WCR FORTESCUE-1

(W702)

ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC.

WELL COMPLETION REPORT

FORTESCUE-1

GIPPSLAND BASIN, VICTORIA

R. DoRozario
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August 1978

CONTENTS

ESSO AUSTRALIA LTD.

COMPLETION REPORT

1. WELL DATA RECORD

LOCATION

WELL NAME	STATE	PERMIT or LICENCE	GEOLOGICAL BASIN	FIELD
FORTESCUE-1	Victoria Offshore	VIC/P1	Gippsland	New Field Wildcat

CO-ORDINATES	MAP PROJECTION	GEOGRAPHICAL LOCATION
LATITUDE 38° 22' 28.30" LONGITUDE 148° 14' 19.38" X 608 203mE Y 5 751 888mN	AMG-AGD Zone 55	107 kms, SE of Sale, Victoria. 7.1 kms WNW of Halibut-1

ELEVATIONS & DEPTHS

ELEVATIONS	WATER DEPTH	TOTAL DEPTH 2691m Average Angle MEASURED DEPTH 2691m Vertical hole
KB 25m RT	65m	
	PLUG BACK DEPTH 129m	REASONS FOR PLUGGING BACK Abandoned.

DATES

MOVE IN	RIG UP	SPUDDED
16th June, 1978	16-17th June, 1978	0600 hrs, 17th June,1978
RIG DOWN COMPLETE	**RIG RELEASED**	**PRODUCTION UNIT - RIG UP**
16th June, 1978	1230 hrs, 16th July, 1978	N/A

PRODUCTION UNIT - RIG DOWN	INITIAL PRODUCTION ESTABLISHED
N/A	N/A

MISCELLANEOUS

OPERATOR	PERMITTEE or LICENCEE	ESSO INTEREST 100%
Esso Australia Ltd.	Hematite Petroleum P/L	OTHER INTEREST

CONTRACTOR	RIG NAME	EQUIPMENT TYPE
Australian Odeco Pty. Ltd	"Ocean Endeavour"	Semi-submersible rotary Drilling vessel

TOTAL RIG DAYS	DRILLING AFE NO.	COMPLETION NO.	TYPE COMPLETION
30.5	238-002	N/A	N/A

LAHEE WELL CLASSIFICATION	Before Drilling	New Field Wildcat
	After Drilling	Dry Hole, Plugged and abandoned.

2. - SUMMARY OF FORTESCUE-1 FIT & RFT DATA - for Details see Appendix 8

FIT No.	Depth (m) KB	SS	Recovery (Litres) GAS	OIL	FILTRATE	Po PSIG	Kh MD/FT
1	2652	2627	-	-	20.8	3705.2	76
2	2565	2540	-	-	19.7	3589.1	366
3	2418.5	2393.5	-	-	-	Tight Test	-

RFT No.	Depth (m) KB	SS	Recovery (Litres) GAS	OIL	FILTRATE	Po PSIG	Kh MD/FT
1	2505	2480	-	-	-	3523.0	78
2	2652	2627	RFT 2-14 gave no pressure build up in pre test chamber due to tool malfunction				
3	2651.5	2626.5					
4	2648	2623					
5	2622.3	2597.3					
6	2621.8	2596.8					
7	2610.5	2585.5					
8	2577	2552					
9	2565	2540					
10	2555	2530					
11	2505	2480					
12	2487	2462					
13	2486.3	2461.3					
14	2473	2448					

WELL:

3. CASING - TUBING RECORD

TYPE	SIZE	WEIGHT	GRADE	THREAD	NO. OF JOINTS	LENGTH m (ft)	DEPTH - MDKB m (ft)
Pile Joint	24"	670#	-	CC	1	9.81 (32.20)	100.43 (329.5)
Cross Over	20"	129#	X-52	JV-CC	1	12.13 (39.81)	112.56 (369.31)
Conductor Casing	20"	94#	X-52	JV	8	96.90 (317.93)	209.46 (687.24)
Float Joint & Shoe	20"	94#	X-52	JV	1	10.59 (34.76)	220.05 (722.00)
Casing Hanger	18-3/4"x 13-3/8"	-	-	-	1	0.70 (2.30)	92.02 (301.92)
Pup Joint	13-3/8"	54.5#	K-55	BUTT	1	1.61 (5.28)	93.63 (307.2)
Surface Casing	13-3/8"	54.5#	K-55	BUTT	57	748.27 (2455.06)	841.90 (2762.26)
Float Collar	13-3/8"	-	-	BUTT	1	0.50 (1.63)	842.39 (2763.89)
Float Joint	13-3/8"	54.5#	K-55	BUTT	1	11.47 (37.63)	853.86 (2801.52)
Float Shoe	13-3/8"	-	-	BUTT	1	0.62 (2.04)	854.48 (2803.56)

4. CEMENT RECORD

STRING	20" Conductor Casing		13-3/8" Surface Casing
TYPE OF CEMENT	Aust. 'N' Neat + 12% Gel.	Aust. 'N' Neat	Class 'G' Neat
SLURRY VOLUME m^3 (ft^3)	65.4 m^3 (2310)	11.7 m^3 (413)	39.1 m^3 (1380)
SLURRY DENSITY	SG 1.45 (12.1 ppg)	SG 1.87 (15.6 ppg)	SG 1.90 (15.8 ppg)
CEMENT TOP	Seafloor		264.9 m (869 ft)
CASING TEST PRESSURE	-		10.34 MPa (1500 psi)
NO. OF CENTRALISERS	6		8
NO. OF SCRATCHERS	-		-
STAGE COLLAR, ETC.	-		-
REMARKS			

G.W. WEYBURY

ENGINEER

WELL FORTESCUE-1

5. SAMPLES, CONVENTIONAL CORES, SW CORES

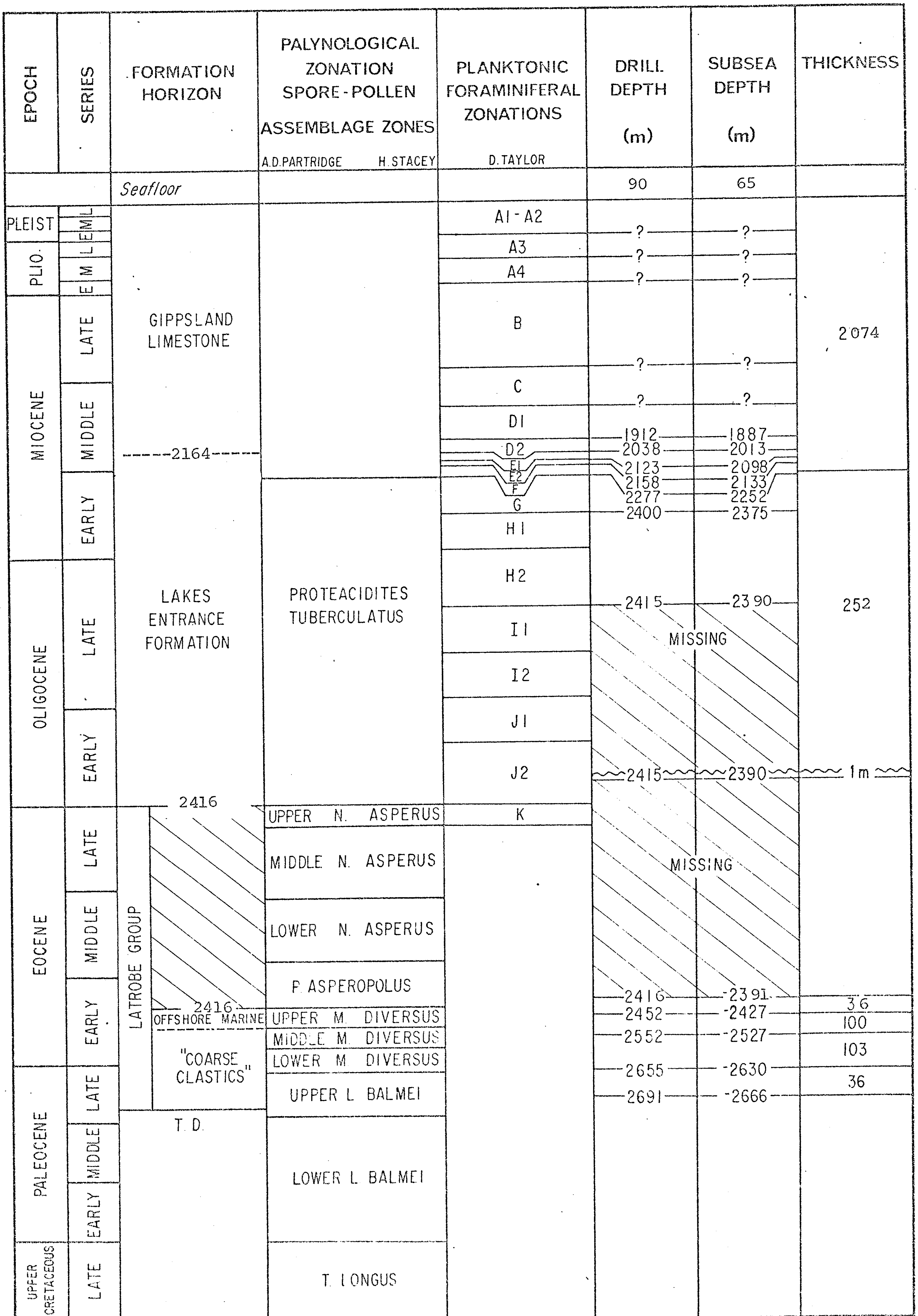
INTERVAL (M)	TYPE	RECOVERED	INTERVAL (M)	TYPE	RECOVERED
Every 10m 240-2000m	5 sets of washed and dried cuttings one unwashed sack of cuttings.		2416.6-2431.09 2431.09-2443.37	Core #1 Core #2	14.49m (100%) 8.29m (68%)
Every 5m 2000-2410 2437-2691			2679-2411 2606-2188 2158- 870	SWC Run #1 SWC Run #2 SWC Run #3	22 out of 30 28 out of 30 29 out of 30
240-2410) 2437-2691)	composite cuttings canned taken every 30 m				

6. WIRELINE LOGS AND SURVEYS (Incl. FIT)

Type & Scale	From To	Type & Scale	From To
ISF-Sonic Run 1 1:200 and 1:500	827 - 220m		
FDC-GR Run 1 1:200 and 1:500	866.5- 220m (-85mGR	Ran 3 FIT's and 14 RFT's, for depths & results see Part II	
FDC-CNL-GR. Run 2 1:200 and 1:500	2680 - 2304m		
*No FDC-CNL-GR for interval 2304-866.5m			
ISF-Sonic-MSFL-GR -CAL 1:200 & 1:500	2679.0- 854m		
HDT 1:100	2678.5- 1500m		
FORMATION INTERVAL TESTER	2652 - 2418.5m		
REPEAT FORMATION TESTER	2652 - 2473m		
VELOCITY SURVEY	14 Levels, 33 shots 2670 - 865		

R. DoRozario/
Geologist

FORTESCUE – 1
STRATIGRAPHIC TABLE



FORTESCUE-1

DESCRIPTION OF LITHOLOGICAL UNITS

GIPPSLAND LIMESTONE (90 - 2164m KB)

SKELETAL

240- 440m — CALCARENITE: white - light grey, very fine-medium grained, firmly-loosely cemented fossil debris with abundant very coarse fossil fragments of forams, bivalve, bryozoa, coral, echinoid spines and ostracods. Fossils commonly stained/replaced with pyrite. Trace glauconite clay, Trace calcareous shale, dark grey, carbonaceous, silty, very calcareous, firm-hard.

440- 700m — MARL GRADING TO FOSSILIFEROUS CALCILUTITE, MINOR SKELETAL CALCARENITE

MARL: light grey, very soft, highly fossiliferous with fossils ranging from very small (1/8mm), forams, gastropods and fossil debris to large (1-3mm) forams, echinoid spines and bivalve fragments. Glauconite commonly impregnating forams. Pyrite common.

CALCILUTITE: light grey, moderately hard to hard, 40-50% 1/8mm fossils (mainly forams, many green due to glauconite), and fossil fragments set in light grey, micro crystalline, clayey matrix.

SKELETAL CALCARENITE: light grey, very fine - fine grained with fine-very coarse fossils and fossil debris as previous interval.

700-1200m — CALCILUTITE: light grey to grey-brown, firm to moderately hard, becoming softer and more clayey towards base; very fossiliferous with siltsize forams, sponge spicules and fossil debris; minor large fossil fragments, mainly bivalve, echinoid spines and bryozoa. Minor dark green glauconite and trace pyrite impregnating fossils. Rare brown amorphous carbonaceous ? material in matrix.

1200-1650m — CALCAREOUS MUDSTONE GRADING TO MARL: Mudstone - light grey to medium grey-brown, soft to moderately hard where well cemented, silty, fossiliferous - very fine size forams and rare sponge spicules; rare glauconite and dark carbonaceous grains. Marl - light grey to grey-brown, very soft-moderately hard, fossiliferous with siltsize forams and fossil fragments set in calcareous clay matrix; trace pyrite, glauconite impregnating fossils and dark carbonaceous ? material.

1650-1740m — SKELETAL CALCILUTITE: light to medium grey, light grey-brown, firm to moderately hard, numerous predominantly silt-size forams, (spicules) and fossil fragments, occasional pyrite, glauconite and dark carbonaceous fragments.

1740-1820m — CALCAREOUS MUDSTONE & MINOR SKELETAL CALCILUTITE: Mudstone - calcareous and silty; medium grey, firm to moderately hard, trace pyrite, glauconite and fossil foram fragments; grading to calcareous siltstone in part. Skeletal calcilutite - light grey to brown, firm to moderately hard as previous interval.

1820-1960m — SKELETAL CALCILUTITE WITH MINOR BEDS OF CALCAREOUS SILTSTONE AND THIN BEDS OF CALCAREOUS SANDSTONE - Skeletal calcilutite - buff, light to medium grey-brown, firm to hard, 50% forams and fossil fragments (most 1/16 - 1.8 mm), set in silty calcareous clay matrix; rare pyrite and glauconite impregnated fossils. Calcareous siltstone-brown to grey, soft to firm, with minor forams and fossil fragments set in silty calcareous clay matrix. Calcareous Sandstone - white to light brown, firm to hard, predominantly medium grained quartz grains, sub-angular to sub-rounded, clear to milky, well sorted; with white calcareous clayey cement, minor forams and fossil fragments.

1960-2164m — INTERBEDDED MARL, CALCAREOUS MUDSTONE, AND CALCAREOUS SILTY SHALE, MINOR SKELETAL LIMESTONE: Marl - very light grey, very soft, fossiliferous with 10% forams (1/16 - 1/8 mm) and fossil fragments, some impregnated with glauconite and pyrite; gradational with Calcareous Mudstone. Calcareous shale - light grey - brown, firm, subfissile, minor silt, and silt size forams and fossil fragments, trace carbonaceous specks, glauconite and pyrite.

LAKES ENTRANCE FORMATION (2164-2416 mKB)

2164-2416 m — INTERBEDDED MARL, CALCAREOUS MUDSTONE AND SHALE: Marl - light grey to white, very soft, silty in part, minor siltsize forams trace nodular pyrite carbonaceous flecks. Calcareous Mudstone - light grey to buff, soft, minor siltsize forams, carbonaceous flecks, pyrite and glauconite, grading to - Calcareous Shale - medium to dark grey, subfissile to fissile, silty, minor siltsize fossil forams, carbonaceous specks and pyrite.

