
1090 - 1095m	70	CALCILUTITE: light grey, sticky (silty marl).
	30	CALCARENITE: light grey to grey, fine grained, well cemented.
1095 - 1100m	60	CALCILUTITE: as above.
	30	CALCARENITE: as above.
	10	LIMESTONE: dark grey to brown, hard, (calcareous mudstone).
1100 - 1105m	50	CALCARENITE: light grey to light buff, very fine grained, well sorted, very well cemented.
	30	CALCILUTITE: as above.
	20	LIMESTONE: greyish brown, otherwise as above.
1105 - 1110m	80	CALCARENITE: very fine grained.
	20	CALCILUTITE: white to light grey, otherwise as above.
1110 - 1115m	60	CALCARENITE: as above.
	45	CALCILUTITE: silty, otherwise as above.
	5	LIMESTONE: as above.
1115 - 1120m	70	CALCARENITE: as above.
	20	CALCILUTITE: as above.
	10	LIMESTONE: as above.
1120 - 1125m	60	CALCILUTITE: white to light grey, silty, sticky, soft.
	40	CALCARENITE: as above.
1125 - 1130m	70	CALCISILTITE: light grey to white.
	30	CALCARENITE: as above.
1130 - 1135m	60	CALCARENITE: as above.
	40	CALCISILTITE: as above.
1135 - 1140m	90	CALCISILTITE: as above.
	10	CALCARENITE: as above.

1140 - 1145m	60 40	CALCISILTITE: as above. CALCARENITE: as above.
1145 - 1150m	50 50	CALCISILTITE: as above CALCARENITE: as above
1150 - 1155m	70 30	CALCARENITE: as above. CALCISILTITE: as above.
1155 - 1175m	80 20	CALCARENITE: as above. CALCISILTITE: as above.
1175 - 1190m	70	CALCARENITE: very fine grained, pyritic, calcitic, otherwise as above.
1190 - 1195m	60 30 10	LIMESTONE: dark grey to greyish brown, hard, calcareous mudstone. CALCARENITE: as above. CALCISILTITE: as above.
1195 - 1200m	60 30 10	CALCARENITE: very fine to fine grained, otherwise as above. CALCISILTITE: light grey, otherwise as above. LIMESTONE: as above.
1200 - 1205m	60 30 10	MARL: light grey, soft, silty. CALCARENITE: grey, medium grained, well sorted, well cemented. LIMESTONE: as above.
1205 - 1210m	80 20	MARL: as above. CALCARENITE: as above.
1210 - 1220m	90 10	MARL: as above. CALCISILTITE: grey to medium grey, firm.
1220 - 1230m	70 30	MARL: as above. SILTSTONE: dark grey with calcareous cement.
1230 - 1235m	60 40	MARL: as above. SILTSTONE: calcareous matrix, otherwise as above.
1235 - 1240m	50 40 10	MARL: as above. SILTSTONE: very fine grained, calcareous matrix, well cemented. LIMESTONE: Packstone: grey to brownish grey, fossiliferous.
1240 - 1245m	90 10	CALCARENITE: grey to buff grey, fine grained, subrounded to subangular, well sorted, well cemented, with dolomitic matrix. MARL: light grey, silty.
1245 - 1250m	100	CALCARENITE: grey to dark grey, strongly dolomitic, with calcareous cement.
1250 - 1255m	80 20	CALCARENITE: as above. LIMESTONE: brown to grey, hard, mudstone.
1255 - 1260m	60 40	CALCARENITE: grey to dark grey, otherwise as above. MARL: light grey, soft, silty.
1260 - 1265m	50 50	CALCARENITE: as above. MARL: as above.



1265 - 1270m	60	MARL: as above.
	40	CALCARENITE: very fine grained, otherwise as above.
1270 - 1285m	70	CALCARENITE: grey to dark grey, otherwise as above.
	30	MARL: as above.
1285 - 1290m	60	CALCARENITE: as above.
	40	MARL: as above.
1290 - 1295m	50	CALCARENITE: dark grey, otherwise as above.
	50	MARL: as above.
1295 - 1300m	70	CALCARENITE: as above.
	30	MARL: as above.
1300 - 1305m	60	MARL: as above.
	40	CALCARENITE: as above.
1305 - 1325m	80	CALCARENITE: dark grey, fine to medium grained, well cemented, firm.
	20	MARL: light grey, soft, silty.
1325 - 1330m	70	CALCARENITE: as above.
	30	MARL: as above.
1330 - 1335m	80	CALCARENITE: grey to dark grey, fine to medium grained, well cemented.
	20	MARL: light grey to white, soft, silty.
1335 - 1340m	70	MARL: very light grey, silty, calcareous, soft, slightly sticky.
	30	CALCARENITE: as above.
1340 - 1350m	50	MARL: as above.
	50	CALCARENITE: as above.
1350 - 1355m	60	CALCARENITE: as above.
	40	MARL: as above.
1355 - 1360m	60	MARL: as above.
	40	CALCARENITE: as above.
1360 - 1365m	70	CALCARENITE: as above.
	30	MARL: as above.
1365 - 1370m	70	CALCARENITE: grey, fine to medium grained, well sorted, well cemented, dolomitic, with calcite - filled voids.
	30	MARL: light grey, soft, silty, calcareous.
1370 - 1375m	70	MARL: as above.
	30	CALCARENITE: as above.
1375 - 1380m	80	CALCARENITE: light grey to grey to buff grey, fine to medium grained, well cemented, dolomitic matrix and grains.
	20	MARL: as above, (cavings).
1380 - 1385m	80	MARL: light grey, soft, silty.
	20	CALCARENITE: as above.
1385 - 1390m	70	MARL: as above.
	30	CALCARENITE: as above.
1390 - 1395m	50	CALCARENITE: as above.
	50	MARL: as above.

1395 - 1400m	60	MARL: as above.
	40	CALCARENITE: as above.
1400 - 1405m	90	MARL: light grey, white, silty, sandy soft, calcareous.
	10	CALCARENITE: as above.
1405 - 1410m	80	MARL: as above.
	20	CALCARENITE: as above.
1410 - 1415m	60	MARL: light grey to whitish grey, calcareous, silty, soft.
	40	CALCARENITE: grey, fine to medium grained, well sorted, well cemented, with dolomitic matrix.
1415 - 1425m	50	CALCARENITE: as above.
	50	MARL: as above.
1425 - 1435m	80	MARL: very silty, otherwise as above.
	20	CALCARENITE: as above.
1435 - 1440m	60	CALCARENITE: as above.
	40	MARL: as above.
1440 - 1445m	70	MARL: as above.
	30	CALCARENITE: as above.
1445 - 1450m	50	CALCARENITE: as above.
	50	MARL: as above.
1450 - 1455m	70	MARL: very light grey, soft.
	30	CALCARENITE: as above.
1455 - 1465m	60	CALCARENITE: as above.
	40	MARL: as above.
1465 - 1470m	50	CALCARENITE: as above.
	50	MARL: as above.
1470 - 1475m	50	CALCARENITE: light grey to grey, fine to medium grained, well cemented.
	50	MARL: light grey, soft, silty.
1475 - 1480m	60	MARL: as above.
	40	CALCARENITE: as above.
1480 - 1485m	70	CALCARENITE: as above.
	30	MARL: as above.
1485 - 1490m	80	MARL: as above.
	20	CALCARENITE: as above.
1490 - 1495m	60	MARL: as above.
	40	CALCARENITE/CALCISILTITE.
1495 - 1500m	50	CALCARENITE: as above.
	50	MARL: as above.
1500 - 1505m	60	MARL: as above.
	40	CALCARENITE: as above.
1505 - 1515m	70	MARL: as above.
	30	CALCARENITE: as above.
1515 - 1520m	80	MARL: as above.
	20	CALCARENITE: as above.

