

WCR OF FORTESCUE-3 W712

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ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC.

WELL COMPLETION REPORT

FORTESCUE-3 Reid 5-6-79

GIPPSLAND BASIN

OIL and GAS DIVISION

ESSO AUSTRALIA LTD. FEBRUARY, 1979 **OIL** and GAS DIVISION

FORTESCUE-3

WELL COMPLETION REPORT

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ESSO AUSTRALIA LTD. COMPLETION REPORT

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1. WELL DATA RECORD

LOCATION

WELL NAME	STATE	PERMIT or	LICENCE	GEOI	LOGICAL BASIN	FIELD
FORTESCUE-3	VICTORIA	A VI	c/l5		GIPPSLAND	FORTESCU
CO-ORDINATES			MAP		GEOGRAPHICAL LOC	CATION
LATITUDE 38°23	' 23.11"s	•	PROJE	CTION	3 Kms SE FORTESC	
LONGITUDE 148° 16	' 02.30"E		AMG 2	ZONE	2 Kms NW WEST HA	LIBUT-1
X 610 677.10mE Y 5 750 164.73mN			5	5		
		ELEVA	TIONS & DEPTH	<u>IS</u>		
ELEVATIONS	WATER	DEPTH	TOTAL	DEPTH	Avera	ge Angle
		69m	262	5m 11D1	KB	3 [°]
KB 31m		0 Jii		7. TVD	• • •	
RT	PLUG BACK DEPTH				PLUGGING BACK	
					ABANDONMENT	
		125m			ADAMOONTINT	
					4 	an a
			DATES	•		•
MOVE IN	H	RIG UP		SPUDD)ED	i na pata mating ay ng matalika katala
25/11/78		26/11	/78		26/11/78	
RIG DOWN COMPLETE	I	RIG RELEASED		PROD	UCTION UNIT - RI	G UP
25/12/78		25/12	/78		N/A	
PRODUCTION UNIT - 1	RIG DOWN		IMITIAL	PRODUC	TION ESTABLISHED	######################################
N/A					N/A	
	<u>.</u>	MI	SCELLANEOUS		ан на селити на селити и на сили и на селити на сел	
OPERATOR	PERMIN	XREEXXXX LICENC	EE ESSO) INTER	EST 50%	
ESSO AUSTRALIA LTD		ITE PETROLEUM EXPL. & PROD.		ER INTI	EREST 50%	•
CONTRACTOR		RIG NAME		EQUI	PMENT TYPE	
AUSTRALIAN ODECO			DIGGER"		SEMI-SUBMERSIBLE	RIG
TOTAL RIG DAYS	DRILLING	AFE NO.	COMPLETION N	10.	TYPE COMPLET	ION
30.50	5-2	38-011	N/A	N/A N/A		
30.30	1					
LAHEE WELL	Bei	fore Drilling	STEPOUT WEL	L		

WELL FORTESCUE-3

2.	:		CASII	NG - I	INER - 7	UBING REC	CORD ·		·	
Туре	Size	Weig	;ht	Gra	ıde	Thread	No	o. Joints	De (m)	epth (ft.)
PILE JOINT	24"	670) _		ÇC		1	_103m	337.9f
CROSS OVER	20"	129)	X-	-52	CC-JV		1	115m	377 . 3f
CONDUCTOR CASING	20"	· 94	1	X-	-52	JV		8	213m	698.8f
FLOAT JOINT	20"	94	1	<u> </u>	-52	JV		1	225m	738.2f
HANGER & PUP JOINT	13 ³ /8"			-	-			l	105m	344.4f
SURFACE CASING	13 ³ /8"	54	.5	K-	-55	BUTT	ļ	63	855.1m	2805.4f
FLOAT JOINT	13 ³ /8"	54	.5	K-	-55	BUTT		1	867m	2844.4f
3.				CEM	ENT RECO	RD	.			
String				20'	T		13 ³ /8	"	<u></u>	<u> </u>
String Type of	Cement		CI + 12%	ASS 1		CL	ASS			
Type of	Cement olume (M ³)		+ 12%	ASS 1	N ·	CI. 2 Neat	ASS	N	•	
Type of	olume (M ³) S	.G. PG)	+ 12% 42 1	ASS 1	N 2% CaCl	<u>CL</u> 2 Neat	ASS 4 4 7	N' + 1% CaCl ₂		
Type of Slurry V	olume (M ³) S ensity (P		+ 12% 42 1	ASS 1 gel .25 .45 .1)	2% CaCl 11.55 1.87	CL 2 Neat 25.7 1.8 (15.6	ASS 4 4 7	N + 1% CaCl ₂ 6.60 1.87		
Type of Slurry V Slurry D Cement T	olume (M ³) S ensity (P	PG)	+ 12% 42 1 (12	ASS (gel .25 .45 .1) Sea	2% CaCl 11.55 1.87 (15.6)	CL 2 Neat 25.7 1.8 (15.6 44	ASS 4 4 7) 4m	N' + 1% CaCl ₂ 6.60 1.87 (15.6)		
Type of Slurry V Slurry D Cement T Casing T	olume (M ³) S ensity (P op	PG)	+ 12% 42 1 (12	ASS (N 2% CaCl 11.55 1.87 (15.6) floor	CL 2 Neat 25.7 1.8 (15.6 44	ASS 4 4 7) 4m	N' + 1% CaCl ₂ 6.60 1.87 (15.6) (1456ft.) 1500 psi)		
Type of Slurry V Slurry D Cement T Casing T Number o	olume (M ³) S ensity (P op ested Kpa f Centrali f Scratche	PG) .zers	+ 12% 42 1 (12	ASS (N. 2% CaCl 11.55 1.87 (15.6) floor 500 psi)	CL 2 Neat 25.7 1.8 (15.6 44	ASS 4 4 7) 4m 0 (N' + 1% CaCl ₂ 6.60 1.87 (15.6) (1456ft.) 1500 psi)		

CEMENT PLUGS 4. Plug 5 2 4 1 3 CLASS 'N' CLASS 'N' CLASS 'N' CLASS 'N' CLASS 'N' Cement Type 'Neat' + 0.8% HR-12 0.3% HR-4 'Neat' 0.3% HR-4 + Slurry Volume ${\rm M}^3$ 11.22 4.22 8.25 10.23 9.90 1.87 Slurry Density SG (PPG) 1.87 1.87 1.87 1.87 (15.6) (15.6) (15.6) (15.6) (15.6) 2500 1575 913 180 2622 m Cement Base (ft.) (8602) (8202) (5167) (2995) (590) 125 m 2522 2393 1475 772 Cement Top (7851) (4839) (2533) (410) (ft.) (8274)

Remarks

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WELL FORTESCUE-3

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SAMPLES, CONVENTIONAL CORES, SIDEWALL CORES.

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INTERVAL		TYPE	. IN	TERVAL		TYPE	
	CU	TTINGS SAMPLES		·	CON	VENTIONAL C	ORES
225m-880m	1	s of 10 metre washed ried and one set un- l.	2409.5	1548.6m m-2410.5m m-2416m	2. 40 3. 27	%, 12.6m red %, 0.4m %, 1.5m	11 11 ·
880m-2625m	1	of 5 metre washed ied and one set un-	2416m- 2416m- 2440m- 2456m- 2470m-	2456m 2470m	5. 10 6. 71 7. 64	ring,pump p: %, 0.1m red %, 11.4m %, 9m %, 0m	
225m-2625m	4	re intervals of un- canned samples.		Cores 2 % 5	, core ba	arrel jammed use of seven	
						SIDEWALL CO	DRES
			2615m-1524.5m			RUN 1, 51 shot, recovered 47.	
•							
		WIRELINE LOGS AN	D SURVEY		·····		
		WIRELINE LOGS AN From To	D SURVEY	S Type & S	cale	From	То
Type & Scale DC-Gr RUN 1						From 13 lev	
Type & Scale DC-Gr RUN 1 :200, 1:500 DC-CNL-Gr RU	'N 2	From To		Type & S			7els
Type & Scale DC-Gr RUN 1 :200, 1:500 DC-CNL-Gr RU :200, 1:500 SF-Sonic RUN		From To 875.0m-100.0m		Type & S	SURVEY ESULTS ISED IN	13 lev	7els
Type & Scale DC-Gr RUN 1 :200, 1:500 DC-CNL-Gr RU :200, 1:500 SF-Sonic RUN :200, 1:500 SF-Sonic RUN	1	From To 875.0m-100.0m 2620.5m-868.0m		Type & S VELOCITY RFT TEST R ARE SUMMAR	SURVEY ESULTS ISED IN	13 lev	7els
Type & Scale DC-Gr RUN 1 :200, 1:500 DC-CNL-Gr RU :200, 1:500 SF-Sonic RUN :200, 1:500 SF-Sonic-MSFL :200, 1:500 DT RUN 1	1	From To 875.0m-100.0m 2620.5m-868.0m 875.4m-225.0m	n	Type & S VELOCITY RFT TEST R ARE SUMMAR	SURVEY ESULTS ISED IN	13 lev	7els
Type & Scale DC-Gr RUN 1 :200, 1:500 DC-CNL-Gr RU :200, 1:500 SF-Sonic RUN :200, 1:500 SF-Sonic-MSFL :200, 1:500 DT RUN 1 :100 IDEWALL CORES	run 2	From To 875.0m-100.0m 2620.5m-868.0m 875.4m-225.0m 868.0m-2618.5m	n	Type & S VELOCITY RFT TEST R ARE SUMMAR	SURVEY ESULTS ISED IN	13 lev	7els
Type & Scale DC-Gr RUN 1 :200, 1:500 DC-CNL-Gr RU :200, 1:500 SF-Sonic RUN :200, 1:500 SF-Sonic-MSFL :200, 1:500 DT RUN 1 :100 IDEWALL CORES UN 1 UN 2	run 2	From To 875.0m-100.0m 2620.5m-868.0m 875.4m-225.0m 868.0m-2618.5m 868.0m-2620.0m	n	Type & S VELOCITY RFT TEST R ARE SUMMAR	SURVEY ESULTS ISED IN	13 lev	7els

5.

SUMMARY OF FORMATION TEST PROGRAMME

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FORTESCUE-3

		ISF-SONIC			RECOV	/ERY (LITR	ES)		HEWLETT- FORMATION	PACKARD PRESSURE	HEWLETT-		HORIZONTAL PERMEABILITY	
TEST	<u>SEAT</u>	<u>DEPTH</u> (METRES) <u>K.B.</u>	<u>CHAMBER</u>	<u>OIL</u>	COND.	GAS	FORMATION WATER	FILTRATE	MPag	Psig	MPag	Psig	millidarcys	REMARKS
RFTL	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	2440.5 " 2440.0 2594.5 2591.5 2583.0 2578.5 2563.0 2554.0 2547.0 2539.0 " 2525.0 2505.0 " 2485.0	PRETEST " SAMPLE PRETEST " " " " " " " " " " " "	16.10	-	206.7		1.00	- 23.43 24.62 24.59 24.52 24.46 24.34 24.20 24.13 - 24.07 24.09 - 23.90 23.71	- 3398.47 3570.84 3557.04 3556.08 3548.13 3529.66 3510.31 3499.57 - 3490.58 3490.58 3494.09 - 3466.89 3439.03	- 27.73 29.42 29.36 29.26 29.19 29.008 28.92 28.83 - 28.74 28.74 28.57 - 28.34 28.11	- 4022.00 4267.23 4259.09 4243.61 4233.56 4207.27 4193.85 4181.00 - 4168.00 4143.06 - 4110.17 4076.79	2925	No test) " ") Port Clogged? (1.75 l oil/filtrate (emulsion. Segregator (#3001 not opened. (Horner Press. 24.43 MPag/3398.8 Psig). No seal. No seal.
	17 18 19	2470.0 2438.0 "	85	• •					23.56 - 23.43	3417.44 - 3397.85	27.92 - 27.54	4050.15 - 3994.32		No seal.
	20 21	11	11		-				-	-	-	-		No seal. No seal.

SUMMARY OF FORMATION TEST PROGRAMME

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FORTESCUE-3

		ISF-SONIC			RECOV	ERY (LITR	ES)	÷	HEWLETT- FORMATION	PACKARD PRESSURE	HEWLETT-1 HYDROSTATIC	PACKARD C PRESSURE	HORIZONTAL PERMEABILITY	
TEST	<u>SEAT</u>	<u>DEPTH</u> (METRES) <u>K.B.</u>	CHAMBER	OIL	COND.	<u>GAS</u>	FORMATION WATER	FILTRATE	MPag	<u>Psig</u>	<u>MPag</u>	Psig	<u>millidarcys</u>	REMARKS
RFT2	22	1524.9	PRETEST						_	_	_			No seal.
	23	2448.5	SAMPLE	0.5	-	8.5	-	19.9	23.49	3408.86	27.52	3991.20	596	(Segregator #3005 not opened.
· ·	24	2438.0	PRETEST			• •			23.42	3397.30	27.31	3961.23		(Horner Press. 23.49
RFT3	25	2462.0	SAMPLE	slight scum	-	-	19	-	23.44	3400.64	27.72	4020.86	569	MPag/3406.4 Psig). (Segregator #3007 not opened. Horner Press.
rft4	26	2457.5	· D	brown scum	-	56.64		19 oily smell	23.43	3398.08	27.68	4015.08	191	23.47 MPag/3403.6 Psig (Segregator #3003 un- opened.
	27	2454.0	PRETEST					Smerr	23.42	3397.31	27.62	4006.03		(Horner Press. 23.45
	28	2443.0 "	11 11						-	-	· -	-		MPag/3401.0 Psig). No seal.
	29 30	" 2442.0	"						23.66	3432.24	27.49	3986.69		
	31	"	n						- 23.47	- 3404.18	- 27.45	- 3981.50		No seal.
;	32	2435.5	11						23.46	3402.99	27.35	3967.17		
	33	2465.0	Π.			i i			23.52	3410.81	27.62	4006.03		
RFT5	34	2454.5	SAMPLE	3	-	11.3	-	17	23.42	3397.44	27.64	4009.57	very low	(Segregator #3008 un-
														(Horner Press. 23.42 MPag/ 3398.00 Psig).
					-									

FORTESCUE - 3

STRATIGRAPHIC TABLE

Т									
EPOCH	SERIES	FORMATION HORIZON	SPORE – POLLEN ASSEMBLAGE ZONES	PLANKTONIC FORAMINIFERAL ZONATIONS D.TAYLOR	DRILL DEPTH	SUBSEA DEPTH (METRES)	THICKNESS (METRES)		
		SEAFLOOR			100	69			
PLEIST	U E F	GIPPSI AND		A I A 2 A 3 A 4 B I					
	LATE	LIMESTONE		B 2	-		1994		
OCENE	MIDDLE	2094		D 					
W	EARLY	LAKES ENTRANCE FORMATION		G H I			326		
.NE	LATE		<u>P. tuberculatus</u>	H 2 I I I 2					
OLIGOCE	EARLY	~~~24209~~~		J I J 2	~~2420~~~	~~ ^{23,89} ~~			
	LATE	dnous and the second se			Upper <u>N. asperus</u> Middle <u>N. asperus</u>	K			
OCENE	MIDDLE				Lower <u>N. asperus</u>				187+
	EARLY		Upper <u>M. diversus</u> "COARSE <u>Middle M. diversus</u>		2462·5	243I·5			
	LATE		Upper <u>L. balmei</u>		2607	2016			
PALEOC	EARLY		Lower <u>L. balmei</u>						
UPPER Cretaceous	LATE		<u>T. longus</u> T. lilliei						
	PALEOCENE EOCENE OLIGOCENE MIOCENE	PALEOCENE EOCENE OLIGOCENE MIOCENE PLIO PRIO EARLY Late EARLY Late EARLY Late EARLY LATE EARLY NIDDLE LATE EARLY NIDDLE LATE EARLY NIDDLE LATE EARLY LATE EARLY LATE EARLY NIDDLE LATE EARLY LATE EARLY NIDDLE LATE EARLY LATE LATE EARLY LATE LATE LATE LATE LATE LATE LATE LATE LATE	SEAFLOOR PLEIST J J M J GIPPSLAND LIMESTONE J MIDOCENE J MIOCENE J MIOCENE J MIOCENE J MIOCENE J MIOCENE J MIDOCENE J MIDOCENE J MIDOCENE J MIDOCENE J MIDOCENE J J LAKES ENTRANCE FORMATION J J J	AD PARTRIDGE/HE STACEY SEAFLOOR PLEIST U GIPPSLAND LIMESTONE GIPPSLAND LIMESTONE U GIPPSLAND LIMESTONE U GIPPSLAND LIMESTONE U GIPSLAND	AD PARTRIDGE/HE STACEY D. TAYLOR A 1 A1 A 1 A 1 A 1 A 1 A 2 A 3 A 4 B 1 B 1 B 1 B 1 B 1 B 1 B 1 B 1	AD PARTRIOGE/HE STACEY D. TAYLOR SEAFLOOR 100 PLEIST 41 01 41 02 41 03 41 04 41 07 43 01 43 01 43 01 43 01 43 01 43 01 43 01 43 01 2094 01 2094 01 2094 01 2094 01 2094 01 2094 01 2094 01 2094 11 12 11 12 11 12 11 12 11 12 11 12 11 12 11 12 11 12 11 12 12 24	AD PARTRIDGE/HE STACEY D. TAYLOR SEAFLOOR IOO 69 PLEIST		

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DESCRIPTION OF LITHOLOGICAL UNITS

FORTESCUE-3

		FORTESCUE-3
	DEPTH	DESCRIPTION
		GIPPSLAND LIMESTONE: (100m-2094m TVD)
	240m-570m	SKELETAL CALCARENITE & MINOR MARL:
•		<u>CALCARENITE</u> - very light to light grey, very fine to medium grained, minor very coarse, fossil debris, firmly to loosely cemented, dominantly fossil fragments of bivalves, bryozoa, foraminifera and gastropods. Traces of very fine grained glauconite.
		MARL - very light grey, very soft.
	570m-1045m	CALCISILTITE GRADING TO MARL IN PART:
		CALCISILTITE - very light grey to buff, soft to firm, occasionally hard and brittle, minor loose fossil fragments dominantly forams, bryozoans, coral and sponge spicules. Glauconite common as nodules, and traces of black carbonaceous? flecks.
		MARL - very light grey, very soft, minor dark glauconite grains and fossil debris.
-	1045m-2094m	MARL GRADING TO CALCAREOUS MUDSTONE AND MINOR CALCISILTITE, RARE BEDS OF CALCARENITE:
		MARL - very light grey to buff, very soft to soft, grading to calcisiltit in part, fossiliferous with predominantly silt size forams, sponge spicules and fossil fragments, minor dark green fine glauconite grains.
		CALCAREOUS MUDSTONE - light grey to medium grey, brown, firm to moderatel hard, silty and fossiliferous with silt size forams and minor sponge spicules. Trace fine nodular glauconite, and carbonaceous material.
		CALCARENITE - white to buff and light grey, very fine to medium grained, minor coarse grained, fossiliferous with fragments of coral, bryozoa, forams and spicules, trace to abundant bright green glauconite.
		LAKES ENTRANCE FORMATION (2094m-2420mTVD)
		MARL GRADING TO CALCAREOUS MUDSTONE, BECOMING SHALEY, INTERBEDDED WITH CALCISILTITE-SILTSTONE:
	5	MARL - very light grey to buff, very soft, silty in part, fossiliferous with predominantly silt to medium grained size forams and minor fossil fragments, traces of pyrite and glauconite.
1		CALCAREOUS MUDSTONE - light to medium grey, grey to brown, firm to hard, subfissile and shaley in part, minor silt to fine grained size forams and fossil fragments. Disseminated pyrite common, traces of glauconite and carbonaceous flecks.
		CALCISILTITE-SILTSTONE - light to medium grey, grey brown, moderately soft to firm, subfissile to blocky, thinly laminated, abundant silt size forams and fossil fragments, traces of pyrite, glauconite and carbonaceous flecks.
	•	LATROBE GROUP FORMATION (2420m-2607mTVD)
	2419m-2605m	INTERBEDDED SANDSTONE AND SILTSTONE WITH THIN COAL SEAMS:
		SANDSTONE - quartzose, clear to milky, minor yellow to brown, fine to very coarse grained to granular, friable to loose, angular to rounded, poorly sorted, trace of pyritised sandstone.
		2/
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DESCRIPTION OF LITHOLOGICAL UNITS

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FORTESCUE-3

	DEPTH	DESCRIPTION
		<u>SILTSTONE</u> - medium brown to brown grey, soft to firm, carbonaceous to very carbonaceous, pyrite and mica common, grades to very fine sandstone in part.
		COAL - black, hard, brittle, conchoidal fracture, pyritised in part.
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FORTESCUE-3

GEOLOGICAL AND GEOPHYSICAL AMALYSIS

STRATIGRAPHY

		DEPTH (m) * PREDICTEDI ACTUAL			
AGE	UNIT/HORIZON	KB	KB	SUBSEA	THICKNESS (m)
Pliocene/Miocene	Gippsland Limestone	98	100	-69	1994
	Base of High Velocity Channel	1711	1744	-1713	
	Mid-Miocene Marker	2241	2240	-2209	
Miocene/Oligocene	Lakes Entrance Formation		2094	-2063	325
Eocene/Paleocene	Latrobe Group	2416	2420	-2389	187+
	M-1.0.0 Base Seal	2521	2515	-2484	
-	M-1.3.1	2586	2591	-2560	
	T.D. (TVD)		2607		
	T.D. (Driller's MD)		2625		

* All log depths are derived from the TVD logs.

GECLOGICAL ANALYSIS

Fortescue-3 was drilled for three reasons; namely to confirm the structural interpretation, to confirm the depth of the oil/water contact, and to evaluate the reservoir potential and stratigraphy of the Fortescue Field.

The Latrobe Group section encountered in Fortescue-3 comprises marginal marine to alluvial plain sediments. These can be correlated well with those in Fortescue-1 to the north-west and West Halibut-1 to the south-east.

The uppermost unit at Fortescue-1 (F1; see geological cross section A-A') pinches out to the west of Fortescue-3, where the top of Latrobe Group is represented by marginal marine sandstone and siltstone of the F2 unit. With depth, the facies progressively change to alluvial plain sandstones, shales and coals.

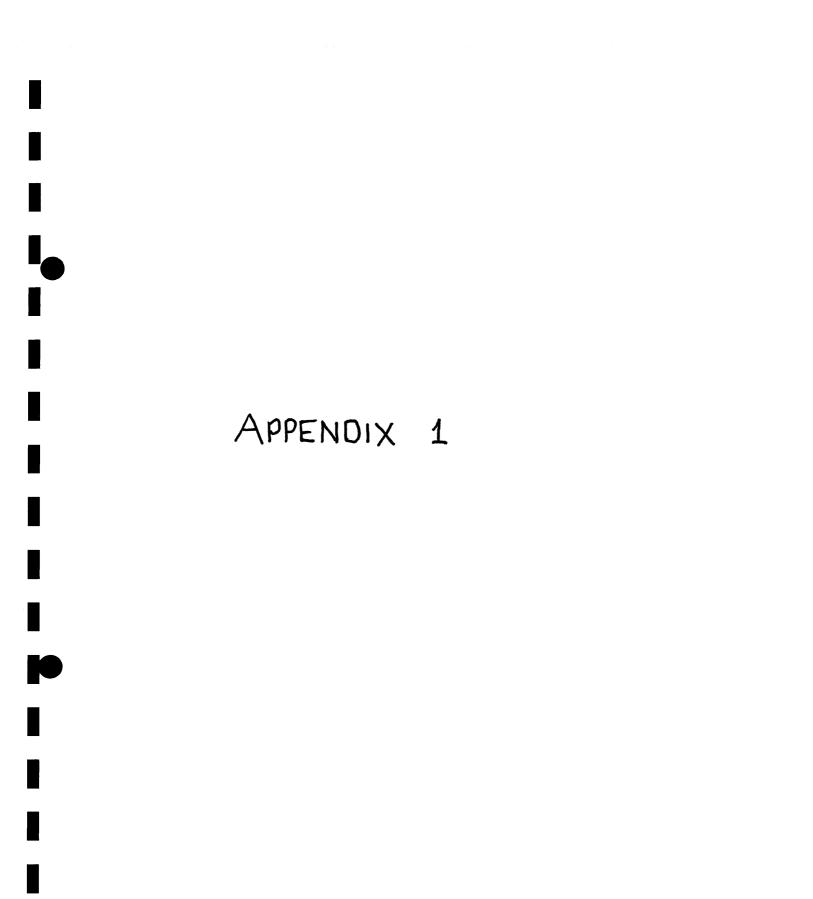
A 29m gross oil column within the F2 unit was cored, but the oil/water contact was not recognised because of core loss. However, the base of known oil is at a depth of 2448m TVD (equivalent to cored depth 2465m). The oil bearing sands in Fortescue-3 pinchout up-dip, west of West Halibut-1.

Formation pressure data indicate that the shales and interbedded coals of the M-1.0.0 base seal form an hydraulic barrier. The formation pressure above the barrier is about 20 psig greater than below it. Formation pressures in the upper sands fall on the same trend as those above the M-1.0.0 seal at West Halibut-1, whereas those in the lower sands equate with Halibut Field pressures.

GEOPHYSICAL ANALYSIS

Fortescue-3 was drilled to delineate the northern fault block of the Fortescue Field, and confirmed the geophysical prognosis which had been made, all events being encountered well within tolerance.

The latest mapping of the Top of Latrobe seismic Marker is enclosed with this report.



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APPENDIX 1

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SAMPLES DESCRIPTIONS

P. KEMP

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FORTESCUE-3

28/11/78

(Depths shown are drillers measured depth)