LATROBE GROUP FORMATION (2416 -2691m KB)

2416 -2445m — INTERBEDDED FINE SANDSTONE & SILTSTONE WITH MINOR THIN COARSE SANDSTONE BEDS: Sandstone - medium grey, very fine to fine, moderately consolidated with fine silty laminae, light grey-white silty matrix; glauconite common (1-5%); mica (1-2%), trace pyrite and carbonaceous specks, numerous burrows (from core). Siltstone - medium grey, grey-brown, grading to very fine sandstone, moderately consolidated, highly bioturbated (from core); glauconite and mica common, traces of dark brown-black carbonaceous material. Coarse Sandstone - medium grey to grey brown, coarse to granular, sub-rounded - rounded quartz grains set in matrix of fine to medium subangular quartz grains, moderately consolidated to friable; glauconite (2-3%), mica (1-2%), trace pyrite and carbonaceous material, few silty bands and burrows (from core). Fair to good porosity.

2445-2691m — INTERBEDDED SANDSTONE, SILTSTONE AND COALS: Sandstone - light grey, medium to very coarse and granular, (seen predominantly as loose quartz grains in cuttings), sub angular to rounded, clear to opaque, rare pyrite seen coating grains. Excellent porosity. Minor Sandstone - light grey-white, very fine to fine, subangular quartz grains, silty in part, moderately consolidated, white clay matrix, med and fine carbonaceous laminae common. Siltstone - brown to dark grey-brown, soft to firm, commonly interbedded with thin coaly band or streaks and micaceous laminae, grades to very fine sandstone in part. Coal - black, moderately hard to hard, vitreous, blocky, some conchoidal fracture; silty and pyrite in part, often with shaley bands.

GEOLOGICAL AND GEOPHYSICAL ANALYSIS

GEOLOGICAL DATA:

AGE	FORMATION/HORIZON	DEPTH (M) PRE-DICTED	ACTUAL (KB)	SUBSEA	THICKNESS
PLIOCENE/MIOCENE	Gippsland Limestone	90	90	- 65	2074
	Base of High Velocity	1715	1747	- 1722	-
OLIGOCENE	Lakes Entrance Formation		2164	- 2139	252
	Mid Miocene Marker	2235	2198	- 2173	-
EOCENE/PALEOCENE	Latrobe Group	2415	2416	- 2391	275+
	Gurnard Formation	2415	Absent		0
	Coarse Clastics	2420	2416	- 2391	275+
	M-1.3 Seismic Marker	2650	2635	- 2610	
	T.D.		2691	- 2666	

ANALYSIS:

Fortescue-1 was drilled into the crest of a small anticlinal culmination northwest of the Halibut Field, primarily to evaluate the hydrocarbon potential of the structure. Closure resulted from a combination of erosional paleo-topography, depositional dip and structural dip. The secondary objective was to correlate the Latrobe Group with that of the most westerly Halibut development wells, and thus provide an indication of the possible stratigraphy of the unevaluated M-1.0.0 section in West Halibut.

Fortescue-1 encountered no hydrocarbons in the Latrobe Group reservoir sands. The reason for this is unknown, but may be the result of a break in lithologic seal rather than to either lack of structural closure, or non generation and emplacement of hydrocarbons. Drilling did show however, that the western flank of the Halibut Field probably contains a most prospective M-1.0.0 equivalent section.

STRATIGRAPHY:

The Latrobe Group in Fortescue-1 was expected to consist of the porous and permeable coarse grained marine reservoir sand sequence of the M.1.0, M.1.1 and M.1.3 units overlain by a thin poor quality reservoir greensand.

In actuality the Upper M. diversus unit encountered at the top of the Latrobe consisted of a tight fine grained sandstone/siltstone with only accessory glauconite and pyrite. This is interpreted to be an "offshore marine facies" with a slightly higher deposition rate and shallower environment of deposition than typical Gurnard Formation.

This was underlain by a thick section of previously unevaluated M.1.0.0 unit, consisting of coarse, pebbly, clean sands of excellent porosity, with rare fine grained carbonaceous interbeds. This is interpreted to be a "Shoreface" marine facies, high energy environment.

The remaining section of Latrobe Coarse Clastics intersected consisted of thinly interbedded sandstone, siltstone, and coals, essentially of poorer reservoir quality than the Halibut field. These are interpreted to be predominantly "deltaic facies" with substantial backshore deposition, as shown by the common coal seams and carbonaceous siltstones.

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10. GEOCHEMICAL ANALYSES OF A CORE SAMPLE AND A WATER SAMPLE FROM FORTESCUE-1 WELL, GIPPSLAND BASIN, AUSTRALIA

by Brian Burns
February 1979

A sample from Core 2, 2428.85m, in the Fortescue-1 well in the Gippsland Basin, Australia was analysed for Total Organic Carbon, C_{15+} liquid and gas chromatography and mass spectrometric analyses for carbon isotopes and heavy molecular types. The results are given in the following tables and figure.

The sample was a fine-grained sandstone containing some non-fluorescing "tarry" material. Table 1 shows that it has a low TOC of 0.2% and so is rated as a non-source rock. However it does contain a reasonable amount of soluble asphaltic material and this is probably related to the "tarry" substance.

The saturates chromatogram (Fig.1) indicates that the sample is immature and so the sampled interval is unlikely to have ever generated any significant quantities of hydrocarbons.

The water analysis from FIT-2, 2565m, indicates a total dissolved solids of approx. 23,000 ppm (Table 3) which, allowing for some possible filtrate dilution, would correspond to the normal Latrobe salt-water salinity. This means that there is little chance of the "tarry" material being the result of biodegradation.

GEOPHYSICS:

The Fortescue anomaly was defined by G72A and G74A seismic data in which the top of the Latrobe Group is represented by a continuous high amplitude event that can be mapped confidently except on the steep erosional side of the Marlin Channel.

Fortescue-1 encountered the top of Latrobe Group 1 metre higher than predicted. Check shot lines from the well indicate that the pre-drill time pick for the top of Latrobe was correct and that the average velocity to the top of Latrobe Group should be revised to 2790 m/s.

The structure map on top of Latrobe Group has been modified to incorporate both the results of the well and the recently shot G77A seismic survey.

Table 1 Heavy (C_{15+}) Soluble Organic Matter

	Fortescue-1
Depth	2428.85 m
Unit	U..M. div.
EPR No.	69203
Rock Extracted (gms)	170.4
Total Organic Carbon (%)	.20
Soluble Organic Matter (ppm)	1445
Asphaltenes (ppm)	1255
Pentane Solubles (milligrams)	32.4
Saturates (mg)	1.8
Aromatics (mg)	6.6
Compositions of Soluble O. M. (%)	
Saturates*	.7
Aromatics	2.7
Eluted NSO's	3.5
Noneluted NSO's	6.3
Asphaltenes	86.8
Hydrocarbons	
ppm	49
% of T.O.C.	
Sats./Aroms.	0.26
C_{15+} Source Rating	Poor

Table 2 Carbon Isotope Values and Heavy (C_{15+}) Aromatic Molecular Types, Fortescue-1 Sample

(Analyses by P. Gregory, R. Barrientos)

Depth	2429 m.
EPR No.	69203
Gross Composition (%)	
Saturates	.7
Aromatics	2.7
NSO's	3.5
Noneluted NSO's	6.3
Asphaltenes	86.8
Carbon Isotope Values	
Saturates	− 27.0
Aromatics	− 28.2
Saturate Molecular Types*	Not Analyzed
Aromatic Molecular Types	
Benzenes	2.4
Indanes	3.7
Indenes	5.8
Naphthalenes	2.4
Tetrahydrophenanthrenes	11.5
Dihydrophenanthrenes	21.5
Phenanthrenes	15.1
Pyrenes	14.1
Chrysenes	9.0
Benzothiophenes	1.8
Dibenzothiophenes	8.7
Thiophenophenanthrenes	4.3

*The saturate fraction was placed in the high-mass spectrometer but the output proved to be unusable due to the small sample size.

TABLE 3 - WATER ANALYSIS FORTESCUE-1, FIT-2, 2565 metres

WATER ANALYSIS REPORT — AMDEL COMPUTER SERVICES

SAMPLE ID. 8468 SFM-B NO.16 — JOB NO. 1223-79

CHEMICAL COMPOSITION		MILLIGRAMS PER LITRE MG/L	MILLIEQUIVS. PER LITRE ME/L
CATIONS			
CALCIUM	(CA)	311	15.5
MAGNESIUM	(MG)	521	42.8
SODIUM	(NA)	7673	333.8
POTASSIUM	(K)	348	8.9
IRON	(FE)		
ANIONS			
HYDROXIDE	(OH)		
CARBONATE	(CO3)		
BICARBONATE	(HCO3)	736	12.1
SULPHATE	(SO4)	1652	34.6
CHLORIDE	(CL)	12045	339.7
BROMIDE	(BR)		
FLUORIDE	(F)		
NITRATE	(NO3)	<1	.0
PHOSPHATE	(PO4)		

TOTALS AND BALANCE

CATIONS (ME/L) 401.0 DIFF = 14.7
ANIONS (ME/L) 386.4 SUM = 787.4

DIFF*100. / SUM = 1.9 %

DERIVED AND OTHER DATA		
CONDUCTIVITY (E.C.) MICRO-S/CM AT 25 DEG. C	17728.	
		MILLIGRAMS PER LITRE MG/L
TOTAL DISSOLVED SOLIDS		
A. BASED ON E.C.		
B. CALCULATED (HCO3=CO3)		22923.
C. RESIDUE ON EVAP. AT 180 DEG. C		
TOTAL HARDNESS AS CACO3		2920.
CARBONATE HARDNESS AS CACO3		603.
NON-CARBONATE HARDNESS AS CACO3		2318.
TOTAL ALKALINITY AS CACO3		603.
FREE CARBON DIOXIDE (CO2)		
SUSPENDED SOLIDS		
SILICA (SIO2)		
BORON (B)		
		UNITS
REACTION - PH		7.2
TURBIDITY (JACKSON)		
COLOUR (HAZEN)		
SODIUM TO TOTAL CATION RATIO (ME/L)		83.2 %

REMARKS

NAME- ESSO AUSTRALIA
ADDRESS-

DATE COLLECTED
DATE RECEIVED

HUNDRED-
SECTION-
HOLE NO-
SUPPLY-
SAMPLE COLLECTED BY-

WATER CUT-
WATER LEVEL-
DEPTH HOLE-

C_{15}^{+} Paraffin-Naphthene Hydrocarbon

GeoChem No. E257-001
Exxon No. 69203

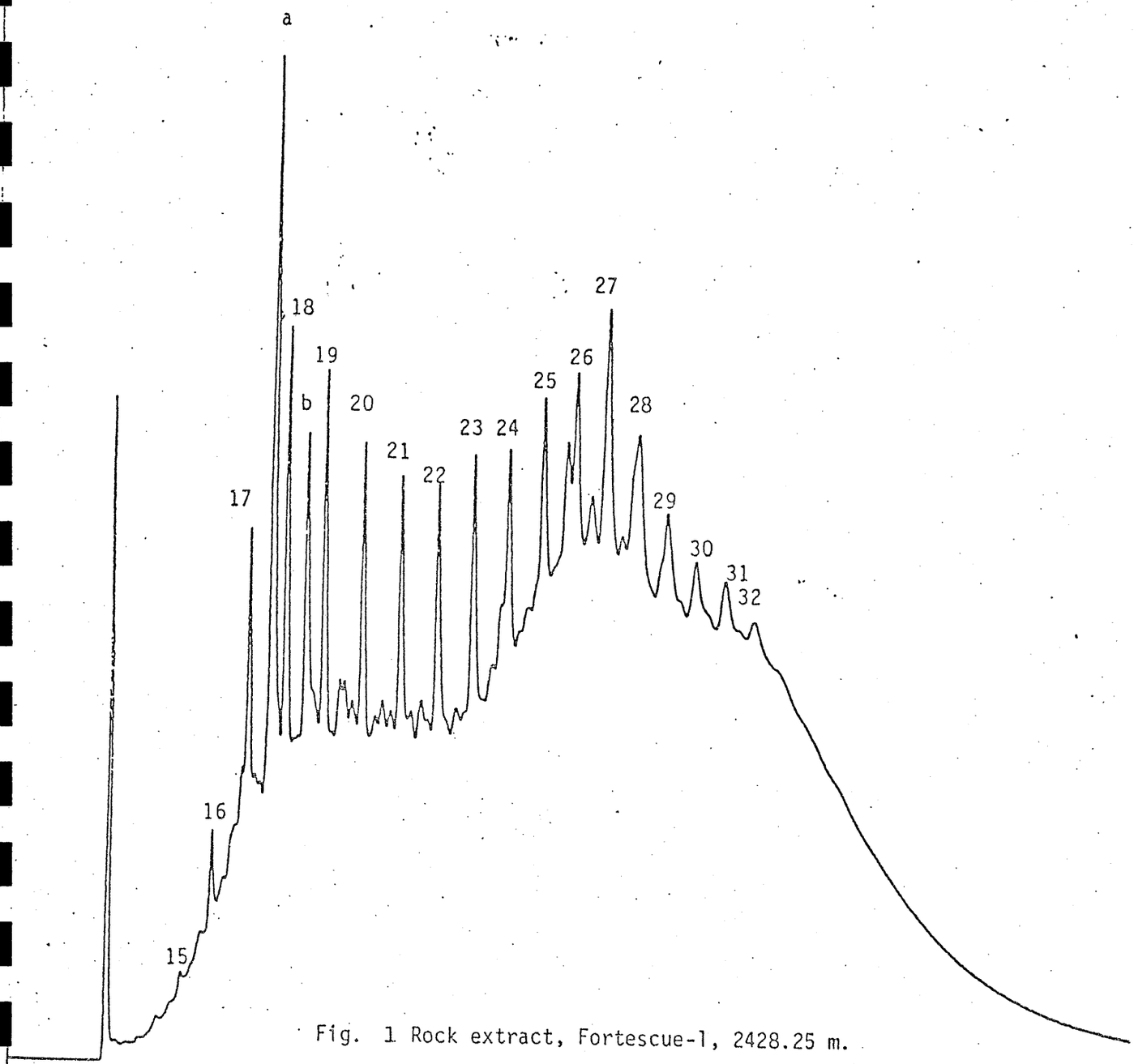

Fig. 1 Rock extract, Fortescue-1, 2428.25 m.