1520 - 1530m	90	MARL: as above.
	10	CALCARENITE: as above.
1530 - 1535m	80	MARL: as above.
	20	CALCARENITE: as above.
1535 - 1545m	60	CALCARENITE: grey to dark grey, fine grained, well sorted, dolomitic matrix, calcareous cement.
	40	MARL: light grey, silty, soft.
1545 - 1550m	50	CALCARENITE: as above.
	50	MARL: as above.
1550 - 1555m	70	MARL: as above.
	30	CALCARENITE: as above.
1555 - 1560m	60	CALCARENITE: as above.
	40	MARL: as above.
1560 - 1570m	80	MARL: as above.
	20	CALCARENITE: as above.
1570 - 1580m	90	MARL: as above.
	10	CALCARENITE: as above.
1580 - 1585m	80	MARL: as above.
	20	CALCARENITE: as above.
1585 - 1590m	70	MARL: as above.
	30	CALCARENITE: as above.
1590 - 1595m	50	CALCARENITE: as above.
	50	MARL: as above.
1595 - 1600m	60	MARL: light grey to greyish white, soft, silty, slightly glauconitic.
	40	CALCARENITE: light grey to dark grey, very fine to fine grained, well sorted, with calcareous cement, partly dolomitic matrix, finely disseminated glauconite.
1660 - 1605m	80	MARL: as above.
	20	CALCARENITE: as above.
1605 - 1615m	80	CALCARENITE: as above.
	20	MARL: as above.
1615 - 1625m	60	CALCARENITE: grey, fine to medium grained, moderately cemented, occasionally fossiliferous.
	40	MARL: as above.
1625 - 1630m	70	CALCARENITE: as above.
	30	MARL: as above.
1630 - 1640m	80	CALCARENITE: as above.
	20	MARL: as above.
1640 - 1645m	100	CALCARENITE: as above.
1645 - 1650m	80	CALCARENITE: as above.
	20	MARL: as above.

1655 - 1670m	80	CALCARENITE: dark grey, very fine grained, well sorted, well cemented, occasionally fossiliferous.
	20	MARL: light grey to whitish grey, soft, calcareous.
1670 - 1680m	90	CALCARENITE: as above.
	10	MARL: as above.
1680 - 1685m	100	CALCARENITE: dark grey to grey, very fine to fine grained, moderately sorted, well cemented, occasionally fossiliferous with calcite filled voids and fractures.
1685 - 1690m	90	CALCARENITE: as above.
	10	MARL: light grey to grey, soft, strongly calcareous.
1690 - 1700m	100	CALCARENITE: as above.
1700 - 1710m	80	CALCARENITE: as above.
	20	MARL: as above.
1710 - 1720m	60	CALCARENITE: as above.
	40	MARL: as above.
1720 - 1725m	70	MARL: as above.
	30	CALCARENITE: as above.
1725 - 1730m	100	MARL: as above.
1730 - 1735m	80	MARL: as above.
	20	CALCARENITE: as above.
1735 - 1745m	50	CALCARENITE: as above.
	50	MARL: as above.
1745 - 1750m	70	MARL: as above.
	30	CALCARENITE: as above.
1750 - 1760m	60	CALCARENITE: as above.
	40	MARL: as above.
1760 - 1770m	80	CALCARENITE: very fine grained, otherwise as above.
	20	MARL: as above.
1770 - 1780m	70	CALCARENITE: very fine grained, glauconitic.
	30	MARL: as above.
1780 - 1790m	80	CALCARENITE: as above.
	20	MARL: as above.
1790 - 1795m	90	CALCARENITE: dark grey, glauconitic.
	10	MARL: as above.
1795 - 1805m	100	CALCARENITE: as above.
1805 - 1810m	70	CALCARENITE: dark to blueish grey, fine to medium grained, grading to calcisiltite, well sorted with calcareous cement.
	30	MARL: light grey to grey, soft, occasionally glauconitic.
1810 - 1815m	90	CALCARENITE: fine grained, otherwise as above.
	10	MARL: as above.

1815 - 1820m	70 30	MARL: light grey, soft slightly silty. CALCARENITE: as above.
1820 - 1825m	70 30	CALCARENITE/CALCISILTITE. MARL: sandy, silty, otherwise as above.
1825 - 1830m	60 40	CALCARENITE: slightly glauconitic. MARL: light grey, soft, silty.
1830 - 1835m	60 40	MARL: as above. CALCARENITE: fine to medium grained, otherwise as above.
1835 - 1840m	50 50	CALCARENITE: as above. MARL: light grey, silty, otherwise as above.
1840 - 1845m	50 50	CALCARENITE: dark grey, fine to medium grained, well cemented. MARL: light grey, silty, soft.
1845 - 1855m	60 40	CALCARENITE: as above. MARL: as above.
1855 - 1860m	70  20 10	CALCARENITE: dark grey to grey, fine to medium grained, well cemented, dolomitic, glauconitic. MARL: light grey, silty, soft. LIMESTONE: light grey to white, sandy.
1860 - 1870m	80 20	CALCARENITE: as above. LIMESTONE: as above.
1870 - 1875m	90 10	CALCARENITE: as above. LIMESTONE: as above.
1875 - 1880m	100	CALCARENITE: dark grey, fine to coarse grained, moderately sorted, moderately cemented.
1880 - 1885m	95  5	CALCISILTITE: dark grey, very fine to fine grained, calcareous, glauconitic, occasionally sandy. LIMESTONE: Trace: white to light grey, sandy, glauconitic.
1885 - 1890m	95 5	CALCARENITE: as above. LIMESTONE: as above.
1890 - 1895m	90 10	CALCARENITE: as above. LIMESTONE: as above.
1895 - 1900m	80 20	CALCARENITE: as above. MARL: as above.
1900 - 1905m	60 40	CALCISILTITE. CALCARENITE: as above.
1905 - 1910m	50 50	CALCARENITE: as above. CALCISILTITE: dark grey, fossiliferous.
1910 - 1915m	70 30	CALCISILTITE: as above. CALCARENITE: as above.
1915 - 1920	100	CALCISILTITE: dark grey, very fine grained, well sorted, moderately cemented, glauconitic, calcite filled voids/fractures.

1920 - 1925m	80	CALCISILTITE: as above.
	20	CALCARENITE: as above.
1925 - 1930m	70	CALCARENITE: as above.
	30	CALCISILTITE: as above.
1930 - 1940m	60	CALCARENITE: as above.
	30	CALCISILTITE: as above.
	10	LIMESTONE: white, sandy, glauconitic.
1940 - 1950m	50	CALCARENITE: as above.
	30	LIMESTONE: white, sandy strongly, glauconitic.
	20	CALCISILTITE: as above.
1950 - 1960m	70	CALCARENITE: fine to coarse grained, well cemented.
	30	LIMESTONE: white, sandy, glauconitic.
1960 - 1980m	100	CALCARENITE: fine to medium grained, well cemented, fossiliferous.
1980 - 1990m	80	CALCARENITE: as above.
	20	MARL: light grey, soft, sandy.
1990 - 1995m	50	CALCARENITE/CALCISILTITE.
	50	MARL: as above.
1995 - 2000m	80	MARL: as above.
	20	CALCARENITE: as above.
2000 - 2010m	60	MARL: as above.
	40	CALCARENITE: as above.
2010 - 2015m	80	MARL: as above.
	20	CALCARENITE: as above.
2015 - 2020m	70	MARL: as above.
	30	CALCARENITE: as above.
2020 - 2025m	60	CALCARENITE: dark grey, fine to medium grained, firm.
	40	MARL: light grey, soft, silty.
2025 - 2030m	70	MARL: as above.
	30	GUMBO ?
2030 - 2045m	70	CALCARENITE: very fine to fine grained.
	30	MARL: as above.
2045 - 2050m	60	MARL: as above.
	40	CALCARENITE: very fine grained, pyritic.
2050 - 2055m	80	MARL: as above.
	20	CALCARENITE: very fine grained.
2055 - 2060m	60	MARL: silty.
	40	CALCARENITE: as above.
2060 - 2070m	80	MARL: as above.
	20	CALCARENITE: as above.
2070 - 2075m	60	MARL: as above.
	40	CALCARENITE: as above.
2075 - 2080m	80	CALCARENITE: as above.
	20	MARL: as above.

2080 - 2100m	90 10	CALCARENITE: as above. MARL: as above.
2100 - 2105m	70 30	CALCARENITE: as above. MARL: as above.
2105 - 2110m	60 40	CALCARENITE: very fine to fine grained, firm, well to finely disseminated glauconitic. MARL: light grey, silty, very calcareous, soft.
2110 - 2130m	100	CALCISILTITE/CALCARENITE: very fine grained, otherwise as above.
2130 - 2140m	80 20	CALCARENITE: as above. MARL: as above.
2140 - 2150m	90 10	CALCARENITE: as above. MARL: as above.
2150 - 2160m	80 20	CALCARENITE: as above. MARL: as above.
2160 - 2180m	100	CALCISILTITE: dark grey to bluish grey, very fine grained, slightly calcareous, occasionally sandy, firm.
2180 - 2195m	80 20	CALCISILTITE: as above. MARL: as above.
2195 - 2200m	100	CALCISILTITE: as above.
2200 - 2220m	100	CALCISILTITE: grey to dark grey, occasionally bluish grey, pyritic, firm.
2220 - 2230m	80 20	CALCISILTITE: as above. MARL: as above.
2230 - 2235m	60 40	CALCISILTITE: as above. MARL: as above.
2235 - 2240m	80 20	CALCISILTITE: as above. MARL: as above.
2240 - 2245m	70 30	CALCISILTITE: as above. MARL: as above.
2245 - 2250m	80 20	CALCISILTITE: as above. MARL: as above.
2250 - 2255m	70 30	MARL: as above. CALCISILTITE: as above.
2255 - 2260m	50 50	CALCISILTITE: as above. MARL: as above.
2260 - 2265m	80 20	MARL: light grey, white, silty, very calcareous. CALCISILTITE: very calcareous.
2265 - 2270m	80 20	CALCISILTITE: as above. MARL: as above.
2270 - 2275m	70 30	CALCISILTITE: as above. MARL: as above.
2275 - 2280m	80 20	CALCISILTITE: as above. MARL: as above.