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	DEPTH	<u>%</u>	DESCRIPTION
			20" casing shoe at 225 metres.
	240m-250m	100%	<u>Calcarenite</u> - very light grey, loose, very fossiliferous with fossil fragments to 1.5mm, dominant bivalve, bryozoa, foraminifera, some minor dark minerals and very rare glauconite.
			Sample contains about 30% cement.
	250m-260m	100%	<u>Calcarenite</u> - As above, with cement.
-	260m-270m	100%	<u>Calcarenite</u> - As above, sample contains about 10% cement.
	270m-280m	100%	Calcarenite - As above, with cement.
	280m-290m	100%	<u>Calcarenite</u> - very light grey, very fine grained, angular, clear to very light grey, calcareous matter, with abundant loose fossil fragments as above, some very fine grained, dark, glauconite.
			Sample contains about 10% cement.
	290m-300m	100%	<u>Calcarenite</u> - As above, grains are slightly firm and brittle.
			Trace cement.
	300m-310m	100%	<u>Calcarenite</u> - AS above.
			Trace cement.
	310m-320m	100%	<u>Calcarenite</u> - very light grey, very fine grained, slightly firm and brittle, angular, minor very dark glauconite grain very fossiliferous, dominant bivalves bryozoans and forams, fragments to 1.5mm.
			Trace cement.
	320m-330m	100%	<u>Calcarenite</u> - As above.
			Trace cement.
	330m-340m	100%	<u>Calcarenite</u> - As above, with some medium light grey calcareous grains included. No cement.
	340m-350m	100%	<u>Calcarenite</u> - As above, loose very coarse grained fossil fragments, constitute approximately 30% of sample.
	350m-360m	100%	<u>Calcarenite</u> - As above.
	360m-370m	100%	<u>Calcarenite</u> - As above.
	370m-380m	100%	<u>Calcarenite</u> - very light grey, dominantly very fine grained slightly firm and brittle, angular, minor very dark glauco- nite grains, very fossiliferous with very coarse grains, loose fossil fragments of bivalves, bryzoans and forams, loose fragments constitute 10-20% of sample.
•	380m-390m	100%	<u>Calcarenite</u> - As above.
	390m-400m	100%	Calcarenite - As above with < 10% loose fossil fragments.
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	DEPTH	<u>8</u>	DESCRIPTION
40	00m-410m	100%	Calcarenite - As for 390m-400m.
41	.0m-420m	100%	Calcarenite - very light grey, very fine grained, minor dark grains, rare glauconite, slightly firm and brittle, angular, very little non-calcareous residue after dissolv- ing in HCl. thtps://www.coarse.grainsloose-fossil-fragments
42	0m-430m	100%	<u>Calcarenite</u> - As above.
43	0 m-4 40m	100%	<u>Calcarenite</u> - As above.
44	0m-450m	100%	<u>Calcarenite</u> - As above.
45	0 m-4 60m	50%	<u>Calcarenite</u> - As above.
		50%	? <u>Marl - very light grey mud</u> , washing out of sample, no discrete grains.
46	0m-470m	80%	<u>Calcarenite</u> - As above.
		20%	? <u>Marl</u> - As above.
47	0m-480m	90%	Calcarenite - very light grey, very fine grained, minor dark grains including glauconite, slightly firm and 'brittle, angular, < 10% loose fossil fragments including bivalves, bryozoans, ?gastropods and forams.
		10%	? Marl - very light grey covering calcisiltite and probably washing out of sample.
48	0m-490m	80%	<u>Calcarenite</u> - As above.
		20%	? Marl - As above.
49	0m-500m	50%	<u>Calcarenite</u> - As above. 20% loose fossil fragments with very abundant forams.
		50%	? <u>Marl</u> - As above.
50	0m-510m	50%	Calcarenite
		50%	? <u>Marl</u> - As above.
51	0m-520m	50%	<u>Calcarenite</u> - As above.
		50%	? <u>Marl</u> - As above.
52	0m-530m	80%	<u>Calcarenite</u> - As above.
		20%	? Marl - As above.
53	0m-540m	80%	<u>Calcarenite</u> - very light grey, very fine grained to silt, minor dark grains and rare glauconite, loose fossils to 20% of sample with forams predominating, slightly firm.
		20%	? <u>Marl</u> - very light grey, covers calcarenite grains, may be washing out of sample.
54	0m-550m	80%	<u>Calcarenite</u> - As above.
		20%	? <u>Marl</u> - As above.
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	DEPTH	<u><u>9</u></u>	DESCRIPTION
	550m-560m	90%	Calcarenite - As above.
		10%	? Marl - As above.
	560m-570m	100%	<u>Calcarenite</u> - As above.
	570m-580m	100%	<u>Calcisiltite</u> - very light grey, silt to very fine grained, and has been a transition from sand to silt size grains, minor glauconite, approximately 10% loose fossil fragments, to lmm, mainly forams, very rare pyrite.
	580m-590m	90%	<u>Calcisiltite</u> - As above.
		10%	? <u>Marl</u> - As above.
	590m-600m	100%	Calcisiltite - As above with glauconite becoming common.
	600m-610m	100%	<u>Calcisiltite</u> - As above.
	610m-620m	100%	Calcisiltite - light grey, silt dominant over very fine grain slightly firm, nodular glauconite common, rare pyrite, approximately 10% loose fossil fragments including forams. Trace Marl - medium to dark grey, firm, very calcareous.
	620m-630m	100%	<u>Calcisiltite</u> - As above.
			Trace Marl - As above.
8	630m-640m	80%	<u>Calcisiltite</u> - As above.
		20%	? <u>Marl</u> - very light grey, disaggregated, very soft, may be washing out of sample.
	640m-650m	80%	<u>Calcisiltite</u> - As above.
		20%	?Marl - As above.
	650m-660m	80%	<u>Calcisiltite</u> - As above.
		20%	Marl - As above.
	660m-670m	100%	<u>Calcisiltite</u> - light grey, silt size grains dominate over very fine grains, slightly firm, common nodular glauconite, rare pryite. Approximately 10% loose fossil fragments to 1.0mm, mainly forams.
	670m-680m	100%	<u>Calcisiltite</u> - As above.
	680m-690m	100%	<u>Calcisiltite</u> - As above.
	690m-700m	100%	<u>Calcisiltite</u> - As above.
	700m-710m	100%	<u>Calcisiltite</u> - As above.
	710m-720m	100%	<u>Calcisiltite</u> - As above.
	720m-730m	100%	<u>Calcisiltite</u> - As above.
	730m-740m	100%	<u>Calcisiltite</u> - very light grey, minor very fine grained calcarenite in part, minor nodular glauconite. Approximate- ly 10% loose fossil fragments mainly bryozoans and forams.
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	DEPTH	8	DESCRIPTION
	730m-740m		Continued/ Trace Limestone - light grey to buff, hard, microcrystalline
	740m-750m	100%	<u>Calcisiltite</u> - As above, includes minor dark grains, some of which appear to be carbonaceous flecks. Very rare? bivalve fossil fragments.
			Trace Limestone - As above.
	750m-760m	100%	<u>Calcisiltite</u> - As above.
			Trace Limestone - As above.
I	760m-770m	100%	<u>Calcisiltite</u> - As above.
			Trace Limestone - As above.
	770m-780m	100%	<u>Calcisiltite</u> - light grey, firm, brittle, minor dark grains including nodular glauconite. Approximately 10% loose fossil fragments mainly bryozoans and forams, some within calcisiltite aggregates. Fossil fragments are very coarse grained to 1.0mm.
	780m-790m	100%	<u>Calcisiltite</u> - As above.
	7 90m-800m	100%	<u>Calcisiltite</u> - As above with rare pyrite replacing fossils. (EXLOG)
	800m-810m	100%	<u>Calcisiltite</u> - light grey, firm, very soft in part, glauco- nite grains, trace fossil fragments, rare quartz grains, forams (bryozoa + coral stems?).
	810m-815m	100%	<u>Calcisiltite</u> - As above, some rare coarser sections.
	815m-820m	100%	<u>Calcisiltite</u> - As above, trace fossil fragments.
\Box	820m-825m	100%	<u>Calcisiltite</u> - As above, glauconite grains, forams, bryozoa (coral stems?).
	825m-830m	100%	<u>Calcisiltite</u> - As above, rare quartz grains.
	830m-835m	100%	<u>Calcisiltite</u> - minor fine grained Calcarenite, light grey to light brown grey, glauconite grains, trace fossil . fragments, forams.
¢	835m-840m	100%	<u>Calcisiltite</u> - As above, some very soft sections, trace fossil fragments.
	840m-845m	100%	<u>Calcisiltite</u> - As above, some with minor marl.
	845m-850m	100%	<u>Calcisiltite</u> - minor calcarenite, trace fossils, forams, light grey to light grey brown, hard to brittle, soft in part.
II	850m-855m	100%	<u>Calcisiltite</u> - As above, forams.
Ļ	855m-860m	100%	<u>Calcisiltite</u> - As above.
┏┫	860m-865m	100%	<u>Calcisiltite</u> - As above.
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DEPTH	<u>6</u>	DESCRIPTION
865m-870m	100%	Calcisiltite - As above.
870m-875m	100%	·
	100%	<u>Calcisiltite</u> - light grey to light brown grey, hard, brittle some sections soft, glauconite, fossils, forams. Approximately 10% Marl, soft, disaggregated.
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 875m-880m		1/12/78 NO RETURNS. BY PASS SHAKERS.
880m-885m	100%	<u>Calcisiltite</u> - light grey to very light brown grey, hard, brittle, 5-10% fine to medium grained fossil fragments, predominantly forams, trace - 1% black glauconite grains.
885m-890m	70%	<u>Calcisiltite</u> - As above, 30% grades to very fine to fine grained Calcarenite.
890m-895m	80%	<u>Calcisiltite</u> - very light grey to very light grey brown, hard, brittle. Trace -5% fossils, predominantly forams, occasional trace of glauconite.
	20%	<u>Calcarenite</u> - gradational with above, grades to very fine to fine grained.
895m-900m	80%	<u>Calcisiltite</u> - As above, grades to
	10%	<u>Calcarenite</u> - very fine to fine grained.
	10%	Limestone - light grey, brown, yellow brown, very hard, massive, brittle, trace glauconite, trace pyrite, sparry in part, grades to Calcisiltite.
900m-905m	90%	Calcisiltite - very light grey, very light brown grey, trace to 1% fine black specks, trace to 5% forams and coral stems, slightly argillaceous, firm to moderately hard.
	10%	Limestone - As above.
905m-910m	100%	<u>Calcisiltite</u> - very light grey, 1% very fine black specks, very soft to firm, very argillaceous, grades to Marl.
910m-915m	100%	<u>Calcisiltite</u> - very light grey, very light brown grey, soft to firm, trace carbonaceous flecks, grades to Calcilutite. Trace forams, sparry.
915m-920m	100%	As above.
920m-925m	100%	<u>Calcisiltite</u> - very light grey, very light brown grey. Trace very fine black flecks, soft to moderately firm, clay size to very fine grains, slightly argillaceous in part, trace fossil fragments, forams.
925m-930m	100%	As above, but becoming moderately hard, brittle.
930m-935m	100%	As above, trace to 5% fossil fragments, coral.
935m-940m	90%	<u>Calcisiltite</u> - very light grey, minor very light brown grey, soft to firm, trace coral fragments, slightly argilla ceous.
	10%	Calcarenite - light tan, firm, friable, medium to coarse
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DEPTH	<u>%</u>	DESCRIPTION
935m-940m	10%	Continued/
		grained coral fragments, with Calcisiltite matrix, sparry in part.
940m-945m	95%	<u>Calcisiltite</u> - As above.
	5%	<u>Calcarenite</u> - As above.
945m-950m	100%	<u>Calcisiltite</u> - As above with trace to 5% coarse sparry calcite.
950m-955m	80%	<u>Calcisiltite</u> - very light grey, very light brown grey, tra very fine black specks, very soft to firm, soft variety is clay size and very argillaceous grading to Marl.
	20%	Marl - very light grey, soft, massive, grades to Calcisiltite.
955m-960m	80%	<u>Calcisiltite</u> - As above.
	20%	Marl - As above, gradational.
960m-965m	100%	<u>Calcisiltite</u> - light grey, grades to Marl, soft to firm, minor dark grains, some of which are carbonaceous, minor glauconite, fossils present, mainly forams and ?spicules.
		Trace Limestone - very light grey to buff, hard, micro- crystalline. 60% carbonate.
965m-970m	100%	<u>Calcisiltite</u> - As above.
		Trace Limestone - As above.
970m-975m	100%	<u>Calcisiltite</u> - As above.
9 75m- 980m	100%	<u>Calcisiltite</u> - As above, fraction that tends to marl, is very light grey.
980m-985m	100%	<u>Calcisiltite</u> - light grey to very light grey, minor part grades to marl, soft to slightly firm, minor dark grains, including carbonaceous matter and glauconite, minor fossils including forams.
		Trace <u>Limestone</u> - very light grey to buff, hard, micro- crystalline.
985m- 990m	80%	Calcisiltite - As above, fossils mainly forams, and ?spicul
	20%	Marl - very light grey, disaggregated in part, very soft, slightly firmer part tends to calcisiltite.
990m-995m	90%	<u>Calcisiltite</u> - As above.
	10%	Marl - As above.
		Trace Limestone - As above.
995m-1000m	90%	Calcisiltite - As above, forams common to 1.25mm.
	10%	Marl - As above.
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	DEPTH	00	DESCRIPTION
	1000m-1005m	50%	<u>Calcisiltite</u> - As above.
		50%	Marl - As above, tends to calcisiltite in part.
			Trace Limestone - As above.
	1005m-1010m	100%	Marl - As above.
			Trace <u>Calcisiltite</u> - As above.
	1010m-1015m	100%	<u>Calcisiltite</u> - light grey to very light grey, high calcareous mud content, fossils common, mainly forams and ?spicules. Trace dark grains and rare glauconite, soft to slightly firm. Very rare coarse grained quartz with trace of pyrite coating surface.
	1015m-1020m	100%	Calcisiltite - As above, no quartz grains.
	1015m-1020m 1020m-1025m	100%	
	1025m-1030m		<u>Calcisiltite</u> - As above.
.	102311-103011	100%	<u>Calcisiltite</u> - As above.
	1020 1025	1000	Trace Limestone - light grey to buff, hard, microcrystalli
	1030m-1035m	100%	<u>Calcisiltite</u> - As above.
	1035m-1040m	100%	<u>Calcisiltite</u> grades to <u>Marl</u> -light grey to very light grey, soft to slightly firm, minor dark grains which include very dark glauconite grains, fossils common, mainly large forams (to 1.0mm) and ?spicules.
	1040m-1045m	100%	<u>Calcisiltite</u> - As above.
	1045m-1050m	100%	Marl grades to <u>Calcisiltite</u> - very soft to soft, minor glauconite and fossils. Large amount of HCL insoluble material.
	1050m-1055m	100%	Marl - As above.
	- -		NOTE: Change to 10m samples due to high (60m/hr) drilling rate and difficulty of washing the clayey samples.
	1050m-1060m	100%	Marl - As above.
	1060m-1070m	100%	Marl - tends to calcisiltite, very light grey to light grey, minor dark grains, rare glauconite, fossils common, large acid insoluble residue.
	1070m-1080m	100%	Marl - As above, fossils, include ?spicules.
			Trace Limestone - buff to hard, microcrystalline.
	1080m-1090m	100%	Marl - As above.
	1090m-1100m	100%	Marl - tends to calcisiltite in part, sample grains contain about 20% silt size material, mainly fossils and dark grain very soft to soft, some larger (to 1.00mm) forams.
			Trace Limestone - hard, buff, microcrystalline.
	1100m-1110m	100%	Marl - As above.
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	DEPTH	<u>%</u>	DESCRIPTION
•.	1110m-1120m	100%	Marl - As above, tends to calcisiltite in part.
•	1120m-1130m	100%	Marl - As above, part that tends to calcarenite is firm.
	1130m-1135m	100%	<u>Marl</u> - very light grey to light grey, tends to calcisiltite in part, contains approximately 20% silt size material, mainly fossils and dark grains, very soft to firm, rare glauconite.
÷.,	1135m-1140m	100%	Marl - As above.
	1140m-1145m	100%	Marl - As above, fossils mainly forams and ?spicules, some larger forams to 1.0mm.
	1145 m-1150m	100%	Marl - As above.
•	1150m-1155m	100%	Marl - very light grey to light grey, minor part grades to calcisilitte, sample contains about 20% silt size material mainly fossils. Minor dark grains and rare glauconite, forams common.
	1155m-1160 m	100%	Marl - As above.
· · ·	1160m-1165 m	100%	Marl - As above.
	1165m-1170m	100%	Marl - As above.
	117 0m-1175m	100%	Marl - As above. Trace dark grey Marl.
	1175m-11 80m	100%	Marl - very light grey to light grey, minor (20%) silt size material mainly fossils. Minor dark grains, rare glauconite, very soft to slightly firm.
	1180m-1185m	100%	Marl - As above.
	1185m-1190m	100%	Marl - As above. Trace dark grey Marl.
	1190m-1195 m	100%	Marl - As above. Larger forams common.
	1195m-12 00m	100%	Marl - very light grey to light grey, minor silt size grains - mainly fossils including forams and ?spicules very soft to slightly firm, very rare glauconite.
	1200m-1205 m	100%	Marl - As above.
	1205m-1210m	100%	Marl - As above.
	1210m-1215 m	100%	Marl - As above, minor calcisiltite.
	1215m-1220m	100%	<u>Marl</u> - light grey and very light grey, minor part tends to calcisiltite, sample contains some silt size grains which are mainly fossils. Some dark grains and rare glauconite, soft.
	1220m-1225m	100%	Marl - As above.
	1225m-1230m	100%	Marl - As above.
	1230m-1235m	100%	Marl - As above.
	1235m-1240m	100%	Marl - both light grey and very light grey, minor part
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	DEPTH	8	DESCRIPTION
	1235m-1240m	100%	Continued/
	 		grades to calcisiltite, some fossil and dark grains, including glauconite, some silt size, soft to very soft.
	1240m-1245m	100%	Marl - As above, very soft and disaggregated.
	1245m-1250m	100%	Marl - As above, disaggregated and very soft.
	1250m-1255m	100%	<u>Marl</u> - both light grey and very light grey, minor part grades to calcisiltite and is firmer, otherwise very soft and often disaggregated minor dark grains, rare glauconite, silt size fossils common, forams and ?spicules.
	1255m-1260m	100%	Marl - As above.
	1260m-1265m	100%	Marl - As above.
			Pulled out of hole at 1845 hours, to change bit 1271m.
	1265m-1270m	100% '	D. HENDERSON 2/12/78 <u>Marl</u> - very light grey and light olive grey, very soft and disaggregated to firm, slight trace very fine dark grains, trace forams.
	1270m-1275m	100%	Marl - As above.
	1275m-1280m	70%	Marl - light olive grey, soft to firm, calcisiltitic, very argillaceous, grades to
		30%	<u>Calcisiltite</u> - light olive grey, moderately firm, massive, very argillaceous, trace forams and ?spicules. Slight trace glauconite.
	1280m-1285m	70%	<u>Calcisiltite</u> - As above, grading to
		30%	Marl - As ábove.
	1285m-1290m	70%	<u>Calcisiltite</u> - medium light grey to medium grey, firm to hard, brittle, massive, very argillaceous, 1-2% forams, rar glauconite.
		20%	Marl - very light grey, soft, trace forams, grades to Calcisiltite.
		10%	Limestone - olive grey, tan, very hard, brittle, massive, microcrystalline, ?silicified, slightly argillaceous.
1	L290m-1295m	90%	<u>Calcisiltite</u> - generally as above, very argillaceous, marly, grades to
		5%	Marl - As above.
		5%	Limestone - As above.
	295m-1300m	90%	<u>Calcisiltite</u> - medium grey, medium light grey, very argillaceous, grading to calcareous mudstone, rare glauco- nite, trace forams and coral fragments, grades to
		10%	<u>Marl</u> - light grey, soft.
1	.300m-1305m	100%	Calcisiltite - As above, grades to Calcareous Mudstone
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	DEPTH	<u><u>ې</u></u>	DESCRIPTION
	1300m-1305m	100%	Continued/
			(Calcareous Siltstone), 30-40% acid insoluble claysize residue.
	1305m-1310m	100%	<u>Mudstone</u> - <u>Calcareous</u> - medium to light grey, firm to moderately hard, massive, trace very fine black carbona- ceous? specks, forams, rare glauconite.
	.1310m-1315m	100%	<u>Calcareous Mudstone</u> - As above, abundant forams.
	1315m-1320m	80%	<u>Calcareous Mudstone</u> - As above.
		20%	Marl - very light grey, very soft, argillaceous, silty.
	1320m-1325m	100%	<u>Calcareous Mudstone</u> - light to medium grey, firm to moderately hard, massive, good trace loose forams, slight trace black? carbonaceous specks. Approximately 40% calcareous silt, 10% micrite, 45% clay, 5% forams and fossil fragments. Trace black carbonaceous(?) specks, rare glauconite.
	1325m-1330m	95%	Calcareous Mudstone - As above.
	• •	5%	<u>Marl</u> - light grey, soft.
	1330m-1335m	100%	Calcareous Mudstone - As above.
	1335m-1340 m	95%	Calcareous Mudstone - As above, trace glauconite. Trace very fine black specks, grades to
		5%	Marl - As above. Calcimetry 48%.
	1340m-1345m	90%	<u>Calcareous Mudstone</u> - medium light to medium grey, firm to moderately hard, trace black specks, rare glauconite. Approximatey 60% micrite and calcareous silt, 40% clay.
		10%	Marl - very light grey, soft, 1-2% forams.
	1345m-1350m	100%	Calcareous Mudstone - As above.
	1350m-1355m	100%	<u>Calcareous Mudstone</u> - As above, 40-70% silt size, 30-60% clay size, trace very fine sand size. Massive to thin laminae.
	. 1355m-1360 m	90%	Calcareous Mudstone - As above.
		10%	Marl - very light grey, soft, silty, occasionally very fir carbonaceous? flecks. Good trace 2mm forams.
	1360m-1365 m	90%	<u>Calcareous Mudstone</u> - As above, silt size 40-60%, clay size 40-60%.
		10%	<u>Marl</u> - As above.
	1365m-1370m	95%	Calcareous Mudstone - As above, grades to
		5%	Marl - As above.
	1370m-1375m	80%	<u>Calcareous Mudstone</u> - light grey to medium light grey, firm to moderately hard, brittle, massive to thin laminae,
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	DEPTH	<u>%</u>	DESCRIPTION
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•	1370m-1375m	80%	Continued/
			30-50% silt size, 50-70% clay size. Trace very fine san size, trace black very fine grains (carbonaceous?), good trace forams, grades to
		20%	Marl - very light grey, soft to firm, silty, trace foram
· · · ·	1375 m-1380m	80%	<u>Calcareous Mudstone</u> - As above.
		20%	Marl - As above.
•	1380m-1385m	80%	<u>Calcareous Mudstone</u> - As above.
		10%	Marl - As above.
		10%	Limestone - buff, hard, microcrystalline, ? slightly dolomitic, (reacts almost immediately with HCL).
	1385m-1 390m	70%	<u>Calcareous Mudstone</u> - As above.
		10%	<u>Marl</u> - As above.
		20%	Limestone - As above.
•	1390m-1 395m	80%	<u>Calcareous Mudstone</u> - light grey to medium light grey,
			firm and brittle in part, contains 20% silt size, minor dark grains some of which are carbonaceous, very rare glauconite, minor forams to 2.0mm.
		10%	Marl - very light grey, soft, slightly silty.
		10%	Limestone - medium light grey, buff, hard, microcrystall
	1395m-14 00m	90%	<u>Calcareous Mudstone</u> - light grey to medium light grey, f and brittle in part, contains approximately 30% silt size grains, minor dark grains.
		10%	Marl - very light grey, soft, slightly silty.
			Trace Limestone - medium light grey to buff, hard, ?slightly dolomitic, microcrystalline.
	1400m-1405m	80%	Calcareous Mudstone - As above.
		20%	Marl - As above.
	1405m-1410m	80%	<u>Calcareous Mudstone</u> - As above, some of the dark grains are carbonaceous.
· · · ·		20%	Marl - As above.
	1410m-1415m	80%	<u>Calcareous Mudstone</u> - As above, some large (1.5mm) forams loose in sample.
		20%	<u>Marl</u> - As above.
			64% calcimetry.
	1415m-1420m	70%	<u>Calcareous Mudstone</u> - light grey to medium light grey, dominantly firm, occasionally very firm, approximately
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	DEPTH	8	DESCRIPTION
	1415 m-1420m	70%	Continued/
			25% silt size grains, minor dark grains -? carbonaceous matter.
		30%	Marl - very light grey, soft to very soft, approximately 15% silty grains.
• •.	1420m-1425m	80%	<u>Calcareous Mudstone</u> - As above.
•	4	20%	Marl - As above.
	1425m-1430m	70%	<u>Calcareous Mudstone</u> - As above.
		30%	Marl - As above.
	1430m-1435m	70%	<u>Calcareous Mudstone</u> - light grey to medium light grey, dominantly firm, minor part very firm and soft, approximate ly 25% silt size grains, minor dark ?carbonaceous matter, minor silt size fossils including forams.
		30%	Marl - very light grey, soft to very soft, up to 15% silt size grains.
•	1435m-1440 m	60%	<u>Calcareous Mudstone</u> - As above.
		40%	Marl - As above, occasionally finely interlaminated with medium to dark grey marl, large amount insoluble material in HCL.
	1440m-1445 m	40%	<u>Calcareous Mudstone</u> - As above (65% carbonate).
		60%	Marl - As above (58% carbonate).
	1445m-1450m	90%	<u>Calcareous Mudstone</u> - light grey to medium light grey, dominantly firm, minor very firm and soft, soft fraction tends to marl. Approximately 20% silt size grains, trace ?carbonaceous matter, minor silt size fossils including forams.
		10%	Marl - very light grey, very soft, minor (10-15%) silt size grains.
	1450m-1455 m	90%	<u>Calcareous Mudstone</u> - As above.
		10%	Marl - As above.
	1455m-1460m	90%	Calcareous Mudstone - As above, forams are common (.25mm)
		10%	Marl - As above, rarely finely interlaminated with medium dark grey marl.
•	1460m-1465m	90%	Calcareous Mudstone - As above, occasionally hard.
		10%	Marl - As above. Loose forams to 1.25 mm.
	1465m-1470m	90%	Calcareous Mudstone - light grey to medium light grey, dominantly firm, some soft and some hard. Approximately 35% silt size fraction. Trace carbonaceous matter, minor to rare fossils, mainly forams, dominantly massive.
		10%	Marl - very light grey, very soft, minor (10%) silt fraction
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	<u><u><u></u> <u></u> <u></u></u></u>	DESCRIPTION
1465m-1470m	10%	Continued/
нан 1. 1. – С.		usually massive.
1470m-1475 m	90%	<u>Calcareous Mudstone</u> - As above.
	10%	Marl - As above.
1475m-1480m	90%	<u>Calcareous Mudstone</u> - light grey to medium light grey, 20-30% silt fraction, minor carbonaceous matter which is mostly silt size rarely to 0.1mm. Very rare nodular light green glauconite, minor fossils - silt size? mainly forams generally firm and brittle, occasionally hard, occasionally soft tending to marl.
	10%	Marl - very light grey, soft, 10% silt size fraction and minor dark grains.
1480m-1485m	100%	<u>Calcareous Mudstone</u> - As above.
· · · ·		Trace <u>Marl</u> as above, disaggregated in part and coats calcareous mudstone grains.
1485m-1490m	100%	<u>Calcareous Mudstone</u> - As above.
		Trace -5% Marl- As above.
1490m-1495m	90%	<u>Calcareous Mudstone</u> - As above, approximately 10-20% silt size fraction, remainder clay size.
	10%	Marl - As above.
1495m-15 00m	100%	<u>Calcareous Mudstone</u> - light grey to medium light grey, 20- 30% silt fraction, minor carbonaceous ⁶ matter (rare laminae of carbonaceous matter) minor fossils silt size ? mainly forams, generally firm to hard, becoming harder with depth. Trace-5% <u>Marl</u> - very light grey, soft, 10% silt fraction.
1500m-1505m	90%	<u>Calcareous Mudstone</u> - As above.
	10%	Marl - As above.
1505m-1510m	100%	Calcareous Mudstone - As above.
		Trace-5% <u>Marl</u> - As above. Good trace sand size forams, loose. Trace very fine Pyrite. Good trace very fine black specks (carbonaceous and/or glauconite).
1510m-1515m	100%	<u>Calcareous Mudstone</u> - medium light grey to light grey, approximately 20-30% silt fraction, minor carbonaceous matter, minor fossils (generally silt size) mainly forams.
		Trace <u>Marl</u> - very light grey, very soft, approximately 10% silt fraction.
1515m-1520m	100%	<u>Calcareous Mudstone</u> - As above.
		Trace <u>Marl</u> - As above.
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DEPTH DESCRIPTION ક 100% 1520m-1525m Calcareous Mudstone - As above. Trace Marl - As above. 1526m-1527m Gas Show. Greater than 2000 units hot wire (saturated). 1,500,000 ppm. C, 7,500 ppm. C_2 с₃ 870 ppm. с₄ 140 ppm. Check for flow (none) and circulate bottoms up. (Current depth 1535m). 70% 1526m-1527m Calcareous Mudstone - medium light grey to light grey, approximately 20% silt size fraction, minor dark grains including carbonaceous matter, contains minor fossils including spherical, silica? forams to.2mm, rare glauconite. 20% Limestone - medium dark grey to buff, ?slightly dolomitic, very hard, microcrystalline, contains minor spherical, silica ?forams to .2mm. 5-10% Silica Grains - clear to white, very coarse to 3mm grains, angular, appear broken, some tabular, some spherical (several layers apparent) and some have very fine grained crystalline coating giving a frosted appearance. Grains have good uniform white to very light yellow fluorescence with an instant white cut. 1527m-1530m 80% Calcareous Mudstone - As above, no silica ?forams. Limestone - As above, rare crystalline silica adhering to 15% Limestone grains! Tr-15% Loose Silica Grains - As above, good fluorescence, do not appear to cut. 1530m-1535m 85% Calcareous Mudstone - medium light grey to light grey, firm occasionally hard, approximately 20% silt fraction including minor carbonaceous material, rare glauconite, no silica? forams. 10% Limestone - medium dark grey to buff, hard, microcrystalline **√** 5% Loose Silica Grains - clear to white, 1.0-5.0mm, often broken and angular, mostly tabular with minor very fine grained crystalline, white, some grains are spherical with layers evident, one grain has 3 such spheres joined together and appears to be organic ? a foraminifera. All grains have good uniform white to very light yellow fluorescence, some grains (including the elongate spherical ?foram described above) show an instant white to very light yellow cut. Others show no visible cut. 15/....

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	DEPTH	<u> </u>	DESCRIPTION
	1536m-1548.6m CORE NO. #1	100%	Calcareous Mudstone - approximately 10-20% silt, occasional- ly 30-40% silt, medium grey, trace mica, trace glauconite, extensively burrowed with light grey silty material and minor dark grey mudstone infilling burrows, trace carbona- ceous matter, minor very fine grained crystalline silica infilling, minor fossils including forams.
	.1548.6m-1550m	100%	<u>Calcareous Mudstone</u> - medium grey and light grey, light grey portion has up to 40% silt fraction, medium grey is less silty, soft to firm, trace glauconite, minor to occasionally common ? forams spherical and clear to 0.05mm in size.
	1550m-1555m	100%	Calcareous Mudstone - As above.
	1555m-1560m	100%	Calcareous Mudstone - As above with minor fraction extending into the very fine grained range including carbonaceous flecks.
	1560m-1565m	100%	<u>Calcareous Mudstone</u> - dominantly medium grey, minor medium light grey, 20-40% silt fraction, trace glauconite, trace carbonaceous material, trace to common fossils mainly silt size, spherical ? forams, very firm to soft.
	1565m-1570m	100%	Calcareous Mudstone - As above.
	1570m-1575m	100%	<u>Calcareous Mudstone</u> - medium light grey to medium grey, firm to moderately hard, brittle, clay to very fine grained size range, 40-70% clay size, 30-55% silt size, trace -5% very fine, trace very fine carbonaceous flecks or black glauconite.
	157 5m-1580m	100%	, <u>Calcareous Mudstone</u> - As above.
	1580m-1585m	100%	Calcareous Mudstone
			40-50% clay size, 50-55% silt size, trace -5% of sand size.
	1585m-1590m	90%	<u>Calcareous Mudstone</u> - light grey to medium light grey, soft to moderately hard, 60-70% clay size, 30-35% silt size, trace -5% very fine sand size, good trace very fine black carbonaceous specks, trace silt size forams, trace * mica.
	• •	10%	Marl - very light grey, soft, 10-20% silt size.
	1590m-1595m	100%	Calcareous Mudstone - As above.
	1595m-1600m	100%	<u>Calcareous Mudstone</u> - As above.
			R.C.N. THORNTON 9/12/78
	1600m-1605m		<u>Calcisiltite</u> - grey to brown to light brown, firm, comprising predominantly fine silt size forams, set in brown clay matrix. Trace slightly larger forams (¹ /8mm), and other fossil fragments. Trace carbonaceous flecks, rare
		.4	trace glauconite, rare trace pyrite. Percentage of clay varies from 20-50%.
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	DEPTH	8	DESCRIPTION
	1605m-1610m		<u>Calcisiltite</u> - As above.
	1610m-1615m		Calcisiltite - As above.
	1615m-1620m		Calcisiltite - As above.
	1620m-1625m		<u>Calcisiltite</u> - As above.
	1625m-1630m		<u>Calcisiltite</u> - As above.
	1630m-1635m	70%	<u>Calcisiltite</u> - As above, except trace sponge spicules, grading to
		30%	<u>Calcareous Mudstone</u> - in which proportion of forams is less than 50%.
	1635m-1640m	70%	<u>Calcisiltite</u> - As above.
		20%	<u>Calcareous Mudstone</u> - As above.
ч -		10%	Marl - buff to light grey, soft, 10-30% forams, sponge spicules, fossil fragments in calcareous clay matrix.
	1640m-1645m	80%	<u>Calcisiltite</u> - grey brown to light brown, firm, comprising mainly fine silt size forams, some orange stained, plus trace sponge spicules and other fossil fragments, set in calcareous clay matrix. Trace carbonaceous flecks and pyrite. Percentage of clay varies 20-50%, grading to
		20%	Calcareous Mudstone - in which proportion of forams is less than 50%.
			Trace <u>Marl</u> - buff to light grey, soft, 10-30% forams, sponge spicules, fossil fragments in calcareous clay matrix.
	1645m-1650m	60%	<u>Calcisiltite</u> - As above.
		40%	<u>Calcareous Mudstone</u> - As above.
	1650m-1655m	70%	<u>Calcisiltite</u> - As above, except more forams are longer tha silt size, more pyrite, rare trace glauconite.
		30%	Calcareous Mudstone - As above.
			Trace large forams (1mm diam.) pyrite aggregates.
	1655m-1660m	60%	<u>Calcisiltite</u> - As above.
		40%	<u>Calcareous Mudstone</u> - As above.
	· ·		Trace Marl - As above.
	1660m-1665m	70%	<u>Calcisiltite</u> - As above.
		30% .	<u>Calcareous Mudstone</u> - As above.
	1665m-1670m	60%	<u>Calcareous Mudstone</u> - As above.
		40%	<u>Calcisiltite</u> - As above.
	1670m-1675m	70%	Calcareous Mudstone - As above.
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DEPTH	• •	DESCRIPTION
1670m-1675m		Continued/
	30%	<u>Calcisiltite</u> - As above.
167 5m-1680m	70%	<u>Calcareous Mudstone</u> - As above.
	30%	<u>Calcisiltite</u> - As above.
1680m-1685m	50%	<u>Calcareous Mudstone</u> - As above.
	50%	<u>Calcisiltite</u> - As above.
		Trace large loose foram.
1685m-1690m	50%	<u>Calcareous Mudstone</u> - As above.
	50%	<u>Calcisiltite</u> - As above.
1690m-1695m	60%	<u>Calcisiltite</u> - grey to brown, firm, comprising mainly silt size forams, plus minor sponge spicules and other fossil fragments, set in clay matrix. Trace carbonaceou flecks and pyrite. Rare trace glauconite impregnated forams. Percentage clay varies 20-50%. Grading to
	40%	<u>Calcareous Mudstone</u> - grey to brown to light brown, buff firm, differing from calcisiltite in that clay percen- tage varies 50-80%.
		Trace Marl - buff, soft, approximately 20% forams and other fossils set in soft highly calcareous clay matrix.
 1 695m-1700m	` 50%	<u>Calcareous Mudstone</u> - As above.
	50%	<u>Calcisiltite</u> - As above.
 17 00m-1705m	70%	<u>Calcareous Mudstone</u> - As above.
	30%	<u>Calcisiltite</u> - As above.
		Trace <u>Marl</u> - As above.
. ×		D.J. HENDERSON
1705m-1710m	60%	<u>Calcareous Mudstone</u> - As above.
	40%	<u>Calcisiltite</u> - As above.
1710m-1715m	50%	<u>Calcisiltite</u> - light grey to medium light grey, buff, firm, massive to blocky, thin laminae, 50-70% silt size to very fine forams and minor sponge spicules in a calcareous clay matrix, trace glauconite.
	50%	<u>Calcareous Mudstone</u> - very light grey to medium light grey, occasionally buff, soft to firm, 30-50% silt size forams. 50-70% clay size matrix, trace glauconite, gradational with Calcisiltite.
1715 m-1720m	70%	Calcisiltite - As above, 60-80% silt size forams, trace pyrite, trace glauconite, grades to
	20%	Calcareous Mudstone - As above.
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	DEPTH	<u><u><u></u></u></u>	DESCRIPTION
	1715m-1720m .		Continued/
		10%	<u>Calcarenite</u> - white, cream, occasionally buff, firm, silt size to coarse grained fragments, coral, bryozoa, trace carbonaceous matter, predominantly medium grained to coarse grained, with silt size matrix.
	1720m-1725 m	50%	<u>Calcisiltite</u> - As above.
		30%	<u>Calcareous Mudstone</u> - As above, gradational with Calcisil- tite.
		20%	<u>Calcarenite</u> - cream, very light grey, firm to hard, silt size to medium grained with occasional coarse grained fragments in silt size matrix, in part gradational with
			Calcisiltite, occasionally dark grey, very coarse, angular fragments, trace glauconite.
X	1725m-1730m	50%	<u>Calcisiltite</u> - As above, trace carbonaceous matter, grades in part to Calcarenite and
		40%	<u>Calcareous Mudstone</u> - As above.
		10%	<u>Calcarenite</u> - As above.
	1 7 30m-1735m	60%	<u>Calcisiltite</u> - light grey to medium light grey, firm, massive to blocky, 60-80% silt size to very fine grained forams, spicules and fossil debris in clay size matrix, good trace glauconite, slight trace very fine carbonaceous flecks.
•		∖ 40%	<u>Calcarenite</u> - very light grey, occasionally buff, 40-60% fine grained to medium grained, occasionally coarse grain- ed, angular fragments including forams in a Calcisiltite matrix, abundant bright green glauconite partly gradationa with Calcisiltite, as above.
X	1735m-1740m	70%	Calcisiltite - As above, trace -20% medium grained, angula fossil debris, grades to
		30%	<u>Calcarenite</u> - As above.
· •	174 0m-1745m	80%	<u>Calcisiltite</u> - As above.
		20%	<u>Calcarenite</u> - As above.
	1745m-1750m	60%	<u>Calcisiltite</u> - As above.
		10%	<u>Calcarenite</u> - As above.
		30%	<u>Calcareous Mudstone</u> - light grey, firm, 20-40% silt, trace glauconite, massive.
	17 50m-1755m	30%	Calcisiltite
		70%	Marl - very light grey to light grey, slightly buff grey, very soft, 10-30% silt size forams.
	1 7 55m-1760m	100%	<u>Marl</u> - As above.
	1760m-1765m	100%	Marl - As above.
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			FORTESCUE-3 9/12/78
	DEPTH	<u>9</u>	DESCRIPTION
	17 65m-1770m	90%	Marl - light grey, soft to firm. 10-30% silt size grains.
		10%	<u>Calcisiltite</u> - 40-60% silt size, firm.
	1770m-1775m	100%	Marl - light grey, very soft, hygroturqid (dispersive), 10-20% silt size forams, occasional trace pyrite.
	1775m-1780m	100%	Marl - As above.
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	1780m-1785m	100%	<u>Marl</u> - As above.
	1785m-1790m	90%	Marl - As above, trace pyrite.
		10%	Calcisiltite - light grey to medium light grey, soft to firm, massive, 30-50% fine silt size forams.
	1790m-1795m	100%	Marl - As above.
	1795m-1800m	100%	Marl - As above.
	1800m-1805m	100%	Marl - very light grey, light grey, very soft, dispersive,
		•	massive, approximately 20% fine silt size grains, abundant forams, slight trace pyrite, sometimes as replacement of forams, rare very fine carbonaceous specks.
· ·	1805m-1810m	70%	Marl - As above.
		30%	<u>Calcareous Mudstone</u> - medium light grey to medium grey, firm, massive, 30-40% fine silt size forams, trace pyrite.
	1810m-1815m	. 70%	Marl - As above.
		30%	<u>Calcareous Mudstone</u> - As above.
	1815m-1820m	90%	Marl - As above, approximately 20% silt size to very fine forams, trace pyrite.
		10%	Calcareous Mudstone
	1820m-1825m	<u>5</u> 0%	Marl - As above.
		40%	<u>Calcareous Mudstone</u> - medium light grey to medium grey, firm, massive, blocky, 30-40% silt size and occasionally very fine fossil fragments and forams, trace carbonaceous specks, good trace pyrite, grades to
		10%	<u>Calcisiltite</u> - medium light grey to medium grey, firm, massive, blocky, 50-60% silt size fragments.
	1825m-1830m	70%	Marl - very light grey to light grey, very soft, 20-30% clear silt size forams, good trace pyrite.
		30%	<u>Calcareous Mudstone</u> - As above.
	1830m-1835m	70%	<u>Marl</u> - As above.
		30%	Calcareous Mudstone - As above.
	1835m-1840m	80%	Marl - As above, 20-25% silt size grains and/or forams, trace pyrite.

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	DEPTH	00	DESCRIPTION
	1835m-1840m		Continued/
•		20%	Calcareous Mudstone - light to medium grey, firm, massive to platey, 20-30% silt size, very abundant forams.
	1840m-1845m	90%	Marl - As above.
		10%	<u>Calcareous Mudstone</u> - As above.
			R.C.N. THORNTON
	1845m-185 0m	70%	Marl - very light grey to buff, very soft, 20-30% clear silt size forams, trace pyrite and carbonaceous flecks, set in highly calcareous clay matrix.
-		20%	Calcisiltite - grey to brown, firm, silt size forams, trace sponge spicules and minor amounts of fossil fragmen trace pyrite and carbonaceous flecks, set in calcareous clay matrix. Percentage clay varies 20-50%. Grading to
		10%	Calcareous Mudstone - differing from Calcisiltite only in that clay percentage varies 50-80%.
	1850m-1855m	40%	Marl - As above.
		30%	<u>Calcisiltite</u> - As above.
-		30%	<u>Calcareous Mudstone</u> - As above.
			Trace pyrite nodule, ? replacing coral.
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	1855m-1860m	50%	<u>Marl</u> - As above.
		30%.	<u>Calcisiltite</u> - As above, except trace orange grains.
		20%	<u>Calcareous Mudstone</u> - As above.
			Trace loose, large forams, some pyrite impregnated.
	1860m-1865m	70%	Marl - As above.
		20%	<u>Calcisiltite</u> - As above.
		10%	Calcareous Mudstone - As above.
	1865m-1870m	80%	Marl - As above.
		10%	<u>Calcisiltite</u> - As above.
		10%	<u>Calcareous Mudstone</u> - As above.
	1870m-1875m	80%	<u>Marl</u> - As above.
		10%	<u>Calcisiltite</u> - As above.
		10%	<u>Calcareous Mudstone</u> - As above.
			Trace loose forams, especially globular forams.
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	DEPTH	<u>%</u>	DESCRIPTION
	1875m-1880m	70%	Marl - As above.
		20%	<u>Calcareous Mudstone</u> - As above.
		10%	<u>Calcisiltite</u> - As above.
			Trace loose forams.
•	1880m-1885m	70%	Marl - As above.
		20%	Calcareous Mudstone - As above.
		10%	Calcisiltite
•	1885m-1890m	70%	Marl - As above.
	• •	20%	<u>Calcareous Mudstone</u> - As above.
		10%	<u>Calcisiltite</u> - As above.
x	1890m-1895m	40%	Marl - As above.
		30%	<u>Calcareous Mudstone</u> - As above.
		30%	Calcisiltite
÷			Trace <u>Calcarenite</u> - skeletal limestone or packstone, light brown, hard, predominantly fine grain size forams, and minor other fossil fragments, trace pyrite, trace glauco- nite set in calcareous cement.
• <u>-</u>	1895m-1900m	<u></u> 40%	<u>Marl</u> - As above.
		30%	<u>Calcisiltite</u> - As above.
		30%	<u>Calcareous Mudstone</u> - As above.
	1900m-1905m	70%	Marl - As above, pyrite impregnated forams.
4 ~		20%	<u>Calcareous Mudstone</u> - As above.
·		10%	<u>Calcisiltite</u> - As above.
	1905m-1910m	70%	Marl - As above.
		20%	<u>Calcareous Mudstone</u> - As above.
		10%	<u>Calcisiltite</u> - As above.
	1910m-1915m	70%	Marl - As above.
		20%	<u>Calcareous Mudstone</u> - As above.
		10%	<u>Calcisiltite</u> - As above.
·	1915m-1920m	70%	Marl - As above.
		20%	Calcareous Mudstone - As above.
		10%	<u>Calcisiltite</u> - As above.
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	DEPTH	8	DESCRIPTION
	1920m-1925m	70%	Marl - As above.
		20%	<u>Calcareous Mudstone</u> - As above.
	. ·	10%	<u>Calcisiltite</u> - As above.
			Trace Calcite fragments, clear, orange.
	1925m-1930m	85%	Marl - very light grey to buff, very soft, generally 20- 30% forams, mostly silt size, with minor fine to medium grained size, plus minor fossil fragments, set in highly calcareous clay matrix. Trace pyrite impregnated forams pyrite aggregates or finely disseminated pyrite. Rare trace carbonaceous flecks.
		10%	<u>Calcareous Mudstone</u> - grey to brown, firm, comprising 20 50% silt size forams, sponge spicules and trace fossil fragments, set in calcareous clay matrix. Trace pyrite, finely laminated.Grades to
		5%	<u>Calcisiltite</u> - in which clay percentage is less than 50%
	1930m-1935m	90%	Marl - As above.
		10%	Calcareous Mudstone and Calcisiltite - As above.
	1935m-1940m	95%	<u>Marl</u> - As above.
		5%	Calcareous Mudstone and Calcisiltite - As above.
-			Trace Calcareous Mudstone fragment and glauconite pellet set in pink calcite.
	1940m-1945m	90%	Marl - As above.
		10%	Calcareous Mudstone and Calcisiltite - As above.
	1945m-1950m	50%	Marl - As above.
		30%	<u>Calcareous Mudstone</u> - As above.
		20%	<u>Calcisiltite</u> - As above.
	1950m-1955m	80% .	Marl - As above.
		20%	Calcareous Mudstone and Calcisiltite - As above.
	1955m-1960m	60%	<u>Calcareous Mudstone</u> - As above.
	•	20%	<u>Calcisiltite</u> - As above.
·		20%	Marl - As above.
	•		Trace loose, globular forams.
	1960m-1965m	50%	<u>Calcareous Mudstone</u> - As above.
		30% ·	<u>Marl</u> - As above.
		20%	Calcisiltite
			Trace large, loose, globular forams.
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DISTRI 1 Discrimination 1965-1970m 509 Maril - As above. 201 201 Calcoreous Xarl - As above. 203 Galoreous Xarl - As above. 204 Galoreous Xarl - As above. 205 Galoreous Xarl - As above. 204 Galoreous Calculation 1970e-1975m 705 Calcoreous Calculation 1970e-1975m 705 Calculation Underson Steves. 204 Calculation of Calcurous Mathemane - Strate Steves. Calculation of Calcurous Mathemane - Strate Calcuroous Mathemane only in this percentage of Calculation Steves. 204 Calculation of Calcurous Mathemane - As above. Namel - Ward As above. 205 Saft - As above. Namel - As above. 206 Saft - As above. Namel - As above. 205 Saft - As above. Namel - As above. 206 Saft - As above. Namel - As above. 207 Saft - As above. Namel - As above. 208 Saft - As above. Saft - As above. 2095m-1995m Sob Calculation - As above. 2095m-2000m		۲	LITHOLOGICAL DESCRIPTIONS R.C.N. THORNTON
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30% <u>Marl</u> - As above.			Trace loose forams, a few pyrite impregnated.
	2010m-2015 m	50%	Calcareous Mudstone - As above.
24/		30%	Marl - As above.
	· .		24/

FORTESCUE-3

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	DEPTH	8	DESCRIPTION
	2010m-2015m		Continued/
•		20%	Calcisiltite - As above.
		200	Trace Skeletal Limestone - Packstone - brown, hard, foram
•			and other fossil fragments fine grain size, set in calca- reous cement, large, loose forams.
	2015m-2020m	40%	<u>Calcareous Mudstone</u> - As above.
· -		. 30%	<u>Calcisiltite</u> - As above.
		30%	Marl - As above.
	2020m-2025m	50%	Marl - As above.
		30%	<u>Calcareous Mudstone</u> - As above.
	•	20%	<u>Calcisiltite</u> - As above.
	2025m-2030m	50%	Calcareous Mudstone - grey to brown, light brown, dark gr
			firm, massive - semifissile, comprising 5-50% silt size forams, minor fine to medium grain size forams and fossil
			fragments, set in calcareous clay matrix. Trace pyrite aggregates and disseminated pyrite. Grading to
		30%	<u>Calcisiltite</u> - light brown, grey to brown, firm, massive, differing from calcareous mudstone in that percentage
			clay matrix is less than 50%.
• •		20% `	Marl - very light grey to buff, very soft, 20-30% silt size forams, minor fine to medium grain size forams and fossil fragments, set in highly calcareous clay matrix.
			Trace loose forams, mostly clear, minor white, ¹ /8-1mm diameter, trace pyrite impregnated.
	2030m-2035m	40%	Calcareous Mudstone - As above.
		. 40%	<u>Calcisiltite</u> - As above.
		20%	Marl - As above.
		. •	Trace forams as above.
	2035m-2040m	60%	<u>Calcareous Mudstone</u> - As above.
		30%	<u>Calcisiltite</u> - As above.
		10%	Marl - As above.
	2040m-2045m	60%	Calcareous Mudstone - As above, trace glauconite.
		30%	<u>Calcisiltite</u> - As above.
r.		10%	Marl - As above.
			Trace loose forams (¹ /8-2mm diameter).
	2045m-2050m	60%	Calcareous Mudstone - As above.
		30%	Calcisiltite - As above.