APPENDIX 1

APPENDIX I

SAMPLE DESCRIPTIONS

FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS

L. BROOKS

22/6/78

DEPTH	%	DESCRIPTION
240m-250m	100%	Skeletal Calcarenite - mainly shell fragments, coarse to very coarse, white to light grey, bryozoa, forams, bivalves, corals and ostracods. Cement and casing shoe cavings.
250m-260m	100%	Skeletal Calcarenite - white to light grey, fine to medium grained, very loosely cemented aggregates of fossil debris with abundant very coarse grained shell fragments. Debris of bivalves, forams, bryozoa, corals, echinoid spines, ostracods. Trace glauconitic clay within some fossils. Some fragments stained/ replaced by pyrite.
260m-270m		As above.
270m-280m		As above. Trace interbeds of medium grey Calcilutite, firm, some quartz silt.
280m-290m	100%	Skeletal Calcarenite - white to medium grey, very fine to fine grained, firmly to loosely cemented fossil debris, silty, abundant very coarse fossil fragments, as above.
290m-300m		As above. Slightly dirtier and greyer.
300m-310m		As above. Rare Calcareous Shale - very calcareous, dark grey to black, silty, firm.
310m-320m	100%	Skeletal Calcarenite - as above. Rare Calcareous Shale - as above.
320m-330m		As above.
330m-340m	100%	Skeletal Calcarenite - off white to light grey, abundant, very coarse to granule size, fossil fragments in very fine to fine matrix of skeletal debris, moderate sorting, speckled, firm. Speckling results from darker pyrite stained grains. Trace of Calcareous Shale, dark grey, carbonaceous, very calcareous, firm to hard.
340m-350m	100%	Skeletal Calcarenite - as above, very much less coarser grained fossil fragments.
350m-360m	100%	Calcarenite - light grey, speckled with darker pyrite stained grains, very fine to fine grained, silty, poorly sorted, made up of fossil debris. Fossils and fossil fragments common. Firm, good porosity.
360m-370m		As above.
370m-380m		As above.
380m-390m		As above.
390m-400m	100%	Calcarenite - as above.
400m-410m	100%	Skeletal Calcarenite - light grey, speckled with darker pyrite stained/replaced grains, very fine to fine grained, silty (quartz)

2/....

FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS

L. BROOKS

22/6/78

DEPTH	%	DESCRIPTION
400m-410m		Continued/....
		poorly sorted, firm. Common larger fossil fragments, especially bivalves. Trace glauconite grains. Fossils include bivalves, forams, bryozoa, gastropods, echinoid spines.
410m-420m	100%	Skeletal Calcarenite - As above. More larger bivalve (?) fragments.
420m-430m	100%	Calcarenite - As above.
430m-440m	100%	Calcarenite - As above. R.C.N. THORNTON
440m-450m	100%	Skeletal Calcarenite to Marl - light grey, very soft, containing quartz silt grains, very fine to fine grained, speckled with dark brown pyrite. Fossils and large fossil fragments, less abundant than above, particularly comprising forams, bivalves, bryozoa. Trace glauconite grains.
450m-460m	100%	Skeletal Calcarenite to Marl - light grey, dominantly very soft to moderately hard, containing quartz silty grains, very fine to fine grained, silt size and very fine to fine shell fragments set in light grey matrix, speckled dark brown with pyrite. Fossils and fossil fragments include forams, bivalve fragments (some stained brown to black in bands by pyrite), echinoid spines, bryozoa, ostracods, gastropods.
460m-470m	100%	Skeletal Calcarenite to Marl - as above (clear spheres 1/8mm diameter).
470m-480m	50% 50%	Skeletal Calcarenite (indurated) to Marl (very soft) - As above. Abundant forams.
480m-490m	60%	Marl - light grey, very soft, speckled with shell fragments, some stained brown by pyrite. Shell fragments range from silt sized to large forams, bivalve fragments, gastropods. Shells abundant, and include also bryozoan fragments, echinoid spines, tiny forams.
	40%	Skeletal Calcarenite - moderately hard, speckled with silt sized shell fragments and minor quartz silt. Trace glauconite grains.
490m-500m	100%	Marl - highly fossiliferous, as above.
500m-510m	100%	Marl - as above, except some moderately indurated and slightly silty. Trace pyritised glauconite grains; glauconite impregnated forams.
510m-520m	100%	Marl - as above, 20% moderately indurated.
520m-530m	100%	Marl - light grey, very soft, highly fossiliferous, fossils range from very small (1/8mm) forams and gastropods to large (3mm) forams, bivalve fragments, echinoid spines. Pyrite common accessory. Trace glauconite impregnated forams.
530m-540m	100%	Marl - very soft, as above, except mostly very small (1/8mm) fossils and fossil fragments. Glauconite impregnated forams common. Trace clear and black (pyrite?) 1mm diameter calcite spheres.

3/....

FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS — R.C.N. THORNTON

22/6/78

DEPTH	%	DESCRIPTION
552.2m		Short trip - 11.30 am to 2.30 pm.
540m-550m		Sample lost.
550m-560m	100%	Marl - as above, 90% very soft; 10% hard (fossiliferous limestone).
560m-570m	100%	Marl - light grey, soft (80%) to hard (20%) fossiliferous limestone), fossiliferous, mainly 1/8mm size but up to 1.2mm. Minor large fossils mainly comprise forams and echinoid spines but include bivalve fragments. Many small fossils are impregnated with glauconite. Trace Pyrite - 1mm diameter clear calcite spheres.
570m-580m	100%	Marl - as above, except all very soft.
580m-590m	60%	Marl - as above.
	40%	Fossiliferous Limestone (packstone) - moderately hard to hard, light grey, comprising 40% 1/8mm diameter fossils (forams, many green due to glauconite) and fossil fragments set in light grey calcite matrix, minor clay (i.e. similar to Marl except was indurated and less clay). Minor large fossils consist of echinoid spines and forams.
590m-600m	55%	Marl - as above.
	45%	Fossiliferous Limestone - As above. Trace Pyrite.
600m-610m	60%	Marl - As above.
	40%	Fossiliferous Limestone - As above.
610m-620m	70%	Marl - As above.
	30%	Fossiliferous Limestone - As above.
620m-630m	90%	Marl - As above.
	10%	Fossiliferous Limestone - As above.
630m-640m	80%	Marl - As above.
	20%	Fossiliferous Limestone
640m-650m	70%	Marl - very light to light grey, very soft to soft, 40% fossils and fossil fragments (1/8 to ¼mm in size) comprising glauconitised forams and debris, set in a clayey calcareous matrix.
	30%	Fossiliferous Limestone (packstone) - light grey, moderately hard to hard, 50% fossils and fossil fragments (1/8 to ¼mm) set in calcareous matrix. Disaggregated fossils, mainly forams (up to 1-2mm diameter) and broken bivalves common; also calcite spheres (1mm diameter).

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FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS — R.C.N. THORNTON

22/6/78

DEPTH	%	DESCRIPTION
650m-660m	70%	Marl - As above.
	30%	Fossiliferous Limestone - As above.
660m-670m	70%	Marl - As above.
	30%	Fossiliferous Limestone - As above.
670m-680m	80%	Marl - As above.
	20%	Fossiliferous Limestone - As above, except disaggregated large fossils are rare.
680m-690m	80%	Marl - As above.
	20%	Fossiliferous Limestone - As above.
		Trace dark grey silty shale.
690m-700m	60%	Marl - As above.
	40%	Fossiliferous Limestone - As above.
700m-710m	90%	Fossiliferous Limestone (packstone) - light grey to brown, moderately hard to hard, comprising 50-60% fossils (mainly forams), and fossil debris (1/8-¼mm diameter), some glauconitised, set in slightly clayey calcareous matrix.
	10%	Marl - very light grey, soft, 40-50% fossil and fossil debris, some glauconitised, set in clayey, calcareous matrix.
		Trace large bivalve shell fragments, forams, echinoid spines.
710m-720m	90%	Fossiliferous Limestone - As above.
	10%	Marl - As above.
720m-730m	60%	Fossiliferous Limestone - As above.
	40%	Marl - As above.
		Disaggregated large fossil fragments, mainly echinoid spines and forams.
730m-740m	80%	Fossiliferous Limestone - As above.
	20%	Marl - As above.
		Disaggregated fossils include bryozoans, echinoid spines.
740m-750m	100%	Fossiliferous Limestone - buff to grey brown, speckled with trace pyrite stained grains and glauconite grains, moderately hard. Mainly comprised of globular (planktonic) forams and fossil debris, very fine grained with calcilutite matrix. Minor terrigenous silt and clay. Minor larger fossil fragments - bivalve, bryozoa, echinoid spines. Minor Marl - light grey, soft, fossiliferous, interbedded with some Limestone.
750m-760m		As above.

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FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS — R.C.N. THORNTON

22/6/78

DEPTH	%	DESCRIPTION
760m-770m	100%	Fossiliferous Limestone - As above.
		Minor Marl - As above.
770m-780m	60%	Fossiliferous Limestone - As above.
	40%	Marl - As above.
780m-790m	70%	Fossiliferous Limestone - As above.
	30%	Marl - As above.
790m-800m	80%	Fossiliferous Limestone - As above, occasionally friable.
	20%	Marl - As above.
800-810m	60%	Fossiliferous Limestone - As above, but generally not as hard to moderately friable, grades to
	40%	Marl - As above.
		More abundant loose globular forams ~ 1mm diameter.
810m-820m	60%	Fossiliferous Limestone - As above.
	40%	Marl - As above.
820m-830m	80%	Fossiliferous Limestone - medium grey brown, friable to hard, generally moderately hard, very fine grained, calcilutite matrix, in places well cemented and less fossiliferous, hard. Globular forams and foram debris make up a large part of the sediment. Trace glauconitic grains and carbonaceous flecks. Significant terrigenous silt and clay.
	20%	Marl - light grey, soft, commonly fossiliferous (forams), terrigenous clay.
830m-840m	60%	Fossiliferous Limestone - As above.
	40%	Marl - As above.
840m-850m	80%	Fossiliferous Limestone - As above.
	20%	Marl - As above.
850m-860m	100%	Fossiliferous Limestone - As above. Minor Marl - As above.
860m-866m	100%	Fossiliferous Limestone - As above. Minor Marl - As above.
		P.O.H. to log and run casing. Casing shoe at 854m.
		Recommenced drilling new hole 2100 hours 25/6/78. L. BROOKS
867m-880m	100%	Calcilutite - light grey brown speckled, firm to moderately hard very silty, fossiliferous. Mainly forams of silt size, Sponge spicules and silt size quartz grains (diatoms?) common. Minor dark green glauconite grains. Considerable clay content.

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FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS

L. BROOKS

26/6/78

DEPTH	%	DESCRIPTION
867m-880m		Continued/.....
		Occasional pyrite layer. Very rare macrofossil fragments.
880m-890m	100%	Calcilutite - silty, as above, 60% medium brown, hard to very hard, which appears to be a recrystallised version of the calcilutite.
890m-900m	100%	Calcilutite - as above, rarely cemented. Minor forams, mainly globular, coarse to small size, abundant cement cavings.
900m-910m	100%	Calcilutite - as above, grades to Minor Marl - light grey, soft, much more clay size fraction version of the Calcilutite. Abundant cement cavings.
910m-920m	70%	Calcilutite - as above, softer and clayier grading to
	30%	Marl - as above. Abundant forams of 1-2mm diameter, globular to spirally. Some tiny bivalves? ~ 1mm.
920m-930m	90%	Calcilutite - as above. Minor hard, cemented.
	10%	Marl - as above. Common forams 1-2mm diameter.
930m-940m	90%	Calcilutite - as above, slightly sandy.
	10%	Marl Common forams as above.
940m-950m	100%	Calcilutite - silty to very fine calcarenite, light grey brown, firm, speckled with common glauconitic and carbonaceous grains. Fossiliferous, mainly very fine small silt size forams, sponge spicules, silt size quartz grains, well rounded (diatoms?). Significant clay content. Minor Marl - light grey, soft, fossiliferous, trace Pyrite. Minor forams, 1-2mm diameter, mainly globular.
950m-960m	90%	Calcilutite - silty, sandy, as above.
	10%	Marl - As above. Common forams as above.
960m-970m	100%	Calcilutite - as above, darker brown.
		Minor Marl - As above. Common forams as above.
970m-980m	100%	Calcilutite - as above, medium grey brown. Very common calcite chips - probably fragments of larger shells. Abundant forams as above.
980m-990m	100%	Calcilutite - as above. 40% cemented hard; medium dark brown. Abundant forams as above.
990m-1000m	100%	Calcilutite - as above, light grey to medium grey brown. Abundant forams.

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FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS — R.C.N. THORNTON

26/6/78

DEPTH	%	DESCRIPTION
1000m-1010m	100%	Calcilutite - As above.
1010m-1020m	100%	Calcilutite - As above. Abundant forams. 26.6.78: 0935 hours, pulled out to change bits. Bit #4: HTC X3A, size 311.15mm, 3 x 14.29mm jets. 1450 hours, recommenced drilling.
1020m-1030m		NO SAMPLE.
1030m-1040m	100%	Calcilutite - light grey, buff, light brown, moderately soft to moderately hard, hardness increasing with relative decrease of clay to calcite in matrix, containing mostly $^{1}/_{8}$-$^{1}/_{16}$mm size (some larger) fossils and fossil fragments (mainly forams, and sponge spicules) in amounts ranging from 0-50%. Minor silt, trace pyrite and glauconite impregnated fossils. Brown amorphous (?) organic material in matrix. Trace large disaggregated forams.
1040m-1050m	100%	Calcilutite - As above. Medium (1mm) - large (3mm) disaggregated forams common.
1050m-1060m	100%	Calcilutite - As above. Some disaggregated forams.
1060m-1070m	100%	Calcilutite - As above. Some disaggregated forams.
1070m-1080m	100%	Calcilutite - As above. Some disaggregated forams.
1080m-1090m	100%	Calcilutite - As above, except mostly moderately soft and relatively clay rich, visible fossils, fossil fragments - 0-20%.
1090m-1100m	100%	Calcilutite - As above.
1100m-1110m	100%	Calcilutite - As above, except minor hard and brown. Trace disaggregated large forams.
1110m-1120m	100%	Calcilutite - As above.
1120m-1130m	100%	Calcilutite - As above, 70% of which is hard, crystalline, fawn to brown. Trace disaggregated large forams.
1130m-1140m	100%	Calcilutite - light to medium grey, buff, light to medium brown, soft to moderately hard, up to 20% visible small ($^{1}/_{16}$-$^{1}/_{8}$mm) globular forams and fossil fragments (including sponge spicules) set in clayey and slightly silty calcareous matrix. Brown amorphous (?) organic material in matrix. Trace large disaggregated forams.
1140m-1150m	100%	Calcilutite - As above, except minor amounts hard crystalline, and relatively lacking in clay.
1150m-1160m	100%	Calcilutite - As above. Trace large disaggregated forams.