2280 - 2310m	100	CALCISILTITE: (calcareous mudstone) very dark grey to greenish grey, moderately soft, occasionally silty.
2310 - 2320m	80	CALCILUTITE: as above.
	20	MARL: light grey to white, sandy, silty, soft.
2320 - 2325m	100	CALCILUTITE: dark grey, occasionally silty, pyritic.
2325 - 2330m	100	CALCILUTITE: as above.
2330 - 2345m	80	CALCILUTITE: as above, with occasional small carbonaceous material.
	20	CALCARENITE: slightly glauconitic.
2345 - 2350m	70	CALCILUTITE: (calcareous claystone).
	30	MARL: light grey, silty, calcareous.
2350 - 2355m	60	CALCILUTITE: as above.
	40	CALCARENITE: light grey, fossiliferous.
2355 - 2360m	60	CALCILUTITE: pyritic, calcite filled voids.
	40	MARL: as above.
2360 - 2365m	80	CALCILUTITE: (calcareous shale) greenish grey.
	20	CALCARENITE: as above.
2365 - 2375m	100	CALCILUTITE: (calcareous shale).
2375 - 2385m	70	SHALE: calcareous.
	30	CALCARENITE: light grey to cream, fine to medium to coarse grained, occasionally fossiliferous and glauconitic.
2385 - 2390m	60	CALCARENITE: as above.
	40	SHALE: calcareous.
2390 - 2400m	70	SHALE: calcareous.
	30	CALCARENITE: as above.
2400 - 2405m	40	CALCARENITE: as above.
	40	SHALE: calcareous.
	20	MARL: as above.
2405 - 2410m	70	CALCARENITE: grading into calcisiltite.
	30	SHALE: calcareous.
2410 - 2415m	70	SHALE: calcareous.
	30	CALCARENITE: as above.
2415 - 2420m	100	SHALE: calcareous.
2420 - 2425m	90	SHALE: calcareous.
	10	SANDSTONE: white, fine to medium grained, occasionally coarse grained, subangular, siliceous cement, common pyrite, occasionally coarse glauconite, no visual porosity, poor white yellow fluorescence, no cut; occasionally clear rounded opaque quartz granules; dull oil stain.



2425 - 2430m	80	SANDSTONE: Type 1) white to clear, fine grained, subangular to subrounded quartz in a predominantly clay matrix with siliceous cut, occasionally coarse to very coarse well angled glauconite, occasional pyrite cluster, 20% white to predominantly yellow fluorescence with slow diffuse to streaming white cut, occasional dark brown oil staining. Type 2) common clear opaque rounded to subrounded quartz granules (chipped from larger quartz clast), tight. No shows.
	20	SHALE: calcareous.
2430 - 2435m	90	SANDSTONE: 50% Type 2) mainly quartz granules, white to clear. 40% Type 1) light grey to white grey, fine to medium to coarse grained, subrounded to subangular, moderately sorted, moderately cemented, occasionally pyritic, with trace oil stain yellow fluorescence, fast stream cut; trace of coal.
	10	SHALE: calcareous
2435 - 2440m	80	SANDSTONE: mainly Type 2), quartz granules, shows yellowish white fluorescence, faint even cut.
	10	SHALE: greyish brown, fissile, with oil stain and blueish white even cut.
	10	COAL.
2440 - 2445m	80	SANDSTONE: Type 1) white to light grey, subrounded to subangular, siliceous cement with clay-silt matrix, moderately sorted, common pyrite, occasional brown oil staining. 10% white to yellow fluorescence with fast streaming cut, fair porosity. Type 2) clear opaque quartz granules, common oil staining with yellow to white fluorescence and slow diffuse cut.
	15	SHALE: calcareous, as above.
	5	COAL: black, bituminous, conchoidal fracture.
2445 - 2450m	80	SANDSTONE: 20% Type 1) light grey to brownish grey, fine to medium grained, subangular to subrounded, moderately sorted and cemented, with clay-silt matrix, common pyrite, trace fluorescence, no cut. 60% Type 2) clear opaqu quartz granules as above, no fluorescence, no cut.
	20	SHALE: as above.
2450 - 2455m	90	SANDSTONE: mainly Type 2) clear opaque quartz granules, no fluorescence, no cut.
	10	SHALE: as above.
2455 - 2460m	100	SANDSTONE: Type 2) clear, opaque, subrounded to subangular quartz granules, good sorting, occasional pyrite encrustations (?), otherwise very clean, no visual porosity, no fluorescence, no cut.
2460 - 2465m	100	SANDSTONE: Type 2) as above.
2465 - 2470m	100	SANDSTONE: Type 2) as above.
2470 - 2475m	100	SANDSTONE: Type 2) clear, opaque quartz with minor pyrite flecks, otherwise as above.
2475 - 2480m	100	SANDSTONE: Type 2) as above.

2480 - 2485m	100	SANDSTONE: (no fluorescence, no cut). 20% Type 1) clear, opaque quartz granules with minor pyrite. 80% Type 2) clear to white, medium coarse to very coarse, moderately sorted, poorly cemented, occasional pyrite and/or glauconite, and brown, grey silty matrix.
2485 - 2490m	95	SANDSTONE: clear, opaque quartz granules, no fluorescence, no cut.
	5	COAL: black, brittle.
2490 - 2495m	90	SANDSTONE: brown, clear quartz granules, no fluorescence, no cut.
	5	COAL: as above.
	5	SHALE: dark grey, slightly calcareous.
2495 - 2500m	90	SANDSTONE: as above.
	5	SHALE: as above.
	5	COAL: as above.
2500 - 2505m	80	SANDSTONE: Type 2) no shows.
	20	COAL: as above.
2505 - 2510m	70	SANDSTONE: Type 2) no shows.
	20	SILTSTONE: brown, sandy, pyritic.
	10	COAL: as above.
2510 - 2515m	90	SANDSTONE: 70% Type 2) clear, opaque quartz granules with minor pyrite, no shows. 20% Type 1) clear to grey to cream, medium to coarse grained, moderately sorted, subrounded to subangular, well cemented, occasionally kaolinitic, pyritic, no visual porosity, no fluorescence, no cut.
	10	SHALE: as above.
2515 - 2520m	70	SANDSTONE: 60% Type 2) quartz granules as above. 10% Type 1) medium to coarse grained as above.
	20	COAL: as above.
	10	SHALE: as above.
2520 - 2525m	80	SANDSTONE: 70% Type 2) quartz granules as above. 10% Type 1) grading to siltstone in part, otherwise as above.
	10	SHALE: grading to siltstone.
	10	COAL: as above.
2525 - 2530m	60	SILTSTONE: predominantly light grey to dark grey, micromicaceous, sandy in part, occasional parallel carbonaceous partings, firm,
	40	SANDSTONE: 20% Type 2) no shows. 20% Type 1) no shows.
2530 - 2535m	80	SANDSTONE: 70% Type 2) clear, opaque, subrounded to subangular, clean, occasional siliceous cement, minor pyrite, no shows. 10% Type 1) white, clear, coarse, subangular, siliceous cemented sandstone, occasional feldspar, excellent visual porosity, minor kaolinite matrix, occasional pyrite encrustation, no shows.
	20	SILTSTONE: light grey to grey, argillaceous in part.
	Trace	GARNET?: minor mica flecks.
	Trace	COAL: as above.