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2050m-2055m 80% Mar1 - As a 20% Calcareous 2055m-2060m 80% Mar1 - As a 2060m-2065m 80% Mar1 - As a 2065m-2070m 80% Mar1 - As a 2070m-2075m 80% Mar1 - As a 2070m-2075m 80% Mar1 - As a 2075m-2080m 90% Mar1 - As a 2080m-2085m 90% Mar1 - As a 2080m-2085m 90% Mar1 - As a 2080m-2090m 80% Mar1 - As a 2090m-2095m 80% Mar1 - As a 2090m-2095m 80% Mar1 - As a 2095m-2100m 70% Mar1 - As a 20% Calcareous I Calcareous I 2095m-2100m	L DESCRIPTIONS R.C.N. THORNTON
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2065m-2070m $80%$ $Marl - As a$ $20%$ $Calcareous$ Trace loose Trace loose $2070m-2075m$ $80%$ $Marl - As a$ $20%$ $Calcareous$ Trace loose $2075m-2080m$ $90%$ $Marl - As a$ $2080m-2085m$ $90%$ $Marl - As a$ $2080m-2085m$ $90%$ $Marl - As a$ $2085m-2090m$ $80%$ $Marl - As a$ $2085m-2090m$ $80%$ $Marl - As a$ $2090m-2095m$ $80%$ $Marl - As a$ $2095m-2100m$ $70%$ $Marl - Very$ $30%$ $Calcareous Marl - As a$ $2095m-2100m$ $70%$ $30%$ $Calcareous Marl - Very$ $10-30%$ silt fragments so pyrite, rare $30%$ $Calcareous Marl - Very$ $30%$ $Calcareous Marl - Very$ $10-30%$ silt fragments so pyrite, rare $30%$ $Calcareous Marl - Very$ $10-30%$ silt fragments so pyrite, rare $30%$ $Calcareous Marl - Very$ $10-30%$ silt fragments so pyrite, rare	Mudstone and Calcisiltite - As above.
$20\% \qquad \frac{\text{Calcareous}}{\text{Trace loose}}$ $2070\text{m}-2075\text{m} \qquad 80\% \qquad \frac{\text{Marl}}{\text{Trace loose}}$ $2075\text{m}-2080\text{m} \qquad 20\% \qquad \frac{\text{Calcareous}}{\text{Trace loose}}$ $2075\text{m}-2080\text{m} \qquad 90\% \qquad \frac{\text{Marl}}{\text{Marl}} - \text{As a}$ $10\% \qquad \frac{\text{Calcareous}}{\text{Calcareous}}$ $2080\text{m}-2085\text{m} \qquad 90\% \qquad \frac{\text{Marl}}{\text{Marl}} - \text{As a}$ $10\% \qquad \frac{\text{Calcareous}}{\text{Calcareous}}$ $2085\text{m}-2090\text{m} \qquad 80\% \qquad \frac{\text{Marl}}{\text{Marl}} - \text{As a}$ $2090\text{m}-2095\text{m} \qquad 80\% \qquad \frac{\text{Marl}}{\text{Marl}} - \text{As a}$ $2090\text{m}-2095\text{m} \qquad 80\% \qquad \frac{\text{Marl}}{\text{Marl}} - \text{As a}$ $2090\text{m}-2095\text{m} \qquad 80\% \qquad \frac{\text{Marl}}{\text{Marl}} - \text{As a}$ $2095\text{m}-2100\text{m} \qquad 70\% \qquad \frac{\text{Marl}}{\text{Marl}} - \text{very}$ $10-30\% \text{ silt}$ $fragments sc}_{pyrite, rard}$ $30\% \qquad \frac{\text{Calcareous fragments}}{\text{to subfissi}}$ $grain size =$ $reous clay \text{fragments}$	tz grain, clear, polished, coarse grained, ractured.
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	above.
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Mudstone and Calcisiltite - As above.
20%Calcareous Trace loose2075m-2080m90%Marl - As a Calcareous10%Calcareous2080m-2085m90%Marl - As a IO%2085m-2090m80%Marl - As a Calcareous2085m-2090m80%Marl - As a Calcareous2090m-2095m80%Marl - As a Calcareous2090m-2095m80%Marl - As a Calcareous2095m-2100m70%Marl - very 10-30% silt fragments sa pyrite, race30%Calcareous to subfissi grain size reous clay	e forams.
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	above.
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Mudstone and Calcisiltite - As above.
$10\% \qquad \frac{Calcareous}{Marl - As}$ $2080m-2085m \qquad 90\% \qquad \frac{Marl - As}{10\%} \qquad \frac{Calcareous}{Calcareous}$ $2085m-2090m \qquad 80\% \qquad \frac{Marl - As}{20\%} \qquad \frac{Calcareous}{Calcareous}$ $2090m-2095m \qquad 80\% \qquad \frac{Marl - As}{20\%} \qquad \frac{Calcareous}{Calcareous}$ $2095m-2100m \qquad 70\% \qquad \frac{Marl - very}{10-30\%}$ $30\% \qquad \frac{Calcareous}{to subfissi}$ $grain size = reous clay results$	e forams, pyrite aggregates.
10%Calcareous2080m-2085m90%Marl - As a10%Calcareous2085m-2090m80%Marl - As a20%Calcareous2090m-2095m80%Marl - As a20%Calcareous2095m-2100m70%Marl - very 10-30% silt fragments sa pyrite, rare30%Calcareous30%Calcareouscalcareouscalcareous30%Calcareous	above. 11/12/78
10%Calcareous I2085m-2090m80%Marl - As at20%Calcareous I2090m-2095m80%Marl - As at20%Calcareous I2095m-2100m70%Marl - very 10-30% silt fragments se pyrite, rare30%Calcareous I to subfissi grain size reous clay r	Mudstone and Calcisiltite - As above.
10%Calcareous I2085m-2090m80%Marl - As a20%Calcareous I2090m-2095m80%Marl - As a20%Calcareous I2095m-2100m70%Marl - very 10-30% silt fragments se pyrite, rare30%Calcareous I to subfissi grain size reous clay r	above.
20%Calcareous I2090m-2095m80%Marl - As al20%Calcareous I2095m-2100m70%Marl - very 10-30% silt fragments se pyrite, rare30%Calcareous I to subfissi grain size reous clay r	Mudstone and Calcisiltite - As above.
2090m-2095m80%Marl - As all20%Calcareous I2095m-2100m70%Marl - very 10-30% silt fragments se pyrite, rare30%Calcareous I to subfissi grain size reous clay r	above.
20% <u>Calcareous 1</u> 2095m-2100m 70% <u>Marl</u> - very 10-30% silt fragments so pyrite, rare 30% <u>Calcareous 1</u> to subfissi grain size reous clay r	Mudstone and Calcisiltite - As above.
2095m-2100m 70% Marl - very 10-30% silt fragments so pyrite, rare 30% <u>Calcareous M</u> to subfissi grain size reous clay m	above.
30% Calcareous I to subfissi grain size reous clay r	Mudstone and Calcisiltite - As above.
to subfissi grain size reous clay r	y light grey to buff, very soft, comprising t to medium grain size forams and minor fossi set in highly calcareous clay matrix. Trace re trace glauconite.
	<u>Mudstone</u> - light grey to brown, firm, massive ile, comprising 5-40% silt size and minor fine forams and minor fossil fragments set in calca- matrix. Trace pyrite, trace carbonaceous
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	DEPTH	~	DESCRIPTION
	2100m-2105m	80%	Marl - As above.
		20%	<u>Calcareous Mudstone</u> - As above.
	2105m-2110m	60%	Marl - As above.
		40%	<u>Calcareous Mudstone</u> - As above, except dominantly 0-5% silt size fraction. Rare trace glauconite.
	2110 m-2115m	70%	<u>Marl</u> - As above.
		30%	<u>Calcareous Mudstone</u> - As above.
	2115m-2120m	50%	Marl - As above.
	-	50%	Calcareous Mudstone - As above.
		·	Trace large, loose forams.
	2120m-2125m	50%	Marl - As above.
		50%	Calcareous Mudstone - As above.
	2125m-2130m	50%	Marl - As above.
		50%	<u>Calcareous Mudstone</u> - As above.
	2130m-2135 m	40%	Marl - As above.
		40%	Calcareous Mudstone - As above, mostly containing 20-30% silt size fraction.
		20%	Calcisiltite - light brown, grey, firm, comprising 50-80% silt size forams and fossil fragments, set in calcareous clay matrix. Trace pyrite.
	2135m-2140m	50%	Marl - As above.
		40%	<u>Calcareous Mudstone</u> - As above.
		10%	<u>Calcisiltite</u> - As above.
	2140m-2145 m	60%	Calcareous Mudstone - As above.
		20%	<u>Calcisiltite</u> - As above.
		20%	Marl - As above.
•			Trace loose forams, mainly ¹ /8- ¹ mm diameter.
	2145m-2150m	60%	Calcareous Mudstone - As above.
		20%	Calcisiltite
		20%	Marl
			Trace loose forams, some up to 2mm diameter.
	21 50m-2155m	60%	Calcareous Mudstone - light brown to brown to grey, firm to hard, mainly subfissile, comprising 0-50%, mainly 20-30% silt size forams set in calcareous clay matrix. Disseminated pyrite common, trace glauconite, rare trace
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R.C.N. THORNTON

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	DEPTH	<u>%</u>	DESCRIPTION
	2150m-2155m	60%	Continued/
			echinoid spine, trace pyrite impregnated forams. Grading to
		30%	Calcisiltite - light grey to light brown, differing from calcareous mudstone in that forams range 50-80%.
		10%	Marl - As above.
			Trace loose forams mostly 4-lmm diameter. Skeletal Lime- stone - brown, hard, comprising fine grain size forams, glauconite and fossil fragments in calcareous clay cement.
	2155m-2160m	60%	<u>Calcareous Mudstone</u> - As above.
		30%	<u>Calcisiltite</u> - As above.
		10%	Marl - As above.
			Trace forams as above, Limestone, as above.
	2160m-2165 m	60%	<u>Calcisiltite</u> - As above. D.J. HENDERSON
-		40%	<u>Calcareous Mudstone</u> - As above.
			Trace Skeletal Limestone.
	2165m-2170m	30%	Marl - very light grey to light grey, very soft, 20-25% silt size forams.
		\60%	<u>Calcisiltite</u> - medium light grey, moderately soft to firm, platey cuttings, poorly defined thin laminations, 40-70% predominantly silt size, but occasionally very fine grain forams, disseminated pyrite, slight trace glauconite grades to
*	•	10%	<u>Calcareous Mudstone</u> - similar to Calcisiltite, but contain less silt size forams (generally 30-40%) in a calcareous clay matrix.
	2170m-2175 m	80%	<u>Calcisiltite</u> - As above, 40-90% silt size to very fine forams, grades to
		20%	Calcareous Mudstone - As above.
	2175m-2180m	80%	<u>Calcisiltite</u> - As above.
		20%	Calcareous Mudstone - As above.
			Trace <u>Marl</u> - As above.
	2180m-2185m	80%	<u>Calcisiltite</u> - As above.
		20%	<u>Calcareous Mudstone</u> - As above.
	2185m-2190m	40%	<u>Calcareous Mudstone</u> - As above.
		60%	Calcisiltite - generally as above, 5-10% silt size to very fine, moderately sorted quartz.
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DEPTH	<u>%</u>	DESCRIPTION
2190m-2195m	80%	<u>Calcisiltite</u> - As above.
	20%	<u>Calcareous Mudstone</u> - As above.
•		Sample Quality: Poor to fair.
2195m-2200m	60%	<u>Calcisiltite</u> - light grey to medium light grey to light tan grey, moderately firm, blocky to platey, weak, thin laminations, 40-80% silt size forams and quartz silt in calcareous clay matrix, quartz silt estimation. Trace-20% of silt size fraction, trace pyrite, trace very fine carbonaceous flecks, slight trace very fine black glauconite, grades to (with decreasing silt fraction).
	40%	<u>Calcareous Mudstone</u> - generally same as Calcisiltite, but with 10-40% silt size fraction.
2200m-2205m	60%	<u>Calcisiltite</u> - As above.
	40%	Calcareous Mudstone - As above.
2205m-2210m	50%	<u>Calcisiltite</u> - As above.
	50%	<u>Calcareous Mudstone</u> - As above.
2210m-2215m	50%	<u>Calcisiltite</u> - As above, very angular, large cuttings.
	50%	<u>Calcareous Mudstone</u> - As above.
2215m-2220m	60% \	<u>Calcareous Mudstone</u> - light grey to medium light grey, light tan grey, firm, platey to subfissile, thinly laminated, 20-50% silt size composed of subequal propor- tions of microfossils and clastic particles, 50-80% calca- reous clay matrix, rock appears to be coming less calca- reous (% CO ₃ approximately 40-60%), good trace pyrite, trace very fine carbonaceous flecks, grades to
	40%	<u>Calcisiltite</u> - light grey to medium grey, grades to brown grey, similar to <u>Mudstone</u> - As above, but with 50- 70% silt size fraction, good trace pyrite, trace carbona- ceous flecks, grades to a very calcareous siltstone.
2220m-2225m	60%	Calcareous Mudstone - As above.
	40%	<u>Calcisiltite</u> - As above.
		Sample Qualilty: Poor to very poor, below approximately 2210 metres.
2225m-2230m	70%	<u>Calcareous Mudstone</u> - As above.
· ·	30%	<u>Calcisiltite</u> - As above.
2230m-2235m	50%	Calcareous Mudstone - As above, grades to
.	50%	Calcisiltite
2235m-2240m	50%	Calcareous Mudstone - As above.
	30%	<u>Calcisiltite</u> - As above.
	20%	Marl - very light grey, very soft, swelling clay, 20-25%
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	DEPTH	<u><u></u></u>	DESCRIPTION
	2235m-2240m	20%	Continued/
	•		silt size fragments, cuttings may be cavings.
	224 0m-2245m	70%	<u>Calcareous Mudstone</u> - medium light grey, pale brown grey, soft to firm, thinly laminated, subfissile to blocky, 20-40% silt size, undifferentiated microfossils and clastic, calcareous clay matrix, trace very fine carbona- ceous specks. Trace pyrite, grades to
		20%	<u>Calcisiltite-Siltstone</u> - light grey to medium light grey to buff grey, firm, blocky to subfissile, 40-70% silt size to very fine grains of microfossils and clastics. Trace pyrite, trace carbonaceous flecks, estimated %CO ₂ approximately 40%.
		10%	Marl - As above, may be cavings.
	2245m-2250m	80%	<u>Calcareous Mudstone</u> - As above.
		10%	<u>Calcisiltite-Siltstone</u> - As above.
		10%	Marl - As above.
	2250m- 2255m	60%	<u>Calcareous Mudstone</u> - As above.
	. · · ·	40%	Calcisiltite-Siltstone - generally as above with 50-70% quartz, silt, 10-20% silt size microfossils.
	2255m-2260m	70%	Calcareous Mudstone- As above, grades to
		2.80%	<u>Calcisiltite-Siltstone</u> - As above.
		10%	<u>Marl</u> - very light grey to light grey, very soft, silty.
			Sample Quality: Poor to very poor.
	2260m-2265m	80%	<u>Calcareous Mudstone</u> - medium light grey, buff grey, soft to firm, subfissile, 20-40% silt size to occasionally very fine grains composed of subequal quantities of quartz silt and microfossils (forams and debris), rare ?spicules, trace carbonaceous flecks, trace pyrite, grades to
		20%	Calcareous Siltstone - generally as Calcareous Mudstone but with 40-70% silt size grains in a calcareous clay matrix, poor to very poor sorting.
	2265m-2270m	80%	Marl - very light grey, very soft, dispersive, silty, possibly cavings.
		. 10%	<u>Calcareous Mudstone</u> - As above.
		10%	<u>Calcareous Siltstone</u> - As above.
	2270m-2275m	60%	<u>Marl</u> - As above.
	,	30%	Calcareous Mudstone - As above, grades to
		10%	<u>Calcareous Siltstone</u> - As above.
	2275m-2280m	70%	Marl - As above.
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	DEPTH	~	DESCRIPTION
	2275m-2280m		Continued/
•	(silty shale- (20%	<u>Calcareous Mudstone</u> - generally as above, subfissile to fissile, grades to
		10%	<u>Calcareous Siltstone</u> - As above.
•	2280m-2285m	70%	Marl - As above.
•		30%	<u>Calcareous Mudstone</u> - medium light grey to medium grey, firm, subfissile to fissile, 20-40% silt size, very calc reous. Trace pyrite, trace carbonaceous material, (?) appears to be interbedded with Marl (?).
•	2285m-2290m	80%	Marl - As above.
	•	20%	<u>Calcareous Mudstone</u> - As above.
	2290m-2295 m	80%	<u>Marl</u> - As above.
		20%	Calcareous Mudstone
			Sample Quality: Fair to poor.
	2295m-2300m	60%	Marl - very light grey, light grey, very soft, dispersive 10-20% silt size particles, predominantly forams in a calcareous clay matrix.
		40% \	<u>Calcareous Mudstone-Shale</u> - medium light grey to medium grey, firm, subfissile, angular cuttings, 10-40% silt si forams, fossil debris, and clastics, calcareous clay matrix, estimated % CO ₃ approximately 25-30% rare spicul good trace carbonaceous streaks, good trace pyrite.
	2300m-2305m	60%	Calcareous Mudstone-Shale - As above. Grades to Siltsto
		40%	Marl - As above.
1. N. 1.	2305m-2310m	50%	<u>Calcareous Mudstone-Shale</u> - As above.
		50%	Marl - As above.
-	2310m-2315m	70%	Marl - As above, (?) grades to
		30%	Calcareous Mudstone-Shale - As above, 20-40% fine silt size, grades to Siltstone.
	2315m-2320m	50%	<u>Marl</u> - As above.
		50%	Calcareous Mudstone-Shale - As above, very silty, sub- fissile, good trace pyrite.
•	2320m-2325m	50%	Marl - As above, grades to
		50%	<u>Calcareous Mudstone-Shale</u> - As above, very silty, calca- reous (CO ₃ 30-40%).
	2325m-2330m	50%	• Marl - very light grey, very soft, dispersive, massive, 10-20% fine silt size to rare medium grained forams, grades in part to
*		50%	<u>Calcareous Mudstone-Shale</u> - light medium grey, buff grey
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FORTESCUE-3

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D.J. HENDERSON

11/12/78

DEPTH	%	DESCRIPTION
2320m-2330m	50%	Continued/
		firm, subfissile, angular cuttings, estimated 20-40%
		fine silt size forams and clastics, estimated 30-40% CO3, trace carbonaceous flecks, trace pyrite.
		Sample Quality: Fair
	C 00	Marl - As above, good trace fine grained forams.
2330m-2335m	60%	
	40%	<u>Calcareous Mudstone-Shale</u> - As above.
2335m-2340m	60%	Marl - As above.
	40%	Calcareous Mudstone-Shale - As above.
2340m-2345m	40%	<u>Marl</u> - As above.
	60%	Calcareous Mudstone-Shale - medium light grey to medium grey, firm, brittle, angular cuttings, subfissile, 20-30 fine silt to occasionally very fine microfossils and clastics, good trace to 1% pyrite.
2345m-2350m	60%	<u>Calcareous Mudstone-Shale</u> - As above, occasionally buff grey, rare very fine carbonaceous flecks, very rare blac (?) glauconite.
	40%	<u>Marl</u> - As above.
2350m-2355m	60%	Marl - As above.
	×40%	Calcareous Mudstone-Shale - As above, good trace pyrite, rare carbonaceous flecks, rare very fine black glauconit (?).
2355m-2360m	50%	Marl - As above.
•	50%	Calcareous Mudstone-Shale
		Trace <u>Siltstone</u> - light brown, buff grey, firm to hard, silt size to very fine, predominantly silt size, well sorted, dolomitic.
2360m-2365m	≁ 50%	Marl - As above.
	~ 50%	Calcareous Mudstone-Shale - As above.
		NOTE: Abundant fine grained forams in sample.
2365m-2370m	60%	Calcareous Mudstone-Shale - possibly becoming more silty
Very poor	40%	Marl - As above.
Sample.		
		R.C.N. THORNTON 12/12/78
2370m-2375m	60%	Marl - As above.
Very poor	40%	Calcareous Mudstone - As above.
sample.	-100	
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LITHOLOGICAL DESCRIPTIONS R.C.N. THORNTON

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FORTESCUE-3

DEPTH	60 	DESCRIPTION
 2375m-2380m	60%	Marl - As above.
Very poor sample		
	30%	<u>Calcareous Mudstone-Shale</u> - light brown to grey brown, firm, subfissile, comprising generally 5-10% silt to fine grained size forams,minor quartz silt and rare trace carbonaceous flecks, rare trace glauconite in calcareous clay matrix. Disseminated pyrite common.
	10%	Siltstone - light grey to light grey brown, firm, massive to subfissile, comprising 80-50% fine quartz silt, plus minor forams and rare trace pyrite,glauconite, carbonaceou flecks set in slightly calcareous clay matrix.
		Trace Pyrite aggregates.
2380m-2385m	50%	Calcareous Mudstone-Shale - As above.
	30%	Marl - As above.
	20%	Siltstone - As above.
		Trace Pyrite aggregates, loose forams, fossil fragment - perhaps echinoid spine, but with radiating pattern in cross section.
2385m-2390m	40%	<u>Calcareous Mudstone-Shale</u> - light grey, light grey to brow grey, as above.
	30%	Siltstone - As above, except more glauconite and quartz silt slightly coarser, forams common.
	∖30 %	Marl - As above.
2390m-2395m	40%	<u>Marl</u> - As above.
	40%	<u>Calcareous Mudstone-Shale</u> - As above, flakey.
	20%	Siltstone - as for 2375m-2380m, flakey. Trace loose forar
2395m-2400m	70%	Calcareous Mudstone-Shale - As above.
	20%	<u>Siltstone</u> - As above.
	10%	Marl - As above.
		Trace large, loose forams.
2400m-2405m	50%	Marl - As above.
	40%	<u>Calcareous Mudstone-Shale</u> - As above.
	10%	<u>Siltstone</u> - As above.
2405m-2409m	50%	Calcareous Mudstone-Shale - As above.
	30%	Siltstone - As above.
	20%	Marl - As above.
		Trace Quartz grains, clear, but orange coated, ferruginous, very coarse grained, angular, fractured.

LITHOLOGICAL DESCRIPTIONS R.C.N. THORNTON

FORTESCUE-3

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· .	DEPTH	er,	DESCRIPTION
	2409m-2417m	· · · · · · · · · · · · · · · · · · ·	CORED INTERVAL, CORES 2-5.
	2417m-2420m	80%	<u>Calcareous Mudstone</u> - light brown, grey to brown, firm, massive, comprising mainly 0-10% (minor 10-50%) silt to fine grain size forams, patches of randomly oriented pyrite
			rods $(1/16-1/8 \text{ mm} \text{ diameter X } \frac{1}{2}-1\text{mm} \text{ long})$, finely disseminated pyrite, trace carbonaceous material, rare trace glauco- nite, set in calcareous clay matrix. Grading to
		20%	Calcisiltite - differing from Calcareous Mudstone only in that percentage forams = $50-80$ %.
	2420m-2425m	70%	<u>Calcareous Mudstone</u> - As above.
		30%	<u>Calcisiltite</u> - As above, trace (very occasionally common) bright green glauconite.
			Trace Quartz grains clear, medium grained, angular.
	2425m-2430m	70%	<u>Calcareous Mudstone</u> - As above.
۲	•	30%	<u>Calcisiltite</u> - As above.
			Trace loose globular forams.
		•••••	15/12/78
	2430m-2435m	80%	<u>Calcareous Mudstone-Shale</u> - As above.
		20%	<u>Calcisiltite</u> - As above.
			Trace loose forams.
`-	2435m- 2440m	× 80%	<u>Calcareous Mudstone-Shale</u> - As above.
		20%	<u>Calcisiltite</u> - As above.
			Trace loose forams, pyrite aggregates, glauconite pellets, quartz grains medium grained, clear, rounded, <u>Calcareous</u> <u>Mudstone</u> -tourquoise, slightly silty. <u>Siltstone</u> - very fine grained Sandstone tourquoise-brown, friable, quartz, minor glauconite.
			Trace carbonaceous material, trace mica, set in very slight ly calcareous clay matrix.
	2440m-2480m	• *	CORED INTERVAL, CORES 6-8. J.D. ALDER
			18/12/78
	2480m-2485m	50%	Sandstone - friable, quartz, clear, milky to yellow brown, polished, very fine grain to granular, angular to subround
	•.		ed, moderate to well sorted, trace pyrite.
		5%	<u>Siltstone</u> - medium brown, micaceous, carbonaceous, firm.
		45%	<u>Calcareous Siltstone</u> - light grey to grey brown, firm, massive, trace pyrite, trace glauconite, slightly calca- reous.
	2485m-2490m	85%	• <u>Sandstone</u> - friable, quartz, clear to milky, polished, very fine to granule, angular to subrounded, moderately sorted, trace pyrite.
		5%	Siltstone - medium brown, firm, micaceous, carbonaceous.
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J.D. ALDER

			FORTESCUE-3 J.B. ALDER
		`	FORTESCUE-3 18/12/78
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	DEPTH	<u>80</u>	DESCRIPTION
	2485m-2490m		Continued/
		10%	<u>Calcareous Mudstone</u> - light grey to grey brown, firm, trace pyrite, trace glauconite, slightly calcareous. Trace coarse pyrite nodules.
	2490m-2495m	90%	Sandstone - As above. Trace Siltstone-medium brown,grading to arenite, micaceous, carbonaceous.
		10%	<u>Calcareous Mudstone</u> - As above.
	2495m-2500m	90%	Sandstone - friable, quartz, clear to white, polished, very fine to granule, angular to subrounded, poor to moderately sorted, trace pyrite, trace mica.
	· · ·	10%	<u>Calcareous Mudstone</u> - As above.
	2500m-2505m	95%	Sandstone - friable, quartz, clear to milky, polished, fine to coarse grained, trace granule, moderate to well sorted, angular to subrounded, trace pyrite.
•		5%	Calcareous Mudstone
	2 505m-2510m	95%	Sandstone - As above.
		5%	<u>Calcareous Mudstone</u> - As above.
	2510m-2515m	95%	<u>Sandstone</u> - friable, quartz, clear to milky, polished to frosted, fine to coarse, trace granule, moderately sorted, subangular to subrounded, trace pyrite.
		、 5%	<u>Calcareous Mudstone</u> - light grey, firm, trace pyrite, slightly calcareous.
			Trace Coal - black, bituminous.
			Trace Siltstone - red brown, micaceous, carbonaceous, firm.
	2515m- 2520m	95%	<u>Sandstone</u> - As above.
		5%	<u>Calcareous Mudstone</u> - As above.
	2520m-2525m	90%	Sandstone - As above.
		10%	<u>Calcareous Mudstone</u> - As above.
	2525m-2530m	90%	Sandstone - As above.
		10%	<u>Calcareous Mudstone</u> - As above.
	•		Trace <u>Siltstone-medium</u> brown to grey brown,micaceous, carbonaceous, firm.
	2530m-2535m	80%	<u>Sandstone</u> - As above.
		10%	<u>Calcareous Mudstone</u> - As above.
		10%	<u>Coal</u> - black, bituminous, brittle, conchoidal fracture, hard, pyritic. Interbedded with minor <u>Siltstone</u> - medium brown, firm, micaceous, carbonaceous.
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			LITHOLOGICAL DESCRIPTIONS	J.D. ALDER
-			FORTESCUE-3	18/12/78
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	DEPTH	8	DESCRIP	<u>FION</u>
	2535m-2540m	80%	<u>Sandstone</u> - friable, quartz, fine to coarse, trace granule lar to subrounded, trace pyri	, moderately sorted, subangu-
	•	10%	<u>Coal</u> - black, bituminous, bri fracture.	ttle, hard, pyritic, concoida
		5%	<u>Calcareous Mudstone</u> - light g trace glauconite, trace pyrite	
		5%	<u>Siltstone</u> - medium brown to b carbonaceous.	rown grey, micaceous,
	2540m-2545 m	85%	Sandstone - As above.	
		5%	Coal - As above.	
		5%	Siltstone - As above.	
		5%	Calcareous Mudstone - As above	2.
	2545m- 2550m	75%	Sandstone - As above.	
		. 5%	Coal - As above.	
		10%	<u>Siltstone</u> - As above.	
		10%	Calcareous Mudstone - As above	9.
	2550m-2555m	65%	Sandstone - As above.	
· .	•	. 30%	<u>Siltstone</u> - As above.	
		5%	<u>Calcareous Mudstone</u> - As above	e. Trace <u>Coal</u> - As above.
	2555m-2560m	60%	Sandstone - friable, quartz, of fine to coarse, trace granule, subangular to rounded, trace p	moderate to well sorted,
		30%	Siltstone - medium brown to br carbonaceous, trace còal, blac .occasional laminae of very coa	k, bituminous, some
		10%	<u>Calcareous Mudstone</u> - light gr calcareous, firm, trace pyrite	
	2560m-2565m	15%	Sandstone - friable, quartz, c fine to coarse, mainly medium sorted, subangular to rounded,	to coarse, moderate to well
		10%	<u>Calcareous Mudstone</u> - light gr calcareous, firm, trace pyrite	
		75%	<u>Siltstone</u> - medium brown to gro ceous, pyritic, trace <u>Coal</u> - b part to very fine grain Sandst coarse mica.	lack, bituminous, grades in
	2565m-2570m	25%	<u>Coal</u> - black, bituminous, hard ture, pyritic in part.	, brittle, conchoidal frac-
		15%	Sandstone - As above.	• • ·
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J.D. ALDER

18/12/78 ł

		FORTESCUE-3 18/12/78
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DEPTH	<u>00</u>	DESCRIPTION
2565m-2570m	10%	Calcareous Mudstone - As above.
	50%	Siltstone - As above. R.C.N. THORNTON
2570 m-2575m	50%	<u>Siltstone</u> - brown, dark brown, minor pale grey, soft to firm, quartz, pyrite and mica common, carbonaceous to very carbonaceous, and infrequently varies to very fine grained sandstone.
	20%	<u>Quartz</u> - grains, loose, clear, light grey, frosted to polished, subrounded to rounded, well sorted, granules.
	10%	<u>Coal</u> - black, hard, brittle, pyritic.
· · ·	20%	Calcareous Mudstone - cavings.
2575m-2580m	50%	<u>Coal</u> - As above, grading to
	10%	Shale - black, hard, pyritic.
	30%	<u>Siltstone</u> - As above.
	5%	<u>Calcareous Mudstone</u> - cavings.
	5%	Quartz - As above.
		Trace <u>Sandstone</u> - quartz, medium grained, pyrite cemented, pyrite aggregates.
2580m-2585m	50%	<u>Siltstone</u> - As above.
	、20%	<u>Coal</u> - As above, minor <u>Shale</u> - As above.
	20%	<u>Quartz Grains</u> - As above, except coarse grained to granule.
•	10%	<u>Calcareous Mudstone</u> - cavings.
		Trace Sandstone - As above, Pyrite - as above.
2585m- 2590m	50%	<u>Siltstone</u> - As above.
	20%	Quartz - As above.
	20%	<u>Calcareous Mudstone</u> - cavings.
	10%	<u>Coal</u> - As above.
		Trace Sandstone - As above, Pyrite - As above.
2590m-2595m	50%	Quartz Grains - loose, clear, minor milky, polished to minor frosted, subrounded to rounded, well sorted, very coarse grained to granule, trace pyrite encrusted.
Ľ	30%	Siltstone - light to dark brown, minor light grey, soft to firm, very carbonaceous and pyritic, trace mica.
	10%	<u>Coal</u> - black, brittle, pyritic in part.
	10%	Calcareous Mudstone - cavings.
		Trace <u>Sandstone</u> - clear, quartz, fine to medium grained,
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R.C.N. THORNTON

FORTESCUE-3

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	DEPTH	<u>6</u>	DESCRIPTION
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	2590m-2595m		Continued/
			subangular to subrounded, well sorted, white clay matrix, pyrite cemented in part.
	2595m-2600m	80%	<u>Quartz</u> - As above.
•		10%	<u>Siltstone</u> - As above.
•		10%	<u>Coal</u> - As above.
•			Trace <u>Sandstone</u> - As above.
•	2600m-2605m	50%	<u>Quartz</u> - As above.
		30%	<u>Siltstone</u> - As above.
		20%	<u>Calcareous Mudstone</u> - cavings.
			Trace <u>Sandstone</u> - As above, <u>Pyrite</u> - As above.
	2605m-2610m	70%	<u>Quartz</u> - As above.
`		20%	Siltstone - As above, except pyrite common.
		8%	<u>Calcareous Mudstone</u> - cavings.
-		2%	<u>Pyritic Sandstone</u> - hard, clear quartz grains, polished, subrounded to rounded, poorly sorted, fine to coarse grained, clean except for minor white clay matrix, cemented by pyrite.
	2610 m-2615m	` 50%	<u>Quartz Grains</u> - As above.
		30%	<u>Siltstone</u> - As above.
		20%	<u>Calcareous Mudstone</u> - cavings.
			Trace <u>Pyritic Sandstone</u> - As above, fine grained sandstone friable, clear, quartz, well sorted, rounded, clean, minor white clay matrix.
~	2615m- 2620m	50%	<u>Quartz Grains</u> - As above.
		30%	<u>Siltstone</u> - As above.
		20%	<u>Calcareous Mudstone</u> - cavings.
			Trace Pyritic Sandstone - As above; Pyrite aggregates.
			TOTAL DEPTH: 2625 metres
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APPENDIX 2

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APPENDIX 2

SIDEWALL CORE DESCRIPTIONS

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M R 257 3.72	2434.	1524.5 RUN-2	1525.	1778	1841.	1891.	1946.	<u>2048.</u> 1999.	2097.	DEPTH
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	flint yellow									
	·									SHOW 21
							-			PROD 22
	trace mica low porosity.	trace fine to medium graine quartz.	trace myrite,	trace pyrite, trace mica	trace pyrite		trace pyrite, forame,	micromicaceous forams.		REMARKS - GAS 23

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	- Calcareous ¹ E		CALCI-Calcareous SILTITE	no recovery		no recovery		MISFIRE	calcareous		calcareous		calcareous M micromicaceous		calcareous M		calcareous M micromicaceou	9-1000111 0-10	calcareous		sandy	4
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	trace glauconite trace carbonac- eous.		trace pyrite, trace forams						trace glauconit trace fossil fragments.	0011C •	ficcilo		laminated, blocky.	blocky.			trace forams.	trace pyrite.	mica,			23

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	ments.	flecks, trace		trace pyrite, forams.		trace mica.			trace mica trace pyrite.		trace pyrite.	: :	trace carbonaceous.	ceous.	trace mica, trace carbon-	trace fossil fragments.	trace forams, trace mica.	trace pyrite trace carbonác- eous.		trace pyrite, trace forams.	0	trace carbonac-	.23	REMARKS - GAS

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R.C.N. THORNTON

FORTESCUE-3

22/12/78

RUN-1

SWC NO.	- <u>DEPTH</u>	RECOVERED	DESCRIPTION
		1	
1	2615m	45mm	Finely interlaminated Sandstone and Siltstone.
			Sandstone - light grey, semifriable, quartz, clear well sorted, very fine grained, subangular to sub- rounded, trace mica, 30% clay matrix.
			Siltstone - dark brown, quartz, highly carbonaceou trace pyrite, trace mica.
2	2610.5m	lOmm	Finely interlaminated <u>Sandstone</u> and <u>Siltstone</u> - As above.
3	2605.5m	30mm	Siltstone - light brown, soft, quartz, clear, trace mica, trace pyrite, trace carbonaceous fleck
4	2599.5m	35mm	Sandstone - light grey, friable, quartz, clear, we sorted, very fine grained, subangular to subrounded 30% clay matrix, trace carbonaceous flecks, pyrite.
5	2596.5m	30mm	Sandstone - light grey, friable, quartz, clear, minor light grey, polished, minor frosted, subangu- lar to rounded, very poorly sorted, very fine to ve coarse grained, minor clay matrix, trace pyrite,
6	2589m	25mm	trace carbonaceous material. <u>Sandstone</u> - brown, friable, quartz, clear, polished
· ·			subangular to subrounded, very poorly sorted, very fine to very coarse grained, abundant carbonaceous clay.
7	2585m	20mm	Finely interlaminated Sandstone and Siltstone.
-			Sandstone - light grey, friable, quartz, clear, well sorted, very fine grained, angular to sub- rounded, trace mica, clean, 20% clay matrix.
			Siltstone - brown, highly carbonaceous, trace mica.
8	2576m	20mm	Shale - brown, soft, carbonaceous, trace mica.
9	2573.2m	50mm	<u>Coal</u> - black, shiny, hard, brittle, trace pyrite.
10	2571m	30mm	Shale - black, fissile, highly carbonaceous, trace pyrite, trace mica, trace fine grained quartz.
11	2568.2m	35mm	Shale - brown, soft, silty, carbonaceous, trace mic
12	2560.8m	20mm	<u>Siltstone</u> - brown, soft, quartz, trace carbonaceous material, trace mica.
13	2557.2m	35mm	<u>Shale</u> - brown, soft, minor fine interlaminae of <u>Siltstone</u> - light grey.
14	2544m	25mm	Sandstone - light grey, friable, quartz, clear, polished, subangular to rounded, well sorted, very fine grained, 20% white clay matrix, trace mica, minor fine interlaminae of soft, brown Shale.
15	2540.5m	25mm	Interbedded Sandstone and Shale.
			Sandstone - brown, friable, quartz, clear, polished,

R.C.N. THORNTON

22/12/78

RUN-1

. Sw	WC NO.	DEPTH	RECOVERED	DESCRIPTION
	·			
	15	2540.5m	25mm	Continued/
		N		subangular to rounded, very poorly sorted, very fine to coarse grained, set in abundant brown, highly carbonaceous clay matrix.
				Shale - brown, soft, silty, carbonaceous, trace mica
	16	2537.7m	30mm	<u>Shale</u> - very dark brown, massive, firm, carbonaceous trace mica.
	17	2535m	30mm	Shale - dark brown, fissile, carbonaceous, trace mica, trace pyrite, silty patches.
	18	253 2m	25mm	Finely interlaminated Siltstone and Shale.
				<u>Siltstone</u> - light grey, soft, quartz, trace carbona- ceous material, trace mica.
				Shale - brown, soft.
	19	2501.2m	40mm	<u>Sandstone</u> - light grey, friable, quartz, clear, polished, angular to subrounded, well sorted, fine to medium grained, clean, trace carbonaceous flecks, no fluorescence.
	20	2491.8m	20mm	Sandstone - light grey, friable, quartz, as above.
	21	2476.5m	20mm	Interbedded Shale and Minor Sandstone.
	2			Shale - dark brown, firm, carbonaceous.
	Р.		at	Sandstone - light grey, semifriable, quartz, clear, polished, angular to subrounded, very poorly sorted, fine to very coarse grained, clean, no fluorescence.
	22	2460.5m	20mm	Sandstone - light grey, friable, quartz, clear, well sorted, very fine grained, subangular to subrounded, clean, trace carbonaceous flecks, trace mica, minor white clay matrix, massive bright yellow fluores- cence, slow milky white cut.
	23	2452.5m	30mm	Siltstone - brown, firm, quartz, highly carbonaceous pyrite common.
	24	2446.3m	20mm	Sandstone - light grey to brown, friable, quartz, clear, well sorted, very fine grained, subangular to subrounded, clean, trace carbonaceous flecks, trace mica, trace pyrite, massive bright yellow fluores- cence, slow milky white cut.
	25 '	2436.8m	-	EMPTY BULLET.
	26	2433. Om	50mm	<u>Sandstone</u> - grey, firm, quartz, clear, very fine grained, trace glauconite, trace mica, trace carbona ceous flecks, trace pyrite. 30% calcareous clay matrix, no fluorescence, minor laminae of <u>Shale</u> - brown, firm, carbonaceous, pyritic.
	27	2429.Om	55mm	<u>Calcareous Mudstone</u> - dark brown, massive, firm, bunches of pyrite rods (.01mm diameter X .5mm long)

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R.C.N. THORNTON

22/12/78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
27	2429.Om	55mm	Continued/ common, trace glauconite, trace mica, trace
28	2425m	45mm	carbonaceous flecks, trace fossil fragments. Calcareous Mudstone - grey brown, massive, firm,
29	2421m	70mm	abundant forams, trace glauconite. <u>Calcareous Mudstone</u> - grey brown, massive, firm, silty, abundant forams, trace mica, trace pyrite.
30	2417m	65mm	<u>Calcareous Mudstone</u> - grey brown, massive, firm, trace mica.
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J. D. ALDER

5/1/79

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RUN-1

	SWC NO.	DEPTH	RECOVERED	DESCRIPTIONS
х. ,	31	2413m	35mm	<u>Claystone</u> firm to very firm, medium grey, massive, calcareous.
	32	2409m	3 Omm	Shale medium to light grey, calcareous, firm, fissile, pyritic, micromicaceous.
	33	2405m	4 Omm	Shale medium grey, firm, fissile, pyritic, calcareous - often with calcareous nodules Imm diameter.
	34	2401m	35mm	Shale medium grey, firm, fissile, pyritic, micromicaceous, calcareous.
	35	2379.5m	35mm	Shale medium grey, firm, very thin laminae, fissile, pyritic, calcareous, micromicaceous.
	36	2350.Om	. 30mm	Shale medium grey, firm very thin laminae, fissile, pyritic, occassional nodules; calcar- eous, micromicaceous.
	37	2321.5m	45mm	Shale medium grey, firm, fissile, pyritic, calcareous, micromicaceous.
	38	2297.5m	50mm	Mudstone medium grey, firm, calcareous, massive. Vein of pyrite with soft white mineral (gypsum?).
	39	2268.5m	40mm	Mudstone medium grey, firm, calcareous, massive, micromicaceous.
	40	2235.Om	5 Omm	Mudstone medium grey, firm, calcareous, massive, trace pyrite, micromicaceous.
	41	2196. 5m	40mm	Calcareous Mudstone medium grey, firm, very finely laminated, micromicaceous.
	42	2146.5m	45mm	Calcareous Mudstone medium grey, firm, massive, trace pyrite, micromicaceous.
	43	2097.2m	35mm	Calcareous Claystone medium grey, firm, massive.
	44	2048.5m	_	MISFIRE
	45	1999.Om	4 Omm	Calcareous Mudstone medium grey, firm massive, micromicaceous, rare foram.
	46	1946.Om	35mm	<u>Calcareous Mudstone</u> medium to light grey, firm massive, trace pyrite, trace mica. Rare forams, occassional nodules of calcite.
	47	1891.Om	-	MISFIRE
	48	1841.Om	25mm	Calcisiltite medium to light grey, firm, massive, trace pyrite, occassional calcite nodules.
	49	1778.Om	25mm	Calcisiltite medium to light grey, firm, massive, trace pyrite, trace mica.
	50	1525.5m	- .	MISFIRE
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J. D. ALDER