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FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS

R.C.N. THORNTON

26/6/78

DEPTH	%	DESCRIPTION
1160m-1170m	100%	Calcilutite - As above. Trace large disaggregated forams and shell fragments.
1170m-1180m	100%	Calcilutite - As above, except slight increase in size and amount of fossil content in part. Slight increase in amount of disaggregated forams. L. BROOKS
1180m-1190m	100%	Calcilutite - As above, but very clayey.
1190m-1200m	100%	Calcilutite - As above.
1200m-1210m	100%	Calcilutite to Calcareous Mudstone - light grey to medium grey brown, soft to moderately hard, silty, fossiliferous, rare glauconite and carbonaceous grains. Much clay, acid insoluble. Minor Marl - light grey, soft, ~50% + clay. Minor forams.
1210m-1220m	100%	Calcareous Mudstone - As above, partly cemented and hard. Minor Marl - As above.
1220m-1230m	100%	Calcareous Mudstone - As above. Minor forams - as above.
1230m-1240m	100%	Calcareous Mudstone - As above, but more fossiliferous and containing sponge spicules. Minor forams, as above.
1240m-1250m	100%	Calcareous Mudstone - As above. Trace forams as above, echinoid spines.
1250m-1260m	100%	Calcareous Mudstone - As above, hard. Trace forams, as above.
1260m-1270m	100%	Calcareous Mudstone - buff to moderate grey brown, soft to hard, where cemented. Slightly fossiliferous - mainly forams with rare sponge spicules. Contains abundant calcareous silt. Trace glauconite and dark carbonaceous grains. Buff colour tends to be siltier and more fossiliferous. Minor Marl - light grey, soft, speckled with trace glauconite and carbonaceous grains, slightly fossiliferous. Some forams 1-2mm diameter. Mainly globular planktonic forams.
1270m-1280m	100%	Calcareous Mudstone - As above. Minor Marl - As above.
1280m-1290m	100%	Calcareous Mudstone - As above, more light grey material. Minor forams, as above.
1290m-1300m		As above.
1300m-1310m	80% 20%	Calcareous Mudstone - As above, more fossiliferous. Marl - As above. Minor forams, as above.
1310m-1320m	90% 10%	Calcareous Mudstone - As above. Marl - As above. Minor forams, as above.
1320m-1330m	100%	Calcareous Mudstone - As above, but more fossiliferous - mainly very fine sand size forams. Abundant forams ~ 2mm diameter.

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FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS

L. BROOKS.

27/6/78

DEPTH	%	DESCRIPTION
1330m-1340m	100%	Calcareous Mudstone - As above.
1340m-1350m	100%	Calcareous Mudstone - light grey to medium grey brown, soft, moderately hard to hard where cemented. Fossiliferous to very fine sand size forams and rare sponge spicules. Trace black carbon? very fine sand size grains, pyrite. Minor Marl - light grey, soft, weak dark laminations. Some loose forams, mainly planktonic. R.C.N. THORNTON
1350m-1360m	100%	Calcareous Mudstone - As above. Some loose forams.
1360m-1370m	100%	Calcareous Mudstone - As above, fossil content mostly 5-20%. Loose forams common.
1370m-1380m	100%	Calcareous Mudstone - As above. Loose forams common.
1380m-1390m	100%	Calcareous Mudstone - As above, except 70% very soft and therefore Marl.
1390m-1400m	100%	Marl - very light grey to buff, very soft, highly calcareous mud, containing up to 20% visible content of fossils (mainly forams) some of which have been altered to pyrite and (?) glauconite. Size of fossils generally $^{1}/_{16}$-$^{1}/_{8}$mm, some larger. (?) Carbonaceous specks. Large (1mm) disaggregated forams common.
1400m-1410m	100%	Marl - As above.
1410m-1420m	100%	Marl - 70% very soft, very light grey to buff, 30% soft, light grey to brown. 0-40%, mostly 20% visible forams and fossil fragments (mostly $^{1}/_{16}$-$^{1}/_{8}$mm, some larger) set in calcareous clay matrix. Minor (?) carbonaceous flecks, minor loose layer (up to 1mm diameter) forams. Trace pyrite, glauconite impregnated fossils.
1420m-1430m	95% 5%	Marl - As above, except 60% soft, 40% very soft. Calcilutite - green to brown, hard, clayey, slightly fossiliferous, crystalline.
1430m-1440m	100%	Marl - As above. Trace large, loose forams.
1440m-1450m	100%	Marl - As above. Trace large, loose forams.
1450m-1460m	100%	Marl - As above. Trace large, loose forams.
1460m-1470m	100%	Marl - As above. Trace large, loose forams.
1470m-1480m	100%	Marl - As above. Trace large, loose forams.
1480m-1490m	100%	Marl - 70% firm to moderately hard, grey to green to brown, 30% very soft, very light grey. 0-40%, mostly 20% visible forams and fossil fragments (mostly $^{1}/_{16}$-$^{1}/_{8}$mm, some larger), set in slightly silty calcareous clay matrix. Minor (?) carbonaceous

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FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS — R.C.N. THORNTON

27/6/78

DEPTH	%	DESCRIPTION
1480m-1490m		Continued/....
		flecks, trace pyrite and glauconite impregnated grains. Trace loose large (up to 2mm diameter) forams.
1490m-1500m	100%	Marl - As above.
1500m-1510m	100%	Marl - As above.
1510-1520m	100%	Marl - 80% firm to moderately hard, light brown to grey, 20% very soft, very light grey. Mostly 40-50% visible forams and fossil fragments ($^{1}/_{16}$-$^{1}/_{8}$mm) set in calcareous and very slight silty clay matrix. Trace (?) carbonaceous flecks, pyrite, glauconite impregnated fossils, large (1-2mm) loose forams.
1520m-1530m	100%	Marl - As above, firm portion could be called calcareous Mudstone.
1530m-1540m	100%	Marl - As above.
1540m-1550m	100%	Marl - As above.
1550m-1560m	100%	Marl - As above.
		L. BROOKS
1560m-1570m	80%	Calcareous Siltstone - grading to Mudstone - light to medium grey brown, soft to moderately hard, harder where cemented, very fossiliferous, silt and very fine sand size foram and fossil fragments. Trace black carbonaceous (?) flecks, pyrite, rare glauconite. Trace forams 1-2mm. Clay insolubles grades to 20% Marl - light grey, soft, only slightly fossiliferous. Trace pyrite, dark carbonaceous flecks.
	20%	
1570m-1580m		As above.
1580m-1590m		As above.
1590m-1600m	80%	Calcareous Siltstone to Mudstone - As above, grading to
	20%	Marl - As above.
		Minor loose forams, as above.
1600m-1610m		As above.
1612m		Pulled out of hole to change bit.

11/....

FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS

R.C.N. THORNTON

27.6.78

DEPTH	%	DESCRIPTION
1612m-1620m	90%	Calcareous Mudstone - As above, light to medium grey to brown, firm to moderately hard, 0-40%, generally 20%, forams and fossil fragments ($\frac{1}{16}$-$\frac{1}{8}$mm, some larger) set in highly calcareous, slightly silty, clay matrix. Trace (?) carbonaceous flecks, pyrite and rare glauconite impregnated fossils.
	10%	Marl - very light grey, very soft, otherwise like Calcareous Mudstone. Trace disaggregated large (1-2mm) forams.
1620m-1630m	90% 10%	Calcareous Mudstone - As above, except fossils slightly larger. Marl - As above. Loose large forams common.
1630m-1640m	90% 10%	Calcareous Mudstone - As above. Marl - As above. Forams as above.
1640m-1650m	100%	Calcareous Mudstone - As above, except fossil content increased, generally 40%.
1650m-1660m	100%	Calcareous Mudstone - As above, except with increased fossil content, it is probably more correctly called skeletal micritic Limestone.
1660m-1670m	100%	Skeletal Limestone - As above.
1670m-1680m	90%	Skeletal Micritic Limestone - light to medium grey, occasional grading to medium grey brown, firm to moderately hard, forams and other fossil fragments, matrix, very calcareous, slightly silty clay matrix. Occasional Pyrite and ? carbonaceous flecks.
	10%	Calcareous Mudstone - medium to medium to dark grey, soft to moderately hard. No visible porosity or permeability.
1680m-1690m	95%	Skeletal Micritic Limestone - light to medium grey brown, moderately hard, otherwise, as above.
	5%	Loose Skeletal Fragments, some pyritised.
1690m-1700m	100%	Skeletal Micritic Limestone - as above, trace loose fossil fragments, as above.
1700m-1710m	100%	Skeletal Micritic Limestone - (i.e. 50-90% skeletal grains in matrix of light grey to light grey brown lime mud), moderately hard to firm, skeletal grains consist mainly of forams with some spicular fragments. Occasional pyrite and ? carbonaceous flecks. No visible porosity and permeability.
1710m-1720m	100%	Limestone - as above, medium to light grey brown. Trace hard, platy, dark grey calcite - probably secondary fissure infilling.
1720m-1730m	100%	Limestone - as above, mainly medium light grey brown, finely disseminated pyrite, decrease in larger fossil fragments. Trace disaggregated fossil fragments.
1730m-1740m (Good sample for Forams)	100%	Limestone - skeletal, micritic. Skeletal fragments commonly larger than silt size, medium to light grey, and light grey brown, mainly firm, occasional carbonaceous fragments, finely pyritised in patches, no visible porosity or permeability.

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DEPTH	%	DESCRIPTION
1730m-1740m		Continued/....
		Occasional medium size grains of ? glauconite. Trace medium to dark grey calcareous mudstone, soft. Trace crystalline calcite, ? vein fillings.
1740m-1750m	60%	Limestone - As above.
	40%	Calcareous Silty Mudstone - medium to dark grey, pyritic in part, hard to moderately firm. Trace desegregated pyrite nodules and calcite ? vein fillings.
1750m-1760m	60%	Calcareous Silty Mudstone - medium grey, firm, pyritic in part.
	40%	Limestone - skeletal, micritic, composed of mainly silt size fossil fragments, medium to light grey lime mud matrix. Occasional desegregated rounded globular forams. Occasional pyrite nodules, no porosity or permeability.
1760m-1770m	60%	Calcareous Silty Mudstone - As above, some fine laminations.
	40%	Skeletal Limestone - As above.
		Trace pyrite nodules and desegregated forams. No visible porosity or permeability.
1770m-1780m	80%	Calcareous Silty Mudstone - medium grey, firm, pyritic in part.
	20%	Skeletal Limestone - As above. Desegregated globular forams and pyrite nodules. No visible porosity or permeability. Two lithologies probably finely interbedded.
1780m-1790m	80%	Calcareous Silty Mudstone - As above.
	20%	Skeletal Limestone - As above.
1790m-1800m	100%	Calcareous Silty Mudstone - medium grey, firm, finely pyritic. Trace Limestone, as above. Occasional foram and ? sponge fragments. Occasional glauconite grains. No visible porosity or permeability.
1800m-1810m	100%	Calcareous Silty Mudstone - As above, grading to calcareous siltstone. Well preserved, occasional desegregated benthonic forams, occasional globular forams. No visible porosity or permeability, trace dull mineral fluorescence.
1810m-1820m	60%	Calcareous Siltstone - light to medium grey, firm, fossiliferous.
	40%	Calcareous Silty Mudstone - As above.
		Trace micritic skeletal Limestone, disaggregated foram fragments. No visible porosity or permeability, no fluorescence.
1820m-1830m	50%	Calcareous Siltstone - light to medium grey, firm, fine spicular fossil fragments.
	50%	Skeletal Micritic Limestone - light grey brown, firm, lime mud matrix. Trace disaggregated fossil fragments (mainly forams)

DEPTH	%	DESCRIPTION
1820m-1830m		Continued/....
		and pyrite. No visible porosity or permeability, no fluorescence. Occasional glauconite grains.
		Note: Samples from 1850m down could be contaminated with white polymer (lumps). R.C.N. THORNTON
1830m-1840m	90%	Skeletal Micritic Limestone - As above, disaggregated forams common.
	10%	Calcareous Siltstone - As above.
		Trace - 1% Pyrite, mostly as concretions formed by replacement of lime mud around fossils by pyrite.
1840m-1850m	90%	Skeletal Micritic Limestone - As above, 2-3% of this comprises loose large forams.
	10%	Calcareous Siltstone - As above.
		Trace Pyrite, as above, Quartz grains - well rounded to sub-rounded, clear to milky and polished, fractured.
1850m-1860m	90%	Skeletal Micritic Limestone - As above.
	10%	Calcareous Siltstone - As above.
		Trace Pyrite - As above, Quartz grains - As above, coral fragment.
1860m-1870m	90%	Skeletal Micritic Limestone - buff, light to medium grey to brown, firm to hard, comprising > 50% forams and fossil fragments ($^1/16$-$^1/8$mm, some larger) set in clayey calcareous matrix. A few fossils impregnated with pyrite or glauconite. Trace amounts of pyrite, which has replaced matrix.
	4-5%	Calcareous Siltstone - soft to firm, brown to grey, with minor (0-10%) forams and fossil fragments ($^1/16$-$^1/8$mm) set in silty, calcareous clay matrix. Minor pyrite.
	4-5%	Calcareous Sandstone - quartz, clear to milky, polished to frosted, well rounded to subrounded, medium to coarse grained, poorly sorted, fractured, minor large fossil fragments, some glauconite impregnated, pyrite cemented by white slightly clayey calcite.
	1-2%	Loose Quartz grains - medium to very coarse grained, disaggregated from Sandstone, forams, especially benthonics and globular forams.
1870m-1880m	90%	Skeletal Micritic Limestone - As above.
	4-5%	Calcareous Siltstone - As above.
	4-5%	Calcareous Sandstone - As above, grading to skeletal sparite (i.e., increase fossil fragments).
	1-2%	Quartz grains - forams, as above.

FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS — R.C.N. THORNTON

28.6.78

DEPTH	%	DESCRIPTION
1880m-1890m	80%	Skeletal Micritic Limestone - As above.
	10%	Calcareous Sandstone - As above, grading to skeletal sparite, as above.
	5%	Calcareous Siltstone - As above.
	5%	Loose Forams plus fossil fragments (including cylindrical (?) coral fragments). Trace Quartz grains - As above.
1890m-1900m	85%	Skeletal Micritic Limestone - As above.
	10%	Calcareous Sandstone - As above, glauconite is a common accessory.
	5%	Forams and fossil fragments, as above, quartz grains, as above. Yellow spotty mineral fluorescence (pyrite).
1900m-1910m	85%	Skeletal Micritic Limestone - As above.
	10%	Calcareous Sandstone - As above, forams impregnated with glauconite common.
	5%	Loose forams and fossil fragments, Quartz grains, as above. Minor mineral fluorescence.
1910m-1920m	80%	Skeletal Micritic Limestone - As above.
	10%	Calcareous Sandstone - As above.
	10%	Loose forams - As above. Trace Quartz grains - clear to pink, medium to very coarse grained, polished to frosted, subangular to rounded.
1920m-1930m	95%	Skeletal Micritic Limestone - buff, light grey to grey brown, soft to moderately hard, comprising 50% forams and fossil fragments (including sponge spicules) ($^1/_{16}$-$^1/_4$mm, but well sorted), some altered to glauconite, occasional pyrite, set in clayey calcareous matrix.
	3%	Calcareous Sandstone - white to light brown, firm to hard, quartz grains, clear, subangular to subrounded, mostly medium grained, well sorted, glauconite impregnated fossils, pyrite, set in white sparry calcite matrix.
	2%	Forams (mostly 1mm), especially globular forams, some glauconite or pyrite impregnated and fossil fragments. Trace Quartz grains - fine to coarse grained, subangular to well rounded, clear, polished, fractured.
1930m-1940m	90%	Skeletal Micritic Limestone - As above.
	10%	Calcareous Sandstone - as above, gradational with:- Skeletal Sparry Limestone - white to light brown, firm to hard, minor quartz grains plus dominant forams and fossil fragments (mainly ¼-½mm), many impregnated with glauconite, occasional pyrite, all set in slightly clayey white sparry matrix. Trace -1% Forams - as above.