2535 - 2540m	90	SANDSTONE: Type 2) predominantly well rounded to subangular, otherwise as above.
	10	SILTSTONE: as above.
2540 - 2545m	90	SANDSTONE: Type 2) as above.
	10	SILTSTONE: as above.
	Trace	COAL: as above.
2545 - 2550m	90	SANDSTONE: 80% Type 2) as above.
	10	10% Type 1) as above. SILTSTONE: as above.
2550 - 2555m	100	SANDSTONE: Type 2) as above.
2555 - 2560m	50	SANDSTONE: Type 2) as above.
	50	SILTSTONE: grey to brown, micaceous in part, occasional carbonaceous flecks, grading to fine quartz sandstone, becoming argillaceous, occasionally carbonaceous, friable to firm, poor sorting, no shows.
2560 - 2565m	100	SILTSTONE: as above.
	Trace	SANDSTONE: clear, opaque, rounded to subangular, clean, quartz granules, hard, tight, occasional fracture partings, recrystallised in part, no shows.
	Trace	COAL: as above.
2565 - 2570m	90	SILTSTONE: Bimodal: white to light grey, fine grained, subangular to subrounded, quartz in a dominant siliceous cement with clay silt clastic, occasional pyrite, trace carbonaceous flecks, no visual porosity, no shows; common clear opaque, rounded to subangular, grading in part to sandstone, otherwise as above.
	10	COAL.
2570 - 2575m	90	SILTSTONE: as above.
	10	COAL: as above.
2575 - 2580m	80	SILTSTONE: as above.
	20	COAL: as above.
2580 - 2585m	60	SILTSTONE: as above.
	20	SANDSTONE: white to light grey, fine to medium grained, subrounded, moderately sorted, well cemented, occasional trace of carbonaceous material, no shows.
	20	COAL: as above.
2585 - 2590m	60	SILTSTONE: as above.
	40	SANDSTONE: white to light grey, fine to medium grained, occasionally coarse grained, moderately to poorly sorted, moderately to well cemented, occasionally minor carbonaceous and pyritic, with siliceous cement, occasionally silty matrix, no fluorescence, no cut.
2590 - 2595m	80	SILTSTONE: light grey to brown, very fine grained, siliceous to clay matrix, occasionally carbonaceous, micromicaceous, pyritic, firm, in part sandy grading into very fine grained sandstone, no shows.
	20	SANDSTONE: white, fine to medium grained, moderately sorted, moderately cemented, no shows.

NOTE: Only three chips in this tray shows fluorescence and very strong cut. Most likely cavings, very fine grained sandstone, brown to dark brown oil stain.

2595 - 2600m	80 20	SILTSTONE: as above. COAL: black, brittle.
		NOTE: Only one chip in this tray sandstone, cream to brown with oil stain, fluorescence, strong diffuse cut.
2600 - 2605m	60 20 20	SILTSTONE: as above. COAL: as above. SANDSTONE: as above.
2605 - 2610m	70 30	COAL: black, brittle. SILTSTONE: as above.
2610 - 2615m	80 20	SILTSTONE: as above. COAL: as above.
2615 - 2625m	80 10 10	SILTSTONE: very sandy, otherwise as above. COAL: as above. SANDSTONE: Type 2) no shows.
2625 - 2630m	80  20	SILTSTONE: grey brown, fine grained, well cemented, grading in part into sandstone, micromicaceous, pyritic, carbonaceous. SANDSTONE: 15% Type 1) fine to medium grained, subangular to subrounded, well cemented, no shows. 5% Type 2) clear quartz granules, subrounded, no shows.
2630 - 2635m	60  30 10	SANDSTONE: 40% Type 1) fine to medium grained, occasionally coarse grained, subangular to subrounded, well cemented, no shows. 20% Type 2) clear, opaque quartz granules, no shows. SILTSTONE: as above. KAOLINITE: white, soft, occasionally slightly carbonaceous.
2635 - 2640m	60 40	SILTSTONE: grading to fine argillaceous sandstone, otherwise as above. SANDSTONE: Type 1) as above.
2640 - 2645m	60 40	SANDSTONE: 40% Type 2) as above. 20% Type 1) as above. SILTSTONE: as above.
2645 - 2650m	70 30	SANDSTONE: 60% Type 2) as above. 10% Type 1) as above. SILTSTONE: as above.
2650 - 2655m	100  Trace Trace	SILTSTONE: grey to brown, firm, argillaceous to carbonaceous in part, micromicaceous, grading in part to fine sandstone, trace pyrite. COAL: as above. SANDSTONE: Type 1).
2655 - 2660m	100	SILTSTONE: as above.

2660 - 2665m	80	SILTSTONE: as above.
	10	SANDSTONE: clear to white, fine to medium grained, moderately sorted, moderately cemented, no shows.
	10	KAOLINITE: white, soft.
2665 - 2670m	50	SILTSTONE: as above.
	30	SANDSTONE: as above.
	20	KAOLINITE: as above.

18501/6-23

APPENDIX 2

## WEST FORTESCUE-1

## SIDEWALL CORE DESCRIPTIONS

<u>No.</u>	<u>Depth</u>	<u>Rec.</u> <u>(mm)</u>	<u>Rock</u> <u>Type</u>	<u>Description</u>
1	2569.2		SHALE	Grey, silty, firm, quartz argillaceous.
2	2565.6		SILTSTONE	Dark grey, fine grained, poorly sorted, subrounded, soft, argillaceous, carbonaceous, micaceous.
3	2560.2		SILTSTONE	Light grey, fine grained moderately sorted, soft, argillaceous, micaceous.
4	2549.0		SHALE	Dark grey, firm, micaceous, carbonaceous.
5	2531.0		SHALE	Dark grey, firm, micaceous, silty.
6	2520.0		SHALE	Dark grey, firm, micaceous, silty.
7	2516.1		SANDSTONE	Light grey, fine to medium grained, moderately sorted, subrounded, unconsolidated, argillaceous.
8	2513.7		SILTSTONE	Light grey, firm, quartz, micaceous.
9	2512.0		SANDSTONE	Light grey, fine to medium grained, poorly sorted, subrounded, friable, argillaceous, micaceous.
10	2510.1		SANDSTONE	Light grey, fine to medium grained, poorly sorted, subrounded, friable, argillaceous, micaceous.
11	2508.1		SILTSTONE	Light grey, firm, argillaceous, carbonaceous.
12	2502.8		SILTSTONE	Light grey, firm, quartz, micaceous, argillaceous.
13	2499.1		SANDSTONE	White, fine to medium grained, poorly sorted, subrounded, friable, micaceous, quartzose.
14	2495.1		SANDSTONE	White, fine to coarse grained, poorly sorted, subrounded, friable, quartzose.
15	2488.1		SANDSTONE	White, fine to coarse grained, poorly sorted, subrounded, friable, quartzose.
16	2486.6		SANDSTONE	White, fine to medium grained, moderately sorted, subrounded, friable, quartzose.
17	2485.0		SANDSTONE	White, fine to coarse grained, poorly sorted, subrounded, friable, quartzose.
18	2484.0		SANDSTONE	White, fine to medium grained, moderately sorted, subrounded, friable, quartzose.
19	2479.7		SANDSTONE	White, fine grained, well sorted, subrounded, friable, quartzose.

20	2477.6	SANDSTONE	White, fine grained, well sorted, subrounded, friable, quartzose.
21	2473.5	SANDSTONE	White, medium to coarse grained, moderately sorted, subrounded, friable, quartzose.
22	2465.2	SANDSTONE	White, coarse grained, moderately sorted, subrounded, friable, quartzose.
23	2460.3	SANDSTONE	White, medium grained, well sorted, subrounded, friable, quartzose.
24	2454.3	SILTSTONE	Grey, firm, quartzose, argillaceous.
25	2447.1	SHALE	Black, firm, carbonaceous, coaly.
26	2446.1	SILTSTONE	Dark grey, firm, carbonaceous, argillaceous.
27	2439.2	SANDSTONE	Grey, fine to medium grained, moderately sorted, subrounded, friable, quartzose; even, bright white blue fluorescence, bright white blue cut fluorescence, light cut residue.
28	2438.0	SANDSTONE	Grey, fine to medium grained, moderately sorted, subrounded, friable, quartzose; even, bright white blue fluorescence, bright white blue cut fluorescence, light cut residue.
29	2436.7	SILTSTONE	Light grey, fine to coarse grained, moderately sorted, subrounded, friable, micaceous, argillaceous; spotty dull yellow fluorescence, faint, yellow cut fluorescence, trace cut residue.
30	2436.0	SANDSTONE	Light grey, fine to coarse grained, moderately sorted, subrounded, friable, micaceous, argillaceous; even bright white blue fluorescence, bright white blue cut fluorescence, light cut residue.
31	2431.1	SILTSTONE	Grey to white, silt to coarse grained, poorly sorted subrounded, friable, micaceous, carbonaceous, argillaceous; even dull white blue fluorescence, dull white cut fluorescence, trace cut residue.
32	2429.7	SILTSTONE	Dark grey, firm, micaceous, argillaceous, carbonaceous.
33	2428.1	SHALE	Black, firm, micaceous, carbonaceous.
34	2427.5	SILTSTONE	Black, firm, micaceous, argillaceous.
35	2425.2	SHALE	Black, firm, micaceous, argillaceous.
36	2424.2	SILTSTONE	Grey, firm, quartzose, argillaceous.
37	2423.0	SANDSTONE	White to grey, fine to medium grained, moderately sorted, subrounded, friable, glauconitic, quartzose.