FORTESCUE-3

5/1/79

RUN-1

NUN-2 NUN-2 S2 2434.4m 10mm Sandstone very light grey, quartzose, frim fine grained, clear, angular, abundant white, earthy, calcareous nodules, no fluorescent no odour. 52 2434.4m 10mm Sandstone very light grey, quartzose, frim fine grained with rare coarse granule grain angular to sub-counded, well sorted. Clear to sub-counded, well sorted. Clear to down, slight brown staining near carbonar material 15%, white day matrix, porcesity visually poor. Slight proven staining near carbonar material. Massive, bright greenish yellow flourescence show, streaming milky cut. 53 2431.0m 50mm 54 2427.0m 50mm 54 2427.0m 50mm 55 2423.0m 45mm 56 2419.0m 35mm 56 2419.0m 35mm 56 2419.0m 35mm 58 2411.0m 45mm 59 2407.0m 30mm 56 2411.0m 45mm 57 2415.0m 50mm 58 2411.0m 45mm 59 2407.0m 30mm 59 2407.0m 30mm 59 2407.0m 30mm <th>SWC NO.</th> <th>DEPTH</th> <th>RECOVERED</th> <th>DESCRIPTIONS</th>	SWC NO.	DEPTH	RECOVERED	DESCRIPTIONS				
Fine grained with rare coarse granule grain Angular to sub-rounded, well sorted. Cleat to miky and frosted, trace mica, trace of aceous material 15%, white clay matrix, porosity visually poor. Slight petrolifer odour, slight brown staining near carbonad material. Massive, bright greenish yellow flourescence show, streaming milky cut.532431.0m50mmSandy Mudstone, medium grey, firm massive. 30% fine sand, quartzose, loose grains, angular to subrounded, clear, milky, smokey frosted. 70% clay silt, slight calcareous, some calcareous nodules, trace glauconite, trace pyrite, trace mica. No fluorescence, no odour.542427.0m50mmMudstone medium grey, firm massive, trace calcareous, trace pyrite. 10% glauconite.552423.0m45mmMudstone medium to light grey, firm, massi micromicaceous, calcareous, trace forams.562419.0m35mmMudstone medium to light grey, firm, hard, massive, blocky, micromicaceous, calcareou small band of green mudstone near base of core.582411.0m45mmShale medium to light grey, firm, friable, Calcareous, trace mica, trace carbonaceous flecks.592407.0m30mmClaystone yellow brown, firm very calcareou with nodules ofmicritic limestone, trace glauconite, trace mica, trace fossil fragm echinoid spines.602403.0m0mmMiss-fire.611718.7m0mmNo recovery.	51		2 Omm	trace loose quartz grains, fine to medium grained, clear, angular, abundant white, earthy, calcareous nodules, no fluorescence,				
30% fine sand, quartzose, loose grains, angular to subrounded, clear, milky, smokey frosted. 70% clay silt, slight calcareous, some calcareous nodules, trace glauconite, trace prite, trace mica. No fluorescence, no odour. 54 2427.0m 50mm 55 2423.0m 45mm 56 2419.0m 35mm 56 2419.0m 35mm 57 2415.0m 50mm 58 2411.0m 45mm 58 2411.0m 45mm 59 2407.0m 30mm 59 2407.0m 30mm 60 2403.0m 0mm 61 1718.7m 0mm	52	2434.4m	lOmm	porosity visually poor. Slight petroliferous odour, slight brown staining near carbonaceous material. Massive, bright greenish yellow,				
552423.0m45mmMudstone medium to light grey, firm, massi micromicaceous, calcareous, trace forams.562419.0m35mmMudstone medium to light grey, firm, hard, massive, blocky, micromicaceous, calcareou small band of green mudstone near base of core.572415.0m50mmMudstone medium to light grey, firm, lamin blocky, micromicaceous, very clayey gradin to a claystone calcareous.582411.0m45mmShale medium to light grey, firm, friable, Calcareous, trace mica, trace carbonaceous flecks.592407.0m30mmClaystone yellow brown, firm very calcareo with nodules ofmicritic limestone, trace glauconite, trace mica, trace fossil fragm echinoid spines.602403.0m0mmMiss-fire.611718.7m0mmNo recovery.	53	2431.Om	50mm	<pre>angular to subrounded, clear, milky, smokey frosted. 70% clay silt, slight calcareous, some calcareous nodules, trace glauconite, trace pyrite, trace mica.</pre>				
562419.0m35mmMudstone medium to light grey, firm, hard, massive, blocky, micromicaceous, calcareou small band of green mudstone near base of core.572415.0m50mmMudstone medium to light grey, firm, lamin blocky, micromicaceous, very clayey gradin to a claystone calcareous.582411.0m45mmShale medium to light grey, firm, friable, Calcareous, trace mica, trace carbonaceous flecks.592407.0m30mmClaystone yellow brown, firm very calcareo with nodules ofmicritic limestone, trace glauconite, trace mica, trace fossil fragm echinoid spines.602403.0m0mmMiss-fire.611718.7m0mmNo recovery.	54	2427.Om	50mm					
572415.0m50mmMudstone medium to light grey, firm, lamin blocky, micromicaceous, very clayey gradin to a claystone calcareous.582411.0m45mmShale medium to light grey, firm, friable, Calcareous, trace mica, trace carbonaceous flecks.592407.0m30mmClaystone yellow brown, firm very calcareou with nodules ofmicritic limestone, trace glauconite, trace mica, trace fossil fragm echinoid spines.602403.0m0mmMiss-fire.611718.7m0mmNo recovery.	55	2423.Om	45mm	<u>Mudstone</u> medium to light grey, firm, massive, micromicaceous, calcareous, trace forams.				
582411.0m45mmShale medium to light grey, firm, friable, Calcareous, trace mica, trace carbonaceous flecks.592407.0m30mmClaystone yellow brown, firm very calcareo with nodules ofmicritic limestone, trace 	56	2419.Om	35mm	-				
592407.0m30mmClaystone yellow brown, firm very calcareo with nodules ofmicritic limestone, trace glauconite, trace mica, trace fossil fragm echinoid spines.602403.0m0mmMiss-fire.611718.7m0mmNo recovery.	57	2415.Om	50mm	Mudstone medium to light grey, firm, laminate blocky, micromicaceous, very clayey grading to a claystone calcareous.				
with nodules ofmicritic limestone, trace glauconite, trace mica, trace fossil fragm echinoid spines.602403.0mOmm611718.7mOmmNo recovery.	58	2411.Om	45mm	Shale medium to light grey, firm, friable, Calcareous, trace mica, trace carbonaceous flecks.				
61 1718.7m Omm No recovery.	59	2407.Om	3 Omm	glauconite, trace mica, trace fossil fragment				
	60	2403.Om	Omm	Miss-fire.				
	. 61	1718.7m	Omm	No recovery.				
62 1680.5m Onut No recovery.	62	1680.5m	Omm	No recovery.				
63 1632.3m 25mm <u>Calcisiltite</u> medium to light grey, firm, massive, trace pyrite, trace forams.	63	1632.3m	25mm					
64 1583.3m 15mm <u>Calcisiltite</u> medium to light grey, firm massive, trace glauconite, trace carbonace flecks and as brown coating on partings.	64	1583.3m	15mm	massive, trace glauconite, trace carbonaceous				

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				<u>RUN-2</u>		
	SWC NO.	DEPTH	RECOVERED	DESCRIPTIONS		
	65	1525.Om	15mm	<u>Calcisiltite</u> medium to light grey, firm, massive, trace carbonaceous flecks, trace pyrite, no fluorescence, no odour.		
	66	1475.Om	20mm	<u>Calcisiltite</u> medium to light grey, firm, massive, trace carbonaceous flecks, trace pyrite, trace forams.		
	67	1425.Om	3 Omm	<u>Calcisiltite</u> medium to light grey, firm, massive, trace carbonaceous flecks, trace pyrite.		
	68	1375.Om	2 Omm	Micrite yellow brown, hard, very fine, cemented crystaline limestone, trace fossils, forams, trace mica, massive.		
-	69	1325.Om	1 Omm	<u>Calcisiltite</u> medium grey, firm to hard, massive, trace indeterminate fossil fragments.		
	70	1275.Om	1 Omm	<u>Calcisiltite</u> medium to light grey, firm, massive, trace mica, trace carbonaceous flecks.		
	71	1225.Om	25mm	Calcisiltite medium to light grey, firm, massive, trace carbonaceous flecks.		
	72	1175.Om	25mm	<u>Calcisiltite</u> medium to light grey, firm, massive, trace pyrite, trace carbonaceous flecks.		
	73	1125.Om	25mm	<u>Calcisiltite</u> medium to light grey, firm, massive, trace pyrite, trace mica, trace carbonaceous flecks.		
	74	1075.Om	30mm	<u>Calcisiltite</u> medium to light grey, firm, massive, trace mica.		
	75	1025.Om	35mm	<u>Calcisiltite</u> medium to light grey, firm, massive, trace mica, trace pyrite, forams and fossil fragments.		
I I	76	975.Om	20mm	<u>Calcisiltite</u> grading to calcarenite, medium to light grey to light grey, firm to very firm, silt to medium grained calcareous grains in white calcareous cement, trace of indeterminate fossil fragments, trace carbonaceous flecks.		
1	77	925.Om	25mm	<u>Calcisiltite</u> medium to light grey, firm, silty with occassional medium and granular grains, trace of indeterminate fossil fragments, trace carbonaceous flecks.		
	.78	880.Om	50mm	<u>Calcisiltite</u> medium light grey to greenish grey, firm, silty with occassional medium coarse grains, trace fossil fragments, trace glauconite.		
	79	2048.5m	35mm	<u>Calcisiltite</u> medium grey, firm to hard, massive trace silt size calcareous nodules.		
	80	1891.Om	35mm	<u>Calcisiltite</u> medium to light grey, firm, massive, pyritic, occasionally calcite nodules.		

FORTESCUE-3

J.D. ALDER

5/1/79

RUN-2

	· · · · · ·		RUN-2
SWC NO.	DEPTH	RECOVERED	DESCRIPTION
81	1522.5m	lOmm	<u>Calcisiltite</u> medium to light grey, firm, massive, trace pyrite, trace mica, no fluorescence, no odour.
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APPENDIX 3

APPENDIX 3

CONVENTIONAL CORE DESCRIPTIONS AND CORE ANALYSIS

CORE LABORATORIES. INC. Petroleum Reservoir Engineering DALLAS, TEXAS

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CORE ANALYSIS RESULTS

Comp	oany ESSO AUS	TRALIA LTD]	Formation	l			File WA-CA-	3.5	
Well	FORTES CL	JE NO 3	(Core Type	2			Date Report		
Field	FORTESCL	JE	I	Drilling H	Fluid			AnalystsDS		
Coun	tyAUSTRALI	A State WA	Elev		_Location	BASS ST	RAIT			
			Lith	ological	Abbrevia	tions				
SAND - S Shale - Lime - L	SH CHERT-CH	ANHYDRITE - ANHY CONGLOMERATE - CONG FOSSILIFEROUS - FOSS	SANDY - SI Shaly - Si Limy - Lmy	4Y ME	NE-FN EDIUM-MED DARSE-CSE	CRYSTALLINE-XLN GRAIN-GRN GRANULAR-GRNL	BROWN - BRN GRAY - GY VUGGY - VGY	FRACTURED - FRAC LAMINATION - LAM STYLOLITIC - STY	SLIGHTLY-SL/ VERY-V/ WITH-W/	
SAMPLE NUMBER	DEPTH 東京家 m.	PERMEABILITY Millidarcys KL	POROSITY PER CENT		SATURATION ENT PORE TOTAL WATER	calc grain denisty		IPLE DESCRIPTION AND REMARKS		
·					WATER	' denisty		· · · ·		
19	2459.4	4 9	18.2	21.2	.57.6	2.65	good sil	med gy br, sort, sl cl cmt, sub rou ows, sl calc,	ly mtx, und, worm	
20	2459.9	157 312		19.1 11.2	51.4 68.7	2.65	shal slow <u>SST</u> : mod	<pre>le, mica, mod yel flu w yel cut. med gy, fine, hd, sort, sl cly mtx, s , sub ang, mica,</pre>		
			22.2	11.2	00./	2.01	carb	onaceous, sl el flu, imme	calc, ge	
21	2461.2	183	22.8	14.6	68.9	2.63	mod cmt, aceo	med gy br, sort, sl cly subang, mic us, mod wt y d yel cut.	y mtx, ca ca,carbon	
22	2464.2	74	18.1	17.0	50.8	2.65	SST:	med gy br, , sl cly mtx		
	2464.7	93	17.0	17.2	52.9	2.64	cmt, car	subang, mic bonaceous, m d wt yel cut	ca, Nod yel f	
23	2464.8	56	15.7	19.9	57.0	2.64	<u>SST</u> : firm mtx, subraceo	med gy, fir , poor sort, calc cmt, s ound, mica,c us, mod yel wt cut.	ne-crs, sl cly subang, sarbon-	

These analyses, opinons or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations, as to the productivity, proper operations, or profitableness of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

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CORE ANALYSIS RESULTS

Compan	y <u>ESSÓ AUS</u>	TRALIA LTD		Formation	ı			File WA-CA-3	5
Well	FORTESCU			Core Typ	e			Date Report	•
Field	FORTESCU			Drilling	Fluid			Analystsds	
County_	AUSTRALI	A State WA	Elev		_Location_	BASS STI	RAIT		
					Abbrevia	tions			
SAND-SD SHALE-SH LIME-LM	DOLOMITE-DOL CHERT-CH GYPSUM-GYP	ANHYDRITE - ANHY CONGLOMERATE - CONG FOSSILIFEROUS - FOSS	SANDY - E SHALY - S LIMY - LM	нч м 14 со	NE - FN EDIUM - MED DARSE - CSE	CRYSTALLINE • XLN GRAIN • GRN GRANULAR • GRNL	BROWN - BRN GRAY - GY VUGGY - VGY	FRACTURED - FRAC LAMINATION - LAM STYLOLITIC - STY	SLIGHTLY-SL/ VERY-V/ WITH-W/
SAMPLE NUMBER	рертн №№ Х m.	PERMEABILITY Millidarcys KL	POROSITY PER CENT		SATURATION ENT PORE TOTAL WATER	- calc grain density		PLE DESCRIPTION	
10	2442.8	1.1	9.6	23.1	72.0	2.65	poor mica, lamina	med gy, fine sort, sil cm carbonaceous ae, good go]	nt, subar s,shale
11	2443.2	87	19.7	14.2	70.7	2.67	<u>SST</u> : 1 good : mica, :	wt cut. ned gy, fine sort, calc c shale lamina	mt, suba
12	2445.0	〈 0.1	13.8	10.1	65.9	2.67	<u>SST</u> : r sort,	immed yel wt ned gy, fine cly mtx, si no flu or c	hd, goo l cmt, s
13	2449.1	73	21.6	18.4	50.0	2.65	<u>SST</u> : r sort, subrou	ned gy, fine sl cly mtx, ınd, mica, m	, hd goo calc cm
14	2457.2	139	21.6	12.9	62.5	2.64	<u>SST</u> : n mod so	wyyel cut. ned gy, fine ort, sil cmt calc, carbona	, subang
15	2457.5	162	22.4	12.4	65.8	2.65	poor y	yel flu, im	med wy c
	2457.7							ned gy, fine mod sort, c	
		274	23.3	12.2	70.7	2.60	subanç	, mica,good mmed wt cut	yel wt
16	2457.9	173	21.7	13.0	56.0	2.64	<u>SST</u> : m mod sc mica, s	ed gy, fine ort, sil cmt shale lamina	-med,fir , subang
17	2458.3	242	23.0	9.0	72.7	2.62	SST: m	ed gy, fine ort, sl cly	
	2458.6	273	23.1	14.0	57.9	2.63	calc c	mt, subang, e, mod yel	mica sh
18	2458.9	31	14.7	19.8	70.0	2.65	<u>SST</u> : m sort, subang shale	ed gy, fine sl cly mtx, , mica,carb laminae, go wt cut,	sil cmt onaceous

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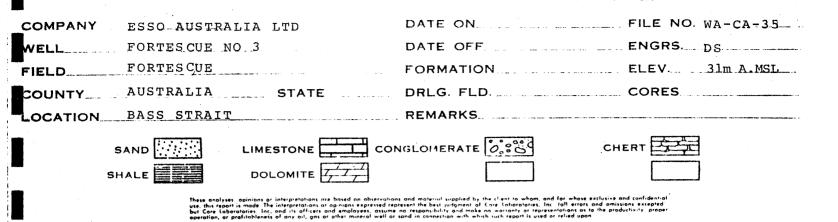
CORE ANALYSIS RESULTS

Company_	ESSO AUSTRALIA LTD	Formation	File WA-CA-35
Well	FORTESĈUE NO 3	Core Type	Date Report
Field		Drilling Fluid	AnalystsDS
County	AUSTRALIA State WA Elev.	<u>31m M.MSL</u> Location <u>BASS STRAIT</u>	

			Lith	ological	Abbrevia	tions			
SAND - SD Shale - SI Lime - Lm		ANHYDRITE - ANHY Conglomerate - Cong Fossiliferous - Foss	SANDY - SI Shaly - Si Limy - Lmy	-1Y ME	NE-FN DIUM-MED ARSE-CSE	CRYSTALLINE - XLN GRAIN - GRN GRANULAR - GRNL	BRÓWN - BRN GRÁY - GY VUGGY - VGY	FRACTURED - FRAC LAMINATION - LAM STYLOLITIC - STY	SLIGHTLY-SL/ VERY-V/ WITH-W/
SAMPLE	DEPTH	PERMEABILITY	POROSITY		SATURATION	calc	SAMPL	E DESCRIPTION	
NUMBER	Σastar m.	MILLIDARCYS K1	PER CENT	OIL	TOTAL WATER	- grain density	AN	D REMARKS	
	2440.1	<0.1	10.5	21.0	73.0	2.69			
1	2440.3	4 0.1	8.9	.9.6	72.0	2.74	good s ang, s	ed gy, fine ort, sil cm hale inter good gold f	nt, sub- beds, w/
2.	2440.5	422	24.1	12.9	49.9	2.64	<u>SST</u> : m mod so:	e d gy, find rt, sil cm l fl _u , imme	t, sub ar
3	2440.8	310	24.6	13.1	51.4	2.63	SST: m good s ang, s	ed gy, fine ort, calc o hale inter good yel wi	e, v hd, cmt, sub- peds w f
4	2440.9	384	24.0	13.1	56.1	2.64	mod so cmt, s onaceo	ed gy, fine rt, sl cly ubround, ma us, poor ye wt cut.	mtx, cal ica carb-
5	2441.1	456	26.2	12.5	5,3.8	2.62	the second s	ed gy, fine	
	2441.3	466	23.2	5.5	68 .; 2(2.62	cmt, s	rt, sl cly ubround, m u, immed yo	ica, poor
6	2441.5	262	22.2	14.9	63.5	2.64		ed gy, find	
	2441.7	40	17.7	14.5	64.1	2.65	mica s	rt, sil cm ⁴ l calc, poo w <u>t</u> cut,	
7	2441.8	118	19.4	16.7	54.6	2.64	<u>SST</u> : m	ed gy, fine	
	2441.9	361	21.6	9.4	67.8	2.61	subang	rt, sl cly , mica, poo wt cut.	
8	2442.2	671	23.5	10.7	56.8	2.63	<u>SST</u> : m mod so	ed gy, find rt, calc ci	
9	2442.5	67	18.3	13.8	71.0	2.63	<u>SST</u> : m mod so mica s	ed gy, find rt, sil cm l calc, mod wt cut.	e-med, fi t, subanc
-								· · · · · ,	

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COMPLETION COREGRAPH TOTAL WATER 0-0 PERMEABILITY 0-0 x 100 3 2 PERCENT PORE SPACE TABULAR DATA and INTERPRETATION 80 60 40 20 4 RESIDUAL SATURATION % PORE SPACE POROSITY x----x OIL SATURATION X----X SAMPLE POROS! FROD DEPTH PERM MD. PEPCENT PERCENT PORE SPACE calc grain FEFT TOTAL WATER 30 20 20 40 60 80 10 0 0 40 meter KT. densit 1111 _ **(**0.1| 10.521.d73.0 2440.1 2.69 -1 2 2440.3 **(**0.1 8.9.9.672.0 2.74 3 2440.5 422 24.112.949.9 2.64 X- X- X- X * X X 2440.8 24.613.151.4 4 2.63 310 5 2440.9 24.013.156.1 384 2.64 26.212.553.8 2441.1 2.62 6 456 23.2 5.568.2 7 2441.3 466 2.62 22.214.963.5 2.64 8 2441.5 262 17.714.564.1 9 2441.7 40 2.65 2441.8 19.416.754.6 10 118 2.64 11 2441.9 21.6 9.467.8 361 2.61 X XIX 23.510.756.8 12 2442.2 671 2.63 13 2442.5 67 18.313.871.0 2.63 14 2442.8 1.1 9.623.172.0 2.65 15 19.714.270.7 2443.2 87 2.67 <0.1 13.810.165.9 16 2445.0 2.67 17 21-618-450-0 2449 1 2 65 Ó 18 2457.2 139 21.612.962.5 2.64 X 22.412.465.8 19 _2457.5 162 2.65 23.312.270.7 20 2457.7 274 2.60 6 21 2457.9 21.713.056.0 173 2.64 22 23.0 9.072.7 2458.3 242 2.62 23 23.114.057.9 2458.6 273 2.63 24 14.719.870.0 2458.9 31 2.65 18.221.257.6 25 2459.4 49 2.65 26 2459.9 157 19.219.151.4 2.65 27 22.211.268.7 2460.9 2.61 312 o O 28 2461.2 183 22.814.668.9 2.63 2 2464.2 29 74 18,117.050.8 2.65 30 2464.7 _93 17.017.252.9 - 2.64 31 15.719.957.0 2464.8 56 2.64

ESSO AUSTRALIA LTD. CORE DESCRIPTION

PAGE 1 of 2

WELL FORTESCUE - 3

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SCALE	· · · · · · · · · · · · · · · · · · ·
CORE No.	1

Interval Cored 1536m-1548.6m Cut. 12.6m Recovered 12.6m P. KEMP, Bit Type CHRISTENSEN C20 Rit Size 8 1532 x 3 in Neer by D. HENDERS

1 100 %) Fm

•	(00.%)	rm.	• •	•	·	•	•	•	•	•	·	·	
SON		Nate	4	/1	2	/	7	8						

bit type. Ctiki	, Mitteritic	49.DIL 312	897	24. A. J	. m., Di	esc by.		, i tri ti	איייט	ŞĊŅ.	•••	. Uate
DEPTH 8 CORING RATE M/HR	COMPOSITION	BEDDING B. STRUCTURES	EWVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
1536	$ \begin{array}{c} \otimes\\ & + \\ \otimes\\ & + $	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	OFFSHORE		dom clay 10-30% silt			m g y	none		none	
af 20 Stry Cyr. C Sta Couper, a thur and an an ann an	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	999, 2 747 99 99 99 99 99 99 99 99 99 99 99 99 99										

ESSO AUSTRALIA LTD.

Page 2 of 2

WELL FORTESCUE-3

SCALE

CORE No ¹

(100 %) Fm. Interval Cored 1536m-1548.6m **Cut** 12.6m Recovered 12.6m P. KEMP Bit Type CHRISTENSEN C20 Bit Size 8¹⁵/32 X 3 in. Desc by D. HENDERSON Date 4/12/78 ENVIRONMENT CONTACTS TEXTURAL CHANGE POROSITY TEXTURE STN CEMENT BEDDING DEPTH 8 FACIES COLOR REMARKS COMPOSITION 8 CORING RATE 01 L STRUCTURES 1546 Μ V dom. clay ┛ m gу ٦ 10-30% silt L Μ Μ _1 U 1548 M 1 Μ Core #1. 100% Calcareous Mudstone - approximately 10-20% silt fraction occasionally higher, medium grey, trace mica, trace glauconite, trace carbonaceous, extensively burrowed with light grey silty material and minor dark grey Mudstone infilling burrows, minor very fine grained crystalline silica infilling, minor fossils including rare

forams, occasional fossil fragments show mineral fluorescence, no hydrocarbon shows.

PAGE 1 of 1

SCALE 1:100

CORE No. 2 (....40.%) Fm LAKES ENTRANCE ENVIRONMENT TEXTURAL CHANGE CONTACTS STN DEPTH 8 BEDDING CEMENT POROSITY **EXTURE** FACIES COLOR CORING RATE COMPOSITION 8 REMARKS 01 STRUCTURES 1 m/hr 24095 ٨٨٨ 1 CALCAREOUS MUDSTONE -7 MA dk dark grey to brown, T Ŵ gy firm, massive, comprisbrn ٨٨٨ t ing less than 1% forams ٠8 ۸۸۸ (silt to fine grain ŧ size), trace mica,____ trace carbonaceous 2410.0 material, set in calca-PWATER reous clay matrix ш >(calcimetry = 36%). ш Z ·2 ഗ NOTE: လ ĉ പ Core barrel jammed. 4 Ш С Þ Σ ≥ •4 ·6 .8 2411.0 >: Sample collected for Palynologic Analysis: Depths: 2409.5m; 2409.9m. Dwg 1107/0P/87

PAGE 1 of 3

SCALE 1:100

8 4 M 4 M 1 massive, comprising 2411-0 1 4 M 1 massive, comprising 1 2411-0 1 1 M 1 1 massive, comprising 1 2411-0 1 1 M 1<	DEPTH 8 CORING RATE m/hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
.6 .6	2410·0 ·2												
12.0 proportion is greate	·6 ·8 ·8 ·8 ·8 ·8 ·6 ·6	→ → → → → → → → → → → → → →	MASSIVE	MARINE	DEEPWATE								<pre>massive, comprising less than 5% forams (up to ¹smm diameter), pyrite, both finely disseminated and in patches of rods (up to ¹/8 mm diameter and 10 long); generally horizontal to bedding -?worm burrows, trace quartz silt, trace mid trace carbonaceous material, trace glauce nite set in calcareous</pre>

PAGE 2 of 3

SCALE 1:100

CORE No. 3

Intorval Cored Bit Type	2410.5-	2 <u>416</u> .0m Bit Siz	Cut 5 re8 ¹⁵	5.5m /32" X 3	Reco '' in., D	vered esc by	1. R.(D.J	.5m C.N. J. H	TH END	ORN ERS	(TON ON	27.%) Fm. LAKES ENTRANCH
DEPTH & CORING RATE m/hr	COMPOSITION	BEDDING 8 STRUCTURES	ENVIRONMENT	FACIES	(1) (1 1 -	SOLOR	JIL STN	CEMENT	POROSITY	REMARKS
2412.0 -2 -4 -6 -8 -8 -2 -4 -6 -6 -6 -6 -6 -6 -6 -6 -6 -6												NO RECOVERY: 2412.0-2415.0m NOTE: Core barrel pulled when severe winds and seas moved rig slightly off location.

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ESSO AUSTRALIA LTD. CORE DESCRIPTION WELL FORTE SCUE - 3 SCALE 1:100

PAGE 3 of 3

CORE No. 3.....

DEPTH 8 CORING RATE m/hr	COMPOSITION	BEDDING 8 STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	0.1 STN	CEMENT	PORUSITY	REMARKS
-2 -4 -6 -6 -6 -6 -6 -6 -6 -6 -6 -6 -6 -6 -6												

PAGE 1 of 1

SCALE 1:100

CORE No. 4

DEPTH B CORING RATE 416						-					%) Fm . Date 15/12/.7.8
	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	согов	OIL STN.	-	PORCSITY	REMARKS
											NO RECOVERY NOTE: No core attempted. Pump pressure failed to build up when bit or bottom.
							· · · · · ·				

PAGE 1 of 1

SCALE 1:100

DEPTH 8 Coring Rate	COMPOSITION	BEDDING & STRUCTÙRES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN	CEMENT	POROSITY	REMARKS
2416·0 ·2 ·4 ·4 ·6 ·6 ·6 ·7 ·8 ·7 ·8 ·7 ·7 ·7 ·7 ·7 ·7 ·7 ·7 ·7 ·7		MASSIVE	MARINE	DEEPWATER				dk brown				CALCAREOUS MUDSTONE dark brown, firm, massive, comprising trace forams, trace glauconite pellets, trace pyrite, set i highly calcareous c matrix (calcimetry 40%). NOTE: 2416.0-2416.9m: Co lost down hole while attempting to remove jammed core by pump through kelly. Recovered core was hammered out.

SHEET 1 of 8

SCALE 1:100

 Interval Cored 2440.0-2456.0m
 Cut. 16.0m
 Recovered
 11.4m
 (...71%) Fm. LATROBE GROUP

 Bit Type
 C22
 Bit Size
 8¹⁵/32" X 3"
 in. Desc by J.D. ALDER
 Date
 16/12/78

DEPTH 8 CORING RATE m/hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	DIL STN	CEMENT	POROSITY	REMARKS
4400 4 8	· · · TM	20		NEAR	fine						p	SANDSTONE - grey to
	M	v V		NEAR	sand		s	gry brn	0		00	brown, semi-friable
]					quartz, clear, angula
		0										to subrounded, well
SP T	• • • •	0 Č				b						sorted, fine grain,
	• • • •	- 0 0			fine	bedded						trace mica, carbonace
≥·4		0			granule	mainly due						streaks and lenses c
	•••				sand	to						choked, poor porosit
	• • •	0				changes IN						brown oil stain, stro
P L.6	· · · ,	0				grain	G	gry	0		poor	petroliferous odour,
	• • •	0				size	v	brn			mod	uniform pale yellow
					m.gr							fluorescence, milky
┍┦╌┦╌┦╌┫		0 <mark>0</mark>					G	ľ				white cut.
L.6	•••											
<u>зр</u>		00000		BAR		м						<u>SANDSTONE - grey to</u>
		00000				A S S						brown, friable, quart
441	• • • •					Š I						clear to light grey,
	•••		ΝE	MOUTH	fine	V E		05.4				polished to frosted,
SP	• • •		MARINE	WO	sand	-		gry brn	0		good	subangular to rounded
->-2 mining			W			A f	_G	-				very poorly sorted,
┝┿┿┽┿╊┿┥ ╷ ┣┿┿┽╋┾╍┨	••••			M	m.gr silt	f multiple						grain to granule, som
	• • •	5		EAI								bimodal distribution
L.4	• • •			STR								Trace mica, minor ca:
	• • •			S								onaceous bands, clay
P	• •											choked, poor to mode
	• • •					M						porosity, brown oil
	• •				m.gr	S						stained, strong petro
	•	a),			·	S I	G					liferous odour, unife
A	• • M				fine sand	V E		gry	0			pale yellow fluoresce
P	· · /m				- silt	E		brn			000 7	milky white cut.
	•											At 2441.2m: Multiple
A	• • m											graded beds 5-10mm th
SP: Set		samples.							lo	manda		

2443.lm;

Dwg. 1107/0P/87

2444.0m; 2445.1m; 2446.5m; 2448.0m; 2449.1m; 2450.5m; 2451.4m.

SHEET 2 of 8

SCALE 1:100

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CORE No. .6

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Interval Cored 2440.0-2456.0m Cut 16.0m Recovered 11.4m (71 %) Fm. LATROBE GROUP R.C.N. THORNTON, Bit Type C22 Bit Size 8¹⁵/32 X 3" in, Desc by J.D. ALDER Date 16/12/78

2 bedding or or finely laminated, light 2 brain brain dute brain dute brain dute dute	DEPTH 8 CORING RATE m/hr	COMPOSITION	BEDDING 8 STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN	CEMENT	POROSITY	REMARKS
Imed grain grain sod. 6 1 6 2443 M 0 0 2443 M M 0 M 0 M 0 M 0 M 0 M 0 M 0 M 0 M 0 M 0 M 0 M 0 M M M M M M M M M M M M M M M M M M M M						-	due to changes in grain		l	G			finely laminated, light and dark grey quartz, clear, polished, suban- gular to subrounded, well sorted, fine grain ed with sand filled vertical burrows. Ligh grey Sandstone - 1-2mm clean, but clay choked poor porosity.
SP At 2443.lm: SANDSTON. 2443 At 2443.lm: SANDSTON. 2443	L		50		R	grain		_6		Ø			
<td>2443</td> <td>· · · / M</td> <td></td> <td>ARIN</td> <td>REAM MOUTH</td> <td></td> <td>? ripple lamin. carb. lamin. & shale</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>grey to brown, friable quartz, clear, pclished subangular to rounded, well sorted, medium grain, minor fine grain clean, minor patches of pyrite, trace mica, carbonaceous streaks, moderate porosity, petroliferous odour, uniform pale yellow</td>	2443	· · · / M		ARIN	REAM MOUTH		? ripple lamin. carb. lamin. & shale						grey to brown, friable quartz, clear, pclished subangular to rounded, well sorted, medium grain, minor fine grain clean, minor patches of pyrite, trace mica, carbonaceous streaks, moderate porosity, petroliferous odour, uniform pale yellow
	-6		· · · · · · · · · · · · · · · · · · ·		ST	grain				@			At 2443.4m: Conglomer ate filled scour into fine grained Sandstone flat bedded. Near horizontal bedding shown by very minor variations in grain size and colour, conglomerate contains quartz and shale
		4.0m: Fl.	at shale p	pebbles	, 2nm }	1 (.5mm o	n bedd	ing	pla	nes	•		

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SHEET 3 of 8

SCALE 1:100

CORE No. 6

CORING RATE COMPOSITION	DDING 8 TURES	ENVIRONMENT	FAC;ES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OL STN	CEMENT	POROSITY	REMARKS
	10° 5° 20° 2°	-		v.f. gr.	v tipe	S G	-lt gy	٢		900q	2444.0-2446.4m SANDSTONE - grey, fri ble quartz, clear, polished, subrounded, very well sorted, ver fine grain, trace pyr trace mica, trace car onaceous material, cl choked, poor porosity petroliferous odour, uniform pale yellow fluorescence, milky white cut.
		MARINE	STREAM MOUTH BAR	fine grain sand.	bedded	-s- G G	lt gy			poor	Brown, flat shale pebbles along bedding planes. Bedding etched out by very slight variations in colour and grain size.

ESSO AUSTRALIA ITD. CORE DESCRIPTION SHEET 4 of 8 WELL FORTESCUE - 3

SCALE 1:100

CORE No. 6

Interval Cored 2440.0-2456.0m Cut 16.0m Recovered 11.4m (71.%) Fm. LATROBE GROUP R.C.N. THORNTON, Rit Size 8¹⁵/32" X 3" in Dece by J.D. ALDER Date 16/12/78

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DEPTH 8 CORING RATE m/hr	COMPOSITION	BEDDING 8 STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	01L STN	CEMENT	POPOSITY	REMARKS
·2				S. M. B	fv.f gr		S	lî gy	0		t g h t	2446.4-2446.7m Finely Lamirated SANDSTONE/SHALE - 2mm-5mm. SANDSTONE light grey, hard, quartz, very well so very fine grained,
·4		2 2 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			f. gr		<u> </u>	.dk .brn				trace pyrite, clay choked, tight, no fluorescence, exten- sively bioturbated laminae disturbed wa
-8	· · · · · · · · · <u>·</u> · · · <u>·</u> · · <u>·</u>		NE	FRONT	f-vf gr			dk	0			perhaps rippled. <u>SHALE - dark brown,</u> <u>hard, pyritic,</u> <u>micaceous.</u> <u>Very_evenly_flat_bec</u>
·2	· · · · · · · · · · · · · · · · · · ·		MARINE	DELTA			S	9 y				slight dip, bedding etched out by very slight grain size an colour variations.
·6	· · · · · · · · · · · · · · · · · · ·	2 2 10° 27	-	DI	f gr		S	gry btn			p	Trace shale pebbles, 1 X 3mm. Shale pebble 50 X 20
2448	· · · · · · · · · · · · · · · · · · ·	m-c gr	0		o r	Shale streaks.						

ESSO AUSTRALIA LTD. DESCRIPTION CORE WELL FORTESCUE-3

SHEET 5 of 8

SCALE 1:100

CORE No. 6

DEPTH 8 CORING RATE m/hr	COMPOSITION	BEDDING 8 STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	-CIL STN	CEMENT	POROSITY	REMARKS
- 2 - 2 - 4 - 6 - 8 - 8 - 8		~ ~ V		FRONT	m.f gr m.gr	A f c		gry brn gry brn	•		poor	SANDSTONE - grey brown friable, quartz, clear trace_dark_grains, polished, subangular_to subrounded, well_sorted fine_grained, trace pyrite, trace_mica, trace pyrite, trace_mica, trace carbonaceous_material, clay_choked, poor_poro- sity, petroliferous odour, uniform_pale yellow_fluorescence, milky_white_cut.
P - 2 - 4 - 4 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7		$ \begin{array}{c} \nu \\ \nu \\$	MARINE	DELTA	vf. gr.	v fine Iaminac	gr S S	green gry brn	6		ght	Either large slump or scour. Carbonaceous streaks.

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ESSO AUSTRALIA LTD. CORE DESCRIPTION SHEET 6 of 8 WELL FORTESCUE-3

SCALE 1:100	•		
CORE No. 6			

 Interval Cored 2440.0-2456.0m
 Cut
 16.0m
 Recovered
 11.4m
 (71%) Fm
 LAT ROBE
 GROUP

 Bit Type
 C22
 Bit Size
 8¹⁵/32" X 3" in., Desc by J.D. ALDER
 Date
 16/12/78

DEPTH & CORING RATE	COMPOSITION	BEDDING B STRUCTURES	ENVIRGNMENT	FAC.ES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLCR	DIL STN	CEMENT	PORGSITY	REMARKS
2 450 ⁰ 4 8 					f. gr	fine Luminae bed	S S	gry brn	Ø			SANDSTONE - interlamination ted with carbonaceous Siltstone and Shale. Extensively bioturbated Sandstone - grey brown, semi-friable, quartz,
· 4	· · · · · · · · · · · · · · · · · · ·	V V V V V V V V V V V V V V V V V V V	R I N E	FRONT		≁ bed					tight	clear, polished, very fine grained, well sorted, trace mica, trace pyrite, fine carbonaceous laminae, clay choked, tight.
2451 ·2	MA 	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	M A	DELTA	f. gr			gry brn	Ø			
-4 -6 -8 2452		VV	· ·									_2451.4-2456.0m; _NO RECOVERY

SHEET 7 of 8

SCALE 1:100

CORE No. 6

71 %) Fm. LATROBE GROUP 11.4m interval Cored 2440.0-2456.0m Cut 16.0m LL.4m (R.C.N. THORNTON, Recovered Bit Type C22 Bit Size 8¹⁵/32" X 3" in, Desc by J.D. ALDER Date 16/12/78 ENVIRONMENT TEXTURAL CHANGE CONTACTS STN POROSITY CEMENT BEDDING DEPTH & TEXTURE FACIES COLOR 8 REMARKS CORING RATE COMPOSITION 01Ľ STRUCTURES m/hr 2452 8 ٠2 .4 •6 • 8 2453 • 2 •4 •6 • 8 2454 Dwg. 1107/09/87

ESSO AUSTRALIA LTD. CORE DESCRIPTION SHEET 8 of 8 WELL FORTESCUE- 3

SCALE 1:100

CORE	No.	6.						