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FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS — R.C.N. THORNTON

28.6.78

DEPTH	%	DESCRIPTION
1930m-1940m		Continued/....
		Trace Quartz Grains - fine to coarse grained, subangular to well rounded, clear, polished, fractured.
		Sample quality poor, because cuttings are very soft.
1940m-1950m	90%	Skeletal Micritic Limestone - As above.
	10%	Skeletal Sparry Limestone - As above.
		Trace forams - as above.
1950m-1960m	90%	Skeletal Micritic Limestone - as above, except that content of visible forams and fossil fragments has diminished.
	10%	Skeletal Sparry Limestone - As above.
		Trace forams, as above.
1960m-1970m	50%	Marl - very light grey, very soft, highly calcareous, containing 10% $^{1}/_{16}$-$^{1}/_{8}$mm forams and fossil fragments.
	40%	Skeletal Micritic Limestone - as above, gradational with:- Calcareous Mudstone, i.e., proportion of $^{1}/_{16}$-$^{1}/_{8}$mm fossils and carbonate cement is less than mud.
	10%	Skeletal Sparry Limestone - As above.
		Trace forams, as above.
1970m-1980m	60%	Marl - As above.
	30%	Calcareous Mudstone/Skeletal Micritic Limestone - as above.
	10%	Skeletal Sparry Limestone - As above.
		Trace forams, as above.
1980m-1990m	70%	Marl - As above.
	25%	Calcareous Mudstone/Skeletal Micritic Limestone - as above in part pyritic.
	5%	Skeletal Sparry Limestone - As above.
		Trace forams, as above, Quartz grains, up to 2mm, rounded, frosted, wavy, cylindrical fossils (?) corals.
1990m-2000m	70%	Marl - As above.
	25%	Calcareous Mudstone - buff, light grey to brown, very soft, comprise 0-20% visible forams and fossil fragments (generally $^{1}/_{10}$-$^{1}/_{8}$mm size, some larger), some glauconite impregnated, set in very calcareous clay matrix, some of which is pyrite cemented.
	5%	Skeletal Sparry Limestone - white to brown, soft, ¼-½mm size fossil fragments, pyrite, glauconite in white clayey calcite matrix.
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FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS — R.C.N. THORNTON

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DEPTH	%	DESCRIPTION
1990m-2000m		Continued/....
		Trace Forams (mostly 1mm), especially globular forams, some glauconite or pyrite impregnated and fossil fragments, especially cylindrical forams (?) corals.
2000m-2005m	70%	Marl - As above.
	20%	Calcareous Mudstone - As above. Indication of fine interlaminations of cleaner skeletal Limestone.
	10%	Skeletal Sparry Limestone - As above.
		Trace Forams, common, Trace Quartz grains.
2005m-2010m	80%	Marl - As above.
	15%	Calcareous Mudstone - As above.
	5%	Skeletal Sparry Limestone - As above.
		Forams common. Trace Quartz grains, cylindrical fossil, oval crystalline section, 1 x 2mm, with pyrite in the core.
2010m-2015m	80%	Marl - As above.
	20%	Calcareous Mudstone - As above.
		Trace Skeletal Sparry Limestone - As above.
		Forams common.
2015m-2020m	80%	Marl - As above.
	20%	Calcareous Mudstone - As above.
		Trace Skeletal sparry Limestone, as above. Glauconite common accessory. Trace forams.
2020m-2025m	80%	Marl - As above.
	20%	Calcareous Mudstone - As above.
		Trace skeletal Limestone, forams, Quartz grains.
2025m-2030m	80%	Marl - As above.
	20%	Calcareous Mudstone - As above.
		Trace Skeletal Limestone, forams, quartz grains, pyrite.
2030m-2035m	40%	Marl - As above.
	60%	Calcareous Mudstone - As above, containing minor carbonaceous flecks, gradational with skeletal Micritic Limestone (i.e., increase in $^{1}/_{16}$-$^{1}/_{8}$mm fraction), light grey to brown, soft to firm.
		Trace -2% Globular forams, pyrite.
		17/....

LITHOLOGICAL DESCRIPTIONS R.C.N. THORNTON

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DEPTH	%	DESCRIPTION
2035m-2040m	70%	Marl - As above.
	30%	Calcareous Mudstone - As above.
		Trace -2% forams, Quartz grains, pyrite.
		C.F.J. SWARBRICK
		29.6.78
		Average penetration 2.8m/m,
2040m-2045m	60%	Marl - very light grey, very soft, moderately calcareous, containing 10-15% silt sized ? forams and other fossil fragments.
	40%	Calcareous Silty Mudstone - predominantly light grey to brown, occasionally buff, firm- platy in part, pyritic, contain 15% suspended ? foram and other fossil fragments (silt size).
		Trace - Pyrite nodules, loose Quartz grains, Limestone, glauconitic Limestone, no fluorescence, no porosity or permeability visible.
2045m-2050m	40%	Marl - As above, very soft.
	60%	Calcareous Silty Mudstone - as above, patches cemented by pyrite. Trace Skeletal Limestone, glauconitic Limestone, pyrite nodules, forams (benthonic predominant). No visible porosity or permeability, dull mineral fluorescence (-calcite).
2050m-2055m	10%	Marl - As above, very soft.
	80%	Calcareous Silty Mudstone - As above, patches contain dense pyrite cement.
	10%	Limestone - medium light grey brown, firm, contain foram and other fossil fragments which range in size to fine sand size (¼mm), partly glauconitic.
		Trace globular and benthonic forams, nodular pyrite. No visible porosity or permeability, no fluorescence.
2055m-2060m	60%	Calcareous Silty Mudstone - As above, grading to -
	30%	Micritic Limestone - medium to light grey brown, firm, fossiliferous in part, glauconitic in part, containing silt size fossil fragments.
	10%	Marl - light grey, soft to very soft, moderately calcareous, containing fossil fragments. Trace glauconite, nodular pyrite, disaggregated benthonic and globular forams some with pyrite coatings.
		No visible porosity or permeability. Sparce spotty mineral fluorescence.
2060m-2065m	80%	Calcareous Silty Mudstone - as above and Micritic Limestone as above, both lithologies grade to one another, but predominance of silty mudstone.

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DEPTH	%	DESCRIPTION
2060m-2065m		Continued/....
	20%	Marl - As above.
		Note: This sample may be unreliable due to stopped circulation due to flow line blockage and "mud ring").
2065m-2070m	50%	Calcareous Silty Mudstone - As above.
	30%	Skeletal Micritic Limestone - As above, glauconitic in part.
	20%	Marl - as above, trace nodular pyrite, globular forams.
		Note: Same comment as previous sample applies.
2070m-2075m	70%	Calcareous Silty Mudstone - medium to light grey brown, pyritic in part, firm, containing benthonic and globular forams and other index fossil fragments, and carbonaceous flecks.
	30%	Marl - As above.
		Trace Limestone, glauconitic Limestone, nodular pyrite and disaggregated forams up to 1mm in size. No visible porosity or permeability, no flourescence.
2075m-2080m	80%	Calcareous Silty Mudstone - As above.
	20%	Marl - As above.
		Accessories as above, no visible porosity or permeability, no fluorescence.
2080m-2085m	80%	Calcareous Silty Mudstone - As above.
	20%	Marl - As above.
		Accessories as above, plus trace glauconitic sparry limestone. No visible porosity or permeability, no fluorescence.
2085m-2090m	80%	Calcareous Silty Mudstone - as above, grading to silty argillaceous Limestone.
	15%	Marl - As above.
	5%	Glauconitic Sparry Limestone - white to buff, firm, grains up to ½mm of calcite, glauconite, fossil fragments and carbonaceou fragments in crystalline cement. Cement contains some clay.
		Trace nodular pyrite, forams, ? sponge debris.
2090m-2095m	60%	Calcareous Silty Mudstone - as above, grading to -
	30%	Fossiliferous,Silty,Argillaceous Limestone - light grey to medium light grey, moderately firm to firm, pyritic in part, fossils consist of forams, and tubular ? sponge fragments.
	5%	Marl - As above.
	5%	Glauconitic, Sparry Limestone - As above.
		Accessories as above. No visible porosity or permeability, spotty dull calcite fluorescence.

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FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS — C.F.J. SWARBRICK

29.6.78

DEPTH	%	DESCRIPTION
2095m-2100m	80%	Calcareous, Silty Mudstone - As above.
	15%	Fossiliferous, Silty, ARgillaceous Limestone - As above.
	5%	Glauconitic, Sparry Limestone - As above.
		Accessories as above, no visible porosity or permeability, spotty dull calcite fluorescence.
2100m-2105m	85%	Calcareous, Silty Mudstone - As above.
	10%	Fossiliferous, Silty, Argillaceous Limestone - As above.
	5%	Glauconitic, Sparry Limestone - As above.
		Trace Marl, nodular pyrite, fossil fragments including benthonic forams up to 1mm.
		No visible porosity or permeability, no fluorescence.
		R.C.N. THORNTON
2105m-2110m	90%	Calcareous, Silty Mudstone - As above, except that much of it has become flaky and slightly darker, and harder and so should be calcareous silty Shale - light grey to brown, firm, flaky, minor amounts of quartz silt and silt size forams and fossil fragments set in calcareous shale, trace amounts of carbonaceous flecks, glauconite, pyrite.
	5%	Fossiliferous, Silty, Argillaceous Limestone - As above.
	5%	Glauconitic, Sparry Limestone
		Trace Marl, forams.
2110m-2115m	95%	Shale - As above.
	5%	Fossiliferous, Silty, Argillaceous Limestone - As above.
		Trace Sparry Limestone, Marl, pyrite, forams.
2115m-2120m	95%	Shale - As above.
	5%	Fossiliferous, Silty, Argillaceous Limestone - As above.
		Trace Pyrite, fossils.
2120m-2126.9m	90%	Shale - As above.
	10%	Fossiliferous, Silty, Argillaceous Limestone - As above.
		Trace Glauconitic Sparry Limestone, forams, pyrite, fossil fragments.
		30.6.78: 0105 hours. Commenced pulling out to change bit. 1535 hours. Recommenced drilling. Bit #6: HTC XDG.
		C.F.J. SWARBRICK 30.6.78
2127m-2130m	90%	Calcareous, Silty Shale - light grey brown to medium light

FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS — C.F.J. SWARBRICK

30.6.78

DEPTH	%	DESCRIPTION
2127m-2130m		Continued/....
		grey brown, firm, flaky, containing silt size quartz, foram and other fossil fragments. Matrix is very calcareous. Carbonaceous streaks, pyrite and glauconite common in Shale.
	10%	Fossiliferous, Silty Limestone - light grey, firm, containing fossil fragments up to fine size (¼ mm), carbonaceous streaks, glauconite and pyrite.
		Trace Glauconitic, Sparry Limestone, nodular pyrite and loose fossil fragments (cylindrical calcite with central pyritised core ? sponge or ? worm burrow).
2130m-2135m	90%	Calcareous Silty Shale - As above.
	10%	Fossiliferous Silty Limestone - As above.
		Trace Glauconitic, Sparry limestone - pyrite, cylindrical fossil (indeterminate) and loose globular forams.
		No visible porosity or permeability, no fluorescence.
2135m-2140m	80%	Calcareous Silty Shale - As above.
	20%	Fossiliferous Silty Limestone - As above.
		Trace Glauconitic, Sparry Limestone, nodular pyrite, cylindrical fossil fragments (up to 1.5 mm in length, .5mm in width). No visible porosity or permeability. Spotty dull yellow mineral fluorescence.
		PD 2142m. Shut down due industrial problem, 5.30 pm 30/6/78.
		Resumed drilling 15.45 2/7/78 on bottom. Trip gas: 11 units hotwire, FID. 3010 C_1 Trace C_2.
2142m-2445m	75%	Calcareous Silty Shale - light grey brown to medium light grey brown, firm, flaky, containing silt size quartz, foram and other fossil fragments. Matrix is clayey and calcareous, carbonaceous streaks, pyrite and glauconite common.
	20%	Fossiliferous Silty Limestone - light grey, firm, containing fossil fragments up to ¼ mm, carbonaceous streaks, glauconite and pyrite.
	5%	Nodular Pyrite.
		Trace Glauconitic, Sparry Limestone, loose globular forams. No visible porosity or permeability, dull spotty fluorescence - pipe dope.
2145m-2150m	80%	Calcareous Silty Shale - As above.
	20%	Fossiliferous, Silty Limestone - As above, some very fossiliferous bands.
		Trace nodular pyrite, trace Glauconitic Sparry Limestone, and large loose crystalline calcite, loose benthonic and globular forams.

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DEPTH	%	DESCRIPTION
		Note: Sample harder and more fissil than previously.
		No visible porosity or permeability, dull spotty fluorescence (mineral).
2150m-2155m		Drilled 10.6, 9.9, 11.4, 8.9, 2.6 metres per hour!
	85%	Calcareous Silty Shale - As above.
	15%	Fossliferous Argillaceous Limestone - medium to light grey brown, hard, very fossiliferous, containing mainly foram fragments. Pyritic in part, sparingly glauconitic.
		Trace loose globular forams, loose benthonic forams, nodular pyrite. No visible porosity or permeability, dull spotty mineral fluorescence.
2155m-2158m	80%	Fossiliferous Argillaceous Limestone - As above.
	20%	Calcareous Silty Shale - As above.
		Trace loose forams, nodular pyrite. No visible porosity or permeability, no fluorescence.
2158m-2160m	50%	Fossiliferous Argillaceous Limestone - As above.
	40%	Silty Marl - light grey, soft to very soft, containing silt grains up to 1/16mm in limy clay matrix. Small discontinuous carbonaceous streaks.
	10%	Calcareous Silty Shale - As above.
		Trace - As above.
		No visible porosity or permeability, no fluorescence.
2160m-2165m	30%	Fossiliferous Argillaceous Limestone - As above.
	50%	Calcareous Silty Shale - sub-fissile, as above.
	20%	Silty Marl - As above.
		Trace loose forams, nodular pyrite. No visible porosity or permeability, no fluorescence.
2165m-2170m	60%	Calcareous Silty Shale - As above.
	20%	Fossiliferous Argillaceous Limestone - As above.
	20%	Silty Marl - As above.
		Trace loose forams, nodular pyrite. No visible porosity or permeability, no fluorescence.
2170m-2175m	80%	Calcareous Silty Shale - light brown to medium to dark grey brown soft to firm, flaky to block cuttings, comprising minor quartz silt set in highly calcareous Shale matrix. Pyrite common, trace carbonaceous flecks and glauconite. Gradational with:-
	10%	Argillaceous Limestone - generally slightly darker and considerably harder than shale, but some soft, comprising silt size forams

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FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS — R.C.N. THORNTON

2.7.78

DEPTH	%	DESCRIPTION
2170m-2175m		Continued/....
		and fossil fragments set in very clayey limestone, trace glauconite
	10%	Marl - very light grey, very soft, minor silt set in calcareous clay matrix.
		Trace loose forams, nodular pyrite, sparry limestone.
2175m-2180m	70%	Silty Shale - As above.
	20%	Marl - As above.
	10%	Argillaceous Limestone - As above.
		Trace loose forams, sparry limestone, orange medium grained quartz grains.
2180m-2185m	60%	Silty Shale - As above, gradational with
	10%	Argillaceous Limestone - light grey, soft, gradational with
	30%	Marl - As above.
		Trace loose forams.
2185m-2190m	60%	Silty Shale - As above, pyrite, very common.
	30%	Marl - As above.
	10%	Argillaceous Limestone - As above, mostly soft, minor hard.
		Trace loose forams.
2190m-2195m	60%	Marl - white to very light grey, very soft, calcareous in part, slightly silty, carbonaceous, fossiliferous.
	20%	Mudstone - light grey to buff, soft, fossiliferous, calcareous (gradational with argillaceous Limestone), minor siltsize forams and fossil debris, carbonaceous flecks, glauconite set in calcareou clay matrix.
	20%	Silty Shale - medium to dark grey to brown, firm, minor silt, pyrite common, minor carbonaceous flecks, glauconite, set in calcareous shale.
		Trace loose forams, sparry Limestone.
2195m-2200m	50%	Silty Shale - As above, gradational with:
	40%	Mudstone - As above.
	10%	Marl - As above.
		Tr-1% Loose forams, mostly 1/8-¼mm, some larger.
		Trace Large fossil fragments.
2200m-2205m	50%	Marl - As above.
	30%	Silty Shale - As above, pyrite common.