38	2421.3	20	SANDSTONE	White, very fine grained, well sorted, subrounded, friable, glauconitic; spotty dull white fluorescence.
39	2420.2	38	CLAYSTONE	Grey green, fine to medium grained, moderately sorted, subangular, soft, glauconitic, calcareous, arenaceous.
40	2419.2	37	CLAYSTONE	Grey, firm, calcareous.
41	2418.6	30	CLAYSTONE	Grey, firm, silty, calcareous.
42	2417.5	24	SILTSTONE	Grey, very fine grained, well sorted, rounded, firm, micaceous, argillaceous, calcareous.
43	2416.4	27	CLAYSTONE	Grey, moderately firm, micaceous, calcareous.
44	2413.5	22	CLAYSTONE	Grey, moderately firm, very calcareous.
45	2411.1	37	CLAYSTONE	Grey, moderately firm, micaceous, very calcareous.
46	2406.6	30	CLAYSTONE	Grey, moderately firm, calcareous.
47	2402.1	36	CLAYSTONE	Grey, soft, micaceous, calcareous.
48	2400.0	34	CLAYSTONE	Grey, soft, micaceous, calcareous..
49	2396.6	30	CLAYSTONE	Grey, moderately firm, silty, pyritic, micaceous, calcareous.
50	2374.5	30	CLAYSTONE	Dark grey, moderately firm, silty, calcareous.
51	2366.2	36	CLAYSTONE	Grey, soft, silty, sandy, calcareous.

1850/25-27

## WEST FORTESCUE-1

## SIDEWALL CORE GAS ANALYSIS

No.	Depth	C1 %	C2 %	C3 %	C4 %	C5 %	C6 %
1	2569.2	0.112	0.041	0.018	0.005	Tr.	-
2	2565.6	0.374	0.156	0.118	0.037	Tr.	-
3	2560.2	0.072	0.056	0.066	0.035	Tr.	Tr.
4	2549.0	0.114	0.064	0.071	0.032	0.008	Tr.
5	2531.0	0.007	0.003	0.002	0.002	0.003	0.001
6	2520.0	0.155	0.062	0.064	0.025	0.002	Tr.
7	2516.1	0.002	0.001	0.001	0.001	Tr.	Tr.
8	2513.7	0.004	0.003	0.002	0.002	0.001	0.001
9	2512.0	0.001	0.001	0.001	Tr.	0.002	-
10	2510.1	NIL	-	-	-	-	-
11	2508.1	0.013	0.018	0.027	0.019	0.004	Tr.
12	2502.8	0.001	0.002	0.001	0.001	0.002	Tr.
13	2499.1	0.003	0.001	0.001	0.001	Tr.	-
14	2495.1	0.002	0.001	0.001	0.001	Tr.	-
15	2488.1	NIL	-	-	-	-	-
16	2486.6	0.009	0.007	0.003	0.001	-	-
17	2485.0	0.001	0.001	0.001	0.001	-	-
18	2484.0	0.004	0.001	0.001	0.001	-	-
19	2479.7	NIL	-	-	-	-	-
20	2477.6	0.003	0.001	0.001	0.001	Tr.	-
21	2473.5	0.005	0.003	0.001	Tr.	-	-
22	2465.2	0.001	Tr.	Tr.	-	-	-
23	2460.3	0.007	0.003	0.004	0.002	0.001	Tr.
24	2454.3	0.006	0.003	0.003	0.002	0.005	0.002
25	2447.1	0.053	0.029	0.029	0.014	0.004	0.001
26	2446.1	0.008	0.010	0.017	0.013	0.005	0.001
27	2439.2	0.012	0.017	0.006	0.006	0.002	Tr.
28	2438.0	0.046	0.069	0.366	0.664	0.566	0.338
29	2436.7	0.010	0.014	0.040	0.102	0.148	0.064
30	2436.0	0.153	0.046	0.087	0.254	0.263	0.210
31	2431.1	0.006	0.007	0.066	0.159	0.090	0.163
32	2429.7	0.004	0.002	0.010	0.222	0.032	0.020
33	2428.1	0.009	0.004	0.002	0.002	0.002	0.003
34	2427.5	0.008	0.010	0.016	0.013	0.006	0.003
35	2425.2	0.006	0.003	0.002	0.003	0.002	0.001
36	2424.2	0.009	0.006	0.008	0.006	0.002	0.001
37	2423.0	0.002	0.001	0.001	0.003	0.003	0.001
38	2421.3	NIL	-	-	-	-	-
39	2420.2	0.012	0.002	0.002	0.002	0.001	-
40	2419.2	0.046	0.007	0.007	0.014	0.006	0.004
41	2418.6	0.032	0.005	0.005	0.005	0.002	0.003
42	2417.5	0.017	0.004	0.005	0.005	0.002	Tr.
43	2416.4	0.007	0.002	0.003	0.005	0.001	Tr.
44	2413.5	0.019	0.003	0.003	0.003	0.001	Tr.
45	2411.1	0.036	0.005	0.005	0.004	0.002	Tr.
46	2406.6	0.031	0.005	0.004	0.004	0.002	-
47	2402.1	0.026	0.004	0.003	0.003	0.002	-
48	2400.0	0.047	0.005	0.004	0.005	0.003	-
49	2396.6	0.038	0.005	0.004	0.006	0.003	-
50	2374.5	0.023	0.003	0.002	0.004	0.002	-
51	2366.2	0.051	0.005	0.005	0.005	0.002	-

APPENDIX 3

WEST FORTESCUE-1  
VELOCITY SURVEY REPORT

1. Marine Velocity Survey data.
2. Schlumberger processing report.
3. Schlumberger field report.
4. Check shot data - observed and corrected.
5. Gun geometry sketch.

Enclosures

1. Schlumberger Geogram.
2. Schlumberger seismic calibration log.
3. Schlumberger CSU field log - WST check shots.
4. Time-Depth Curve.

1.

MARINE VELOCITY SURVEY DATA

Well West Fortescue-1  
Basin Gippsland

INTRODUCTION

Esso Personnel A. Bramall

Contractor Schlumberger

Supplied (1) Instruments  
(2) Personnel

Seismic Observer M.Aw

Marine Shooter N/A

Navigation N/A

(3) Licenced Shooting Boat

Name N/A

Date Loaded N/A

Date Released N/A

Agent N/A

(4) Seismic Source

Air Gun

Bolt 1900B 120 cu. inch 9m below MSL

Personnel and Instruments

assembled at N/A Date N/A

Boarded (rig) Southern Cross Date May 11, 1984

Date of Survey May 12-14, 1984

Casing Depth 799m - 13 3/8

T.D. when shot 2656m

Water Depth 65.0 below MSL metres

SURVEY PROCEDURE

Weather: Wind Strong and gusty

Swell 2 to 3 metres

Sea Rough

Rig Movement N/A

Rig Noise Some at shallow

levels.

Hydrophones: Number One  
Depth below sea level 9 metres  
Position In moonpool

Gas Gun: Number of shots per level variable  
Gun Depth 9 metres

Well phone positioning:

No. of depths 12  
Time: First shot 21.45  
Last shot 23.43  
Total rig time 4.25 hours

RESULTS

Quality of Results (good 12 good  
(fair 1 fair  
(poor \_\_\_\_\_  
(not used \_\_\_\_\_

CONCLUSION

Reliability of T-D curve Fair

COMMENTS

7460f11

2.

PROCESSING

OPEN HOLE LOGS

Both the sonic and density logs used in this report have been edited prior to input into the WST chain.

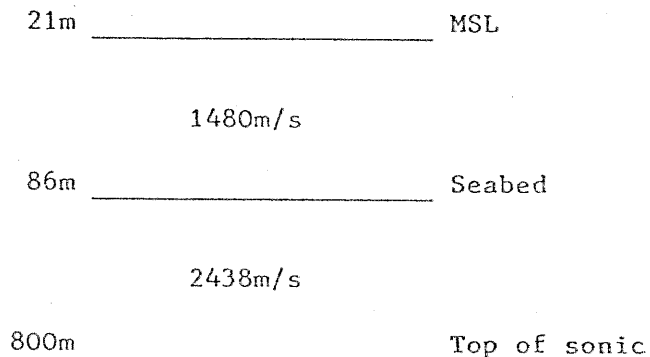
CORRECTION TO DATUM

Seismic reference Datum (SRD) is at Mean Sea Level. The airgun was positioned 9m below SRD.