DEPTH 8 CORING RATE (m/hr	OMPOSITION	BEDDING 8 STRUCTURES	NON	FACLES	TEXTURE	TEXTUPAL CHANGE	CONTACTS	COLOR	OLL STN	 POROSITY	REMARKS
2454 $\cdot 2$ $\cdot 2$ $\cdot 4$ $\cdot 6$ $\cdot 8$ $\cdot 2$ $\cdot 4$ $\cdot 6$ $\cdot 8$ $\cdot 6$ $\cdot 6$ $\cdot 8$ $\cdot 6$											

ESSO AUSTRALIA LTD. CORE WELL FORTESCUE-3

SHEET 1 of 7

SCALE 1:100

CORE No. 7

64%) Fm LATROBE GROUP

Interval Cored 2456-2470m Cut 14.0m Recovered 9.0m (R.C.N. THORNTON,

Bit Type C22 Bit Size 8¹⁵/32" X 3" in., Desc by J.D. ALDER Date 17/12/78

DEPTH 8 CORING RATE	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACLES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN	νEN.	°CROSITY	REMARKS
245 <u>6</u> .2 .2 .4 .4 .6 .8 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2	AM AM · · · · AM · · · · · · ·		M ARINE	EARSHORE	mainly v.f. gr	lenses of f∞v.c. gr	S	d gry		pyrite	tight	SANDSTONE - grey to brown to dark grey, har quartz, clear, subangul to subrounded, generall well sorted, very fine grained, but containing lenses, up to 30mm across, of Sandstone - very poorly sorted, fine to very coarse grained, micaceous, pyrite, car- bonaceous material common, trace glauconit clay choked, tight, pyrite cement2-lmm interlaminae of SHALE - dark grey, pyrite, mica carbonaceous. Biotur- bated.
SP 	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	MA SSIVE		N	mainly fmm.gr but 5% patches qtz granules			gry brn	\$		mod.	SANDSTONE - grey to brown, friable to semi- friable, quartz, clear, polished to frosted, angular to rounded, generally moderately sorted, with 5% patches of quartz granules, grey, frosted, fairly clean, minor pyrite, carbonaceous matter, mica common, moderate porosity. Oil stained brown, strong petroli- ferous odeur, uniform pale yellow fluorescenc immediate milky white cut.
C	A: Sampl): Sampl	le collec e collect 9m; 2458	ted for ted for	Core A Palyno	Analysi ologic J	s. Analys	is:	24	56.	Om;	2.	456.8m; 2457.4m; Om; 2463.0m; 2464.2m;

SHEET 2 of 7

SCALE 1:100

CORE No. 7 64%) Fm. LATROBE GROUP 9.0m (R.C.N. THORNTON, **Cut** 14.0m Interval Cored 2456-2470m Recovered Bit Type C22 Bit Size 8¹⁵/32" X 3" in., Desc by J.D. ALDER Date 17/12/78 TEXTURAL CHANGE **NVIRONMEN** CONTACTS STN PORGSITY BEDDING EXTURE CEMENT DEPTH 8 ŝ COLOR COMPOSITION 8 REMARKS CORING RATE 0:1 PC: STRUCTURES m/hr 24 58 SANDSTONE - brown, friable, quartz, clear, minor milky, polished, minor frosted, very fine to medium grained, clear minor mica, trace pyrite v.,f. m trace carbonaceous Ino gr S mgr mod material, minor white f. gr 0 clay matrix, moderate brn porosity. Petroliferous odour, ĊA uniform pale yellow fluorescence, immediate .8 milky white cut. Laminations shown by ш EARSHOR slight colour variations ய G L2459 2 2 M Interlaminated fine 4 >grained SANDSTONE and ~ M SHALE. Shale laminae 1-5mm thick. Sedimenf.gr. tary structures include ٨٨ 00 poor (?) ripple bedding, cut \bigcirc and fill, slumping, IM gry pebble bands with brn. pebbles 2-3mm diameter ٠F and well rounded. S Bleeding golden yellow oil. ۰8 ASSIVE f. gr. poor mod 5

Dwg. 1107/07/87

SHEET 3 of 7

SCALE 1:100

CORE No. 7

interval Cured 2456-2470m Cut 14.0m Recovered 9.0m (64 %) Fm LATROBE GROUP R.C.N. THORNTON,

DEPTH & CORING RATE COMPOSI m/hr	BEDDING TION & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN	CEMENT	POROSITY	REMARKS
24 60 24 60 2 2 2 3 4 4 4 5 5 6 5 6 5 6 5 7 7 7 7 7 7 7 7 7 7 7 7 7	$\begin{array}{c c} & & & \\ & & & & \\ & & & & \\ & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\$		NEARSHORE	f. gr		S	br gry	9		poor	SANDSTONE - brown to grey, semi-friable, burrowed, with horizo tal burrow infillings distinguished by thei light brown colour, guartz, clear, polish well sorted, fine gra ed, clay choked, poor porosity. Uniform pa yellow fluorescence, especially in burrow infillings, milky whi cut. Bleeding oil. Interlaminated with 1: thick laminae of SHAL brown, carbonaceous, micaceous, pyritic laminae.
A -2461 -2461 -2461 	20 100 	MARINE	SHOREFACE	v.f. gr			gry	\$		very poor	SANDSTONE - grey, semi friable, quartz, clea: polished, subangular to subrounded, well sorted very fine grained, mice and carbonaceous material common, trace pyrite, clay choked, very poor porosity. Petroliferous odour, bright yellow fluores- cence, milky white cut

ESSO AUSTRALIA LTD. DESCRIPTION CORE WELL FORTESCUE-3

SHEET 4 of 7

SCALE 1:100

CORE No. 7 Interval Cored 2456-2470m 64%) Fm. LATROBE GROUP **(**... Cut 14.0m TEXTURAL CHANGE CONTACTS INVIRONMENT STN POROSITY CEMENT BEDDING **EXTURE** DEPTH 8 FACIES COLOR CORING RATE COMPOSITION 8 REMARKS ٥IL STRUCTURES m/hr 4 8 2462 9 50 ≜ f I c A^f Ic Af Ì_c 0 ≬ f | c 5° Af Ìc thick MASSIVE .6 ∧f Ì_c -10 m m o set Af Ic 0 SANDSTONE - grey, semieach . 8 poor friable, massive, quartz grey ∧f Î_c SHOREFACE clear, polished, subanш 2° rery bedding: RINE gular to subrounded, A f I c 2463 Д poorly sorted, very fine 0 0 0 0 0 0 5 graded to fine grained matrix, A f | c with varying amounts of .2 multiple coarse to very coarse A ^f Ic grain, resulting in 100 graded bedding, mica A f I c and carbonaceous • 4 material common, trace A f pyrite, clay choked, very poor porosity. • 6 MASSIVE Af Ìc Petroliferous odour, bright yellow fluores-Af Ìc

A f

f

• 8

2460

cence, milky white cut.

SHEET 5 of 7

SCALE 1:100

CORE No. . 7.

DEPTH 8 Coring rate	COMPOSITION	BEDDING	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OLL STN	IENT	POROSITY	. Date . 17/12/78
2464 -4 -6 -6 -6 -6 -6 -6 -6 -6 -6 -6			MARINE	SHOREFACE	v. f. m v. c. gr	Af c A A A A A A A A A A A A A	<u>S</u>	gry brn.				SANDSTONE - brown, se friable, bimodal dis- tribution of quartz granules concentrated along bedding planes, clear, milky, pale gr well rounded, frosted to polished, set in matrix of fine graind Sandstone - quartz, clear, subangular to subrounded, clay, mid ceous flecks, moderat to poor porosity. Petroliferous odour, Uniform pale yellow fluorescence, milky white cut. 2465.0-2470.0m: NO RECOVERY.

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ESSO AUSTRALIA LTD. CORE DESCRIPTION

SHEET 6 of 7

WELL FORTESCUE - 3 sc

SCALE 1:100

CORE No. 7

Interval Cored Bit Type	2456-2470m C22 Bit Siz	Cut ¹ e 8 ¹⁵ /32	2" X 3"	Recov	vered esc by	9.0 R.C J.D	Om •N• •AI	THC .DEF	DRN'I R	('ON,	.64 .%) Fm. LATROBE GROU
DEPTH 8 CORING RATE m/hr	BEDDING COMPOSITION B STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	C WIACTS	COLOR	OIL STN	CEMENT	POROSITY	REMARKS
		EWIR	FAC		TEX CHA		201	011	CE	čo d.	
6 8 8 2468											Dwg. 1107/0P/8

ESSO AUSTRALIA LTD. CORE DESCRIPTION · SHEET 7 of 7 WELL FORTESCUE-3

SCALE 1:100

CORE No. 7

DEPTH 8 CORING RATE COMPOSITION 8 STRUCTÙRES 468 -2			NOTE: No recovery
			due (?) to poorly consolidated sand as suggested by increasing drill rate.

SHEET 1 of 5

SCALE 1:100

CORE No.⁸

Interval Cored 2470-2480m Cut 10.0m CONTACTS TEXTURAL CHANGE WIRDNMENT STN. POROSITY BEDDING TEXTURE CEMENT DEPTH 8 FACIES COLOR CORING RATE COMPOSITION 8 REMARKS 01 L m/hr STRUCTURES 0 2470 2470.0-2480.0m: NO RECOVERY. NOTE: Core head badly damaged, suggested coring on a large boulder ahead of bit. Drill rate suggests a poorly consolidated sand initially. 8 2471 6 2472

SHEET 2 of 5

SCALE 1:100

CORE No. 8

Interval Cored			Cut	10.Om	Recov	vered		Dm N	THO	RNT	(ON,	
Bit Type		Bit Sizi	grav szerekérten estekete	2" X 3"	. in., D			, AL	DER II		 Y	. Date 17/12/78
DEPTH & CORING RATE m/hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	DIL STN.		POROSITY	REMARKS
2472												
-2		-										
6												<u> </u>
.8												
	$\mathbf{V}_{\mathbf{r}}$											
2473	Å											
2												
4 ministration of the second sec												
												· · · · · · · · · · · · · · · · · · ·
•6 - <u>Brander</u>												
2474]	
66 7500700,000,000,000,000,000,000,000,000	inge filme wit die Seine gester war werenen schwahren under	a franski stali stali stali se sa		1999 x 21.20 (2 + 20) (2 + 21 - 1 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 +	999 (1997) (1999) (1999) (1997) (1997) (1997)	•						

SHEET 3 of 5

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DEPTH 8 ORING RATE COMPOSITION 8 m/hr. STRUCTURES	TEXTURE TEXTURAL CHANGE	CONTACTS	OL STN CEMENT POROSITY	REMARKS
m/hr. Shoutores 2 474 4 8 .2 .4 .4 .4 .6 .4 .6 .4 .6 .4 .6 .4 .6 .4 .6 .4 .6 .4 .6 .4 .7 .4 .6 .4 .7 .4 .8 .4 .8 .4 .8 .4 .8 .4 .8 .4 .8 .4 .8 .4 .8 .4				

SHEET 4 of 5

SCALE 1:100

CORE No.8

Recovered Om⁷ (R.C.'N. THORNTON, Cut 10.0m 0 %) Fm LATROBE GROUP Interval Cored 2470-2480m Bit Type C22 Bit Size 8¹⁵/32" X 3" in., Desc by J.D. ALDER Date 17/12/78 TEXTURAL CHANGE EVVIRONMENT CONTACTS STN POROSITY CEMENT TEXTURE BEDDING DEPTH 8 FACIES COLOR 8 REMARKS CORING RATE COMPOSITION 01 F STRUCTURES m/hr 8 Ç 2476 ·2 . 4 ·6 •8 2477 ·2 .4 ŧ •8 2478

SHEET 5 of 5

SCALE1:100

CORE No.8 Interval Cored 2470-2480m 10.Om Om (R.C.N. THORNTON, Cut Recevered C22 Bit Size 8¹⁵/32" X 3" in., Desc by J.D. ALDER Date 17/12/78 Bit Type ENVIRCHMENT TEXTURAL CHANGE CONTACTS STN TEXTJRE CEWENT POROSITY BEDDING DEPTH 8 FACIES COLCR 8 REMARKS CORING RATE COMPOSITION 01 L STRUCTURES 8 2478 •2 4 • 6 •8 2479 .2 .4 • 6 •8 24 80

Dwg 1107/07/67

APPENDIX 4

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APPENDIX 4

PALYNOLOGY REPORT

A PALYNOLOGICAL ANALYSIS OF FORTESCUE-3, GIPPSLAND BASIN.

by

H.E. Stacy

and

A.D. Partridge

Esso Australia Ltd Palaeontology Report 1979/5

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March 20, 1979.

INTRODUCTION

Twenty five samples were examined from Fortescue-3 consisting of five conventional core samples and twenty sidewall core sample. Overall the yields from the samples were good, however preservation was generally poor to fair, mainly owing to extensive pyrite pitting of the fossil exines.

The formation and zone subdivision of the section examined is summarised below. Table-1 lists all of the samples examined and summarises the findings, while individual fossil occurrences are recorded on the accompanying Distribution Charts. The zone limits and their confidence ratings are also given on the accompanying Data Sheet.

UNIT/FACIES	ZONE	*DEPTH (in metres)
LAKES ENTRANCE FORMATION	P. tuberculatus	2417 - 2433m
	UNCONFORMITY AT 2434m	
LATROBE GROUP	Middle <u>M</u> . <u>diversus</u>	2437 - 2448.4m
(Coarse Clastics)	Middle/Lower M. <u>diversus</u>	2452.5 - 2453.8m
	Lower M. diversus *	2476.5 - 2605.5m
	Upper L. balmei *	2610.5
• 		T.D.,

SUMMARY

* <u>Apectodinium</u> (<u>al. Wetzeliella</u>)
 <u>hyperacantha</u> 2589 - 2610.5
 Dinoflagellate Zone.
 (Extending across zone boundary)

GEOLOGICAL COMMENTS

1.

*

Dinoflagellates were present in all samples except for the coals at 2571 and 2573 metres.

Depth shown are drillers measured depths.

.../2

2. Because of the rarity of Middle <u>M</u>. <u>diversus</u> Zone indicator species the interval between 2446.5 metres and 2535 metres can only be referred to either the Lower or Middle subdivisions of the <u>M</u>. <u>diversus</u> Zone at very low levels of confidence. The boundary between these subzones could easily be taken anywhere within the above interval without conflicting with the palynology.

Electric log correlation with adjacent wells and comparison of the thickness of the Lower <u>M. diversus</u> Zone between Fortescue-3 and adjacent wells suggests that the base of the Middle <u>M. diversus</u> Zone should be taken as low as 2501 metres. This cannot be demonstrated from the palynology although it is conceded that the only sample (i.e. at 2476.5m) assigned to the Lower <u>M. diversus</u> Zone above 2501 metres has been given a 2 confidence rating.

- 3. In this report the species <u>hyperacantha</u> has been transferred from the genus <u>Wetzeliella</u> to the genus <u>Apectodinium</u>, which affects the name of an important dinoflagellate zone in the Gippsland Basin. This change follows the recent comprehensive reviews of dinflagellate cyst taxonomy by Lentin and Williams (1977) and Stover and Evitt (1978), which are likely to be followed in the future by the majority of workers in the field. It is anticipated that other name changes will be progressively made in future reports to bring our taxonomic terminology up to date.
- 4. The basal sample in the Lakes Entrance Formation at 2433 metres contains common reworked spores and pollen indicative of the <u>P. asperopolus</u> Zone. The reworked elements are so diagnostic that it can be stated emphatically that they cannot have been derived from the underlying Latrobe coarse clastics at the Fortescue-3 location.

DISCUSSION OF ZONES

Detailed assemblage lists for all samples examined are plotted on the accompanying Distribution Sheets. How the individual zones were identified in this well is summarised below:

-2-

.../3

Upper Lygistepollenites balmei Zone: 2610.5 metres.

The common occurrence of the gymnosperm pollen <u>Lygistepollenites balmei</u> in the one sample is characteristic of the Paleocene <u>L. balmei</u> Zone. The presence of the large spores <u>Cyathidites gigantis</u> and <u>Verrucosisporites</u> <u>kopukuensis</u> is diagnostic of the Upper subdivision of the Zone.

Apectodinium (al. Wetzeliella) hyperacantha Zone: 2589 - 2610.5 metres.

The presence of the nominate species in the three samples in this interval is diagnostic of this zone. As in adjacent wells the zone overlaps the Upper <u>L</u>. <u>balmei</u> Zone to Lower <u>M</u>. <u>diversus</u> Zone boundary.

Lower Malvacepollis diversus Zone: 2476.5 - 2605.5 metres.

The base of this zone in Fortescue-3 is identified by the first appearance of Spinizonocolpites prominatus, Polypodiaceoisporites varus and Proteacidites biornatus in the sample at 2605.5 metres. The presence of the following species S. prominatus, P. varus, Crassiretitriletes vanraadshoovenii and Myrtaceoipollenites australis which are normally found in association and are interpreted to be indicative of "mangrove environments" and lack of any large numbers of Proteacidites grandis is characteristic of the samples between 2585 and 2605.5 metres near the base of this zone. The overlying section from 2535 to 2568.2 metres in contrast can be characterised by common P. grandis and the frequent to common occurrence of <u>Rotverrusporites</u> <u>stellatus</u> and could be regarded as more typical of assemblages from the Lower M. diversus Zone. Up to 2535 metres are less definitive but are still referred to this zone on the presence of Tetrocolporites multistrixus at 2476.5 metres and absence of any Middle M. diversus Zone markers. The same rarity of marker fossils precludes assigning the overlying samples at 2452.5 and 2453.8 metres either of the Lower or Middle subdivisions of the M. diversus Zone.

Middle Malvacepollis diversus Zone: 2437 - 2448.4 metres.

The presence of the pollen <u>Proteacidites plemmelus</u> at 2443.5 metres and <u>Tricolporites moultonii</u> at 2448.4 metres is used to assign these and the overlying sample to this zone.

Proteacidites tuberculatus Zone: 2417 - 2433 metres.

Both <u>Cyatheacidites annulatus</u> and various marker species of dinoflagellates including <u>Protoellipsodinium simplex</u> and "<u>Dinosphaera</u>" <u>mamilatus</u> from these samples assign this interval to the <u>P</u>. <u>tuberculatus</u> Zone.

REFERENCES

LENTIN, J.K., and WILLIAMS, G.L., 1977: Fossil dinoflagellates - index to genera and species, 1977 edition: Bedford Inst. Oceanography Rept. B1-R-77-8, 209pp.

STOVER, L.E., and EVITT, W.R., 1978:

Analyses of Pre-Pleistocene Organic-walled Dinoflagellates. Stanford Univ. Publ. Geol. Sciences. Vol. 15, 300pp. PALYNOLOGY DATA SHEET

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		SLAND				EVATION TAL DEP	-	<u>31m</u> 625m	GL:	<u>- 69</u>	<u>m</u>
щ	T	HIG	нE	ST D	АТ	A		WE	כת ידי	A T Z	
A G I	PALYNOLOGICAL ZONES	Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time	1	Rtg	Alternate Depth	Rtg	Two Way Time
	T. pleistocenicus		1		1			1 .			
ធ	M. lipsis							1		1	
NEOGENE	C. bifurcatus				1					1	
NEO	T. bellus										
	P. tuberculatus	2417	0				2433	2	2429	0	
	Upper N. asperus									1	
	Mid N. asperus										
ы	Lower N. asperus										
PALEOGENE	P. asperopolus										
LEQ	Upper M. diversus										
PA.	Mid M. diversus	2440	2	2446.5	1		2451.4	2	2446.5	1	
	Lower M. diversus	2476.5	2	2535	1		2605.5	0			
	Upper L. balmei	2610.5	0	· ····································			2610.5	0			
	Lower L. balmei										
	T. longus										*****
SUC	T. lilliei							<u> </u>			
CRETACEOUS	N. senectus										
RET	U. T. pachyexinus						<u> </u>				
ប	L. T. pachyexinus										
LATE	C. triplex										
H	A. distocarinatus										
	C. paradoxus										*
CRET	C. striatus						· · · · · · · · · · · · · · · · · · ·				
U.	F. asymmetricus										
EARLY	F. wonthaggiensis										
EA	C. australiensis										
_	PRE-CRETACEOUS										
ć O I	MENTS: All depths	in motroa									
COM											
	Apectodiniu	um (al. we	tzel	iella) hyj	pera	cantha I	Dinoflagel	late	Zone 2589	9m -	2610.5
	-						<u></u>				
CONT	FIDENCE O: SWC or C	ma Evallant	+ Conf	idanaa amam			anazian of our		-11	1	1
				<u>idence</u> , assem <u>ce</u> , assembla							
				<u>e</u> , assemblag ssemblage wit							
	or both.	rair Connden	<u>ce</u> , a:	semorage wit	n zone	species of	ettner spores	and po	offen or micro	plank	ton,
	4: Cuttings,	No Confidence	e, ass	emblage with	non-ċ	liagn <i>o</i> stic s	spores, pollen	and/c	r microplankt	on.	
NOTE	If an entry is given entered, if possi unless a range of limit in another.	ble. If a sam zones is give	ple c:	annot be assign	ned to	one partic	ular zone, the	en no e	entry should be	e mad	е,
DATA	RECORDED BY: H.E	. STACY &	A.D	. PARTRIDO	<u>E</u>	DA	TE: MAR	CH 6,	1979		
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Well Name FORT			1	T	<del></del>	, 	T		T		·	Basi		GIP									·	r	f <u>4</u>	  
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PALYNOMORPHS	2417	2429	2433	2440	2446.	2446.	2451.	2452.	245	2476.	2532	2535	2537.	2540	255	2560.	256	2571	2573.	2576	2585	2589	2605.	261	2615	 
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A. acutullus			ļ	<b> </b>			·	<b> </b>						$\leq$						$\leq$						 
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A. oculatus					<u> </u>				-															<b> </b>		 
A. sectus						<b> </b>					<b> </b>															 
A. triplaxis A. obscurus		1		<b> </b>			╂	<b> </b>																	—	 
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B. elegansiformis				_																						 
B. trigonalis		ļ		ļ			<b> </b>				[	<b></b>												ł		 
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B. emaciatus	1	<b> </b>		<u> </u>			<b> </b>	$\vdash$	<u>   </u>		ļ													<b> </b>		 
C. bullatus		<b> </b>	<u> </u>	<b> </b>			<b> </b>	ļ																<u> </u>		 
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C. horrendus	+	ļ		ļ																						 
C. meleosus	<b>_</b>	ļ	<b> </b>	<b> </b>				<u>                                     </u>	<u>                                     </u>																	 
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D. tuberculatus	T			$\overline{}$										$\square$	$\geq$								$\sim$			
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G. cranwellae	1																									 
G. wahooensis	1			<u> </u>																						 
G. bassensis	1								├																	 
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L. bainii																										 
L. lanceolatus																			$\angle$							
L. balmei										R.V																 
L. florinii	$\mathbb{Z}$				_	$\bigtriangleup$	$\square$			$\bigtriangleup$		$\square$	$\leq$		_			$\leq$						$\leq$		 
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M. duratus									ľ			T			1			Ī								
M. grandis												-+			†	+										 

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*C=core; S=sidewoll core; T=cuttings.