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FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS

R.C.N. THORNTON

3.7.78

DEPTH	%	DESCRIPTION
2200m-2205m		Continued/....
	20%	Mudstone - As above.
		Trace Loose forams, quartz - orange stained, medium grained, subangular.
2205m-2210m	50%	Marl - As above.
	30%	Silty Shale - As above.
	20%	Limestone - As above, some very silty, slightly fossiliferous, with glauconite impregnated forams.
		Trace loose forams.
2210m-2215m	50%	Marl - As above.
	30%	Mudstone - As above, pyrite common.
	20%	Silty Shale - As above.
		Trace Loose forams.
2215m-2220m	50%	Marl - As above.
	20%	Silty Limestone - light grey, soft, minor silt size forams and fossil fragments set in silty and clayey calcite. Gradational with Mudstone, as above.
	30%	Silty Shale - As above.
2220m-2225m	70%	Marl - As above.
	30%	Silty Shale - As above.
	20%	Silty Limestone - As above.
		Trace loose forams.
2225m-2230m	80%	Marl - As above.
	10%	Silty Shale - As above.
	10%	Silty Limestone - As above.
		Trace - 1% loose globular forams, mostly ¼mm diameter.
2230m-2235m	60%	Marl - As above.
	20%	Silty Shale - As above, slightly laminated, commonly pyritic.
	20%	Calcareous Silty Mudstone - gradational with silty Limestone, as above, soft, light grey, forams and fossil fragments set in silty calcareous clay matrix. Trace pyrite and glauconite impregnated grains.
		Trace Loose globular grains.
2235m-2240m	60%	Marl - As above.

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DEPTH	%	DESCRIPTION
2235m-2240m		Continued/.....
	20%	Silty Shale - As above.
	20%	Calcareous Silty Mudstone - As above.
		Trace loose globular forams.
2240m-2245m	50%	Marl - Offwhite to very light grey, very soft, comprising very minor silt and silt size forams set in very soft calcareous clay matrix.
	30%	Calcareous Silty Mudstone - light grey, soft to firm, silt size forams and fossil fragments (up to 20%) set in silty, calcareus clay matrix. Pyrite common accessory, trace pyrite and glauconite impregnated grains. Slightly laminated in part.
	20%	Silty Shale - medium to dark grey to brown, firm, flakey, slightl laminated, comprising minor silt and silt sized forams and fossil debris set in calcareous shale. Pyrite very common accessory. Minor carbonaceous flecks.
		Trace loose globular forams.
2245m-2250m	60%	Marl - As above.
	20%	Mudstone - As above.
	20%	Shale - As above.
		Trace - 1% Loose globular forams (¼-½mm diameter). Spotty, dull yellow mineral fluorescence.
2250m-2255m	60%	Marl - As above.
	20%	Mudstone - As above.
	20%	Shale - As above, abundant pyrite.
		Trace forams, as above.
2255m-2260m	60%	Marl - As above.
	20%	Mudstone - As above.
	20%	Shale - As above.
		Trace forams, as above, quartz grains.
2260m-2265m	40%	Shale - As above.
	30%	Mudstone - As above.
	30%	Marl - As above.
		Trace loose forams, fossil fragments.
2265m-2270m	60%	Marl - As above.
	20%	Shale - As above.
	20%	Mudstone - As above.

25/....

DEPTH	%	DESCRIPTION
2265m-2270m		Continued/....
		Trace loose forams, as above.
2270m-2275m	50%	Marl - As above.
	30%	Shale - As above, pyrite common.
	20%	Mudstone - As above.
		Trace loose forams, as above.
2275m-2280m	50%	Shale - As above.
	30%	Marl - As above.
	20%	Mudstone - As above.
		Trace loose forams, as above.
2280m-2285m	70%	Shale - medium to dark grey, firm, fissile, silty, calcareous, comprising fine quartz silt (0-20%), trace globular forams, carbonaceous flecks, abundant pyrite, set in calcareous shale.
	20%	Mudstone - light brown, soft, comprising minor quartz silt and globular forams, trace carbonaceous flecks, pyrite, set in calcareous clay matrix.
	10%	Marl - off white, very soft, minor silt and forams set in calcareous clay.
		Trace loose forams.
2285m-2290m		No sample.
2290m-2295m	60%	Shale - As above, firm to minor hard, abundant pyrite.
	30%	Mudstone - As above.
	10%	Marl - As above.
		Trace Sparry Limestone, large fossil fragments.
2295m-2300m	60%	Shale - As above.
	30%	Mudstone - As above.
	10%	Marl - As above.
		Trace echinoid spine, loose forams.
2300m-2305m	50%	Shale - As above.
	40%	Mudstone - As above.
	10%	Marl - As above.
		Trace - 1% loose forams, fossil fragments, glauconite fragment.
2305m-2310m	60%	Shale - As above.
	30%	Mudstone - As above.

DEPTH	%	DESCRIPTION
2305m-2310m		Continued/....
	10%	Marl - As above.
		Trace loose forams, fossil fragments.
2310m-2315m	70%	Shale - As above. Pyrite common.
	20%	Mudstone - As above. Echinoid spines in situ.
	10%	Marl - As above.
		Trace loose forams, some pyrite or glauconite impregnated.
2315m-2320m	60%	Shale - As above.
	30%	Mudstone - As above.
	10%	Marl - As above.
		Trace forams, fossil fragments, echinoid spine, very coarse grained quartz grain, clear, slightly red stained, subrounded.
2320m-2325m	60%	Shale - As above.
	30%	Mudstone - As above.
	10%	Marl - As above.
		Trace forams, glauconite fragment.
2325m-2330m	70%	Shale - As above.
	20%	Mudstone - As above, in small parts grading to argillaceous Limestone.
	10%	Marl - As above.
		Trace forams, calcite vein material.
		C.F.J. SWARBRICK
2330m-2335m	80%	Shale - As above.
	15%	Mudstone - As above, grading to argillaceous Limestone.
	5%	Marl - As above.
		Trace loose benthonic/planktonic forams, crypt. calcite, nodular pyrite. No visible porosity or permeability, rare dull mineral fluorescence.
2335m-2340m	80%	Shale - medium to dark grey, firm, subfissile to fissile, silty, moderately calcareous, fine quartz silt throughout in matrix of calcareous clay. Fossiliferous, containing mainly forams, slightly carbonaceous, pyritic, rare glauconite.
	10%	Mudstone - As above.
	10%	Marl - very light grey to white, very soft, silty, sparingly fossiliferous.

DEPTH	%	DESCRIPTION
2335m-2340m		Continued/....
		Trace nodular pyrite, loose forams.
		No visible porosity or permeability, rare dull mineral fluorescence
2340m-2345m	70%	Shale - As above, medium to dark grey, silty, calcareous, trace pyrite and black carbonaceous material.
	10%	Mudstone - As above, silty, grading to shale.
	20%	Marl - As above, light grey, very soft.
2345m-2350m	80%	Shale - As above, strongly calcareous in part.
	10%	Mudstone - As above, grading to shale.
	10%	Marl - As above, thin interbeds of mudstone, fossiliferous, very soft.
		Trace loose forams, calcite and nodular pyrite. No visible porosity or permeability, no fluorescence.
		(INTERMEDIATE SAMPLE - NO SIGNIFICANT CHANGE)
2350m-2355m	80%	Shale - As above, strongly calcareous.
	10%	Mudstone - As above.
	10%	Marl - As above, containing small amount of very fine sand and silt.
		Trace loose forams, nodular pyrite. No visible porosity or permeability, no fluorescence.
		(INTERMEDIATE SAMPLE - NO SIGNIFICANT CHANGE)
2355m-2360m	80%	Shale - As above, strongly calcareous and hard in part, fossiliferous, silty in part, trace pyrite and black carbonaceous flecks.
	10%	Mudstone - As above.
	10%	Marl - As above, soft, calcareous, containing small amount of grains up to very fine sand.
		Trace Glauconite Sparry Limestone, nodular pyrite, loose benthonic and planktonic forams. No visible porosity or permeability, no fluorescence.
		(2 INTERMEDIATE SAMPLES - NO SIGNIFICANT CHANGES IN MAJOR LITHOLOGIES GREEN COLOURATION (SLIGHT) IN SOME SHALE FRAGMENTS)
		1 loose medium size sand grain in lower samples.
2360m-2365m	90%	Calcareous Shale - slightly silty, strongly calcareous, medium to light grey brown, firm, fissile, fossiliferous, sparingly carbonaceous, grading in part to argillaceous limestone.
	10%	Mudstone - As above, non-fissile, soft, blocky. No visible porosity or permeability, no fluorescence.

DEPTH	%	DESCRIPTION
		(NO SIGNIFICANT CHANGE ON INTERMEDIATE SAMPLES).
2365m-2370m	80%	Calcareous Shale - As above.
	10%	Marl - As above.
	10%	Calcareous Siltstone - medium light grey, firm, brittle, fossiliferous, sparingly carbonaceous, trace pyrite.
		Trace Glauconitic Sparry Limestone, nodular pyrite, loose globular forams. No visible porosity or permeability, no fluorescence.
		(NO SIGNIFICANT CHANGE IN INTERMEDIATE SAMPLES).
2370m-2375m	70%	Calcareous Shale - As above.
	20%	Marl - silty, containing silt and very fine sand grains suspended in calcareous matrix, fossiliferous.
	10%	Calcareous Siltstone - As above.
		Trace Glauconitic, Sparry Limestone, loose forams.
		One fragment green, Glauconitic Mudstone. No visible porosity or permeability, no fluorescence.
2375m-2380m	60%	Calcareous Shale - As above, glauconite, slightly carbonaceous.
	20%	Marl - light grey, soft, silty, containing small fossil fragments and suspended very fine sand grains.
	20%	Calcareous Siltstone - grading to argillaceous silty Limestone fossiliferous, glauconitic in part, sparce pyrite.
		Trace Glauconitic, Sparry Limestone, loose globular forams. No visible porosity or permeability, no fluorescence.
2382.5m	50%	Calcareous Shale - As above.
	30%	Marl - silty, fossliferous, soft, sparingly glauconitic.
	20%	Calcareous Siltstone - As above.
		Trace as above thin spicular fossil fragments, loose globular and benthonic forams, some with pyrite coatings. No visible porosity or permeability, no fluorescence.
2382.5m-2385m	70%	Calcareous Shale - As above, fissile, pyritic, poorly glauconitic fossiliferous.
	20%	Marl - very silty in part, as above.
	10%	Calcareous Siltstone - As above, glauconitic in part.
		Trace nests of fine pyrite needles, loose benthonic and planktonic forams. No visible porosity or permeability, no fluorescence.
2385m-2390m	50%	Calcareous Shale - As above.

FORTESCUE-1

LITHOLOGICAL DECRIPTIONS — C.F.J. SWARBRICK

3.7.78

DEPTH	%	DESCRIPTION
2385m-2390m		Continued/....
	30%	Marl - very silty, very soft, laminated.
	20%	Calcareous Siltstone - as above, grading to calcareous shale.
		Trace loose forams, pyrite nodules, one piece Glauconitic, Sparry Limestone. No visible porosity or permeability, no fluorescence.
		(NO CHANGE IN INTERMEDIATE SAMPLE).
2390m-2395m	60%	Calcareous Shale - As above, fissile, brittle, fossiliferous, grading to Calcareous Siltstone
	20%	Calcareous Siltstone - As above, very calcareous in part, fossiliferous, poorly carbonaceous.
	20%	Marl - As above, very silty in part, occasionally containing glauconitic grains.
		Trace pyrite nodules, ? echinoid spine fragments, loose globular forams. No visible porosity or permeability, no fluorescence.
2395m-2400m	90%	Calcareous Shale - As above, more fissile and brittle than previously.
	10%	Marl - silty, occasional glauconitic grains.
		Trace loose benthonic forams, pyrite, Glauconitic, Sparry Limestone No visible porosity or permeability, no fluorescence.
2400m-2405m	90%	Shale - As above, medium to dark grey, moderately hard, only weakly calcareous, silty in part, splintery and brittle, pyritic, few carbonaceous specks.
	10%	Marl - light to medium grey, very soft to firm, silty in part, trace pyrite and forams.
2405m-2410m	90%	Shale - As above, mildly calcareous, occasional glauconitic grains, pyritic, sparingly carbonaceous.
	10%	Marl - As above.
		Trace Quartz grains, very coarse, rounded, unstained pyrite and forams.
		On coring point 2410.6m, 1805 hours, 3.7.78.
		Pulled out of hole, preparing to run Core Bit #1.
		N.B. 6m correction to core depths after logging. Cored interval was 2416.6 - 2443.37m.

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FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS

B. BURNS

7.7.78

DEPTH	%	DESCRIPTION
2437m-2440m	80%	Siltstone - medium grey, partly sandy, moderately soft, trace pyrite and carbonaceous flecks. Calcareous.
	20%	Sandstone - light grey to white, very fine with occasional coarse grains, trace glauconite and pyrite, tight, no fluorescence. Calcareous cement. One echinoid (?) one gastropod (?) - both tiny.
2440m-2445m	80%	Siltstone - medium grey to grey brown, partly sandy, soft, minor carbonaceous specks.
	15%	Sandstone - loose quartz grains, granular to pebble size, angular to subrounded, some well rounded. Clear to milky quartz, often with coatings of pyrite, no fluorescence or cut.
	Tr-5%	Sandstone - white, very fine to fine, moderately hard, occasional glauconite grains, no fluorescence or cut.
		Some aggregates of pyrite containing abundant glauconite grains. Rare fossil fragments, spirally 1-1½mm.
		Drilling break at 2446m-2447.8m - circulated bottoms up.
2445m-2447.8m	60%	Siltstone - medium grey to grey brown, clayey in part, firm, weakly calcareous, trace glauconite and pyrite, few black carbonaceous specks, subfissile in part, probably a lot of cavings
	35%	Quartz - loose, medium to coarse (minor very coarse) grains, subangular to rounded, predominantly clear, minor frosted and milky, some grains with some pyrite growth and few glauconite grains, no fluorescence or cut.
	5%	Sandstone - light grey, very fine to fine, moderately hard, trace glauconite and pyrite.
2447.8m-2450m	70%	Siltstone - as above. Weakly calcareous in part, trace glauconite and pyrite, rare carbonaceous specks, rare indeterminate fossil fragments (¼mm). Subfissile.
	20%	Quartz Sand - loose, as above, medium to very coarse, some grains with pyrite coatings.
	10%	Sandstone - light grey, very fine to fine, silty, containing coarser grains, pyritic, trace dark mica, low porosity. Trace pyrite, glauconite.
		Trace fluorescence, no cut.
2450m-2455m	60%	Siltstone - As above, (? predominantly cavings).
	30%	Quartz Sand - loose, medium to coarse, subangular to subrounded, clear, occasionally milky, pyrite coatings.
	5%	Sandstone - As above.
	5%	Pyrite - commonly associated with glauconite ? burrow filling.