VELOCITY MODELLING

Interval velocities above the sonic log were taken as shown below. The velocity between seabed and the top of the sonic has been derived from the time at the check level at 800m below KB.

Depths stated are referenced to Kelly Bushing.



SONIC CALIBRATION RESULTS

The top of the sonic log is chosen as the origin for the calibration drift curve. All drift measurements are relative to this point.

The drift curve indicates two corrections to be made to the sonic log. A Block shift of 3.59 us/ft has been applied over the interval 800 - 2420 m below KB and a zero shift has been applied from 2420m to the bottom of the log at 2656m below KB.

The adjusted sonic curve is considered to be the best result using the available data.





4.

WEST FORTESCUE-1VELOCITY SURVEY

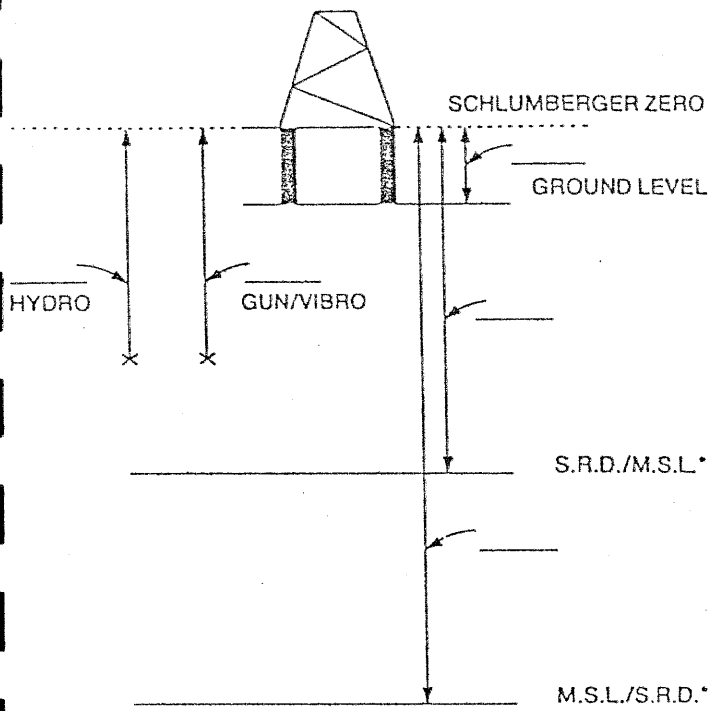
7460f12

Level Number	Measured Depth from KB (m)	Vertical Depth from SRD (m)	Observ. Travel Time HYD/GEO MS	Vertical Travel Time SRD/GEO MS	Average Velocity SRD/GEO M/S	Delta Depth between shots (m)	Delta Time between shots MS	Interv. Velocity between shots M/S
01	86.00	65.00	43.28	43.92	1480			
02	800.00	779.00	331.00	336.81	2313	714.00	292.89	2438
03	1035.00	1014.00	406.00	411.89	2462	235.00	75.08	3130
04	1200.00	1179.00	458.00	463.92	2541	165.00	52.03	3171
05	1400.00	1379.00	520.00	525.95	2622	200.00	62.03	3224
06	1600.00	1579.00	582.00	587.97	2686	200.00	62.02	3225
07	1800.00	1779.00	645.00	650.98	2733	200.00	63.01	3174
08	2000.00	1979.00	711.00	716.99	2760	200.00	66.01	3030
09	2220.00	2199.00	788.00	794.00	2770	220.00	77.01	2857
10	2425.00	2404.00	856.00	862.01	2789	205.00	68.01	3014
11	2510.00	2489.00	878.00	884.01	2816	85.00	22.00	3863
12	2550.00	2529.00	889.00	895.01	2826	40.00	11.00	3636

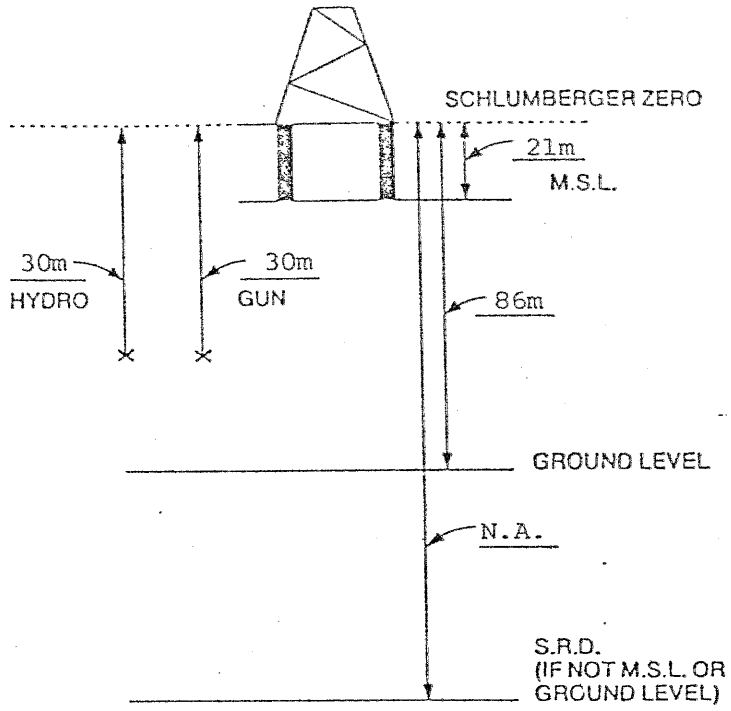
CLIENT: ESSO AUSTRALIA LTD.

WELL: WEST FORTESCUE #1 DATE: 12 MAY 1984

LAND



OFFSHORE

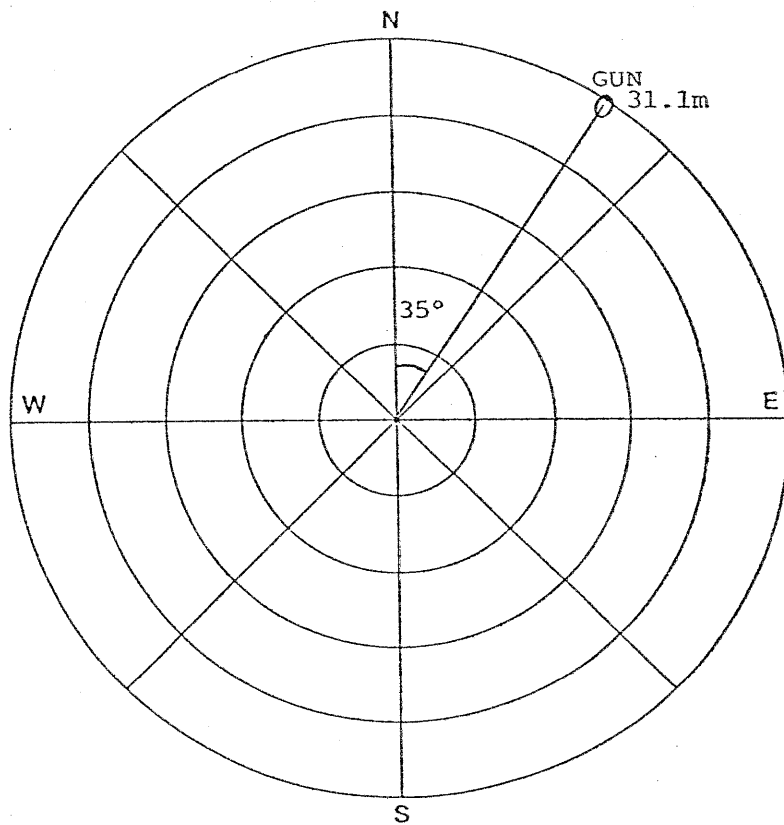


INDICATE ALL DISTANCES RELATIVE TO SCHLUMBERGER ZERO

\* DELETE AS APPLICABLE

INDICATE ALL DISTANCES RELATIVE TO SCHLUMBERGER ZERO

HOT DS'N	GUN OFFSET	HYDRO OFFSET	GUN DEPTH	HYDRO DEPTH
1	31.1m	0	30m	30m
2				
3				
4				
5				
6				
7				



INDICATE GUN/VIBRO AND HYDROPHONE OFFSET AND AZIMUTH RELATIVE TO NORTH

PE907953

This is an enclosure indicator page.  
The enclosure PE907953 is enclosed within the  
container PE902477 at this location in this  
document.