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Well Name _____FORTESCUE-3

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Basin _____GIPPSLAND

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| DEPTHS         Encode         Status         Status<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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| M. emarcidus/heterus       A. emarcidus/heterus         N. falcarus       A. falcarus         N. falcarus       A. falcarus         N. falcarus       A. geniatus         N. geniatus       A. geniatus         N. servectus       A. geniatus         N. servectus       A. geniatus         N. servectus       A. geniatus         P. achesis       A. geniatus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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| M. endurus       N. felocitus         M. Herningii       N. goniatus         M. geniatus       N. goniatus         M. spectrus       N. spectrus         M. sencetus       N. spectrus         M. sencetus       N. spectrus         M. sencetus       N. spectrus         P. ochesis       N. spectrus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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| N. vansteenisii         O. sentosa         P. ochesis         P. catastus         P. adotastus         P. adotastus         P. adotastus         P. catastus      <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| O. sentosa   P. ochesis   P. ochesis   P. demarcatus   P. demarcatus   P. demarcatus   P. naguas   P. polyoratus   P. polyoratus   P. polyoratus   P. densus   P. rescontis   P. rescontis   P. advanthoides   (Pot.)   P. advanthoides   P. advanthoides   P. advanthoides   P. annularis   P. annularis   P. advantus   P. delicatus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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| P. ochesis         P. detastus         P. demarcatus         P. magnus         P. polyoratus         P. vessus         P. vessus         P. densus         P. vessus         P. morganil/jubatus         P. romoganil/jubatus         P. romoganil/jubatus         P. romoganil/jubatus         P. romoganil/jubatus         P. romoganil/jubatus         P. romoganil/jubatus         P. romosonii         P. romosonii         P. reticulosaccatus         P. vertucosus         P. vertucosus         P. structus         P. asobaltaus         P. atrus         P. advanthoides         (Prot.)         P. advalatus         P. angulatus         P. angulatus         P. angulatus         P. angulatus         P. delicatus         P. delicatus <tr td=""> <!--</td--><td></td><td></td><td>Ι</td><td></td><td>T</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>$\geq$</td><td>T</td><td></td></tr> <tr><td>P. catastus   P. demarcatus   P. magnus   P. polyoratus   P. velscus   P. velscus   P. velscus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. reticulosaccatus   P. vervuosus   P. vervuosus   P. esobalteus   P. esobalteus   P. advenanthoides   (Prot.)   P. advenanthoides   P. delinatus   P. delinatus</td><td></td><td></td><td>Ļ</td><td></td><td>T</td><td></td><td></td><td></td><td></td><td>L</td><td></td><td></td><td></td><td> </td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>P. demarcatus   P. magnus   P. polyroatus   P. vesicus   P. vesicus   P. densus   P. velosus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. verucosus   P. verucosus   P. reticulatus   P. reticulatus   P. reticulatus   P. advanthoides   (Prot.)   P. advanthoides   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. alperopolus   P. delinai   P. delinai   P. delinai   P. delinai   P. delinai   P. delinais   P. delinais</td><td></td><td></td><td>$\perp$</td><td></td><td>1</td><td>ļ</td><td></td><td>_</td><td>1</td><td> </td><td></td><td></td><td>1_</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>P. megnus   P. polyoratus   P. densus   P. densus   P. densus   P. morganii/jubatus   P. mawsonii   P. mawsonii   P. mersus   P. mersus   P. mersus   P. reticulosacatus   P. reticulatus   P. adapticatus   P. clarus   P. clarus   P. clarus   P. clarus   P. clarus   P. clarus   P. delicatus   P. delicatus   P. delicatus   P. delicatus   P. delicatus   P. delicatus</td><td></td><td></td><td>$\downarrow$</td><td></td><td>1</td><td></td><td></td><td></td><td>4</td><td>ļ</td><td></td><td></td><td>1</td><td> </td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td> </td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>P. polyoratus   P. vesicus   P. densus   P. welosus   P. welosus   P. welosus   P. morganii/jubatus   P. mawsonii   P. mawsonii   P. reticulosaccatus   P. angotonii   P. reticulatus   P. angotonii   P. angotoniii   P. ang</td><td></td><td></td><td>1</td><td></td><td>$\downarrow$</td><td></td><td></td><td></td><td>+</td><td>ļ</td><td></td><td></td><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>4</td><td></td></tr> <tr><td>P. vesicus   P. densus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. reticulosaccatus   P. reticulosaccatus   P. vervocous   P. vervocous   P. vervocous   P. vervocous   P. reticulatus   P. reticulatus   P. reticulatus   P. reticulatus   P. reticulatus   P. reticulatus   P. anglosk   P. anglosk   P. anglosk   P. anglosk   P. anglosk   P. deinartus   P. doinei   P. formosus   P. dorus   P. formosus</td><td></td><td></td><td>+</td><td></td><td>+</td><td> </td><td></td><td></td><td>+</td><td></td><td></td><td></td><td>+</td><td> </td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>$\rightarrow$</td><td></td><td></td><td></td><td> </td><td></td><td></td><td>+</td><td></td></tr> <tr><td>P. densus   P. welosus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. reticulosaccatus   P. reticulatus   P. reticulatus   P. varus   P. varus   P. varus   P. adenanthoides   (Prot.)   P. adenanthoides   P. angulatus   P. angulatus   P. angulatus   P. biornatus   P. clarus   P. clarus   P. clarus   P. darus   P. delicatus   P. delicatus</td><td></td><td></td><td>+-</td><td></td><td>+</td><td></td><td></td><td></td><td>+</td><td></td><td></td><td>-+</td><td>+</td><td></td><td>$\leq$</td><td></td><td></td><td></td><td>$\leq$</td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>P. velosus   P. morganii/jubatus   P. mawsonii   P. mawsonii   P. reticulosaccatus   P. verucosus   P. crescentis   P. esobalteus   P. akenalthoides   (Prot.)   P. alveolatus   P. alveolatus   P. anularis   P. aperopolus   P. biornatus   P. clarus   P. clarus   P. confragosus   P. delicatus   P. formosus   P. formosus   P. formosus   P. formosus   P. formosus   P. grandis</td><td></td><td></td><td>+</td><td></td><td>+</td><td></td><td></td><td>-</td><td>+</td><td></td><td>·</td><td></td><td>+-</td><td></td><td></td><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td> </td><td></td><td></td><td></td><td></td><td></td><td></td><td>+</td><td></td></tr> <tr><td>P. morganii/jubatus   P. mawsonii   P. mawsonii   P. reticulosecatus   P. verusous   P. esobalteus   P. esobalteus   P. langstonii   P. reticulatus   P. simplex   P. simplex   P. advanthoides   (Prot.)   P. advolatus   P. anolosexinus   P. anolosexinus   P. anolosexinus   P. biornatus   P. biornatus   P. cleinei   P. cleinei   P. cleinei   P. delicatus   P. formosus   P. formosus   P. formosus   P. grandis</td><td></td><td></td><td>+-</td><td></td><td>┿</td><td></td><td></td><td></td><td>+</td><td> </td><td></td><td></td><td>+</td><td></td><td></td><td></td><td>$\leq$</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>+</td><td></td></tr> <tr><td>P. mawsonii   P. reticulosaccatus   P. verucosus   P. verucosus   P. druss   P. anglatus   P. angulatus   P. darus   P. confragosus   P. delinei   P. delinei  <td></td><td></td><td>+</td><td></td><td>╈</td><td></td><td></td><td></td><td>+</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td><u> </u></td><td></td><td></td><td></td><td>—</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-+-</td><td></td></td></tr> <tr><td>P. verucosus   P. crescentis   P. esobalteus   P. hangstonii   P. teiculatus   P. simplex   P. varus   P. varus   P. adenanthoides   (Prot.)   P. advolatus   P. angulatus   P. angulatus   P. angulatus   P. asperopolus   P. cleinei   P. cleinei   P. confragosus   P. delicatus   P. delicatus   P. formosus   P. formosus</td><td></td><td></td><td>+</td><td></td><td>+</td><td></td><td>_</td><td>-</td><td></td><td></td><td></td><td></td><td>+</td><td></td><td>/</td><td>$\nearrow$</td><td>$\geq$</td><td></td><td>$\geq$</td><td>$\nearrow$</td><td>$\nearrow$</td><td></td><td></td><td>$\geq$</td><td>$\geq$</td><td></td><td></td><td></td><td>$\geq$</td><td></td><td></td><td>+</td><td></td></tr> <tr><td>P. verucosus   P. crescentis   P. esobalteus   P. hangstonii   P. teiculatus   P. simplex   P. varus   P. varus   P. adenanthoides   (Prot.)   P. advolatus   P. angulatus   P. angulatus   P. angulatus   P. asperopolus   P. cleinei   P. cleinei   P. confragosus   P. delicatus   P. delicatus   P. formosus   P. formosus</td><td></td><td></td><td>1-</td><td>_</td><td>$\uparrow$</td><td></td><td></td><td>-</td><td>1</td><td></td><td>c</td><td></td><td>+</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td></td><td>Ť</td><td></td><td></td><td></td><td></td><td></td><td>T</td><td>P. reticulosaccatus</td></tr> <tr><td>P. esobalteus   P. langstonii   P. reticulatus   P. reticulatus   P. simplex   P. varus   P. adenanthoides   (Prot.)   P. adveolatus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. appropolus   P. clarus   P. confragosus   P. deliceitus   P. formosus   P. formosus   P. formosus   P. grandis</td><td></td><td></td><td>$\mathbf{T}$</td><td>_</td><td>+</td><td></td><td></td><td>-</td><td>+</td><td></td><td></td><td>-</td><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>+</td><td></td></tr> <tr><td>P. langstonii   P. reticulatus   P. simplex   P. varus   P. adenanthoides   (Prot.)   P. adenanthoides   P. adenanthoides   P. adenanthoides   P. adenanthoides   P. amolastinus   P. annularis   P. annularis   P. asperopolus   P. biornatus   P. clarus   P. clarus   P. clarus   P. clarus   P. clarus   P. clarus   P. confragosus   P. delicatus   P. formosus   P. formosus   P. grandis</td><td></td><td></td><td></td><td></td><td>T</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>P. crescentis</td></tr> <tr><td>P. reticulatus   P. simplex   P. varus   P. adenanthoides (Prot.)   P. adenanthoides (Prot.)   P. adenanthoides (Prot.)   P. adveolatus   P. amolosexinus   P. amolosexinus   P. angulatus   P. asperopolus   P. biornatus   P. clarus   P. confragosus   P. delicatus   P. formosus   P. formosus   P. grandis</td><td></td><td></td><td></td><td></td><td>Ι</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>$\land$</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>P. simplex   P. varus   P. adenanthoides   (Prot.1   P. alveolatus   P. anolosexinus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. asperopolus   P. biornatus   P. clarus   P. clarus   P. confragosus   P. delicatus   P. formosus   P. formosus   P. grandis</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>P. varus   P. adenanthoides   (Prot.)   P. alveolatus   P. anolosexinus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. asperopolus   P. biornatus   P. clarus   P. confragosus   P. delicatus   P. formosus   P. grandis</td><td></td><td></td><td>$\bot$</td><td></td><td>$\perp$</td><td></td><td></td><td></td><td></td><td></td><td></td><td>_</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>P. adenanthoides (Prot.)   P. alveolatus •   P. amolosexinus •   P. angulatus •   P. angulatus •   P. angulatus •   P. angulatus •   P. asperopolus •   P. biornatus •   P. clarus •   P. clarus •   P. clarus •   P. cleinei •   P. delicatus •   P. formosus •   P. grandis •</td><td></td><td></td><td>–</td><td></td><td>+</td><td></td><td>$\rightarrow$</td><td>_</td><td></td><td></td><td></td><td></td><td>+</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>_</td><td></td><td></td><td></td><td></td><td>-</td><td></td></tr> <tr><td>P. alveolatus   P. amolosexinus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. asperopolus   P. asperopolus   P. biornatus   P. clarus   P. clarus   P. cleinei   P. confragosus   P. delicatus   P. delicatus   P. formosus   P. grandis</td><td></td><td></td><td>┢</td><td></td><td>+</td><td></td><td>$\leq$</td><td>$\rightarrow$</td><td></td><td></td><td></td><td></td><td>+</td><td></td><td></td><td>-</td><td></td><td>_</td><td>-&gt;</td><td></td><td>$\rightarrow$</td><td></td><td></td><td></td><td>-</td><td>-</td><td>_</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>P. amolosexinus   P. angulatus   P. angulatus   P. annularis   P. asperopolus   P. biornatus   P. clarus   P. confragosus   P. crassis   P. delicatus   P. formosus   P. grandis</td><td></td><td></td><td>┝</td><td></td><td>+</td><td></td><td></td><td>-+</td><td>K</td><td><u> </u></td><td></td><td></td><td>+</td><td></td><td>$\leq$</td><td>$\leq$</td><td>$\leq$</td><td>$\leq$</td><td>$\leq$</td><td></td><td>$\rightarrow$</td><td></td><td></td><td></td><td>$\leq$</td><td>$\rightarrow$</td><td>+</td><td>+</td><td></td><td></td><td></td><td></td><td>P. alugalatura</td></tr> <tr><td>P. angulatus  </td><td></td><td></td><td>+</td><td></td><td>+</td><td></td><td></td><td>-+</td><td>-</td><td></td><td></td><td>+</td><td>+</td><td></td><td></td><td></td><td></td><td></td><td>+</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>╉</td><td>P amolosovinus</td></tr> <tr><td>P. asperopolus   P. biornatus   P. clarus   P. cleinei   P. confragosus   P. confragosus   P. cleinei   P. confragosus   P. confragosus   P. chicatus   P. delicatus   P. formosus   P. grandis</td><td></td><td></td><td>+</td><td></td><td>+</td><td></td><td></td><td>-+</td><td></td><td></td><td></td><td>-+</td><td>+</td><td></td><td></td><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td>P angulatus</td></tr> <tr><td>P. asperopolus   P. biornatus   P. clarus   P. clarus   P. cleinei   P. confragosus   P. crassis   P. delicatus   P. formosus   P. grandis</td><td></td><td></td><td>$\vdash$</td><td></td><td>+</td><td></td><td></td><td>+</td><td>+</td><td>7</td><td>1</td><td>-+</td><td></td><td></td><td>7</td><td></td><td></td><td>7</td><td>$\nearrow$</td><td>オ</td><td>7</td><td>-+</td><td></td><td></td><td>$\nearrow$</td><td></td><td></td><td></td><td>$\nearrow$</td><td></td><td></td><td>1</td><td>P. annularis</td></tr> <tr><td>P. biornatus   P. clarus   P. cleinei   P. confragosus   P. confragosus   P. crassis   P. delicatus   P. formosus   P. grandis</td><td></td><td></td><td>$\vdash$</td><td></td><td>+</td><td></td><td></td><td>+</td><td></td><td></td><td>-</td><td></td><td>+</td><td></td><td></td><td>-</td><td></td><td></td><td>_</td><td>-</td><td>-</td><td>-</td><td></td><td></td><td></td><td>-</td><td>-</td><td></td><td>$\mathbf{T}$</td><td> /</td><td></td><td></td><td></td></tr> <tr><td>P. clarus   P. cleinei   P. confragosus   P. confragosus   P. crassis   P. delicatus   P. formosus   P. grandis</td><td></td><td></td><td>F</td><td></td><td>$\uparrow$</td><td>••</td><td></td><td>1</td><td>$\square$</td><td></td><td></td><td>-+</td><td>+</td><td></td><td></td><td></td><td></td><td></td><td></td><td>-+</td><td>$\neg$</td><td>$\nearrow$</td><td></td><td>$\nearrow$</td><td>$\geq$</td><td></td><td></td><td></td><td></td><td>†</td><td></td><td></td><td>P. biornatus</td></tr> <tr><td>P. contragosus P. crassis P. delicatus P. formosus P. grandis P. grandis</td><td></td><td></td><td>Γ</td><td></td><td>T</td><td></td><td></td><td></td><td>L</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td><td>P. clarus</td></tr> <tr><td>P. contragosus P. crassis P. delicatus P. formosus P. grandis P. grandis</td><td></td><td></td><td></td><td></td><td>Γ</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>P. cleinei</td></tr> <tr><td>P. delicatus P. formosus P. grandis P. grandis</td><td></td><td></td><td></td><td></td><td>L</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>$\square$</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>P. contragosus</td></tr> <tr><td>P. formosus<br/>P. grandis</td><td></td><td></td><td>$\vdash$</td><td>_</td><td>Ļ</td><td></td><td></td><td>_</td><td>ļ</td><td></td><td></td><td></td><td>1_</td><td></td><td></td><td>4</td><td></td><td></td><td></td><td></td><td>[</td><td></td><td></td><td></td><td>4</td><td>$\rightarrow$</td><td>_</td><td></td><td></td><td></td><td></td><td>4</td><td>P. crassis</td></tr> <tr><td>P. grandis</td><td></td><td></td><td>┣</td><td></td><td>+</td><td></td><td></td><td></td><td><b> </b></td><td></td><td></td><td></td><td>+</td><td></td><td>_+</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td>–</td><td></td><td>+-</td><td></td><td></td><td>_</td><td></td><td></td><td>$\rightarrow$</td><td>$\rightarrow$</td><td></td><td></td><td>$\rightarrow$</td><td>$\rightarrow$</td><td>$\rightarrow$</td><td>$\rightarrow$</td><td>$\rightarrow$</td><td>$\rightarrow$</td><td>$\rightarrow$</td><td>$\rightarrow$</td><td>$\rightarrow$</td><td>$\rightarrow$</td><td>$\rightarrow$</td><td>$\rightarrow$</td><td></td><td>$\rightarrow$</td><td>$\rightarrow$</td><td></td><td>+</td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td>┣</td><td>_</td><td>+</td><td></td><td></td><td>-+-</td><td> </td><td>_</td><td>$\leq$</td><td>-+</td><td>K</td><td>$\leq$</td><td>$\rightarrow$</td><td>$\leq$</td><td><b>A</b></td><td>A</td><td>A</td><td>A</td><td>A</td><td>$\leq$</td><td>$\leq$</td><td>$\rightarrow$</td><td>$\rightarrow$</td><td></td><td></td><td>$\rightarrow$</td><td>$\rightarrow$</td><td></td><td></td><td><b>A</b></td><td>i granano</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td>┢</td><td>-&gt;</td><td></td><td></td><td></td><td><u> </u></td><td>$\rightarrow$</td><td>-+-</td><td>-</td><td></td><td>$\rightarrow$</td><td></td><td>$\rightarrow$</td><td></td><td></td><td></td><td>$\rightarrow$</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>P. grevillaensis</td></tr> <tr><td>P. incurvatus P. intricatus</td><td></td><td>-+</td><td>-</td><td></td><td>+</td><td></td><td></td><td>+</td><td> </td><td><u> </u></td><td>$\rightarrow$</td><td>+</td><td>+</td><td></td><td>$\rightarrow$</td><td>-+</td><td>$\rightarrow$</td><td>+</td><td></td><td></td><td></td><td>-+-</td><td>+</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-+</td><td>•</td><td>P. intricatus</td></tr> <tr><td>P. kopiensis</td><td>+</td><td>$\dashv$</td><td></td><td>+</td><td>+</td><td></td><td>+</td><td>-+-</td><td></td><td>-</td><td>-+</td><td></td><td>+</td><td></td><td>+</td><td></td><td>-+</td><td></td><td></td><td>-+</td><td></td><td></td><td></td><td>-+</td><td></td><td></td><td>-+</td><td></td><td></td><td></td><td>-+</td><td>-</td><td>P. kopiensis</td></tr> <tr><td>P. lapis</td><td></td><td></td><td></td><td></td><td>+</td><td></td><td>-+</td><td>オ</td><td>17</td><td>7</td><td></td><td>-+-</td><td>+</td><td></td><td>-+</td><td>$\nearrow$</td><td></td><td></td><td>$\nearrow$</td><td></td><td></td><td></td><td></td><td></td><td>?</td><td></td><td>-+</td><td></td><td></td><td></td><td>-+</td><td>•</td><td></td></tr> <tr><td>P. latrobensis</td><td>+</td><td>$\rightarrow$</td><td><u> </u></td><td>$\uparrow$</td><td>+</td><td></td><td>$\neg \uparrow$</td><td></td><td>r</td><td></td><td>-†</td><td></td><td>†</td><td></td><td></td><td>+</td><td>*</td><td>+</td><td></td><td></td><td></td><td></td><td></td><td></td><td>•+</td><td>-</td><td></td><td></td><td></td><td></td><td>-+</td><td></td><td></td></tr> <tr><td>P. leightonii ?</td><td></td><td>-+</td><td><u> </u></td><td>$\neg$</td><td>$\uparrow$</td><td></td><td>+</td><td>+</td><td></td><td></td><td>?</td><td>+</td><td>1</td><td></td><td>$\nearrow$</td><td></td><td></td><td>+</td><td></td><td></td><td>-</td><td></td><td></td><td>$\nearrow$</td><td></td><td>?</td><td></td><td></td><td></td><td>$\uparrow$</td><td>-+</td><td>•</td><td>P. leightonii</td></tr> <tr><td>P. obesolabrus</td><td></td><td></td><td>L</td><td></td><td>Γ</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>P. obesolabrus</td></tr> <tr><td>P. obscurus</td><td></td><td></td><td>Ē</td><td></td><td>Γ</td><td></td><td></td><td>Ι</td><td></td><td></td><td></td><td>T</td><td></td><td></td><td></td><td></td><td></td><td>$\triangleleft$</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>•</td><td>P. obscurus</td></tr> <tr><td>P. ornatus</td><td></td><td></td><td></td><td></td><td>Γ</td><td></td><td></td><td></td><td></td><td></td><td>?</td><td></td><td></td><td></td><td>T</td><td></td><td>Τ</td><td></td><td></td><td>ef.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Τ</td><td>•</td><td>P. ornatus</td></tr> <tr><td>P. otwayensis</td><td></td><td></td><td></td><td></td><td>F</td><td></td><td></td><td>T</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-<br/>-</td><td>P. otwayensis</td></tr> <tr><td>P. pachypolus</td><td></td><td></td><td>-</td><td></td><td>$\bot$</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>4</td><td></td><td></td><td>•</td><td>P. pachypolus</td></tr> <tr><td>P. palisadus</td><td></td><td></td><td></td><td>_</td><td>Ļ</td><td>]</td><td></td><td>1</td><td></td><td></td><td></td><td>-</td><td> </td><td></td><td></td><td></td><td></td><td>_</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>·  </td><td>_</td><td></td><td></td><td>-</td><td>P. palisadus</td></tr> <tr><td>P. pachypolus P. parus P. parus P. perus P. prodigus P</td><td></td><td>$\rightarrow$</td><td></td><td>-</td><td>╞</td><td></td><td></td><td>-</td><td></td><td></td><td>-+</td><td>_</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>$\rightarrow$</td><td></td><td></td><td></td><td>^</td><td></td><td>-</td><td>P. plammelus</td></tr> <tr><td>P. plemmelus ? ?</td><td></td><td>-+</td><td></td><td></td><td>╞</td><td></td><td>$\rightarrow$</td><td></td><td></td><td></td><td><u>r</u></td><td></td><td> </td><td></td><td>$\rightarrow$</td><td>$\rightarrow$</td><td>$\rightarrow$</td><td></td><td></td><td>$\rightarrow$</td><td></td><td>$\rightarrow$</td><td></td><td></td><td></td><td>$\downarrow$</td><td>-k</td><td></td><td></td><td></td><td></td><td></td><td>P prodique</td></tr> <tr><td>P. prodigus</td><td></td><td>-+</td><td></td><td></td><td>$\vdash$</td><td></td><td>$\rightarrow$</td><td></td><td></td><td>$\leq$</td><td>$\leq$</td><td>+</td><td></td><td></td><td>$\rightarrow$</td><td>$\neq$</td><td>$\rightarrow$</td><td>-+</td><td>$\rightarrow$</td><td>4</td><td>$\rightarrow$</td><td>4</td><td>-k</td><td></td><td>$\rightarrow$</td><td>$\square$</td><td>-+</td><td></td><td></td><td></td><td></td><td>-</td><td>P pseudomoides</td></tr> <tr><td>P. pseudomoides</td><td></td><td>+</td><td></td><td></td><td>$\vdash$</td><td></td><td>-+</td><td>-+</td><td></td><td>$\leq$</td><td></td><td></td><td></td><td></td><td>-+</td><td>$\rightarrow$</td><td>-</td><td>+</td><td>$\sim$+</td><td></td><td>+</td><td></td><td></td><td></td><td>+</td><td>-+</td><td></td><td></td><td></td><td></td><td></td><td>+-</td><td>P. recavus</td></tr> |   |               | Ι            |            | T            |                  |                 |               |              |                                              |                |               |            |         |                 |                 |                |                 |               |               |                |               |               |                |                |                 |     |                |                |            | $\geq$ | T             |                     | P. catastus   P. demarcatus   P. magnus   P. polyoratus   P. velscus   P. velscus   P. velscus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. reticulosaccatus   P. vervuosus   P. vervuosus   P. esobalteus   P. esobalteus   P. advenanthoides   (Prot.)   P. advenanthoides   P. delinatus   P. delinatus |  |  | Ļ |  | T |  |  |  |  | L |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | P. demarcatus   P. magnus   P. polyroatus   P. vesicus   P. vesicus   P. densus   P. velosus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. verucosus   P. verucosus   P. reticulatus   P. reticulatus   P. reticulatus   P. advanthoides   (Prot.)   P. advanthoides   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. alperopolus   P. delinai   P. delinai   P. delinai   P. delinai   P. delinai   P. delinais   P. delinais |  |  | $\perp$ |  | 1 | ļ |  | _ | 1 |  |  |  | 1_ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | P. megnus   P. polyoratus   P. densus   P. densus   P. densus   P. morganii/jubatus   P. mawsonii   P. mawsonii   P. mersus   P. mersus   P. mersus   P. reticulosacatus   P. reticulatus   P. adapticatus   P. clarus   P. clarus   P. clarus   P. clarus   P. clarus   P. clarus   P. delicatus   P. delicatus   P. delicatus   P. delicatus   P. delicatus   P. delicatus |  |  | $\downarrow$ |  | 1 |  |  |  | 4 | ļ |  |  | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | P. polyoratus   P. vesicus   P. densus   P. welosus   P. welosus   P. welosus   P. morganii/jubatus   P. mawsonii   P. mawsonii   P. reticulosaccatus   P. angotonii   P. reticulatus   P. angotonii   P. angotoniii   P. ang |  |  | 1 |  | $\downarrow$ |  |  |  | + | ļ |  |  | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 4 |  | P. vesicus   P. densus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. reticulosaccatus   P. reticulosaccatus   P. vervocous   P. vervocous   P. vervocous   P. vervocous   P. reticulatus   P. reticulatus   P. reticulatus   P. reticulatus   P. reticulatus   P. reticulatus   P. anglosk   P. anglosk   P. anglosk   P. anglosk   P. anglosk   P. deinartus   P. doinei   P. formosus   P. dorus   P. formosus |  |  | + |  | + |  |  |  | + |  |  |  | + |  |  |  |  |  |  |  |  |  |  |  | $\rightarrow$ |  |  |  |  |  |  | + |  | P. densus   P. welosus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. reticulosaccatus   P. reticulatus   P. reticulatus   P. varus   P. varus   P. varus   P. adenanthoides   (Prot.)   P. adenanthoides   P. angulatus   P. angulatus   P. angulatus   P. biornatus   P. clarus   P. clarus   P. clarus   P. darus   P. delicatus   P. delicatus |  |  | +- |  | + |  |  |  | + |  |  | -+ | + |  | $\leq$ |  |  |  | $\leq$ |  |  |  |  |  |  | - |  |  |  |  |  |  |  | P. velosus   P. morganii/jubatus   P. mawsonii   P. mawsonii   P. reticulosaccatus   P. verucosus   P. crescentis   P. esobalteus   P. akenalthoides   (Prot.)   P. alveolatus   P. alveolatus   P. anularis   P. aperopolus   P. biornatus   P. clarus   P. clarus   P. confragosus   P. delicatus   P. formosus   P. formosus   P. formosus   P. formosus   P. formosus   P. grandis |  |  | + |  | + |  |  | - | + |  | · |  | +- |  |  |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  | + |  | P. morganii/jubatus   P. mawsonii   P. mawsonii   P. reticulosecatus   P. verusous   P. esobalteus   P. esobalteus   P. langstonii   P. reticulatus   P. simplex   P. simplex   P. advanthoides   (Prot.)   P. advolatus   P. anolosexinus   P. anolosexinus   P. anolosexinus   P. biornatus   P. biornatus   P. cleinei   P. cleinei   P. cleinei   P. delicatus   P. formosus   P. formosus   P. formosus   P. grandis |  |  | +- |  | ┿ |  |  |  | + |  |  |  | + |  |  |  | $\leq$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  | + |  | P. mawsonii   P. reticulosaccatus   P. verucosus   P. verucosus   P. druss   P. anglatus   P. angulatus   P. darus   P. confragosus   P. delinei   P. delinei <td></td> <td></td> <td>+</td> <td></td> <td>╈</td> <td></td> <td></td> <td></td> <td>+</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td><u> </u></td> <td></td> <td></td> <td></td> <td>—</td> <td></td> <td>-+-</td> <td></td> |  |  | + |  | ╈ |  |  |  | + |  |  |  |  |  |  |  | <u> </u> |  |  |  | — |  |  |  |  |  |  |  |  |  |  | -+- |  | P. verucosus   P. crescentis   P. esobalteus   P. hangstonii   P. teiculatus   P. simplex   P. varus   P. varus   P. adenanthoides   (Prot.)   P. advolatus   P. angulatus   P. angulatus   P. angulatus   P. asperopolus   P. cleinei   P. cleinei   P. confragosus   P. delicatus   P. delicatus   P. formosus   P. formosus |  |  | + |  | + |  | _ | - |  |  |  |  | + |  | / | $\nearrow$ | $\geq$ |  | $\geq$ | $\nearrow$ | $\nearrow$ |  |  | $\geq$ | $\geq$ |  |  |  | $\geq$ |  |  | + |  | P. verucosus   P. crescentis   P. esobalteus   P. hangstonii   P. teiculatus   P. simplex   P. varus   P. varus   P. adenanthoides   (Prot.)   P. advolatus   P. angulatus   P. angulatus   P. angulatus   P. asperopolus   P. cleinei   P. cleinei   P. confragosus   P. delicatus   P. delicatus   P. formosus   P. formosus |  |  | 1- | _ | $\uparrow$ |  |  | - | 1 |  | c |  | + |  |  |  |  |  |  |  |  | - |  |  |  | Ť |  |  |  |  |  | T | P. reticulosaccatus | P. esobalteus   P. langstonii   P. reticulatus   P. reticulatus   P. simplex   P. varus   P. adenanthoides   (Prot.)   P. adveolatus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. appropolus   P. clarus   P. confragosus   P. deliceitus   P. formosus   P. formosus   P. formosus   P. grandis |  |  | $\mathbf{T}$ | _ | + |  |  | - | + |  |  | - | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | + |  | P. langstonii   P. reticulatus   P. simplex   P. varus   P. adenanthoides   (Prot.)   P. adenanthoides   P. adenanthoides   P. adenanthoides   P. adenanthoides   P. amolastinus   P. annularis   P. annularis   P. asperopolus   P. biornatus   P. clarus   P. clarus   P. clarus   P. clarus   P. clarus   P. clarus   P. confragosus   P. delicatus   P. formosus   P. formosus   P. grandis |  |  |  |  | T |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | P. crescentis | P. reticulatus   P. simplex   P. varus   P. adenanthoides (Prot.)   P. adenanthoides (Prot.)   P. adenanthoides (Prot.)   P. adveolatus   P. amolosexinus   P. amolosexinus   P. angulatus   P. asperopolus   P. biornatus   P. clarus   P. confragosus   P. delicatus   P. formosus   P. formosus   P. grandis |  |  |  |  | Ι |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $\land$ |  |  |  |  |  |  |  |  |  |  |  | P. simplex   P. varus   P. adenanthoides   (Prot.1   P. alveolatus   P. anolosexinus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. asperopolus   P. biornatus   P. clarus   P. clarus   P. confragosus   P. delicatus   P. formosus   P. formosus   P. grandis |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | P. varus   P. adenanthoides   (Prot.)   P. alveolatus   P. anolosexinus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. asperopolus   P. biornatus   P. clarus   P. confragosus   P. delicatus   P. formosus   P. grandis |  |  | $\bot$ |  | $\perp$ |  |  |  |  |  |  | _ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | P. adenanthoides (Prot.)   P. alveolatus •   P. amolosexinus •   P. angulatus •   P. angulatus •   P. angulatus •   P. angulatus •   P. asperopolus •   P. biornatus •   P. clarus •   P. clarus •   P. clarus •   P. cleinei •   P. delicatus •   P. formosus •   P. grandis • |  |  | – |  | + |  | $\rightarrow$ | _ |  |  |  |  | + |  |  |  |  |  |  |  |  |  |  |  |  |  | _ |  |  |  |  | - |  | P. alveolatus   P. amolosexinus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. asperopolus   P. asperopolus   P. biornatus   P. clarus   P. clarus   P. cleinei   P. confragosus   P. delicatus   P. delicatus   P. formosus   P. grandis |  |  | ┢ |  | + |  | $\leq$ | $\rightarrow$ |  |  |  |  | + |  |  | - |  | _ | -> |  | $\rightarrow$ |  |  |  | - | - | _ |  |  |  |  |  |  | P. amolosexinus   P. angulatus   P. angulatus   P. annularis   P. asperopolus   P. biornatus   P. clarus   P. confragosus   P. crassis   P. delicatus   P. formosus   P. grandis |  |  | ┝ |  | + |  |  | -+ | K | <u> </u> |  |  | + |  | $\leq$ | $\leq$ | $\leq$ | $\leq$ | $\leq$ |  | $ \rightarrow$ |  |  |  | $\leq$ | $ \rightarrow$ | + | + |  |  |  |  | P. alugalatura | P. angulatus |  |  | + |  | + |  |  | -+ | - |  |  | + | + |  |  |  |  |  | + |  |  |  |  |  |  |  |  |  |  |  |  | ╉ | P amolosovinus | P. asperopolus   P. biornatus   P. clarus   P. cleinei   P. confragosus   P. confragosus   P. cleinei   P. confragosus   P. confragosus   P. chicatus   P. delicatus   P. formosus   P. grandis |  |  | + |  | + |  |  | -+ |  |  |  | -+ | + |  |  |  | - |  |  |  |  |  | - |  |  |  |  |  |  |  |  | - | P angulatus | P. asperopolus   P. biornatus   P. clarus   P. clarus   P. cleinei   P. confragosus   P. crassis   P. delicatus   P. formosus   P. grandis |  |  | $\vdash$ |  | + |  |  | + | + | 7 | 1 | -+ |  |  | 7 |  |  | 7 | $\nearrow$ | オ | 7 | -+ |  |  | $\nearrow$ |  |  |  | $\nearrow$ |  |  | 1 | P. annularis | P. biornatus   P. clarus   P. cleinei   P. confragosus   P. confragosus   P. crassis   P. delicatus   P. formosus   P. grandis |  |  | $\vdash$ |  | + |  |  | + |  |  | - |  | + |  |  | - |  |  | _ | - | - | - |  |  |  | - | - |  | $\mathbf{T}$ | / |  |  |  | P. clarus   P. cleinei   P. confragosus   P. confragosus   P. crassis   P. delicatus   P. formosus   P. grandis |  |  | F |  | $\uparrow$ | •• |  | 1 | $\square$ |  |  | -+ | + |  |  |  |  |  |  | -+ | $\neg$ | $\nearrow$ |  | $\nearrow$ | $\geq$ |  |  |  |  | † |  |  | P. biornatus | P. contragosus P. crassis P. delicatus P. formosus P. grandis P. grandis |  |  | Γ |  | T |  |  |  | L |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1 | P. clarus | P. contragosus P. crassis P. delicatus P. formosus P. grandis P. grandis |  |  |  |  | Γ |  |  |  |  |  |  |  |  |  |  |  |  | - | - |  |  |  |  |  |  |  |  |  |  |  |  |  | P. cleinei | P. delicatus P. formosus P. grandis P. grandis |  |  |  |  | L |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $\square$ |  |  |  |  |  |  |  |  |  |  | P. contragosus | P. formosus<br>P. grandis |  |  | $\vdash$ | _ | Ļ |  |  | _ | ļ |  |  |  | 1_ |  |  | 4 |  |  |  |  | [ |  |  |  | 4 | $ \rightarrow $ | _ |  |  |  |  | 4 | P. crassis | P. grandis |  |  | ┣ |  | + |  |  |  | <b> </b> |  |  |  | + |  | _+ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | – |  | +- |  |  | _ |  |  | $\rightarrow$ | $\rightarrow$ |  |  | $\rightarrow$ |  | $\rightarrow$ | $\rightarrow$ |  | + |  |  |  |  |  | ┣ | _ | + |  |  | -+- |  | _ | $\leq$ | -+ | K | $\leq$ | $ \rightarrow$ | $\leq$ | <b>A</b> | A | A | A | A | $\leq$ | $\leq$ | $ \rightarrow$ | $ \rightarrow$ |  |  | $ \rightarrow$ | $ \rightarrow$ |  |  | <b>A</b> | i granano |  |  |  |  |  | ┢ | -> |  |  |  | <u> </u> | $\rightarrow$ | -+- | - |  | $\rightarrow$ |  | $\rightarrow$ |  |  |  | $\rightarrow$ |  |  |  |  |  |  |  |  |  |  |  | P. grevillaensis | P. incurvatus P. intricatus |  | -+ | - |  | + |  |  | + |  | <u> </u> | $ \rightarrow$ | + | + |  | $ \rightarrow$ | -+ | $ \rightarrow$ | + |  |  |  | -+- | + |  |  |  |  |  |  |  | -+ | • | P. intricatus | P. kopiensis | + | $\dashv$ |  | + | + |  | + | -+- |  | - | -+ |  | + |  | + |  | -+ |  |  | -+ |  |  |  | -+ |  |  | -+ |  |  |  | -+ | - | P. kopiensis | P. lapis |  |  |  |  | + |  | -+ | オ | 17 | 7 |  | -+- | + |  | -+ | $\nearrow$ |  |  | $\nearrow$ |  |  |  |  |  | ? |  | -+ |  |  |  | -+ | • |  | P. latrobensis | + | $\rightarrow$ | <u> </u> | $\uparrow$ | + |  | $\neg \uparrow$ |  | r |  | -† |  | † |  |  | + | * | + |  |  |  |  |  |  | •+ | - |  |  |  |  | -+ |  |  | P. leightonii ? |  | -+ | <u> </u> | $\neg$ | $\uparrow$ |  | + | + |  |  | ? | + | 1 |  | $\nearrow$ |  |  | + |  |  | - |  |  | $\nearrow$ |  | ? |  |  |  | $\uparrow$ | -+ | • | P. leightonii | P. obesolabrus |  |  | L |  | Γ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | P. obesolabrus | P. obscurus |  |  | Ē |  | Γ |  |  | Ι |  |  |  | T |  |  |  |  |  | $\triangleleft$ |  |  |  |  |  |  |  |  |  |  |  |  |  | • | P. obscurus | P. ornatus |  |  |  |  | Γ |  |  |  |  |  | ? |  |  |  | T |  | Τ |  |  | ef. |  |  |  |  |  |  |  |  |  |  | Τ | • | P. ornatus | P. otwayensis |  |  |  |  | F |  |  | T |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | -<br>- | P. otwayensis | P. pachypolus |  |  | - |  | $\bot$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 4 |  |  | • | P. pachypolus | P. palisadus |  |  |  | _ | Ļ | ] |  | 1 |  |  |  | - |  |  |  |  |  | _ |  |  |  |  |  |  |  |  |  | · | _ |  |  | - | P. palisadus | P. pachypolus P. parus P. parus P. perus P. prodigus P |  | $\rightarrow$ |  | - | ╞ |  |  | - |  |  | -+ | _ |  |  |  |  |  |  |  |  |  |  |  |  |  | $\rightarrow$ |  |  |  | ^ |  | - | P. plammelus | P. plemmelus ? 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| P. catastus   P. demarcatus   P. magnus   P. polyoratus   P. velscus   P. velscus   P. velscus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. reticulosaccatus   P. vervuosus   P. vervuosus   P. esobalteus   P. esobalteus   P. advenanthoides   (Prot.)   P. advenanthoides   P. delinatus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| P. demarcatus   P. magnus   P. polyroatus   P. vesicus   P. vesicus   P. densus   P. velosus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. verucosus   P. verucosus   P. reticulatus   P. reticulatus   P. reticulatus   P. advanthoides   (Prot.)   P. advanthoides   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. alperopolus   P. delinai   P. delinai   P. delinai   P. delinai   P. delinai   P. delinais                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| P. megnus   P. polyoratus   P. densus   P. densus   P. densus   P. morganii/jubatus   P. mawsonii   P. mawsonii   P. mersus   P. mersus   P. mersus   P. reticulosacatus   P. reticulatus   P. adapticatus   P. clarus   P. clarus   P. clarus   P. clarus   P. clarus   P. clarus   P. delicatus   P. delicatus   P. delicatus   P. delicatus   P. delicatus   P. delicatus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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| P. densus   P. welosus   P. morganii/jubatus   P. morganii/jubatus   P. morganii/jubatus   P. reticulosaccatus   P. reticulatus   P. reticulatus   P. varus   P. varus   P. varus   P. adenanthoides   (Prot.)   P. adenanthoides   P. angulatus   P. angulatus   P. angulatus   P. biornatus   P. clarus   P. clarus   P. clarus   P. darus   P. delicatus   P. delicatus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| P. velosus   P. morganii/jubatus   P. mawsonii   P. mawsonii   P. reticulosaccatus   P. verucosus   P. crescentis   P. esobalteus   P. akenalthoides   (Prot.)   P. alveolatus   P. alveolatus   P. anularis   P. aperopolus   P. biornatus   P. clarus   P. clarus   P. confragosus   P. delicatus   P. formosus   P. formosus   P. formosus   P. formosus   P. formosus   P. grandis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| P. morganii/jubatus   P. mawsonii   P. mawsonii   P. reticulosecatus   P. verusous   P. esobalteus   P. esobalteus   P. langstonii   P. reticulatus   P. simplex   P. simplex   P. advanthoides   (Prot.)   P. advolatus   P. anolosexinus   P. anolosexinus   P. anolosexinus   P. biornatus   P. biornatus   P. cleinei   P. cleinei   P. cleinei   P. delicatus   P. formosus   P. formosus   P. formosus   P. grandis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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| P. verucosus   P. crescentis   P. esobalteus   P. hangstonii   P. teiculatus   P. simplex   P. varus   P. varus   P. adenanthoides   (Prot.)   P. advolatus   P. angulatus   P. angulatus   P. angulatus   P. asperopolus   P. cleinei   P. cleinei   P. confragosus   P. delicatus   P. delicatus   P. formosus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| P. verucosus   P. crescentis   P. esobalteus   P. hangstonii   P. teiculatus   P. simplex   P. varus   P. varus   P. adenanthoides   (Prot.)   P. advolatus   P. angulatus   P. angulatus   P. angulatus   P. asperopolus   P. cleinei   P. cleinei   P. confragosus   P. delicatus   P. delicatus   P. formosus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| P. esobalteus   P. langstonii   P. reticulatus   P. reticulatus   P. simplex   P. varus   P. adenanthoides   (Prot.)   P. adveolatus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. appropolus   P. clarus   P. confragosus   P. deliceitus   P. formosus   P. formosus   P. formosus   P. grandis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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| P. langstonii   P. reticulatus   P. simplex   P. varus   P. adenanthoides   (Prot.)   P. adenanthoides   P. adenanthoides   P. adenanthoides   P. adenanthoides   P. amolastinus   P. annularis   P. annularis   P. asperopolus   P. biornatus   P. clarus   P. clarus   P. clarus   P. clarus   P. clarus   P. clarus   P. confragosus   P. delicatus   P. formosus   P. formosus   P. grandis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| P. reticulatus   P. simplex   P. varus   P. adenanthoides (Prot.)   P. adenanthoides (Prot.)   P. adenanthoides (Prot.)   P. adveolatus   P. amolosexinus   P. amolosexinus   P. angulatus   P. asperopolus   P. biornatus   P. clarus   P. confragosus   P. delicatus   P. formosus   P. formosus   P. grandis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| P. simplex   P. varus   P. adenanthoides   (Prot.1   P. alveolatus   P. anolosexinus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. asperopolus   P. biornatus   P. clarus   P. clarus   P. confragosus   P. delicatus   P. formosus   P. formosus   P. grandis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| P. varus   P. adenanthoides   (Prot.)   P. alveolatus   P. anolosexinus   P. angulatus   P. angulatus   P. angulatus   P. angulatus   P. asperopolus   P. biornatus   P. clarus   P. confragosus   P. delicatus   P. formosus   P. grandis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| P. biornatus   P. clarus   P. cleinei   P. confragosus   P. confragosus   P. crassis   P. delicatus   P. formosus   P. grandis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| P. clarus   P. cleinei   P. confragosus   P. confragosus   P. crassis   P. delicatus   P. formosus   P. grandis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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           |  |  |               |  |               |  |  |  |                |    |  |  |  |  |  |            |             |  |    |  |  |          |  |               |  |  |        |        |   |  |  |                 |        |                |    |               |   |               |   |    |  |               |           |    |  |  |  |  |   |                |                 |  |   |  |  |          |  |    |    |  |        |  |  |  |  |    |                 |   |   |          |  |   |  |  |  |   |    |  |  |  |  |  |    |            |

*C=core; S=sidewall core; T = cuttings.

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Well NameFORTE												Basi	n			LAND					snee	t N	0. 3	0		 	
SAMPLE TYPE *	υ	N	N	U	S	υ	U	Ŋ	υ	S	S	S	S	S	S	N	S	S	S	S	s N	S	S	N	S	 	ł
DEPTHS	1	67	33	10	l6.3	16.5	2451.4	52.5	56.8		32	35	37.7	fo	57.2	2560.8	58.2	1	13.2	76	35	6	05.5	10.5	5		
LYNOMORPHS	2417	2429	2433	2440	2446.	2446.	245	2452.	2456.	2476.	2532	2535	2537.	2540	2557.	256	2568.	2571	2573.	2576	2585	2589	260	2610.	2615		
P. rectomarginis	1	ļ																								 	_
P. reflexus	<u> </u>	<u> </u>		<u> </u>																		<u> </u>		<b> </b>		 	_
P. reticulatus P. reticuloconcavus																					┼──					 	1
P. reticuloconcavus P. reticuloscabratus P. regulatus P. scitus P. stipplatus P. tenuiexinus				_										$\geq$													-
P. rugulatus		ļ																			ļ			<u> </u>			_
P. scitus P. stipplatus	<b> </b>																							<b> </b>		 	_
P. tenuiexinus																						2		17		 	-
P. truncatus				<u> </u>			r-				<u> </u>									<u> </u>	<b>F</b> -	ľ		ŕ			-
P. tuberculatus																											
P. tuberculiformis P. tuberculotumulatus								~ .																<u> </u>		 	_
		<u> </u>																								 	-
P. xestoformis (Prot.) O. brossus	$\vdash$	-																					-			 	-
R. boxatus	[			-																							
R. stellatus						<b></b> ,							A	A								ļ.,		Ļ			_
R. mallatus R. trophus												$\square$	$\leq$			$\vdash$						$\vdash$	$\vdash$	$\vdash$	<b> </b>	 	-
S. cainozoicus																						<u> </u>				 	-
S. rotundus	1																										
S. digitatoides																											_
S. marlinensis	1																				ļ		ļ			 ļ	
S. rarus S. meridianus													$\leq$													 	-
S. prominatus				<u> </u>		_	$\sim$				$\sim$			_							17	7	2	K-		 	-
S. uvatus																					r	r	r				-
S. punctatus													$\angle$														
S. regium																										 	_
T. multistrixus (CP4)										4					$\leq$		$\leq$									 	-
T. textus T. verrucosus												$\sim$			<u> </u>												-
T. securus																											
T. confessus (C3)																				L	ļ					 	_
T. gillii							$\leq$													<u> </u>						 	-
T. incisus T. longus																								<u> </u>		 	-
T. phillipsii										_					7												1
T. renmarkensis																										 	
T. sabulosus																					 					 	_
T. simatus														_									· · ·			 	-
T. thomasii T. waiparaensis			——																							 	1
T. adelaidensis (CP3)		<u> </u>				/				$\nearrow$					$\geq$												-
T. angurium				[																						 	1
T. delicatus																										 	+
T. geraniodes T. leuros											_													-		 	+
T. lilliei													44 1											<u> </u>		 	+
T. marginatus													•														
T. moultonii																]	]					$\leq$				 	_
T. paenestriatus						$\leq$								$\leq$												 	4
T. retequetrus T. scabratus																										 	-
T. scabratus T. sphaerica										$\nearrow$																	
T. magnificus (P3)																											
T. spinosus								]																		 	
T. ambiguus T. chnosus														_												 	4
T. helosus																										 	-
T. scabratus																											j
T. sectilis																											1
V. attinatus												]														 	_
V. cristatus													$\rightarrow$	$\rightarrow$	$\rightarrow$											 	-
V. kopukuensis	$\left  - \right $					$\leq$						-+	$ \rightarrow$	$ \rightarrow$	$\neg$											 	-
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*C=core; S=sidewall core; T=cuttings.

Well Name _____FORTESCUE-3

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Sheet No. 4_of 4___

Well Name PORTESU			•									Basi	n							5	hee.	t No	0. 또	0	1 4			
SAMPLE TYPE *		5	5		5	C	0	N N	0	S	N N	S	S	S	S	2	5	S	S	S	S	S	S	_ ∽	9			
$\sim$	┢──				1	<u> </u>		<u> </u>	t								-											
DEPTHS					2446.3	L	. <del>.</del>	2	2456.8	2476.5			2537.7		2557.2	2560.8	2568.2		3.2				2605.5	0.5				
	2417	2429		2440	146		151	152	156	476	2532	2535	537	2540	557	560	568	2571	2573.	2576	586	2589	60	2610.	2615			1
PALYNOMORPHS	2	2	2	5	2	ç	ĥ	~	5	Š	i5	تہ	is.	5	5	ন	3	2	ίλ	2	~	~	Ñ	~	2			
APICAL					1																							
Calig. amiculum	$\square$																							ļ				
G. retiintexta *						$\square$	L,		L		ļ																	L
Hyst. rigaudae			$\swarrow$	]	L		$\swarrow$	<u> </u>				L															L	<u> </u>
H. varispinosum ms.				ļ																								L
Hyst. tubiferum *									I															ļ				ļ
System. placacantha		$\sim$	]		L		L													$\leq$			ļ		L			<b> </b>
					L	ļ	·		L													L	L					ļ
INTERCALARY	Ļ	ļ	ļ	ļ	ļ						ļ											L						ł
	I	L	ļ																					ļ				<u> </u>
Apecto. homomorpha * (1.sp	$\mu$										ļ															L	<u>├</u>	<b> </b>
A. homomorpha (sh. sp)		ļ			· ·	$\leq$		$\sim$	$\angle$	A													$\sim$					<b>i</b>
A. hyperacantha	[																							Ļ				i
D. flounderensis	L	L		$\swarrow$	1					L.,	ļ,															L		₋
D. dartmooria	<u> </u>		<u> </u>		ļ				<b>.</b>	A	$\swarrow$	A	cf.	$\square$									ļ			<u> </u>	L	<b> </b>
D. pachyceros (sh. h).						ļ																	-	L				<b> </b>
Palae. australinum								ļ				A												ļ			ļ	ļ
Spinidinium spp.		ļ				$\swarrow$	$\swarrow$	$\swarrow$	$\checkmark$					ļ														 
					L											]											ļ	<u> </u>
PRECINGULAR												1		L										ļ			ļ	
																											ļ	<b> </b>
Achom. alcicornu	$\mathbb{Z}$	L																									Ļ	I
Apteo. australiense						$\mathbb{Z}$									]							l	Ļ.,					
C. inodes *		ļ				$\swarrow$																					 	
Dinosph. mamilatus		2	1																					ļ			ļ	
Impagidinium spp.																		]									ļ	ļ
Lingu. machaerophorum *																							L				ļ	L
Nemat. balcombiana *	$\overline{Z}$		$\square$																					L				
Operculod. centrocarpum *	$\mathbb{Z}$	$\geq$	$\geq$																	$\angle$			$\angle$	ļ				L
o israelianum	$\nabla$					·												]										
Pent. laticinctum *																								L	L		ļ	L
P. simplex ms.																												L
Pyxid. pontus ms.	$\checkmark$																											1
S. ramosus *		/	$\mathbb{Z}$			$\mathbb{Z}$			$\mathbb{Z}$			A	Ζ	$\sim$										ļ	$\triangleleft$		ļ	L
T. scabroellipticus																											ļ	Ļ
T. peligica *										$\geq$																	<u> </u>	L
Tubio. filosa.						$\mathbb{Z}$	Ζ									]	]										ļ	
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COMBINATION																										ļ		ļ
																											L	ļ.
Hemic. zoharyi *																											L	į
7																												Ĺ
ACRITARCHS																												Γ.
				T																								1_
Cyclop. vieta																												Į
Paral. indentata								$\mathbb{Z}$									[		]	[]		]	$\swarrow$		L			I
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*C=core; S=sidewall core; T = cuttings.

## TABLE - 1

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#### SUMMARY OF PALEONOLOGICAL ANALYSIS, FORTESCUE-3, GIPPSLAND BASIN

SAMPLE	DEPTH (m)	DEPTH(ft)	ZONE	AGE	CONFIDENCE RATING	YIELD	DIVERSITY	COMMENTS
		2000		· · ·	2	M. J	Malanaha	
CORE 5	2417	7930	P. tuberculatus	Oligocene	0	Moderate	Moderate	C. annulatus present
SWC 27	2429	7969	P. tuberculatus	Oligocene	0	Moderate	High	C. annulatus present
SWC 26	2433	7982	P. tuberculatus	Oligocene	2.	High	Very high	Reworked P.asperopolus zone fossils
CORE 6	243 <b>7 *</b>	7995	Middle <u>M. diversus</u>	Early Eocene	2	Fair	Low	P.grandis, Defl. flounderensis
SWC 24	2446.3	8026	Indeterminate			Barren	Barren	
CORE 6	2443.5 *	8017	Middle M. diversus	Early Eocene	1	High	Very High	P. plemmelus present
CORE 6	2448.4 *	8033	Middle M. diversus	Early Eocene	2	High	Very High	<u>T. moultonii</u> present
SWC 23	2452.5	8046	Lower/Middle M.diver	sus " "	2	Moderate	Moderate	
CORE 7	2453.8 *	8050	Lower Middle M.diver	sus " "				
SWC 21	2476.5	8125	Lower M. diversus	Early Eocene	2	High	Moderate	Highest occurrence T. multistrixus
SWC 18	2532	8307	Lower M. diversus	Early Eocene	2	High	Moderate	
SWC 17	2535	8317	Lower M. diversus	Early Eocene	1	High	High	
SWC 16	2537.7	8326	Lower M. diversus	Early Eocene	1	High	High	
SWC 15	2540.5	8333	Lower M. diversus	Early Eocene	1	High	High	
SWC 13	2557.2	8390	Lower M. diversus	Early Eocene	1	High	High	
SWC 12	2560.8	8402	Lower M. diversus	Early Eocene	1	High	Moderate	
SWC 11	2568.2	8426	Lower M. diversus	Early Eocene	1	High	High	Reworked Paleocene and Early Cretac- eous fossils.
SWC 10	2571	8435	Lower M. diversus	Early Eocene	2	Moderate	Low	Coal
SWC 9	2573.2	8442	Lower M. diversus	Early Eocene	1	High	Low	Coal
SWC 8	2576	8451	Lower M. diversus	Early Eocene	1	High	Moderate	
SWC 7	2585	8481	Lower M. diversus	Early Eocene	1	High	High	S. prominatus present
SWC 6	2589	8494	Lower M. diversus	Early Eocene	1	Moderate	High	S. prominatus, A. hyperacantha preser
SWC 3	2605.5	8548	Lower M. diversus	Early Eocene	0	High	High	S. prominatus, A. hyperacantha preser
SWC 2	2610.5	8565	Upper L. balmei	Paleocene	õ	Moderate	High	A. hyperacantha present
SWC 1	2615	8579	(P. tuberculatus)	(Oligocene)	(1)	Moderate	Moderate	Mislabeled or mud contaminated SWC

*	NOTE CORRECTIONS TO CORE DEPTHS:	Labelled Depth	Ad	E-Log justed depth
	CORE-6	2440m	=	2437m
	CORE-6	2446.5m	=	2443.5m
	CORE-6	2451.4m	=	2448.4m
	CORE-7	2456.8m	=	2453.8m

.