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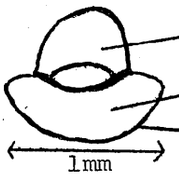
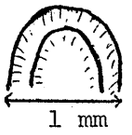
FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS

R. DO ROZARIO
C.F. SWARBRICK

7.7.78

DEPTH	%	DESCRIPTION
		Trace loose fragments pyrite cemented quartz grain aggregates. Unidentified fossil -
		CROSS SECTION 
		PLANE VIEW  no fluorescence, no cut.
		Drilling break: 4.6 mins/metre @ 2455m to 2.4 mins/metre @ 2457m
2455m-2457m	50%	Siltstone - As above.
	35%	Quartz Sand - loose, as above, predominantly medium to coarse, occasionally very coarse.
	10%	Sandstone - As above.
	5%	Pyrite - As above.
		Trace fluorescence (pipe dope), no cut.
2455m-2460m	80%	Quartz Sand - loose, medium to coarse, rarely very coarse, clear quartz, occasionally milky, mainly subangular to subrounded, rarely rounded larger grains, occasionally pyrite coatings. No fluorescence, no cut.
	15%	Siltstone - As above.
	5%	Sandstone - light grey, very fine to fine, containing occasional medium to coarse grains, silty matrix, low porosity, no fluorescence or cut.
		Trace Pyrite.
2460m-2465m	90%	Quartz Sand - loose, medium to very coarse, as above. Predominantly subrounded, less subangular, rarely rounded. Rare pyrite coatings.
	10%	Siltstone - sandy in part, as above.
		No fluorescence, no cut.
		Trace Pyrite, Sandstone - light grey, very fine to fine, as above.
2465m-2470m	95%	Quartz Sand - loose, predominantly coarse, some very coarse, subrounded to rounded, clear to milky, rare pyrite coatings.
	5%	Siltstone - medium grey to grey brown, firm, sandy in part, weakly calcareous, some black to brown carbon material, trace green glauconite, trace mica (cavings?).
2470m-2475m	90%	Quartz Sand - loose, coarse to very coarse, subrounded to rounded, clear to milky, as above.

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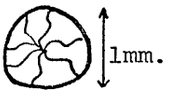
DEPTH	%	DESCRIPTION
2470m-2475m		Continued/....
	10%	Siltstone - medium grey to grey brown as above (cavings?).
2475m-2480m	90%	Quartz Sand - loose, coarse to very coarse, subrounded to rounded, as above.
	10%	Siltstone - medium grey to grey brown as above (cavings?).
2480m-2485m	95%	Quartz Sand - loose,medium to coarse predominantly, minor very coarse, clear predominantly, minor opaque and milky.
	5%	Siltstone - medium grey to grey brown as above (cavings?).
		R.D. ROZARIO
2485m-2490m	95%	Quartz Sand - loose, predominantly coarse to very coarse, few granules, subrounded to rounded, clear to opaque, no fluorescence or cut.
	5%	Siltstone - medium grey, sandy in part, firm to moderately hard and brittle, trace black carbonaceous specks, trace green glauconite moderately calcareous.
2490m-2495m	95%	Quartz Sand - loose, predominantly coarse to very coarse, and approximately 10% granules.
	5%	Siltstone - medium grey - as above.
2495m-2500m	70%	Quartz Sand - loose, predominantly coarse to very coarse, minor medium and granular, subrounded to rounded, minor subangular clear to opaque.
	30%	Siltstone - medium grey, grey to brown, firm to moderately hard, moderately calcareous, trace fine pyrite, black carbonaceous material, rare glauconite, clayey in part.
2500m-2505m	90%	Quartz Sand - loose, coarse to very coarse, as above, trace Pyrite
	10%	Siltstone - medium grey to grey brown, as above.
2505m-2510m	90%	Quartz Sand - loose, coarse to very coarse, minor medium and granular, clear to opaque, few aggregates seen, rare pyrite coating and cementing grains.
	10%	Siltstone - medium grey to grey brown, moderately calcareous, trace fine pyrite, trace black carbonaceous specks, one fossil foram?  1mm.
		Trace Coal - black, brittle, vitreous to subvitreous. Shaley in part.
2510m-2515m	75%	Quartz Sand - As above.
	25%	Siltstone - As above. Trace Coal.
2515m-2520m	95%	Quartz Sand - predominantly coarse, minor very coarse to granular, subangular to subrounded, clear to opaque, occasionally pyrite coating, no fluorescence.
33/	5%	Siltstone - medium grey, moderately calcareous as above, and brown non calcareous, very carbonaceous, soft to firm, pyritic.

DEPTH	%	DESCRIPTION
2520m-2525m	100%	Quartz Sand - predominantly coarse, no fluorescence. Heavy trace - Siltstone - as above.
2525m-2530m	90%	Quartz Sand - predominantly coarse as above, no fluorescence.
	10%	Siltstone - light to medium grey, clayey, soft to firm; moderately calcareous, few black carbonaceous specks; minor brown, non calcareous, very carbonaceous.
2530m-2535m	60%	Quartz Sand - coarse to very coarse, minor medium and granular, subround to round; traces pyrite coating grains.
	40%	Coal - black, 'hard', brittle, conchoidal fracture.
2535m-2540m	60%	Coal - black, black-brown, brittle, blocky-subfissile, pyrite, silty in part; trace yellow-white fluorescence coming from brown transluscent resin? associated with coal, giving weak white cut.
	30%	Quartz Sand - coarse to very coarse, loose as above.
	10%	Siltstone - light to medium grey, firm, moderately calcareous and brown, noncalcareous, very carbonaceous, pyrite, sandy in part.
2540m-2545m	30%	Coal - black, black-brown, brittle, blocky - subfissile, pyrite, conchoidal to subconchoidal fracture, interlaminated with siltstone in part.
	20%	Quartz Sand - loose, coarse to very coarse as above.
	45%	Siltstone - light to medium grey, clayey, firm, trace pyrite, trace green glauconite?, weakly calcareous,
	5%	Sandstone - white, cream, light brown, very fine to fine, friable, little white clay matrix; trace black carbonaceous material, trace mica.
2545m-2550m	75%	Siltstone - medium grey; clayey to firm, sandy in part, trace glauconite, weakly calcareous, minor brown, noncalcareous, very carbonaceous.
	20%	Quartz Sand - loose, coarse to very coarse, few granules clear to opaque, subround to round.
	5%	Sandstone - white, cream, very fine to fine, friable, subangular quartz grains; little white clay matrix, trace black carbonaceous specks, no fluorescence or cut.
		Trace Coal - black, brittle.

FORTESCUE-1

LITHOLOGICAL DESCRIPTIONS

B. BURNS

7.7.78

DEPTH	%	DESCRIPTION
2550m-2555m	70%	Sandstone - loose sand. Very coarse to granule, clear to opaque, subrounded, minor coatings of pyrite. No fluorescence or cut.
	20%	Siltstone - medium grey, sandy, calcareous.
	10%	Sandstone - white to cream, very fine to fine subangular.
		Trace Coal - black brittle.
2555m-2560m	90%	Sandstone - loose sand. Very coarse to granule with occasional pebble. Mostly clear quartz with occasional milky; fair sorting. Subrounded. Excellent porosity. No fluorescence, no cut.
	10%	Siltstone - medium grey. Firm. Weakly calcareous.
2560m-2565m	95%	Sandstone - loose sand. Clear quartz, occasionally milky. Very coarse to granule to pebble. Fair sorting. Subrounded, excellent porosity. No fluorescence, no cut.
	5%	Coal - black, brittle and some conchoidal fracture.
		Trace Siltstone - medium grey, firm, calcareous (cavings??)
2565m-2570m	90%	Sandstone - loose sand, clear quartz sand to occasionally milky. Very coarse to granule. Subrounded. Fair sorting, excellent porosity. No fluorescence, no cut.
	10%	Siltstone - grey, slightly sandy. Weak calcareous.
		Trace Siltstone - brown, micaceous, carbonaceous, non calcareous.
2570m-2575m	90%	Siltstone - medium grey, moderately firm, weakly calcareous, rare carbonaceous flecks.
	10%	Sandstone - loose sand, very coarse to granule, clear quartz, occasional pyrite coating, excellent porosity. No fluorescence, no cut.
		Trace Coal - black, brittle.
2575m-2580m	80%	Siltstone - medium grey, moderately firm, calcareous, pyritic. Minor Siltstone brown, firm, carbonaceous, non calcareous.
	10%	Sandstone - white, cream, very fine to fine, subangular to subrounded, occasional glauconite grains. Low porosity. No fluorescence, no cut.
	10%	Sandstone - loose quartz sand. Coarse to very coarse, subangular to subrounded.

FORTESCUE-1 B. BURNS

LITHOLOGICAL DESCRIPTIONS 8.7.78

DEPTH	%	DESCRIPTION
2580m-2585m	50%	Siltstone - medium grey, firm, calcareous and pyritic. Minor brown Siltstone - carbonaceous.
	30%	Coal - Black, brittle, moderately hard, conchoidal fracture. Minor spotty white, yellow fluorescence associated with resinous grains in coal. Weak white cut.
	10%	Quartz Sand - loose, coarse to granule, subangular to subrounded, clear to milky. No fluorescence or cut.
	10%	Sandstone - white, very fine to fine, occasional glauconite as above.
2585m-2590m	80%	Coal - black, moderately hard to hard, vitreous, blocky, some conchoidal fracture. Silty and pyritic in part. Occasional spotty yellow fluorescence. Weak cut.
	10%	Sandstone - white, very fine to fine with occasional medium to coarse grains imbedded, subangular to subrounded, moderately hard.
	10%	Siltstone - medium grey as above.
2590m-2595m	100%	Coal - black, moderately hard to hard. Vitreous in part. Blocky with some irregular conchoidal fracture. Pyritic and silty in parts.
		Trace Sandstone and Siltstone - as above. Scattered white, yellow fluorescence in the coal, apparently associated with transparent resinous grains. Weak white cut.
2595m-2600m	50%	Coal - black as above with pyrite common.
	20%	Siltstone - brown moderately soft, carbonaceous, non calcareous.
	10%	Siltstone - grey, moderately hard, glauconitic and calcareous.
	20%	Quartz Sand - loose, quartz grains, medium to coarse, subangular to subrounded.
		Trace - large pyrite grains, and sandstone very fine to fine.
2600m-2605m	50%	Siltstone - grey, moderately hard.
	20%	Siltstone - brown, moderately soft, carbonaceous streaks, micaceous, occasionally sandy.
	15%	Sandstone - loose quartz sand. Medium to coarse occasionally very coarse.
	10%	Sandstone - fine to medium. Subangular to subrounded, clay matrix (white) pyritic - grades into brown siltstone (above). No fluorescence, no cut, poor porosity.
	5%	Coal - black as above.

DEPTH	%	DESCRIPTION
2605m-2610m	40%	Siltstone - medium grey, firm, moderately hard, subfissile, moderately calcareous, slightly pyritic (?cavings).
	30%	Coal - black, hard, brittle, subvitreous to vitreous, conchoidal fracture, thin bands clay and silt.
	10%	Siltstone - brown, moderately soft, micaceous, sandy in part, carbonaceous streaks.
	10%	Sandstone - light grey to white, fine to medium, quartzose, white clay matrix, subangular to subrounded, low visible porosity.
	10%	Quartz Sand - loose, predominantly medium, some coarse, clear some milky, subangular to subrounded.
		Trace - pyrite, glauconite, small loose cephalopod
		Trace yellow resin fluorescence, weak milky cut.
2610m-2615m	30%	Siltstone - as above, glauconitic in part, (?cavings)
	20%	Siltstone - brown, micaceous, sandy in part, carbonaceous.
	20%	Coal - black, hard brittle, subvitreous to vitreous, as above,
	20%	Quartz Sand - loose, moderately coarse, occasionally very coarse. Subangular to subrounded, mainly clear.
	10%	Sandstone - light grey to white, moderate to well sorted, fine to medium, quartzose, white clay matrix, slightly friable, low visible porosity (< 10%).
		Trace - pyrite, commonly associated with coal, occasionally glauconite grains. Trace yellow resin fluorescence, slight milky cut.
2615m-2620m	30%	Siltstone - medium grey to medium light grey, firm, subfissile, calcareous, occasional glauconitic, grading to calcareous shale (?cavings).
	30%	Coal - as above, grading to carbonaceous shale, black to dark grey, brown.
	20%	Siltstone - brown, moderately soft, strongly micaceous bands, some iron staining, commonly interbedded with thin coaly bands, or streaks.
	15%	Quartz Sand - loose, medium to coarse, occasionally very coarse, subangular to subrounded, predominantly clear.
	5%	Sandstone - as above.
		Trace - pyrite, glauconite.
		Trace dull yellow resin fluorescence; weak milky cut.

DEPTH	%	DESCRIPTION
2620m-2625m	40%	Shale - black to dark grey, brown, occasionally silty, subfissile to fissile, hard, dense, brittle, micro-banding in parts.
	30%	Coal - As above.
	10%	Siltstone - light to medium grey, calcareous, slightly pyritic, rare glauconite grains (? cavings).
	10%	Siltstone - brown, micaceous, carbonaceous.
	5%	Quartz Sand - loose, medium to coarse, occasionally very coarse to granular.
	5%	Sandstone - light grey to white, moderate sorting, quartzose, fine, subangular to subrounded, white clay matrix. Visible porosity 10%.
		Trace Pyrite. Minor dull yellow resin fluorescence, very weak milky cut.
2625m-2630m	50%	Coal - black, hard, brittle, subconchoidal fracture, mostly vitreous, some sub-vitreous, occasionally banded, grading to carbonaceous shale.
	20%	Shale - black to dark grey brown, occasionally silty, hard as above.
	10%	Siltstone - brown, micaceous, carbonaceous, laminated.
	10%	Siltstone - light to medium grey, calcareous, (? cavings).
	10%	Sandstone - 70% as loose fine to coarse quartz grains. 30% as consolidated fine quartz sand in white clay matrix (as above).
		Trace Pyrite. No fluorescence, no cut.
2630m-2635m	30%	Siltstone - dark grey brown, firm, micaceous, carbonaceous, commonly finely laminated.
	20%	Siltstone - light to medium grey, calcareous, minor glauconite, shaley.
	15%	Quartz Sand - medium to very coarse, subrounded to subangular, mainly clear quartz.
	15%	Sandstone - light grey to white, very fine to fine, quartzose, subangular to subrounded, moderate to well sorted, firm, white clay matrix, minor muscovite and biotite, low visible porosity.
	20%	Coal and Carbonaceous Shale - As above.
		Trace Pyrite. No fluorescence, no cut.
2635m-2640m	35%	Siltstone - medium to light grey, firm, fissile, calcareous shaley in part, rare glauconite (? cavings).
	20%	Siltstone - brown to dark grey brown, micaceous, carbonaceous, as above.
	20%	Coal - as above, grading to carbonaceous shale.
38/	20%	Quartz Sand - clear to white, some milky, medium to very coarse, predominantly coarse, subrounded to subangular.