The enclosure PE907953 has the following characteristics:

ITEM\_BARCODE = PE907953  
CONTAINER\_BARCODE = PE902477  
NAME = Time Depth Curve  
BASIN = GIPPSLAND  
PERMIT = VIC/L7  
TYPE = WELL  
SUBTYPE = VELOCITY\_CHART  
DESCRIPTION = Time Depth Curve (enclosure from WCR  
vol.1) for Orange Roughy-1  
REMARKS =  
DATE\_CREATED = 30/07/84  
DATE\_RECEIVED = 2/08/84  
W\_NO = W1121  
WELL\_NAME = Orange Roughy -1  
CONTRACTOR = ESSO EXPLORATION AND PRODUCTION  
AUSTRALIA INC.  
CLIENT\_OP\_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902479

This is an enclosure indicator page.  
The enclosure PE902479 is enclosed within the  
container PE902477 at this location in this  
document.

The enclosure PE902479 has the following characteristics:

ITEM\_BARCODE = PE902479  
CONTAINER\_BARCODE = PE902477  
NAME = WST Raw Shots  
BASIN = GIPPSLAND  
PERMIT = VIC/P1  
TYPE = WELL  
SUBTYPE = VELOCITY\_CHART  
DESCRIPTION = WST Raw Shots for West Fortescue-1  
REMARKS =  
DATE\_CREATED = 12/05/84  
DATE\_RECEIVED = 20/08/84  
W\_NO = W866  
WELL\_NAME = West Fortescue-1  
CONTRACTOR = Schlumberger  
CLIENT\_OP\_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE601208

This is an enclosure indicator page.  
The enclosure PE601208 is enclosed within the  
container PE902477 at this location in this  
document.

The enclosure PE601208 has the following characteristics:

ITEM\_BARCODE = PE601208  
CONTAINER\_BARCODE = PE902477  
    NAME = Seismic Calibration Log  
    BASIN = GIPPSLAND  
    PERMIT = VIC/P1  
    TYPE = WELL  
    SUBTYPE = VELOCITY\_CHART  
DESCRIPTION = Seismic Calibration Log, Adjusted  
              Continuous Velocity Log (CPI) for West  
              Fortescue-1  
REMARKS =  
DATE\_CREATED = 23/05/84  
DATE\_RECEIVED = 20/08/84  
    W\_NO = W866  
    WELL\_NAME = West Fortescue-1  
    CONTRACTOR = Schlumberger  
    CLIENT\_OP\_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE601210

This is an enclosure indicator page.  
The enclosure PE601210 is enclosed within the  
container PE902477 at this location in this  
document.

The enclosure PE601210 has the following characteristics:

ITEM\_BARCODE = PE601210  
CONTAINER\_BARCODE = PE902477  
    NAME = Seismic Calibration log  
    BASIN = GIPPSLAND  
    PERMIT = VIC/P1  
    TYPE = WELL  
    SUBTYPE = VELOCITY\_CHART  
DESCRIPTION = Seismic Calibration log for West  
Fortescue-1  
REMARKS =  
DATE\_CREATED = 12/05/84  
DATE\_RECEIVED = 20/08/84  
    W\_NO = W866  
    WELL\_NAME = West Fortescue-1  
CONTRACTOR = Schlumberger  
CLIENT\_OP\_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

*Appendix 4*

WEST FORTESCUE - 1 W.C.R

OIL and GAS DIVISION

20 AUG 1984

GEOGRAM PROCESSING REPORT

COMPANY : ESSO AUSTRALIA LTD.

WELL : WEST FORTESCUE #1

LEASE : VIC-P-1

FIELD : WILDCAT

COUNTRY : AUSTRALIA

COORDINATES : 38DEG. 02' 56.47"S  
148DEG. 14' 25.43"E

RIG : SOUTHERN CROSS

ELEVATIONS : GROUND LEVEL AT -65.0M AMSL  
KELLY BUSHING AT 21.0M AMSL

DATE OF SURVEY : 12TH MAY 1984



# WEST FORTESCUE-1

LOCATION

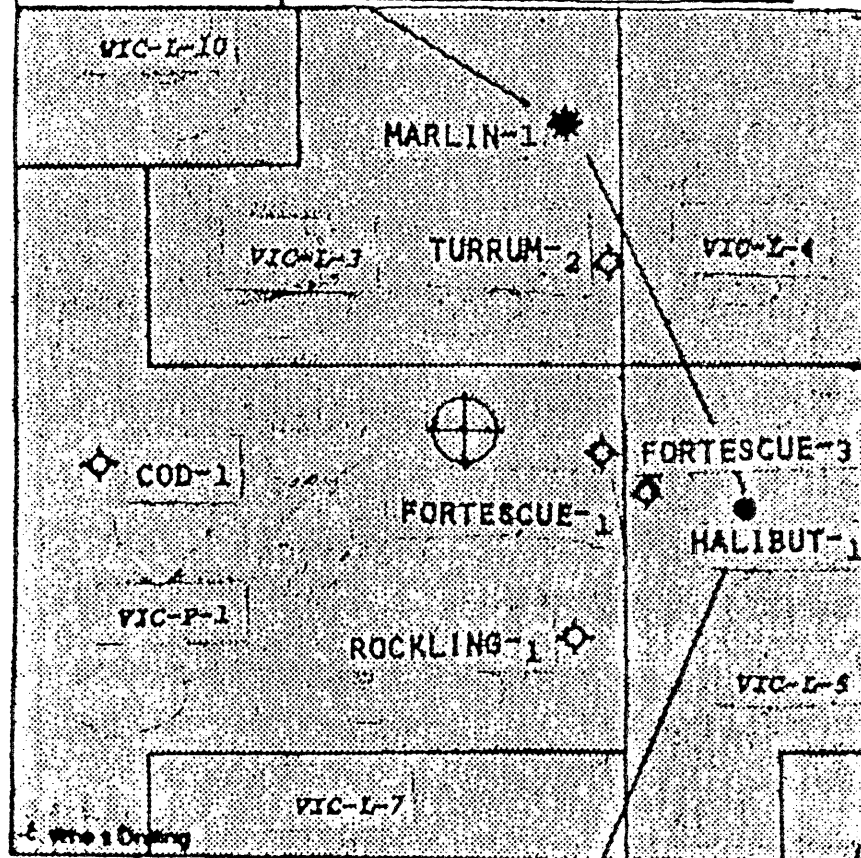
CO-ORDINATES  
38° 21' 56.47" S  
148° 14' 25.43" E  
PERMIT Vic-P-1



TD 2650m  
WD 65m

SCALE

0 10 20 km



## DATA ACQUISITION

FIELD EQUIPMENT

Energy Source : Bolt airgun (model 1900B)  
120 cu.in.

Source Offset : 31.1m

Source Depth : 9m below MSL

Source Azimuth : 35 Deg.

Reference Sensor : Accelerometer

Sensor Offset : 31.1m

Sensor Depth : 9m below MSL

Downhole Geophone : Geospace HS-1  
High temperature (350 Deg. F), Coil Resistance  
225 + 10%, Natural Frequency 8-12 Hz, Sensitivity  
0.45 V/in/sec. Maximum tilt angle 60 Deg. Min.

Recording Instrument

Recording was made on the Schlumberger Computerized Service Unit (CSU) using LIS format recorded at 1ms sample interval.

PROCESSING PARAMETERS

Seismic Reference Datum (SRD) : Mean Sea Level

Elevation SRD : Mean Sea Level

Elevation Kelly Bushing : 21.0m AMSL

Elevation Ground Level : -65.0m AMSL

Well Deviation : 0 Deg.

Total Depth : 2656m below KB

Sonic Log Interval : 800 - 2656m below KB

Density Log Interval : 2361 - 2656m below KB

### GEOGRAM PROCESSING

Geograms were generated using zero phase and minimum phase Ricker wavelets with frequencies at 20, 25, 30 and 35 Hz.

The presentations include both normal and reverse polarity at 7.5in/sec.

Geogram processing produces synthetic seismic traces based on reflection coefficients generated from sonic and density measurements in the well-bore. The steps in the processing chain are the following:

- Time to depth conversion
- Generate reflection coefficients
- Generate attenuation coefficients
- Choose a suitable wavelet
- Convolution
- Output

## TIME TO DEPTH CONVERSION

Open hole logs are recorded from bottom to top with a depth index. This data is converted to a two-way time index and flipped to read from top to bottom in order to match the seismic section.