# APPENDIX 5

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APPENDIX 5

APPENDIX 5

# LOG ANALYSIS

# WELL LOG ANALYSIS REPORT

Form R167 6/70 Page 1

OPERATOR ESSO AUSTRA	ALIA LTD.	well FORT	ESCUE-3	DATE 2/1/79
		STATE VICT	ORIA	ELEV. 31m KB
DEPTH INTERVAL	POROSITY ESTIMATE	WATER SAT. ESTIMATE		REMARKS
2433.0 - 2434.3 (1.3) $2434.3 - 2436.0 (1.7)$ $2436.0 - 2437.2 (0.8)$ $2437.2 - 2438.2 (1.0)$ $2438.2 - 2439.0 (0.8)$ $2439.0 - 2439.9 (0.9)$ $2439.9 - 2443.6 (3.7)$ $2443.6 - 2445.0 (1.8)$ $2445.0 - 2447.3 (2.3)$ $2448.0 - 2449.0 (1.0)$ $2449.5 - 2451.3 (1.8)$ $2451.3 - 2453.5 (2.2)$ $2453.5 - 2455.5 (2.0)$ $2455.5 - 2456.5 (1.0)$ $2455.5 - 2457.8 (1.3)$ $2457.8 - 2461.4 (3.6)$ $2461.4 - 2475.5 (14.1)$	$ \begin{array}{r} - \\ 14.1 - 15.0 \\ - \\ 19.7 - 20.0 \\ 24.0 \\ 22.0 \\ 21.3 - 22.0 \\ - \\ 20.0 \\ - \\ 20.0 \\ - \\ 21.5 - 22.0 \\ 13.0 \\ 17.0 - 18.0 \\ 14.8 - 15.0 \\ 20.0 \\ \end{array} $	42 - 28 15 12 13 - 31 - 29 46 41 56 100	Tight shale z Oil Productio Oil Productio Oil Productio Oil Productio Silty Shale. Silty Shale. Oil Productio Silty Shale. Silty Shale. Oil Productio	bly oil/gas productive. one. n. n. n. n.
RFT 2 2448.5m; Receiv RFT 3 2462.0m; Receiv RFT 4 2457.5m; Receiv RFT 5 2454.5m; Receiv	ed 0.5 litres o ed 19.0 litres f ed 19.0 litres f	il, 8.5 litre ormation water;	litres gas, brown	s filtrate. scum.
ATROBE I.B. add 3m to Electri	c log depths to t	ie into driller	s.	ISF-Sonic-MSFL FDC-CNL-GR
MMENTS:				

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3. Results computed on hand calculator.

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TO

# APPENDIX 6

APPENDIX 6

# VELOCITY SURVEY

### VELOCITY SURVEY

Well FORTESCUE-3

Basin ..... GIPPSLAND

#### INTRODUCTION

(3) Seismic Souce

Gas Pressures ..... Propane ... 50PSI.....

Gas Gun

Esso	personnel	K.	WOOD			• • • • • • • • • • • • •
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Supplied (1) Instruments

(2) Personnel

Seismic Observer
Marine Shooter G. ATKINSON
Dynamite
<u> </u>
(3) Licenced Shooting Boat
name
date loaded
date released
Agent
·····
amount of powderlbs
size of canslbs
number of cans
number of caps
number of boosters
struments
at

Personnel and Instrumen

assembled at .. boarded (rig). OCEAN DIGGER date. 19/12/78 date of survey. 20/12/78 casing depth....20" @ 225m, 13-3/8" @ 867m 

#### SURVEY PROCEDURE

	Weather: sea .2-3m at start, reduced to 1m during survey
4	rig movementslight
	rig noisemoderate
	Hydrophones: number three
	depth below sea level12.2 metres
	position . 2-1m above bottom of gas gun
	1- in moon pool
	Shot Positioning and Charges: marker buoys (number (distance (direction
	charge depth charge size metres number of shots charge size lbs. number of shotscharge size lbs. number of misfires
Gas gun	amount of powder usedlbs
Number of pops per	level:

amount of powder dumped .....lbs.

## Well-phone positioning :

Time:

T-bar	• • • • • • • • • • • • • • • • • • • •
number of depths	
first shot	0400 hours
last shot	0614 hours
rig time	2-5 hours
-	

RESULTS

Quality of	records ( good22 ( fair8 ( poor2 ( not used
Comparison with sonic	of Interval Times log /\average

#### CONCLUSION

Reliability of T-D curve .....FAIR

#### COMMENTS:

Had trouble positioning gun in 40 mph winds.

Tool began to slip at level 2452m due to arm not being able to lock into walls. Reduced slack on cable and was able to position the tool correctly.

	Shothole	information	:- Elevot	ion, Distanc	e 8 Direction from	Well	C.	ompan	v		Well			Eleva	tion Total	Depth				LOCATI	0 N
							ESSO	EXPL	ORATIO		TESCUE	2–3		(Derrick	Floor)	· T.A	coord AT:38023 NG:1480	16'02.	533 ¹¹		hip, Range County Area or Field GIPPSLAND <u>N SEA LEVEL BASIN</u>
ord Shotho m bar Numb	Time of Shot	Dgm	Ds	tus ti		rity Grade	Dgs	н	TAN I	Cos I	Tgs	∆sd	∆sd V	Tçd	Tgd Average	Dgd	$\Delta$ D gd	∆Tgd	Vi Interval Velocity	V a Average Velocity	Elevation Shothole Ae
	0400	880	12.2		.354	G	836.8	48	.0574	.9984	.353	.008		.361	.361	849	150	.050	2994	2349	De Ds Elevation Datum Plane
	0402	880	11		.354	F		81				11									Elevation Shot
1	0613	1030	11		.404	G	986.8	11	.0486	.9988	.404	11		.412	.412	999	- 150	.047	3186	2428	
2	0614	1030	11		.403	VP		11				11				ļ		.04/	5100	]	
9	0605	1180	11		.451	G	1136.8	3 111	.0422	.9991	.451	"		.459	.459	1149	- 150	.048	3121	2505	
0	0606	1180	11		.451	G		1				11				ļ		.040		ļ	S Dem Des
7	0600	1330	11		.499		1286.8		.0373	.9993	.499	11		.507	.507	1299	195	.054	3607	2564	
8	0602	1330	11		.499	G		11	ļ			11						.0.24			-
	0411	1525	"		.553	G		11	ļ	ļ		11					105	.031	3385	<b> </b>	
	0412	1525	"		.553	G	1481.8	3 ''	.0324	.9995	.553	"		.561	.561	1494		-0 <u>5</u>		2664	
	0413	1525	11		.553	G		11				"								ļ	Dom = Geophone depth measured from well elevation
5	0550	1630	-11		.584	G	1586.8		.0302	.9995	.584	"		.592	.592	1599	- 115	.033	3483	2702	Dgs = • • • shot •
6	0551	1630	"		.584	G		11			ļ	"				ļ		.055	1 2403	<b> </b>	Dgd = • • • • = • = • = • = • = • • • = • • • • • • • • • • • • • • • • • • • •
	0420	1745	11		.616	<u> </u>		"	ļ			"								ļ	Ds = Depth of shot
	0421	1745	"		.617		1701.8		.0282	.9996	.617	11		.625	.625	1714	150	.050	. 2999	2743	De = Shothole elevation to datum plane
	0422	1745	"		.618	G		11	ļ			11	·					.0.00	· 4333	ļ	H = Horizontal distance from well to shatpoint
3	0535	1895	11		.666	F		11	ļ			"					199	.063	3158	ļ	S = Straight line travel path from shat to well geopt
4	0537	1895	"		.667		1851.8		.0259	.9997	.667	"		.675	.675	1864	-1-122-		محتد	2762	Tus = Uphole time at shotpoint T = Observed time from shotpoint to well geophone.
	0433	2094	"		.731	G	ļ	11	ļ			"								ļ	tr = • • to reference geophone.
0	0434	2094	"		.730		2050.8		.0234	.9997	.730	"		.738	.738	2063	146	.051	2862	2796_	$\Delta e$ = Difference in elevation between well & shatpoint
1	0435	2094	11		.730	G	ļ	11	ļ			11				ļ			2002	<b> </b>	∆sd = 4. • • shot & dotum p
2	0445	2240	"		.781	F	ļ	11				"								ļ	$\Delta \mathfrak{sd} = D \mathfrak{s} - D \mathfrak{s}$
3	0446	2240	11	l	.781		2196.8	3	.0218	<b>.99</b> 98	.781	"		.789	.789	2209	193	.063	3063	2800	$Dgs = Dgm - Dst \Delta e; tan i = \frac{H}{Dgs}$
4	0447	2240	11		.781	F		11	<u> </u>		ļ	"				ļ			5005		Tas = cos i T= Vert, travel time from shot elev to geop
5	0455	2433	"		.844	G	ļ	11			L	11				ļ			1	1	$T_{gd} = T_{gs} \pm \frac{\Delta sd}{V} = m + e^{-s} datum plane =$
6	0456	2433	"		.843	G	2389.8		.0201	.9998	.844	11		.852	.852	2402	- 29	.009	3221	2820	$Dgd = Dgm - \Delta md$ $\Delta Dgd$
7	0457	2433	"		.844	G		11	<u> </u>	ļ	<u> </u>	"				ļ		.009			$V_{I} = \text{Interval velocity} = \frac{\Delta D g d}{\Delta T g d}$
8	0502	2462	"		.853	G	ļ	11	ļ		ļ	11									Va = Average * <u>D gd</u> T gd Surveyed by: <u>K.J. WOOd</u>
9	0503	2462	11		.853	<u> </u>	2418.8	3 "	.0198	.9998	.853	11		.861	.861	2431	156	.040	3899	2824	Surveyed by: K.J. Wood
0	0504	2462	"		.854		ļ		ļ							<b> </b>				ļ	Dote December 20, 1978
1	0522	2618	11		.893	G	ļ	"	l	ļ	ļ	11						1			Weathering Data :
2	0523	2618	11		.893	G	2574.8	8 "	.0186	.9998	.893	11		.901	.901	2587			<b>-</b> ,	2872	-
		1								<u> </u>	ļ	11				ļ				ļ	-
							ļ			ļ		<u>                                      </u>			l	<u> </u>				<b> </b>	Casing Record
			<b> </b>				<b> </b>			ļ	l	<b></b>						1		ļ	$-20''_{0}^{2}25m + 13^{3}/_{2} \cdot 0.867m$
		1					L	<u> </u>	<u> </u>	<u> </u>	1				L <u></u>	ــــــ		<u></u>	L	<u> </u>	20"@225m, 13 ³ /8 @867m Dwg 1107/09/
					÷													•			DWG 107 0P
					•																
																					•

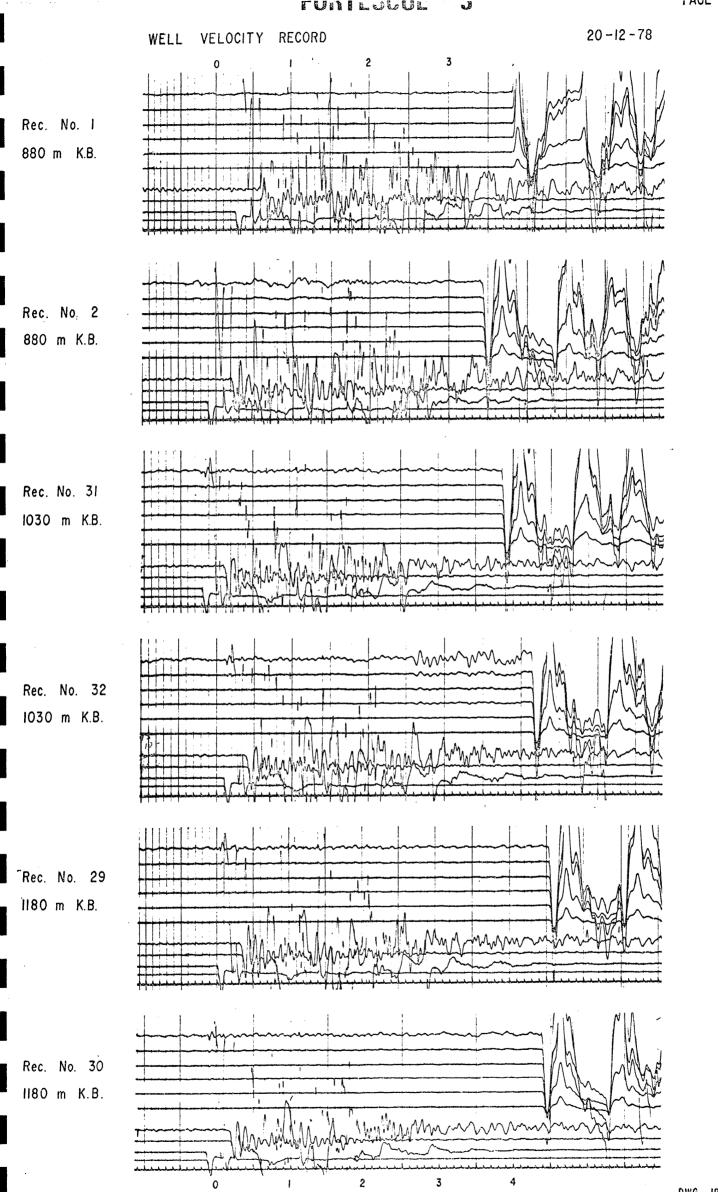
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FORTESCUE-3 VELOCITY SURVEY ERROR CHECK

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epth Rel. S.L.	Av. Vertical Travel Time (check shots)	Ti Check Shots (sec.)	Ti Sonic Log (scc.)	∆ (Millisecs.) Ti — Ti Sonic Check	Depth Interval (m)	Error (Microsec. per m)
849	.361					
999	.412	.051	.0485	-2.5	150	16.7
999	.412					
1149	.459	.047	.0475	.5	150	3.3
1149	.459					
1299	.507	.048	.0465	-1.5	150	10.0
1299	.507					
1494	.561	.054	.0545	.5	195	2.6
1494	.561					
1599	.592	.031	.030	-1	105	9.5
1599	.592					
1714	.625	.033	.033	0	115	-
1714	.625					
1864	.675	.050	.048	-2	150	13.3
1864	.675					
2063	.738	.063	.0635	.5	199	2.5
2063	.738					
2209	.789	.051	.050	-1	146	6.8
2209	.789					
2402	.852	.063	.063	0	193	-
2402	.852					
2431	.861	.009	.008	-1	29	34.5
2431	.861					
2587	.901	.040	.042	2	156	12.8
	-	-				
		an er angelen og de e ser en geven og der er de ser er de se				
		1				

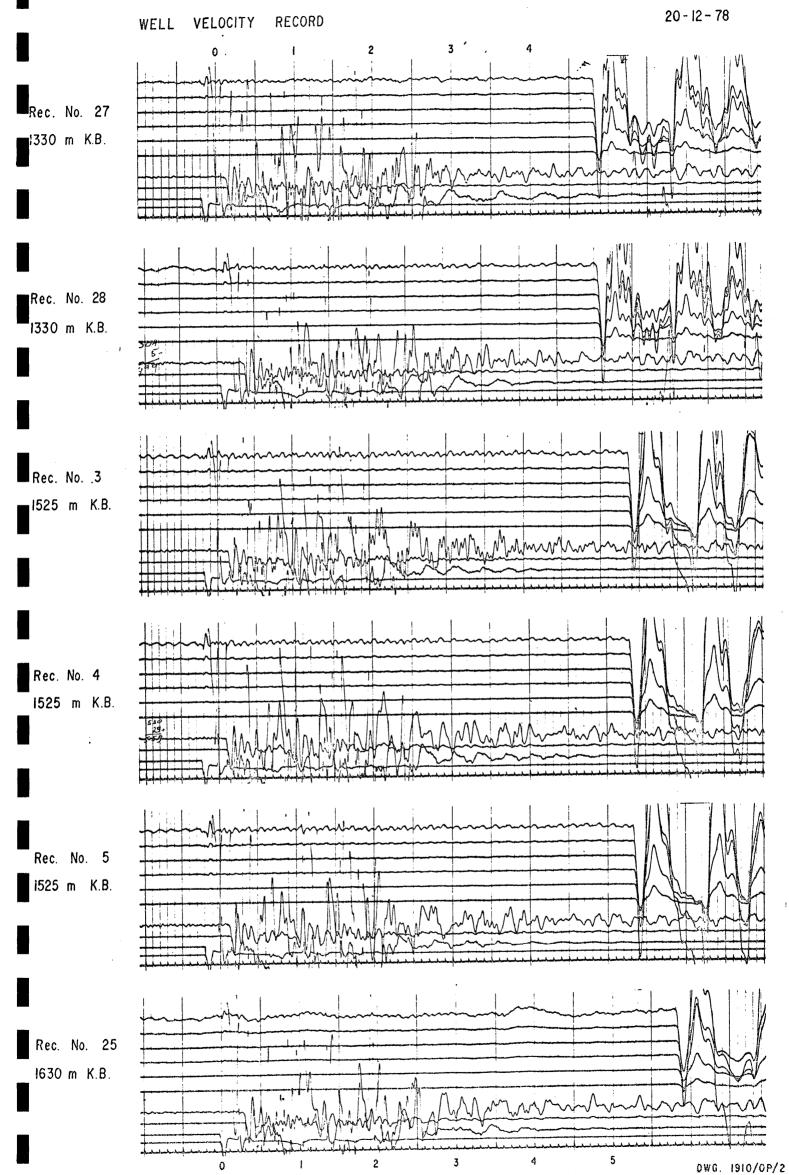


DWG. 1910/07/1

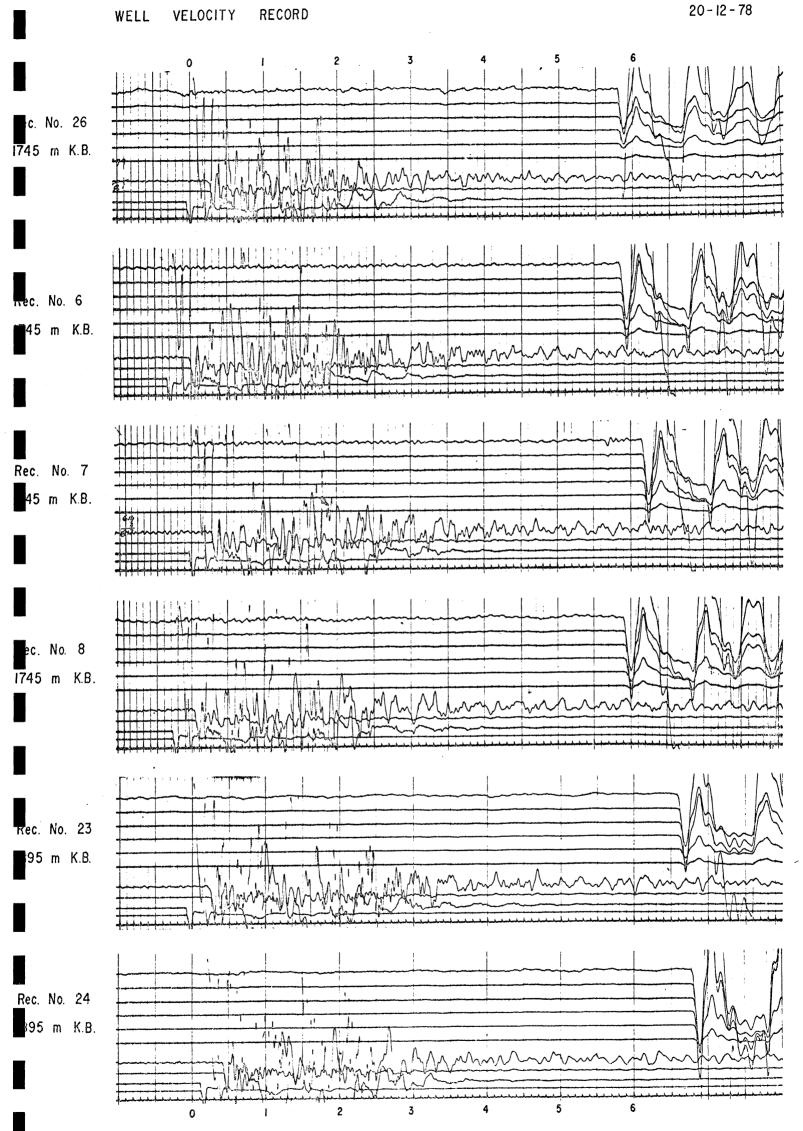
THUL I UI



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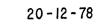
# FORTESCUE - 3

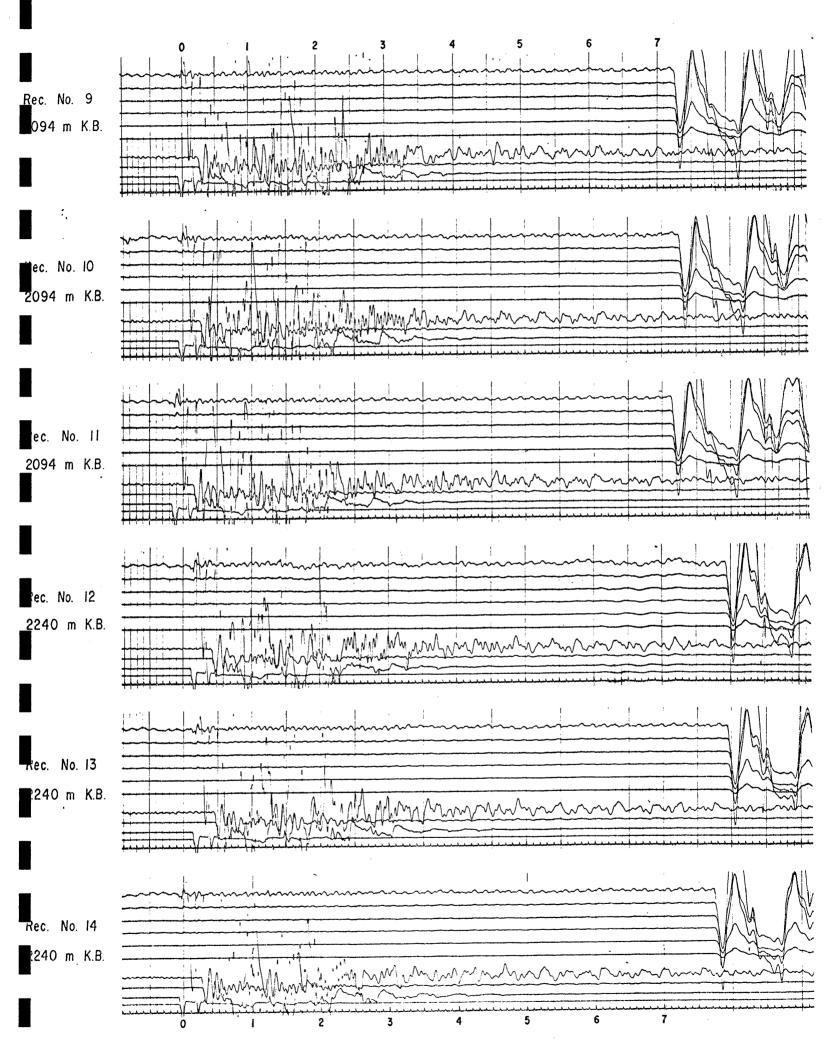


DWG. 1910/0P/3

FORTESCUE - 3

WELL VELOCITY RECORD





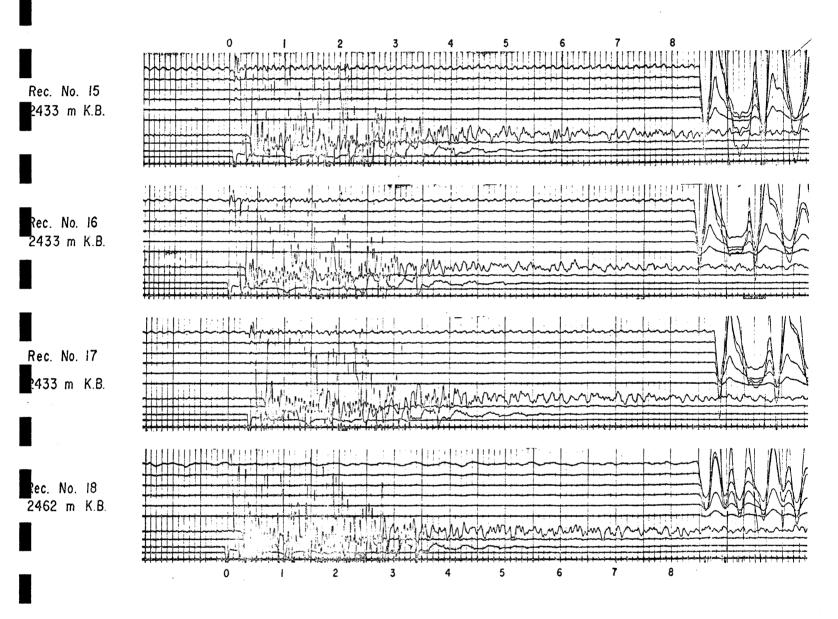
DWG. 1910/0P/4

PAGE 5 OF 6

FORTESCUE - 3

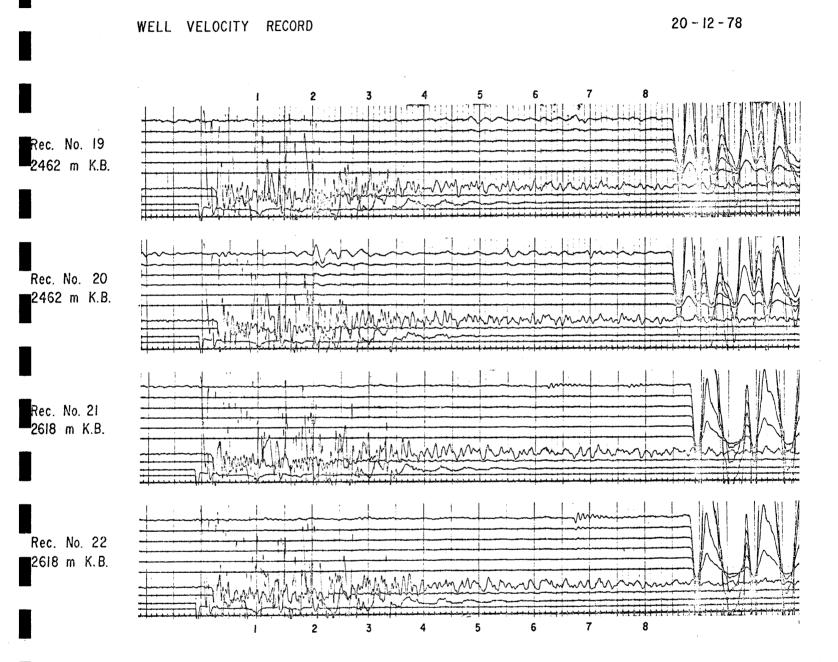
# WELL VELOCITY RECORD

20-12-78



PAGE 6 OF 6

FORTESCUE - 3



#### DWG. 1910/0P/6

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# APPENDIX 7

APPENUIX /

APPENDIX 7

## REPEAT FORMATION TESTER REPORTS

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PART 1

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		WELL:	and the first of the first of the second second	
<u>RUN #:</u>	1	GEOLOGIST/S:	J.D. ALDER, R.C.N. THORNTON	DATE: 21/12/78
			PRETESTS	
·	NO.	DEPTH	PRESSURE	REMARKS
SEAT #:	1	<u>2440.5</u> m	MPag	No test - port clogged?
SEAT #:	2	2440.5 m	MPag	
<u>SEAT #</u> :	4	2594.5 m	3570.84 Psig/ 24.62 MPag	
SEAT #:	5	m	3567.04 Psig/ 24.59 MPag	
SEAT #:	6	m	3556.08 Psig/ 24.52 MPag	
SEAT #:	7	<u>2578.5</u> m	3548.13 Psig/ 24.46 MPag	an a
SEAT #:	88	<u>2563.0</u> m	3529.66 Psig/ 24.34 MPag	
SEAT #:	99	<u>2554.0</u> m	3510.31 Psig/ 24.20 MPag	
SEAT #:	10	2547.0 m	3449.59 Psig/ MPag	
SEAT #:	11	m	<u> </u>	No seal.
		•	SAMPLES	· ·
		CHAMBER 1 ( 2	22.000 1.) <u>CH</u>	AMBER 2 ( 3.690 1.)
		SEAT. #: 3 I	DEPTH: 2440.0m SEAT #	t: 3 DEPTH:2440.0 m
Hydrosta	tic Initial	4022.00 Ps	sig/27.73 MPag	MPag
Pretest				MPag
Flowing 1	Press. Initia		MPag	MPag
Flowing 1	Press. Final		MPag	MPag
Sampling	Range	3148-3197 21.70-22		2282-2749 Psig/ 15.73-18.95 MPag
Final Sh	ut-in	3398.16 Ps	sig/23.43 MPag 3	3394.53 Psig/23.40 MPag
Hydrosta	tic Final		MPag 4	1017.97 Psig/27.70 MPag
Formation	n Press. (Ho:	rner) _3398.8 Psi	_g/23.43MPag	MPag
		. <u>.</u>	CEMPERATURE	•
Maximum 1	Recorded:	<u>190[°]F/ 88[°]C</u>	Time Since Circulat:	ion: <u> </u>
Depth Too	ol Reached:	2594.5	Circulation Stop	ped:Hrs
	Fo	ormation Temperatu	ire (Horner):	°c
			REMARKS	
Calibrat	ion Pressure	3400 Psig/ : 23.44 MH	Pag Calibration Tempo	erature: 73.9 °C
Hewlett-	Packard Gauge	e #: <u>319</u>		
Mud Weig	ht: <u>9.6ppg</u>	/ <u>1.15</u> S.G. Ca	alculated Hydrostatic:	: <u>3976 Psig/27.41</u> MPag
RFT Chok	e Size: 1	<u>x 0.020", with flo</u>	ow restrictor.	
	;	(Depths show	m are Log Depths)	

· .			RMATION TESTE		2
		_	ECORDING TIME:		
	CHAMBE	<u>R1</u> (22.	.000 1.)	<u>CHAMBER 2</u> ( 3.690	1.)
•	SEAT #:	<u> </u>	TH: 2440.0 m	<u>SEAT #: 3</u> <u>DEPTH</u>	24 <u>40.0</u> m
Tool Set:	(	01:39:54			
Pretest Open:	(	01:40:05	<u></u>		•
Time Open:		01:37	<u></u>		
Chamber Open:	(	01:42:42		02:11:47	
Chamber Full:	(	01:56:00	· · · · · · · · · · · · · · · · · · ·	02:12:56	
Fill Time:	·	13:18		01:09	
Start Build-up:	(	01:56:00		02:12:56	
Finish Build-up:	(	02:11:20		02:19:50	
Build-up Time:		15:20		06:54	
Seal Chamber:	(	02:11:20		02:19:50	
Tool Retract:				02:21:40	
Total Time:		31:26		09:53	· · · · · · · · · · · · · · · · · · ·
		·.	RECOVERY	•	
•					
•					
Surface Pressure:	80 Psig/(	0.5516	MPag	Segregator #3001	MPag
Gas:		206.7	1.	Not opened.	1
Oil:		16.1	1.		1
Water:	<b></b>	1.00	1.	<u> </u>	1
Others: Oil/Filtra	te emulsio		1.		1.
011/111010	<u></u>		PROPERTIES	· · · · · · · · · · · · · · · · · · ·	
•					
Gas Composition	Ter		· .		
the state of the s	<u>TOP</u> 640,000	MIDDLE	BOTTOM		
C ₁ (ppm)	040,000	694,612	602,181		
c ₂	109,350	121,500	115,920	, 	· ·
C				•	:
c ₃	109,575 35,325	<u>111,196</u> 35,985	103,770		
$iC_{4/nC_{4}}$	30,150	17,992	30,600		
c ₅	11,925	6,360	11,900		
				······································	
°6+	1,000	1,000	1,000		
C0 ₂ /H ₂ S		-	-		
Oil Properties	45	°API @	<u>16</u> °C	OAPI @	°.
Colour:		- " C ocolate bro			· · · · · · · · · · · · · · · · · · ·
Fluorescence:					
	<u>Bright</u> 0	greenish-ye	2 T T O M		
COR.	14			· · · · · · · · · · · · · · · · · · ·	
G.O.R.:					
Water Properties		Â	15 %	A	o
Water Properties Resistivity:	0.84	@	<u>15</u> °c	• • •	
Water Properties Resistivity: NaCl Equivalent:	0.84	,000	ppm		ppr
Water Properties Resistivity: NaCl Equivalent: Cl Titrated:	8 3	,000 ,900	ppm	<u>~ </u>	ppr
Water Properties Resistivity: NaCl Equivalent: Cl ⁻ Titrated: NO ₃ :	0.84 3 1!	,000 ,900 5-20	ppm	<u>A</u> @	זפקזקק זקקזקק
Water Properties Resistivity: NaCl Equivalent: Cl Titrated:	0.84 3 1!	,000 ,900	ppm		0 ppr ppr ppr
Water Properties Resistivity: NaCl Equivalent: Cl Titrated: NO3:	0.84 3 1!	,000 ,900 5-20	ppm ppm ppm REMARKS	<u>A</u> @ 	זפקזקק זקקזקק

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PART 1

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	•	WE	LL:	FORTESCUE-3	-			
RUN #:	1	GEOLOGIST/S:		C.N. THORNTON, D. ALDER		DATE:	21/12/78	3
	· · ·			PRETESTS				•
	NO.	DEPTH		PRESSURE 3490.58 Psig/	•		REMARKS	
SEAT #:	12	2539.0	m	24.07	MPag			
SEAT #:	13	2525.0	m	3494.09 Psig/ 24.09	MPag			
SEAT #:	14	2505.0	m		MPag	No seal	•	
SEAT #:	15	lt	m		MPag			
SEAT #:	16	2485.0	m		MPag			
SEAT #:	17	2470.0	m	3417.44 Psig/ 23.56	MPag .			
SEAT #:	18	2438.0	_m		MPag	No seal	- •	
SEAT #:	19	tt	m		MPag	<u></u>		,
SEAT #:	20	11	m		MPag	No seal	- •	
SEAT #:	21	11.	m	<b></b>	MPag	11 17		
	· · ·			SAMPLES				
		CHAMBER 1	(	1.)	CHAMI	BER 2	(	1.)
		SEAT. #:	DE	PTH:m S	EAT #:		DEPTH:	m
Indroat at				•		•		
Hydrostat	ic Initial			MPa	.g		- <u></u>	MPag
Pretest	cic Initial			MPaMPa			- <u></u> .	MPag MPag
Pretest	ress. Initial	 1			rà			
Pretest Flowing P		 1		MPa	rd		· · · · · · · · · · · · · · · · · · ·	MPag
Pretest Flowing P	Press. Initia Press. Final	1		MPaMPa	ra			MPag MPag
Pretest Flowing F Flowing F	Press. Initia Press. Final Range	1		MPa MPa MPa	ra ra ra			MPag MPag MPag
Pretest Flowing P Flowing P Sampling	Press. Initia Press. Final Range nt-in	1		MPa MPa MPa MPa	ra ra ra ra			MPag MPag MPag MPag
Pretest Flowing P Flowing P Sampling Final Shu Hydrostat	Press. Initia Press. Final Range nt-in			MPa MPa MPa MPa	ra ra ra ra			MPag MPag MPag MPag MPag
Pretest Flowing P Flowing P Sampling Final Shu Hydrostat	Press. Initia Press. Final Range at-in tic Final		TE	MPa MPa MPa MPa MPa MPa	ra ra ra ra			MPag MPag MPag MPag MPag
Pretest Flowing P Flowing P Sampling Final Shu Hydrostat	Press. Initia Press. Final Range at-in tic Final Press. (Horn		-	MPa MPa MPa MPa MPa MPa	a a a a a a			MPag MPag MPag MPag MPag
Pretest Flowing P Flowing P Sampling Final Shu Hydrostat Formation Maximum R	Press. Initia Press. Final Range at-in tic Final Press. (Horn	ner)	°c	MPa MPa MPa MPa MPa MPa MPa	ulatior	n:		MPag MPag MPag MPag MPag MPag MPag
Pretest Flowing P Flowing P Sampling Final Shu Hydrostat Formation Maximum R	Press. Initia Press. Final Range ht-in tic Final Press. (Horn Recorded: l Reached:	ner)	°C	MPa MPa MPa MPa MPa MPa MPa MPa MPERATURE Time Since Circ m Circulation	ulatior	n:		MPag MPag MPag MPag MPag MPag MPag MPag
Pretest Flowing P Flowing P Sampling Final Shu Hydrostat Formation Maximum R	Press. Initia Press. Final Range ht-in tic Final Press. (Horn Recorded: l Reached:	ner)	°C	MPa MPa MPa MPa MPa MPa MPa MPa MPERATURE Time Since Circ m Circulation	ulatior	n:		MPag MPag MPag MPag MPag MPag MPag MPag
Pretest Flowing F Flowing F Sampling Final Shu Hydrostat Formation Maximum R Depth Too	Press. Initia Press. Final Range ht-in tic Final Press. (Horn Recorded: l Reached:	ner)	oC 1	MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa	g	n: 1: °c		MPag MPag MPag MPag MPag MPag MPag MPag
Pretest Flowing P Flowing P Sampling Final Shu Hydrostat Formation Maximum R Depth Too Calibrati	Press. Initia Press. Final Range at-in tic Final Press. (Horn Recorded: Pl Reached: For	ner)	oC 1	MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPAMPA MPA MPA	g	n: 1: °c		MPag MPag MPag MPag MPag MPag MPag Hrs
Pretest Flowing P Flowing P Sampling Final Shu Hydrostat Formation Maximum R Depth Too Calibrati	Press. Initia Press. Final Range at-in tic Final Press. (Horn ecorded: Press. (Horn con Pressure: ackard Gauge	ner)	OC I ature	MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPa MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPA MPAMPA MPA MPA	Ig Ig Ig Ig Ig Ig Ig Ig Ig Ig Tempera	n: 1: °c		MPag MPag MPag MPag MPag MPag MPag Hrs

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PART 1

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		WELL:	FORTESCU				
<u>RUN #: 2</u>	GEOL		.C.N. THORN	TON,	DATE:	21/12,	/78
· .·	· ·		PRETESTS			•	
Ţ	<u>NO.</u> <u>I</u>	DEPTH	PRESSU	RE	•	REMARKS	
<u>SEAT #: 2</u>	.21	.524.9 m		MPag	No seal	•	
<u>SEAT #: 2</u>	.42	.438.0 m	3397.30 Ps 23.42	sig/ MPag	<u></u>	•	
<u>SEAT #:</u>		m		MPag			
<u>SEAT #:</u>		m		MPag			
<u>SEAT #</u> :		m		MPag			
<u>SEAT #</u> :		m		MPag			· · ·
SEAT #:		m		MPag	<u> </u>		
<u>SEAT #:</u>		m	<b></b>	MPag			
SEAT #:		m		MPag			
SEAT #:	· · · · · · · · · · · · · · · · · · ·	m		MPag			
· · · · · · · · · · · · · · · · · · ·		· · · ·	SAMPLES				
ал т. С	CHF	MBER 1 (	22.000 1.)	CHAM	IBER 2	( 3.690	1.)
	SEAT. #	: <u>23</u> D	EPTH: 2448.5	5m <u>SEAT #</u> :	23	DEPTH: 24	48.5 _m
Hydrostatic In	nitial	3991.2 Psi	g/27.52	MPag		۰.	MPag
Pretest		3406.86 Ps	lg/23.49	MPag			MPag
Flowing Press.	Initial			MPag		······	MPag
Flowing Press.	Final			MPag			MPag
Sampling Range	2	407-2535 Ps 2.81-17.48			648-1669 1.36-11.		MPag
Final Shut-in		3405.72 Ps	g/23.48	MPag3	405.47 P	sig/23.48	MPag
Hydrostatic Fi	nal			MPag3	981.39 P	sig/27.45	MPag
Formation Pres	s. (Horner)	3406.4 Psig	g/23.49	MPag			MPag
		T	MPERATURE				
Maximum Record	ed: Not recor	ded ^o c	Time Since	Circulatio	n:	20.75	Hrs
Depth Tool Rea	ched: 2	448.5	m Circulat	tion Stoppe	d:		Hrs
	Formatic	n Temperatu	re (Horner)	•••••••••••	°c		
,			REMARKS				•
Calibration Pr		4 Psig/ 54MPa	ag Calibrat	tion Temper	ature:	83.7	°c
Hewlett-Packar	d Gauge #: _	319					
Mud Weight: 9	.6 ppg/1.15	S.G. Ca	Lculated Hyd	lrostatic:	3980 Psi	g/27.44	MPag
RFT Choke Size	: <u>1 X 0.020"</u>	with flow n	estrictor.				
	Permeabili	tv 596 md.					