## REFLECTION COEFFICIENTS - ATTENUATION COEFFICIENTS

## Primaries:

Sonic and density data are averaged over chosen time intervals (normally 2 or 4ms intervals). Reflection coefficients are then computed using:

$$R = \frac{\rho_2 v_2 - \rho_1 v_1}{\rho_2 v_2 + \rho_1 v_1}$$

where  $\rho_1$  = density of the layer above the reflection interface  
 $\rho_2$  = density of the layer below the reflection interface  
 $v_1$  = compressional wave velocity of the layer above the reflection interface  
 $v_2$  = compressional wave velocity of the layer below the reflection interface

This computation is done for each time interval to generate a set of primary reflection coefficients without transmission losses.

## PRIMARIES WITH TRANSMISSION LOSS;

Transmission loss on two-way attenuation coefficients are computed using:

$$A_n = (1-R_1^2)(1-R_2^2)(1-R_3^2)\dots(1-R_n^2)$$

A set of primary reflection coefficients with transmission losses is generated using:

$$\text{Primary}_n = R_n A_{n-1}$$

## PRIMARIES PLUS MULTIPLES:

Multiples are computed from these input reflection coefficients using the transform technique from the top of the well to obtain the impulse response of the earth. The transform outputs primaries + multiples.

## MULTIPLES ONLY:

By subtracting previously calculated primaries from the above result we obtain multiples only.

#### WAVELET

A theoretical wavelet is chosen to use for convolution with the reflection coefficients previously generated.

Choices available include:

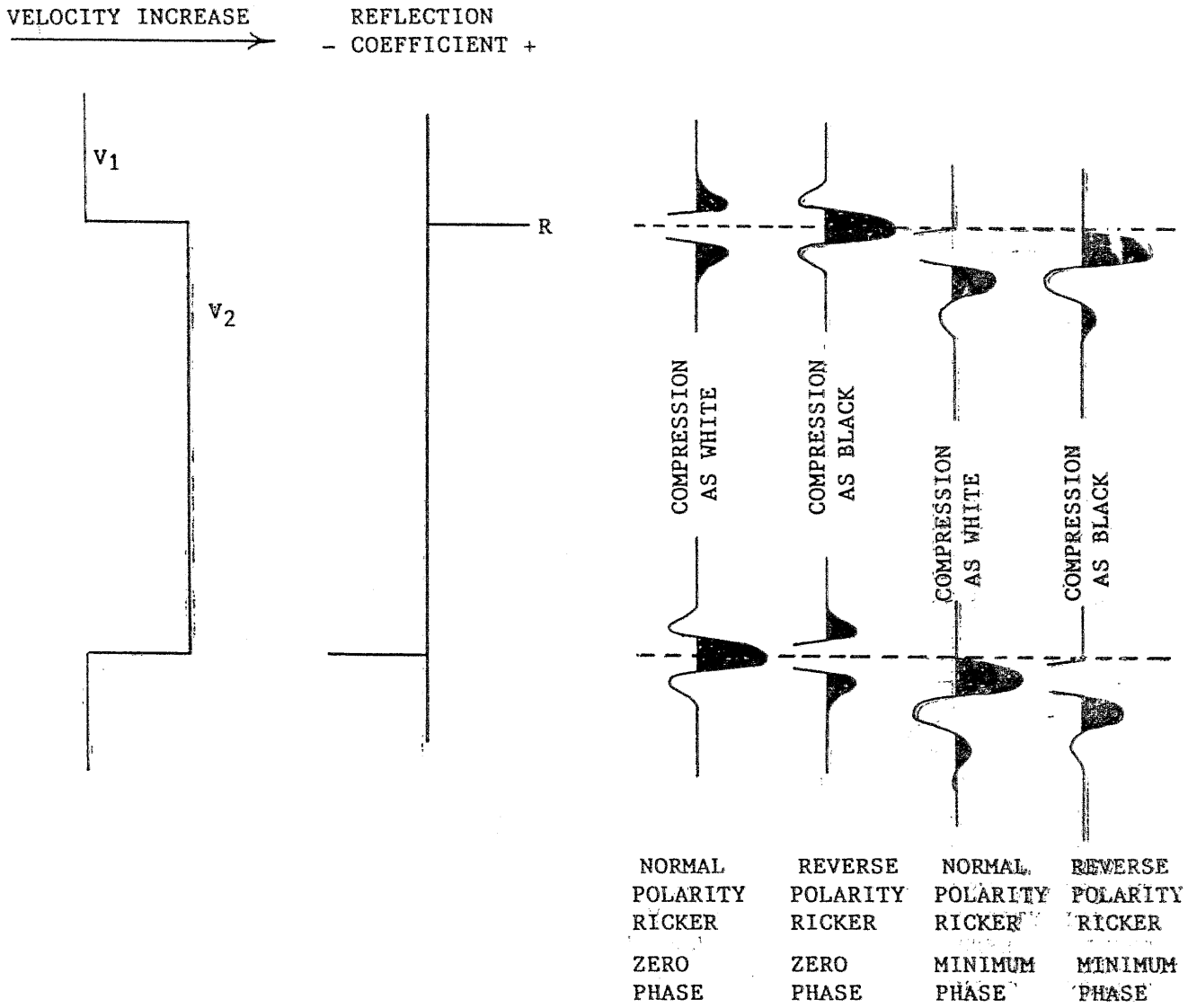
- Klauder wavelet
- Ricker zero phase wavelet
- Ricker zero phase wavelet
- Ricker minimum phase wavelet
- User defined wavelet

All wavelets can be chosen with or without butterworth filtering and with user defined centre frequencies. Polarity conventions are shown in Figure 1. These Geograms were generated using zero and minimum phase Ricker wavelets.

#### CONVOLUTION

Standard procedure of convolution of wavelet with reflection coefficients. The output is the synthetic seismic data.

SCHLUMBERGER WAVELET POLARITY CONVENTION



NOTE: WAVELET DISPLAYED UNDER GEOGRAMS ARE FOR A REFLECTION COEFFICIENT OF -0.5

FIGURE 1

PE902478

This is an enclosure indicator page.  
The enclosure PE902478 is enclosed within the  
container PE902477 at this location in this  
document.

The enclosure PE902478 has the following characteristics:

ITEM\_BARCODE = PE902478  
CONTAINER\_BARCODE = PE902477  
    NAME = Synthetic Seismogram Table  
    BASIN = GIPPSLAND  
    PERMIT = VIC/P1  
    TYPE = WELL  
    SUBTYPE = VELOCITY\_CHART  
DESCRIPTION = Synthetic Seismogram Table for West  
              Fortescue-1  
REMARKS =  
DATE\_CREATED = 12/05/84  
DATE\_RECEIVED = 20/08/84  
    W\_NO = W866  
    WELL\_NAME = West Fortescue-1  
    CONTRACTOR = Schlumberger  
CLIENT\_OP\_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)



PE601209

This is an enclosure indicator page.  
The enclosure PE601209 is enclosed within the  
container PE902477 at this location in this  
document.

The enclosure PE601209 has the following characteristics:

ITEM\_BARCODE = PE601209  
CONTAINER\_BARCODE = PE902477  
NAME = Geophone Seismic Chart  
BASIN = GIPPSLAND  
PERMIT = VIC/P1  
TYPE = SEISMIC  
SUBTYPE = CHART  
DESCRIPTION = Geophone Seismic Chart for West  
Fortescue-1  
REMARKS =  
DATE\_CREATED = 12/05/84  
DATE\_RECEIVED = 20/08/84  
W\_NO = W886  
WELL\_NAME = WEST FORTESCUE-1  
CONTRACTOR = SCHLUMBERGER  
CLIENT\_OP\_CO = ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

PE603886

This is an enclosure indicator page.  
The enclosure PE603886 is enclosed within the  
container PE902477 at this location in this  
document.

The enclosure PE603886 has the following characteristics:

ITEM\_BARCODE = PE603886  
CONTAINER\_BARCODE = PE902477  
NAME = Geogram  
BASIN = GIPPSLAND  
PERMIT = VIC/P1  
TYPE = WELL  
SUBTYPE = SYNTH\_SEISMOGRAM  
DESCRIPTION = Geogram recorded with 120 C.U. in  
airgun from West Fortescue-1  
REMARKS = Divided into 4 intervals, normal and  
Reverse Polarity  
DATE\_CREATED = 12/05/84  
DATE\_RECEIVED = 20/08/84  
W\_NO = W886  
WELL\_NAME = WEST FORTESCUE-1  
CONTRACTOR = SCHLUMBERGER  
CLIENT\_OP\_CO = ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)