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RECORDING TIMES

PART 2

	<u>CHAMBER 1</u> ( 22.000 1.)	<u>CHAMBER 2</u> (3690 1.)
	<u>SEAT #: 23 DEPTH: 2448.5m</u>	SEAT #: DEPTH: 2448.5m
Tool Set:	01:32:58	
Pretest Open:	01:33:12	
Time Open:	02:19	
Chamber Open:	01:36:31	02:07:18
Chamber Full:	01:50:56	02:08:23
Fill Time:	14:25	01:05
Start Build-up:	01:50:56	02:08:23
Finish Build-up:	02:05:51	02:12:14
Build-up Time:	14:55	03:51
Seal Chamber:	02:05:51	02:12:14
Tool Retract:		02:14:20
Total Time:	32:03	07:02
	RECOVERY	

Surface Pressure:	<u>38 Psig/0.262</u> MPag	9 <u>Segregator #3005</u> MPag
Gas:	8.5 1	Not opened. 1.
Oil:	0.5 1	1.
Water:	<u>    19.9        1</u>	1.
Others:	1	·l.
	PROPERTIES	
Gas Composition		
C ₁ (ppm)	Insufficient for analysis	
c ₂		
c ₃		
ic _{4/} nc ₄	•	
c ₅		-
с ₆ +		·
C0 ₂ /H ₂ S		-
Oil Properties	41 [°] API @ 26 [°] C	°° API @° C
Colour:	Dark green-brown	
Fluorescence:	Bright greenish-yellow	
G.O.R.:		
Water Properties		
Resistivity:	<u></u> <u></u> <u></u> <u></u> <u></u>	۲ ۲ @°c
NaCl Equivalent:	12,000 ppm	n ppm
Cl Titrated:	6,000ppm	n ppm
N03:	40ppm	n ppm
Est. Water Type:	Filtrate	
	REMARKS	
Mud Properties:	Resistivity: <u>0.</u>	<u>63@17</u> °C
NaCl Equiv.:	ppm Cl Titrated:	4400 ppm NO ₃ : <u>130 ppm</u>

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PART 1

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· · · · ·			WI	ELL:	FORTESCU	JE-3			
<u>RUN #:</u>	3	GEOLC	GIST/S:		C.N. THOF	RNTON,	DATE:	21/12/78	, 
• •	• •			P	RETESTS		• • •	· · · ·	
	NO.	D	DEPTH		PRESS	URE	•	REMARKS	
SEAT #:	-			m		MPag	J		
SEAT #:			,	m		MPag	J		
SEAT #:						MPac	ı		
SEAT #:		·				MPag	ī	<b></b>	
SEAT #:				m		MPag	r		
SEAT #:						MPag	r <u>.</u>	• • • • • • • • • • • • • • • • • • •	
SEAT #:						MPag	·		
SEAT #:		) 		m		MP ag	·		
SEAT #:						MPag			
SEAT #:			•			MPag			
			· .	S	AMPLES				
· ·		CHA	MBER 1	( 22	.000 1.)	<u>CH</u>	AMBER 2	( 3.690 1.	)
• •	•	SEAT. #	: 25	DEP	<u>TH: 2462</u>	Om SEAT	<b>#:</b> _ 25	DEPTH: 2462	<u>. O</u> m
Hydrostat.	ic Initial		4020.86	Psig/2	27.72	MPag		M	IPag
Pretest			3400.64	Psig/2	23.45	MPag	*******************************	M	IPag
Flowing P	ress. Initia	1				MPag		M	IPag
Flowing P	ress. Final	•	<b>1173-3</b> 22	3 Dei	<b>T</b> /	MPag	 	M	Pag
Sampling	Range			22.22	<u></u>	MPag	<u>3273 Psig</u>	<u>/22.57</u> M	1Pag
Final Shu	t-in	:	3402.76	Psig/2	23.46	MPag	3403.09 P	sig/23.46 M	IPag
Hydrostat	ic Final			****	······	MPag	4018.54 P	sig/27.71 M	IPag
Formation	Press. (Hor	ner)	340316 P	sig/23	3.47	MPag		M	lPag
				TEMI	PERATURE				
Maximum Re	ecorded: <u>1</u>	92 ⁰ F/	88.9	°C Ti	ime Since	e Circulat	ion:	25.5	Hrs
Depth Tool	l Reached:	240	62	m	Circula	tion Stop	ped:		Hrs
	Fo	rmatio	n Temper	ature	(Horner)	:	°c		
•		3410	0 Psig/	R	EMARKS				
Calibratio	on Pressure:		- · · ·	MP ag	Calibra	tion Temp	erature:	88.5	_°c
Hewlett-Pa	ackard Gauge	#:	319		_				
Mud Weight	t: 9.6ppg/	1.15	S.G.	Calcu	lated Hy	drostatic	: <u>3995</u> I	Psig/27.54 M	Pag
	Size: <u>1 X</u>		with r	estric	tor				
Permeabili	ity: 569 md	•							

	REPEAT FORMATION TEST	ER RECORD PART 2
	RECORDING TIM	ES
	CHAMBER 1 ( 22.000 1.)	CHAMBER 2 ( 3.690 1.)
	SEAT #: 25 DEPTH: 2462.0 m	<u>SEAT #: 25 DEPTH: 2462.0 m</u>
Tool Set:	01:06:57	
Pretest Open:	01:07:07	
Time Open:	02:19	
Chamber Open:	01:09:26	01:35:05
Chamber Full:	01:21:47	01:35:28
Fill Time:	12:21	00:23

01:21:47

01:34:10

01:34:10

12:23

27:13

Start Build-up: Finish Build-up: Build-up Time: Seal Chamber: Tool Retract:

Total Time:

RECOVERY

01:35:28

01:37:23

01:37:23

01:38:06

01:55

03:01

Surface Pressure:	100 Psig/0.6895	MPag	Segregator #3007	MPa
Gas:		1.	not opened.	1
Oil:	Very slight scum	1.		1
Water:	19.0	1.		1
Others:		1.	· · · · · · · · · · · · · · · · · · ·	1
	PRO	PERTIES		
Gas Composition				
C ₁ (ppm)				
c ₂				
-		<u></u>		
C ₃				
iC _{4/} nC ₄	· · · · · · · · · · · · · · · · · · ·			
-				
c ₅ -			•	
C ₆ +			<del></del>	
CO2/H2S				
Oil Properties	OAPI @	°c	OAPI @	0
Colour:				
Fluorescence:		······		
G.O.R.:				
Water Properties				1999
Resistivity:	0.30 0 0	18 °C	<u>~</u>	° o
NaCl Equivalent:	23,000	ppm	and an analysis and an analysis and an	pp
Cl Titrated:	12,000	ppm	······································	pp
N0 ₃ :	50	ppm	· · · · · · · · · · · · · · · · · · ·	p
Est. Water Type:	Formation			
	· R	EMARKS		
Mud Properties:	Resistivity:		@ 17 ° _C	
NaCl Equiv.:	ppm Cl Titrat			ppi

PART 1

		WE	LL:	FORTESCUE-3				
RUN #:	4	GEOLOGIST/S:		C.N. THORNTON, D. ALDER		DATE:	21/12/7	B
				PRETESTS				
	NO.	DEPTH		PRESSURE			REMARKS	
<u>SEAT #</u> :	27	2454.0	m	3397.31 Psig/ 23.42 MF	Pag_			
SEAT #:	28	2443.0	m		Pag_	No sea	al	
SEAT #:	29	88	m	3432.24 Psig/ 23.66 MF	Pag _			
SEAT #:	30	2442.0	_m	- MF 	Pag _	No sea	al	
SEAT #:	31	11	m	00.45	Pag _			· .
SEAT #:	32	2435.5	m		Pag_			
SEAT #:	33	2465.0	_m		Pag _	••••••••••••••••		•
SEAT #:		) 	m	MF	Pag _			······································
SEAT #:			_m	MP	Pag _			
SEAT #:			m	MP	Pag _			
				SAMPLES				
	• •	CHAMBER 1	(22	.000 1.)	CHAME	BER 2	( 3.690	1.)
		<u>SEAT. #: 26</u>	DE	PTH: 2457.5m SEA	<u>T #</u> :	26	DEPTH: 24	157.5m
Hydrosta	tic Initial	4015.08	Psig	/27.68 MPag				MPag
Pretest		3398.08	Psig	/23.43 MPag				MPag
Flowing	Press. Initia	1		MPag				MPag
Flowing	Press. Final			MPag				MPag
Sampling	Range			0 Psig/ .34 MPag		.2-10.6	13 Psig/ 54	MPag
Final Sh	ut-in	<b>33</b> 99.51	Psig	/23.44MPag	_339	8.50 Ps	sig/23.43	MPag
Hydrosta	tic Final			MPag	401	2.12 Ps	sig/27.66	MPag
Formation	n Press. (Hor	mer) <u>3401.0 P</u>	sig/	23.45 MPag				MPag
TEMPERATURE								
Maximum Recorded: 200°F/ 93.3 °C Time Since Circulation: 32.25 Hrs								
Depth Tool Reached:2465.0 m Circulation Stopped: Hrs								
	Fc	rmation Temper	atur	e (Horner):		oc		
				REMARKS				
Calibrat	ion Pressure:	3400 Psig/ 23.44	_MPa	g Calibration Te	mpera	ture:	89.7	°c
Hewlett-Packard Gauge #:319								
Mud Weight: <u>9.6 ppg/1.15</u> S.G. Calculated Hydrostatic: <u>4025 Psig/27.75</u> MPag								
RFT Choke Size: 1 X 0.020" with restrictor.								
Permeability: 191 md.								

	REPEAT FORMATION TEST	ER RECORD PART 2
	RECORDING TIM	ES
	CHAMBER 1 ( 22.000 1.)	CHAMBER 2 ( 3.690 1.)
	<u>SEAT #: 26 DEPTH:2457.5 m</u>	SEAT #: 26 DEPTH: 24 <u>57.5 m</u>
Tool Set:	04:40:15	
Pretest Open:	04:40:30	
Time Open:	01:49	
Chamber Open:	04:42:19	05:21:05
Chamber Full:	04:58:18	05:22:23
Fill Time:	15:59	1:18
Start Build-up:	04:58:18	05:22:23
Finish Build-up:	05:20:56	05:25:23
Build-up Time:	21:38	3:00
Seal Chamber:	05:20:56	05:25:23
Tool Retract:		05:26:20
Total Time:	37:39	3:15
	RECOVERY	- · · · · ·
Surface Pressure:	<u>26 Psig/0.1793</u> MPag	Segregator #3003 not MPag
Gas:	56.641.	opened. 1.
Oil:	brown scum 1.	1.
Water:	(oily & oily smell) 19 1.	1.
Others:	1.	1.
	PROPERTIES	
	PROPERTIES	
Gas Composition	PROPERTIES	
Gas Composition C _l (ppm)		
•	PROPERTIES	
C ₁ (ppm)		
с ₁ (ppm) с ₂		
С ₁ (ppm) С ₂ С ₃		
$c_1$ (ppm) $c_2$ $c_3$ $ic_{4/}nc_4$		

CO₂/H₂S

Oil Properties Colour: Fluorescence:

G.O.R.: Water Properties Resistivity: NaCl Equivalent: Cl Titrated:

N0₃: Est. Water Type:

Mud Properties:

NaCl Equiv.:

0.52

API @

Insufficient for analysis.

∿ @

14,000

6,000

Filtrate

15

REMARKS Resistivity: 0.63 ppm Cl Titrated: _____4,400 ppm NO3:

°c

°c

ppm

ppm

ppm

ഫീ

18

OAPI @

17

@ 0

> °c 130 ppm

°c

°c

ppm

ppm

ppm

<u>CHAMBER 1</u> ( 22.00 <u>SEAT #: 34 DEPTH</u> 00:49:58 00:50:06 03:18	ORDING TIME 0 1.) :24 <u>54.5 </u> m	<u>CHAMB</u> <u>SEAT #:</u>				
SEAT #: <u>34</u> DEPTH 00:49:58 00:50:06 03:18	•					
00:49:58 00:50:06 03:18	:24 <u>54.5</u> m	SEAT #:	34 DEPTH:			
00:50:06 03:18				24 <u>54.5</u> m		
03:18			,			
				•		
00:53:24		•	01:31:56	•		
01:10:28			01:33:06			
17:04	<u></u>					
01:10:28		01:33:06				
01:31:17			01:38:43	<u></u>		
20:49			05:37			
01:31:17			01:38:43			
			01:39:45	• 		
41:19			07:49			
· · ·	RECOVERY	· ·				
	•		•			
		•	· · · ·	·		
40 Psig/0.2758	MPag	Segregat	or #3008_not	MPag		
	1.			1.		
	1.			1.		
	1.			1.		
		<b></b>	· · · · · · · · · · · · · · · · · · ·	1.		
 P		••••••••••••••••••••••••••••••••••••••	and a second			
<b>.</b>			. •	•		
•		• .	•			
102.205	- •		-			
103,305	·					
59,231	· · · · · · · · · · · · · · · · · · ·					
96,228		:		•.		
28,917/26,365						
7 956						
7,930		<u></u>	· · · · · · · · · · · · · · · · · · ·			
	·			'		
45 ⁰ ADT (1	20 °C		одрт ()	۰°ر		
		<u></u>				
Diright Greenish-yell	~~~					
0.57 0	16 °C		- 0	o		
			A. ^e			
				תקק תקק		
· · · · · · · · · · · · · · · · · · ·		•	<u></u>	ppr		
· ·	ppm			ppn		
Filtrate	-					
	REMARKS		0			
Resistivity	• 0.63	@	<u> </u>			
	01:10:28 01:31:17 20:49 01:31:17 41:19 41:19 40 Psig/0.2758 11.3 3.0 17.0 P 103,365 59,231 96,228 28,917/26,365 7,956 7,956 7,956 7,956 0.57 c @ 17,000 5,800 ? Very low Filtrate Resistivity	01:10:28         01:31:17         20:49         01:31:17         41:19         RECOVERY         40 Psig/0.2758       MPag         11.3       1.         3.0       1.         17.0       1.         PROPERTIES       103,365         59,231       96,228         28,917/26,365       7,956         7,956       0.57         0.57       0         16       °C         17,000       ppm         5,800       ppm         5,800       ppm         7 Very low       ppm         Filtrate       Resistivity:         0.63       0.63	01:10:28         01:31:17         20:49         01:31:17         41:19         RECOVERY         40 Psig/0.2758       MPag         Segregat         11.3       1.         0pened.         3.0       1.         17.0       1.         PROPERTIES         103,365	01:10:28       01:33:06         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         01:31:17       01:38:43         103:365       1.         103,365       1.         103,365       1.         96,228       28,917/26,365         28,917/26,365       2.         91:90       2.         0.57       0 </td		

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PART 1

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	- · · ·	<u>N</u>		FORTESCU				
<u>RUN #:</u>	5	GEOLOGIST/S:		N. THOR ALDER	NTON,	DATE:	21/12/7	18
•	. · ·		PRE	TESTS				•
	NO.	DEPTH		PRESSUI	RE	· ·	REMARKS	•
SEAT #:			m		MPa	ıg		
SEAT #:			m		MPa	ıg		
SEAT #:			m		MPa	.g		
SEAT #:			m	1	MPa	ıg		
SEAT #:	÷				MPa	ıg		
SEAT #:		·	 m		MPa	· · · · · ·		
SEAT #:	· · ·	<b></b>	 m		MPa			
SEAT #:			 m		MPa			
SEAT #:			m	· · · · · · · · · · · ·	MPa			
SEAT #:		·			MPa	<u></u>		
<u></u> .	÷	<b></b>		PLES	111 (1	.9	· · · · · · · · · · · · · · · · · · ·	
		CHAMBER 1	( 22.00		· ·	HAMBER 2	1 2 6 00	1 \
	• •			-			( 3.690	1.)
<b>Uudro</b> stat	ia Thitial	<u>SEAT. #: 34</u>		:24 <u>54.5</u>		#:34	DEPTH: 24	
Pretest	ic Initial		Psig/27		MPag		••••••••••••••••••••••••••••••••••••••	MPag
	mono Tribio	· · ·	Psig/23	•42	MPag	<del>. / / / / / / / / / / / / / / / / / / /</del>		MPag
	ress. Initia	11. 			MPag	<u></u>		MPag
	ress. Final		-2125 Ps:	ig/	_MPag		02 Psig/	MPag
Sampling	- · .	<del></del>	L <b>-14.6</b> 5		MPag	696-9.6		MPag
Final Shu		3387.57	Psig/23	.36		3395.19 Ps		MPag
Hydrostat				: 	MPag	4005.04 Ps	ig/27.61	MPag
Formation	Press. (Hor	mer) <u>3398.00</u>	Psig/23	.42	_MPag			MPag
			TEMPEI	RATURE				
Maximum R	ecorded: _	_98 [°] F/ 92.2	C Time	e Since	Circulat	tion: <u>3</u>	5.5	Hrs
Depth Too	l Reached:	2454.5	m C	Circulat	ion Stop	pped:		Hrs
	Fc	rmation Temper	ature (H	Norner):	<del></del>	°c		
		3397 Psig/	REMA	ARKS				
Calibratio	on Pressure:	23.42	_MPag C	Calibrat	ion Temp	perature:	92.0	°c
Hewlett-Pa	ackard Gauge	: #: <u>319</u>	· · ·					•
Mud Weight	t: 9.6ppg/l.	15S.G.	Calcula	ted Hyd	rostatic	:3999 Psig	3/27.57	MPag
RFT Choke	Size: <u>1 X</u>	0.020" with r	estricto	or.				
Permeabil	ity: Very ]	ow.						

## APPENDIX 8

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APPENDIX 8

### WELL DEVIATION SURVEY



## REPORT of SUB-SURFACE DIRECTIONAL SURVEY

## ESSO AUSTRALIA LTD. FORTESCUE No. 3

LOCATION

JOB NUMBER

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SURVEY BY

DEKORTE

TYPE OF SURVEY DT. MULTISHOT

the line



OFFICE SALE



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## JOB NO_Fortescue 3 D.T. M/S

### DATE 19.12.78

	MEASURED	DRIFT	TRUE	COURSE	DRIFT	R	ECTANGULAR	COORDINATI	ES of Angel	
,	DEPTH	ANGLE	VERTICAL DEPTH	DEVIATION		NORTH	SOUTH	EAST	WEST	REMARKS
5	845 00 899 00 924 20 950 40 976 60	0°00' 0°15' 0°15' 0°30' 0°45'	845 00 893 00 924 20 950 40 976 60		0 S63W N53W N58W N38W	0 0 05 0 24	0 0 05 0 04	0	0 0 10 0 21 0 35 0 56	
10	100280102900105520108140110760	0°45' 0°45' 0°45' 0°45' 0°45'	1002 80 1028 99 1055 19 1081 39 1107 59		N26W N03W N18E N44E N55E	0 53 0 86 1 20 1 49 1 72			0 75 0 83 0 79 0 61 0 35	-
15	1133 80 1160 00 1186 20 1212 40 1238 60	0°45' 1°00' 1°00' 1°00' 0°30'	1133 78 1159 98 1186 18 1212 37 1238 57		N66E N64E N65E N56E N34E	1 88 2 05 2 25 2 48 2 72		0 31 0 72 1 12 1 36	0 05	
20	1264 80 1291 00 1317 20 1343 40 1369 60	0°30' 0°30' 0°15' 1°00' 1°00'	1264 77 1290 97 1317 17 1343 37 1369 56		N31E N03E N34W S63W S54W	2 91 3 13 3 29 3 35 3 12		1 48 1 55 1 51 1 25 0 86		

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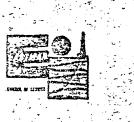


JOB NO. Fortescue 3 D.T. M/S

2/4 DATE 19.12.78

1 . . .

	MEASURED	DRIFT	TRUE VERTICAL	COURSE	DRIFT	R	ECTANGULAR	COORDINATE	S and the	REMARKS
-	DEPTH	ANGLE	DEPTH	DEVIATION	DIRECTION	NORTH	SOUTH	EAST	WEST	KEMARAS
	1395 80	1°15'	1395 76		S55W	- 2 32		0 44		
	1422 00	1°15'	1421 95		S57W	2 50		-	0 03	
	1448 20	1°30'	1448 14		S71W	2 2 2 2			0 59	
<u> </u>	1474 40	1°30'	1474 33		S78W	2 04			1 25	
25	1500 60	1°30'	1500 53		S80W	1 91			1 93	
	1526 80	2°00'	1526 71		S88W	1 82			2 72	
	1553 00	2°30'	1552 89		S86W	1 77	÷		3 75	
	1579 20	3°00'	1579 06		S85W	1 67			5 00	
30	1605 40 1631 60	3°30' 4°00'	1605 22 1631 36		N84W	1 68	· ·		6 49	
30	TOJT 00	41001	1031 30		N69W	2 08			8 15	
	1657 80	5°00'	1657 48		N61W	2 95			10 01	
	1684 00	6°00'	1633 56		N53W	4 32			12 11	
	1710 20	6°45'	1709 60		N46W	6 21			14 32	
25	1736 40	7°00'	1735 61		N41W	8 48			16 48	
35	1762 60	7°30'	1761 60		N 35W	11 09			18 52	
	1788 80	8°15'.	1787 55		N28W	14 15			20 39	
	1815 00	9°00'	1813 46		N21W	17 72			22 02	
	1841.20	9°45′	1839 31		N15W	21 78			23 34	
	1867 40	10°00'	1865 12		N09W	26 17			24 27	
40	1893 60	10°30'	1890 90		NO4W	30 80			24 80	
		х. 			. e					
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## JOB NO. Fortescue 3 D.T. M/S

DATE 19.12.78

19 19 19 19 19 45 20	DEPTH 019 80 046 00 072 20 098 40	ANGLE 10°45' 11°00'	VERTICAL DEPTH 1916 65 1942 38	DIRECTION	NORTH 33 65	SOUTH	EAST	WEST	REMARKS
19 19 19 45 20	946 00 972 20	11°00'		NOLE	22 65	1			
	24 60	11°30' 11°45' 11°45'	1968 08 1993 74 2019 39	N06E N09E N14E N18E	40 56 45 63 50 80 55 93			24 93 24 63 23 96 22 91 21 44	•
20 21 21	050 80 077 00 03 20 29 40 56 60	11°15' 11°30' 11°45' 11°45' 12°00'	2045 06 2070 75 2096 41 2122 06 2148 68	N21E N24E N30E N35E N41E	60 85 65 63 70 33 74 83 79 23			19 69 17 72 15 32 12 46 9 01	
22 22 22	81 80 08 00 34 20 260 40 866 60	12°30' 12°15' 12°15' 12°00' 11°45'	2173 31 2198 90 2224 50 2250 12 2275 95	N47E N53E N59E N66E N71E	83 08 86 69 89 79 92 33 94 32	-	3 61 8 49 13 54	5 30 1 00	
23 23 23	312     80       339     00       365     20       391     40       17     60	11°45' 11°30' 11°00' 10°45' 10°00'	2 301 41 2327 07 2352 77 2378 50 2404 27	N76E N82E N85E N87E N86E	95 83 96 83 97 41 97 76 98 05		18 61 23 79 28 87 33 80 38 51		



### JOB NO. Fortescue 3 D.T. M/S

### DATE 19.12.78

	MEASURED DEPTH	DRIFT ANGLE	TRUE VERTICAL	COURSE DEVIATION	DRIFT	T PROPERTY AND INCOME.		CCORDINATE		REMARKS
			DEPTH			NORTH	SOUTH	EAST	WEST	
	2443 80 2470 00	9°00' 9°00'	2430 11 2455 98		S89E S87E	98 16 98 02		42 83 46 93		
	2496 20	8°30'	2481 88		EAST	97 91		50 91		
65	2522 40 2548 60	8°00' 6°30'	2507 81 2533 80		N87E N83E	93 01 98 30		54 67 57 96		
	2574 80	5°15'	2559 86		N86E	98 55		60 63		-
68	2601 00 2618 00	4°15'	2585 97		N83E	98 76		62 79		
00	2018 00	3°45'	2602 93		N25E	98 89		63 97		
			Closure	117.8m	N32°54'E					
						-				-
	-									
									P P	



JOB NO. Fortescue 3 D.T. M/S

DATE 19.12.78

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	MEASURED	DRIFT	TRUE VERTICAL	COURSE	DRIFT	R	ECTANGULAR	COORDINAT	ES	
	Depth	ANGLE	DEPTH	DEVIATION	DIRECTION	NCRTH	SOUTH	EAST	WEST	REMARKS
5	845 00 898 00 924 20 950 40 976 60	0°00' 0°15' 0°15' 0°30' 0°45'	845 00 898 00 924 20 950 40 976 60		0 S63W N53W N58W N38W	0 0 05 0 24	0 0 05 0 04	0	0   0 0 10 0 21 0 35 0 56	
10	1002 80 1029 00 1055 20 1081 40 1107 60	0°45' 0°45' 0°45' 0°45' 0°45'	1002 80 1028 99 1055 19 1031 39 1107 59		N26W N03W N18E N44E N55E	0 53 0 86 1 20 1 49 1 72			0 75 0 83 0 79 0 61 0 35	
15	113380116000118620121240123860	0°45' 1°00' 1°00' 1°00' 0°30'	1133 78 1159 98 1186 18 1212 37 1238 57		N65E N64E N65E N56E N34E	1 88 2 05 2 25 2 48 2 72		0 31 0 72 1 12 1 36	0 05	
20	1264 30 1291 00 1317 20 1343 40 1369 60	0°30' 0°30' 0°15' 1°00' 1°00'	1264 77 1290 97 1317 17 1343 37 1369 56		N 31E N 0 3E N 3 4W S 6 3W S 5 4W	2 91 3 13 3 29 3 35 3 12		1 48 1 55 1 51 1 25 0 86		



-	MEASURED	DRIFT	TRUE VERTICAL	COURSE	DRIFT	R	ECTANGULAR	COORDINATE	S Charles	an ang ang ang ang ang ang ang ang ang a
- ` . •	DEPTH	ANGLE	DEPTH	DEVIATION	DIRECTION	NORTH	SOUTH -	EAST	WEST	REMARKS
25	1395 80 1422 00 1448 20 1474 40 1500 60	1°15' 1°15' 1°30' 1°30' 1°30'	1395 76 1421 95 1448 14 1474 33 1500 53		S55W S57W S71W S78W S80W	2 82 2 50 2 22 2 04 1 91		0 44	0 03 0 59 1 25 1 93	
30	1526 80 1553 00 1579 20 1605 40 1631 60	2°00' 2°30' 3°00' 3°30' 4°00'	1526 71 1552 89 1579 06 1605 22 1631 36		S88W S86W S85W N84W N69W	1 82 1 77 1 67 1 68 2 08			2 72 3 75 5 00 6 49 8 15	
35	1657 80 1684 00 1710 20 1736 40 1762 60	5°00' 6°00' 6°45' 7°00' 7°30'	1657 48 1683 56 1709 60 1735 61 1761 60		N61W N53W N46W N41W N35W	2 95 4 32 6 21 8 48 11 09			10 01 12 11 14 32 16 48 18 52	
40	1788 80 1815 00 1841 20 1867 40 1893 60	8°15' 9°00' 9°45' 10°00' 10°30'	1787 55 1813 46 1839 31 1865 12 1890 90		N28W N21W N15W N09W N04W	14 15 17 72 21 78 26 17 30 80	•		20 39 22 02 23 34 24 27 24 80	

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## RECORD OF SURVEY

#### JOB NO. Fortescue 3 • • • a chaire an an

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D.T. M/S

### DATE 19.12.78

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<b>Shoka</b>					***		- - 	ar 13 4 42 44	Sta penti men un penta		
		LIEASURED	DRIFT	TRUE VERTICAL	COURSE	DRIFT	R	ectangula	R CCORDINATE	S	DEDUADIO
		DEPTH	ANGLE	DEPTH	DEVIATION	DIRECTION	NORTH	EOUTH	EAST	WEST	REMARKS
	45	1919 30 1946 00 1972 20 1998 40 2024 60	10°45' 11°00' 11°30' 11°45' 11°45'	1916 65 1942 38 1968 08 1993 74 2019 39		N01E N06E N09E N14E N18E	33 65 40 56 45 63 50 80 55 93			24 93 24 63 23 96 22 91 21 44	
	50	$\begin{array}{c} 2050 \\ 2077 \\ 00 \\ 2103 \\ 2129 \\ 40 \\ 2156 \\ 60 \end{array}$	11°15' 11°30' 11°45' 11°45' 12°00'	2045 06 2070 75 2096 41 2122 06 2143 63		N21E N24E N30E N35E N41E	60 85 65 63 70 33 74 83 79 23			19 69 17 72 15 32 12 46 9 01	
	<b>5</b> 5	2181 80 2208 00 2234 20 2260 40 2286 60	12°30' 12°15' 12°15' 12°00' 11°45'	2173 31 2198 90 2224 50 2250 12 2275 95		N47E N53E N59E N66E N71E	83 08 86 69 89 79 92 33 94 32		3 61 8 49 13 54	5 30 1 00	
	60	2312 80 2339 00 2365 20 2391 40 2417 60	11°45' 11°30' 11°00' 10°45' 10°00'	2301 41 2327 07 2352 77 2378 50 2404 27		N76E N82E N85E N87E N86E	95 83 96 83 97 41 97 76 98 05	••	18 61 23 79 28 87 33 80 38 51		
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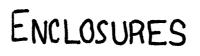
Fortescue 3

JOB NO.

### DATE 19.12.78

	MEASUBE	D	DRIFT	TRUE VERTICAL	COURSE	DRIFT	RE	CTANGULAR	COORDINATE	S	
	DEPTH		ANGLE	VERTICAL DEPTH	DEVIATION	DIRECTION	NORTH	SOUTH	EAST	WEST	REMARKS
65	2443 2470 2496 2522 2548	20 20 10	9°00' 9°00' 8°30' 8°00' 6°30'	2430 11 2455 98 2481 88 2507 81 2533 80		S89E S87E EAST N87E N83E	98 16 98 02 97 91 98 01 98 30		42 83 46 93 50 91 54 67 57 96		-
63	2574 2601 2618	00	5°15' 4°15' 3°45'	2559 86 2585 97 2602 93		N86E N83E N85E	98 55 98 76 98 89		60 63 62 79 63 97		
				Closure	117.3m	N32°54'E					
								~			
• •											

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This is an enclosure indicator page. The enclosure PE902731 is enclosed within the container PE902729 at this location in this document.

The enclosure PE902731 has the following characteristics: ITEM_BARCODE = PE902731 CONTAINER_BARCODE = PE902729 NAME = Time Structure Map Top of Latrobe Group Seismic Marke BASIN = GIPPSLAND PERMIT = TYPE = SEISMIC SUBTYPE = HRZN_CONTR_MAP DESCRIPTION = Time Structure Map Top of Latrobe Group Seismic Marker. Plate 1 of WCR. REMARKS =  $DATE_CREATED = 28/02/1979$  $DATE_RECEIVED = 05/06/1979$  $W_NO = W712$ WELL_NAME = Fortescue-3 CONTRACTOR = ESSOCLIENT_OP_CO = ESSO

This is an enclosure indicator page. The enclosure PE902730 is enclosed within the container PE902729 at this location in this document.

The enclosure PE902730 has the following characteristics: ITEM_BARCODE = PE902730 CONTAINER BARCODE = PE902729 NAME = Structure Map Top of Latrobe Group Seismic Marker BASIN = GIPPSLAND PERMIT = TYPE = SEISMIC SUBTYPE = HRZN_CONTR_MAP DESCRIPTION = Structure Map Top of Latrobe Group Seismic Marker. Plate 2 of WCR REMARKS =  $DATE_CREATED = 28/02/1979$  $DATE_RECEIVED = 05/06/1979$  $W_NO = W712$ WELL_NAME = Fortescue-3 CONTRACTOR = ESSOCLIENT_OP_CO = ESSO

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This is an enclosure indicator page. The enclosure PE902732 is enclosed within the container PE902729 at this location in this document.

The enclosure PE9	2 has the following	characteristics:
ITEM_BARCODE	902732	
CONTAINER_BARCODE	902729	
NAME	ructural Cross Sect	ion Fortescue-West
	libut -Halibut Gamm	a Ray Logs
BASIN	PPSLAND	
PERMIT		
TYPE	LL	
SUBTYPE	OSS_SECTION	
DESCRIPTION	ructural Cross Sect	ion Fortescue-West
	libut -Halibut Gamm	a Ray Logs. Plate
	of WCR.	
REMARKS		
DATE_CREATED	/02/1979	
DATE_RECEIVED	/06/1979	
WNO	12	
WELL_NAME	rtescue-3	
CONTRACTOR	SO	
CLIENT_OP_CO	SO	

This is an enclosure indicator page. The enclosure PE902733 is enclosed within the container PE902729 at this location in this document.

The enclosure PE902733 has the following characteristics: ITEM_BARCODE = PE902733 CONTAINER_BARCODE = PE902729 NAME = Sonic Calibration Curve BASIN = GIPPSLAND PERMIT = TYPE = WELLSUBTYPE = VELOCITY_CHART DESCRIPTION = Sonic Calibration Curve. Enclosure 56 of WCR. REMARKS =  $DATE_CREATED = 04/01/1978$  $DATE_RECEIVED = 05/06/1979$  $W_NO = W712$ WELL_NAME = Fortescue-3 CONTRACTOR = ESSO $CLIENT_OP_CO = ESSO$ 

(Inserted by DNRE - Vic Govt Mines Dept)

This is an enclosure indicator page. The enclosure PE906135 is enclosed within the container PE902729 at this location in this document.

The enclosure PE90	6135 has the following characteristics:
ITEM_BARCODE =	PE906135
CONTAINER_BARCODE =	PE902729
NAME =	: Time-Depth Curve
BASIN =	GIPPSLAND
PERMIT =	· VIC/L5
TYPE =	· WELL
SUBTYPE =	· VELOCITY_CHART
DESCRIPTION =	Time-Depth Curve (basic data) for
	Fortescue-3. Enclosure 4 of WCR.
REMARKS =	
DATE_CREATED =	: 31/01/1979
DATE_RECEIVED =	05/06/1979
W_NO =	· W712
WELL_NAME =	FORTESCUE-3
CONTRACTOR =	:
CLIENT_OP_CO =	ESSO AUSTRALIA LIMITED
(Inserted by DNRE -	Vic Govt Mines Dept)

This is an enclosure indicator page. The enclosure PE902734 is enclosed within the container PE902729 at this location in this document.

The enclosure PE902734 has the following characteristics:  $ITEM_BARCODE = PE902734$ CONTAINER_BARCODE = PE902729 NAME = Well Deviation Survey Plot BASIN = GIPPSLAND PERMIT = TYPE = WELL SUBTYPE = DIAGRAM DESCRIPTION = Well Deviation Survey Plot. Enclosure 6 of WCR. REMARKS = DATE CREATED = DATE RECEIVED = 05/06/1979 $W_NO = W712$ WELL_NAME = Fortescue-3 CONTRACTOR = EASTMAN DIRECTIONAL DRILLING AUSTRALIA CLIENT_OP_CO = ESSO

This is an enclosure indicator page. The enclosure PE601413 is enclosed within the container PE902729 at this location in this document.

The enclosure PE601413 has the following characteristics:  $ITEM_BARCODE = PE601413$ CONTAINER_BARCODE = PE902729 NAME = Well Completion Log (TVD) Latrobe Group BASIN = GIPPSLAND PERMIT = TYPE = WELL SUBTYPE = COMPLETION_LOG DESCRIPTION = Fortescue-3 Well Completion Log (TVD) Latrobe Group. Enclosure 8 of WCR. REMARKS =  $DATE_CREATED = 31/05/1979$  $DATE_RECEIVED = 05/06/1979$  $W_{NO} = W712$ WELL_NAME = Fortescue-3 CONTRACTOR = ESSOCLIENT_OP_CO = ESSO

This is an enclosure indicator page. The enclosure PE601414 is enclosed within the container PE902729 at this location in this document.

The enclosure PE601414 has the following characteristics: ITEM_BARCODE = PE601414 CONTAINER_BARCODE = PE902729 NAME = Well Completion Log BASIN = GIPPSLAND PERMIT = TYPE = WELL SUBTYPE = COMPLETION_LOG DESCRIPTION = Fortescue-3 Well Completion Log. Enclosure 7 of WCR. REMARKS =  $DATE_CREATED = 31/05/1979$  $DATE_RECEIVED = 05/06/1979$  $W_NO = W712$ WELL_NAME = Fortescue-3 CONTRACTOR = ESSOCLIENT_OP_CO = ESSO

This is an enclosure indicator page. The enclosure PE603475 is enclosed within the container PE902729 at this location in this document.

The enclosure PE603475 has the following characteristics:  $ITEM_BARCODE = PE603475$ CONTAINER_BARCODE = PE902729 NAME = Mud Log BASIN = GIPPSLAND PERMIT = VIC/L5 TYPE = WELL SUBTYPE = MUD_LOG DESCRIPTION = Mud Log for Fortescue-3. Enclosure 9 of WCR. REMARKS = (missing accompanying report).  $DATE_CREATED = 18/12/1978$ DATE_RECEIVED = 05/06/1979 $W_{NO} = W712$ WELL_NAME = FORTESCUE-3 CONTRACTOR = EXPLORATION LOGGING OF AUSTRALIA INC. CLIENT_OP_CO = ESSO AUSTRALIA LIMITED (Inserted by DNRE - Vic Govt Mines Dept)