DEPTH	%	DESCRIPTION
2635m-2640m	5%	Sandstone - light grey to white, no fluorescence, no cut.
2640m-2645m	40%	Siltstone - medium to light grey, calcareous, as above, (? cavings).
	40%	Siltstone - brown to dark grey brown, micaceous, carbonaceous streaks, firm, thinly laminated appearance due to mica and carbon concentrations on particular bedding surfaces.
	10%	Quartz Sand - loose, as above.
	5%	Sandstone - light grey to white, as above.
	5%	Coal and Carbaceous Shale - as above
		R. DO ROZARIO
2645m-2650m	20%	Siltstone - light to medium grey; calcareous, firm, clayey in part; trace green glauconite; (cavings ?).
	60%	Siltstone - buff-dark brown to black; soft to firm; sandy in part, very carbonaceous with some common laminae of carbonaceous material and mica.
	10%	Quartz Sand - loose, coarse to very coarse, subrounded, predominantly milky, rare pyrite coating.
	5%	Sandstone - light grey to white and buff; very fine to fine, friable to moderately consolidated; white clay matrix; some black, brown carbonaceous material; trace mica; few coarse to very coarse grains in matrix; no fluorescence or cut.
	5%	Coal - black to black-brown; shaley in part; brittle.
2650m-2655m	60%	Quartz Sand - coarse to very coarse, subangular to subrounded, minor round, clear to milky; few grains with some yellow fluorescence but no cut.
	20%	Siltstone - brown to dark brown, very carbonaceous as above.
	10%	Siltstone - medium grey, calcareous, (cavings?).
	10%	Sandstone - very fine to fine, subangular, quartzose as above, and medium to very coarse, well consolidated; subangular, trace green grains - chlorite?, scattered dull yellow fluorescence, but no cut even upon crushing - dolomite cement coating grains.

DEPTH	%	DESCRIPTION
2655m-2650m	30%	Quartz Sand - coarse to granular; subrounded to rounded, milky to light grey; few grains with some yellow fluorescence but no cut.
	15%	Sandstone - medium to granular; subangular to subrounded, clear to milky grains, well consolidated, little white clay matrix, tight, rare green chlorite?; scattered yellow fluorescence but no cut - dolomite cement.
	5%	Sandstone - very fine to fine; white to cream, friable; carbonaceous, white clay matrix; no fluorescence.
	30%	Siltstone - brown, grey to brown; sandy in part; very carbonaceous, trace mica.
	20%	Siltstone - medium grey, calcareous (cavings?).
		Trace pyrite aggregates.
2660m-2665m	40%	Siltstone - buff; brown, brown to grey; sandy in part, very carbonaceous; micaceous, soft to firm, trace pyrite.
	20%	Siltstone - medium grey, moderate calcareous, firm, clayey.
	30%	Sandstone - white, light grey, light brown, very fine to medium granular, quartzose; subangular clear grains, white clay matrix, silty in part; common carbonaceous specks and pyrite cementing grains.
	10%	Quartz Sand - loose, coarse to very coarse as above.
		Trace Coal - black, brittle, shaley in part.
2665m-2670m	60%	Siltstone - brown, brown to grey, very carbonaceous, micaceous as above.
	10%	Siltstone - medium grey, firm, moderately calcareous, trace pyrite.
	30%	Sandstone - very fine to fine grain, white, light grey, light brown, subangular clear quartz grains, very carbonaceous in part with some black laminae; trace mica, white clay matrix with some dolomite cement in part, dull orange mineral fluorescence.
		Trace Quartz Sand - loose coarse to very coarse grains as above.
		Trace Coal - black, brittle.

DEPTH	%	DESCRIPTION
2670m-2675m	60%	Siltstone - brown to brown grey as above.
	10%	Siltstone - medium grey, calcareous as above, trace glauconite?
	20%	Sandstone - white, light grey, light brown, carbonaceous.
	10%	Coal - black to black brown, brittle, shaley in part pyritic, conchoidal to subconchoidal fracture.
		Trace Quartz Sand - loose, coarse to very coarse as above.
2675m-2680m	70%	Siltstone - brown, brown to grey, very carbonaceous, micaceous, firm; rare shaley, fissile grains.
	20%	Siltstone - medium grey, calcareous as above.
	10%	Sandstone - light grey, light brown; silty; white clay matrix, dolomitic in part, trace carbonaceous specks, and mica; pyritic in part.
		Trace Quartz Sand - loose, coarse to very coarse as above.
		Trace Coal
2680m-2685m	55%	Siltstone - brown, brown to grey, carbonaceous, mica, as above.
	30%	Siltstone - medium grey, calcareous, clayey, subfissile, as above.
	10%	Sandstone - light grey, light brown, very fine to fine as above.
	5%	Coal - black, black to brown, brittle, shaley in part, pyritic.
		Trace pyrite aggregate, loose coarse to very coarse quartz grains.
		Depth correction - down 6m - T.D. 2691m.

APPENDIX 2

APPENDIX 2

CORE DESCRIPTIONS

RESULTS OF ONSITE CORE ANALYSIS

BY CORE LABORATORIES

Core No.	Sample No.	Depth	Natural Density	Saturated Density	Grain Density	Porosity %	Oil Saturation	Water Saturation	Permeability KL (md)	Remarks
1	1	2430.33-2430.46m	2.57	2.58	2.94(?)	18.12	0	80.90	13.1	Friable, crumbly sample. Strong H_2S odour
	2	2430.33-2430.46m	2.29	2.33	2.59	16.82	0	77.55	Not done	
	3	2420.62-2420.76m	2.56	2.57	2.69	6.98	0	88.13	4.90	Slight sulphur odour
2	1	2431.63-2431.78m	2.56	2.57	2.67	6.39	0	80.08	5.50	Strong sulphur odour
	2	2438.29-2438.40m	2.32	2.35	2.51	9.68	0	69.34	6.20	No odour.

FORTESCUE-1

CORE DESCRIPTIONS

R.C.N. THORNTON

5.7.78

DEPTH	DESCRIPTION
	Core #1 2416.6m-2431.09 Recovered 14.5m, = 100% +. Description of representative chip samples. Sample for Seal Peal: 2424.76m-2424.85m and 2416.24m-2416.35. Sample for Core Analysis: 2424.33m-2424.46m and 2414.62m-2414.76m.
2413.1m	Sandstone - light to medium grey, hard,quartz, fine grained, well sorted, subangular to subrounded, 1-2% mica, both muscovite and biotite, trace brown stained grains, rare trace glauconite pellet set in grey clay matrix. Muscovite flakes generally larger than biotite. Tight. No fluorescence.
2416.3m	Sandstone - light to medium grey, hard, quartz, fine grained, well sorted, subangular to subrounded, 1-2% mica, both muscovite and biotite, set in grey clay matrix. Finely laminated, light and dark bands, due to amount of clay. Interbedded with their (5mm) bands which are carbonaceous, micaceous and pyritic. Tight. No fluorescence.
2423.3m	Siltstone - dark grey, hard, quartz, very minor, fine to medium grained, minor mica, very carbonaceous, abundant pyrite (impregnating woody tissue). Very low porosity, very minor spotty yellow fluorescence with milky white cut.
2424.1m	Sandstone - light to medium grey, non-friable, hard, quartz, very poorly sorted, very fine grained granule, angular to subangular in finer grains - well rounded in granules, which are mostly frosted, minor small mica flakes, set in clay matrix. Very low porosity. No fluorescence.
2424.6m	Sandstone - medium grey, semi-friable, clear quartz, poorly sorted, mainly medium grained, minor coarse to very coarse grained, angular to subangular in medium grains, to well rounded in very coarse grains, 1-2% light green glauconite grains, trace brown staining, trace mica. Good porosity. Trace spotty white fluorescence.
	Core #2 2431.09 - 2433.3m Recovered: 8.29m = 68% Description of representative chip samples included in core description.

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

SHEET 1 of 8

WELL FORTESCUE-1.

SCALE 1:10

CORE No. 1

Interval Cored 2416.6-2431.09m Cut 14.49m Recovered 14.49m (100 %) Fm. Latrobe

Bit Type C20 Bit Size 8 15/32" in. Desc by DoRozario, Burns, Swarbrick Date 5.7.78

SAMPLES	DEPTH & CORING RATE MIN/m	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
	2416.6 0 10 20												2416.6-2416.95m
	.8		py			pred f (vf) even			m gry		—	low	sandstone, lt-med gy;qtz, pred f.gr; sub ang-sub rnd, well consd; tr.mica, no fluor or cut; no odour or taste; few worm burrows one py infill
	2417.0					vf-f w/few silt bands		S	m gry		—	low	2416.95-2417.24m vf-f sandstone as above, but highly bioturbated, few silty laminae
P 20	.2					vf-f		S	m gry		—	low	2417.24-2417.55m vf-f sandstone as above, only few burrows, trace black carb specks and brown iron staining no fluor or cut.
	.4			MARINE	NEARSHORE								
	.6					vf-f w/ silty bands		g	m gry			low	2417.55-2418.81m sandstone as above, becoming silter and more bioturbated towards base, numerous silty laminae; no fluor or cut; no odour or taste.
	2418.0								dark gry silt lam				
P 10	.2												
	.4		py			vf-f							
	.6												

SP - seal pealed sample

P - sample for palynology

CA - sample for onsite core analysis

SYD- sample taken to Sydney

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

NOTE: Depth Correction add 6.0m to ALL depths

SHEET 2 of 8

WELL FORTESCUE 1.

SCALE 1:10

CORE No. 1

Interval Cored 2416.6-2431.09m Cut 14.49m Recovered 14.49m (100%) Fm. Latrobe

Bit Type C20 Bit Size 8 15/32" in., Desc by Burns, Swarbrick Date 5.7.78

DEPTH & CORING RATE MIN./m	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
0 10 20												
2418.6	M		MARINE	NEARSHORE	vf-f becoming silty							thin bedding with muscovite, biotite on bedding planes, and iron staining
.8	M						S					2418.81-2419.96m sandstone, lt-med grey, well consd, qtz, fine gr pred, sub ang-sub rnd, well srtd, 1-2% muscovite & biotite, tr. glauconite set in green clay matrix; tight, no fluor or cut; no odour or taste
2419.0					vf-f w/ silty lam.			med gry w/ dark gry silty lam			v low.	
.2												
.4												
.6												
.8												numerous laminae from 2-10mm thick; some burrows contain occassional coarser grains.
2420.0		py			vf-f w/ silty bands		S	med gry			v. low	2419.96-2420.28m sandstone, highly bioturbated decreasing with depth; some carbonaceous streaks & pyrite infill burrows.
.2												
.4					vf-f w/ silty lam.		S	med gry			low	2420.28-2420.76m sandstone as above but no burrowing evident; no fluor or cut; no odour or taste; well sorted w/ fine silty laminae
.6												

Core Analysis

Depth	K	Ø	So	Stw	Sp	Gp
2420.62-.76	4.9	6.98	0	88.13	2.57	2.69
2430.33-.46	131.0	18.12	0	80.9	2.58	2.96

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

NOTE: Depth Corrections add 6.0m to ALL depths

CORE DESCRIPTION

WELL FORTESCUE 1.

SCALE 1:10

CORE No. 1.

Interval Cored 2416.6-2431.09m Cut 14.49m Recovered 14.49m (100%) Fm. Latrobe

t Type C20 Bit Size 8 15/32" in. Desc by Burns/Swarbrick Date 5.7.78

SAMPLING	DEPTH & CORING RATE MIN./m	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
	0 10 20												
	0.6								med gry				
	62												
	CA												
	76							S					
	.8	M				vf to Silty			med-dk gry			v low	2420.76-2420.85m sandstone & finely laminated with siltstone
	85							S					2420.85-2421.38m sandstone, vf, with fine silty laminae. thin bedding planes contain mica & pyrite
	.0	M				vf fine bedding highly bioturbated.			med — dk gry			v low or nil	
	.2	M											
		M											
		M											
	.4	M						S					
	.6			MARINE	NEARSHORE	vf			med gry			v low	2421.38-2422.35m sandstone, lt-med gy, well consd, qtz; sub ang-sub rnd, very tight, with no fluoresence or cut, no odour or taste; finely laminated light and dark bands due to amount of clay matrix; 1-2% muscovite & biotite
	.8												
	2.0												
	.2												
	24		1-2°										
	SP												
	35							S					2422.35-2423.0m sandstone, very fine-silty; poorly sorted and highly bioturbated mica & pyrite abundant. no fluor or cut
	.4	M				vf — silt	intense bioturb		med — dk gry			v low	
		M											
	.6	M											

Dwg. 1107/OP/87

NOTE: Depth Correction
add 6.0m to All depths

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

WELL FORTESCUE I.

SCALE 1:10

CORE No. 1

Interval Cored 2410.6-2425.09m Cut 14.49 Recovered 14.49 (100%) Fm. Latrobe

Bit Type C20 Bit Size 8 15/32" in. Desc by Burns/Swarbrick Date 5.7.78

SAMPLING / DEPTH & CORING RATE MIN./m	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2422.6 (10 20)	MM		MARINE	NEARSHORE	vf – silt occ. med grains		S	med – dark gry				
.8	MM											
2423.0	MM											
P.00					f w/ vf- laminae			med gry			low	2423.00-2423.33m sandstone, finely laminated, trace pyrite & brown iron stain, muscovite & biotite, tr, black carb. specks
.2							S					
.4	MM				vf – silt			med – dk gry			negligible	2423.33-2425.20m sandstone/siltstone, bedding obliterated by burrowing; no fluor or cut, no odour or taste
.6	MM											
.8	MM											
2424.0	MM											Intensely bioturbated w/ minor cut & fill structures, biotite & muscovite abundant.
.2	MM											
.4	MM											
.6	MM											

Dwg. 1107/OP/87

NOTE: Depth Correction - add 6.0m to ALL Depths

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

WELL FORTESCUE 1.

SCALE 1:10

CORE No. 1

Interval Cored 2416.6-2431.0m Cut 14.49m Recovered 14.49m (100%) Fm. Latrobe

Bit Type ..... Bit Size 8 15/32" in. Desc by Burns/Swarbrick Date 5.7.78

SAMPLING DEPTH & CORING RATE MIN/m	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2416.6 0 10 20			MARINE	NEARSHORE								
.8												
2425.0												
.2					vf	finely bedded	S	med gry			fair	2425.20-2425.38 m Sandstone, vf grained, well sorted, minor biotite, no fluor.
.4							S					
.6					fine very fine & silt	intense bioturb		med gry – dk gy			negligible	2425.38-2427.27 m Sandstone/Siltstone; bedding obliberated by burrowing; very tight with no fluor or cut.
60												
.8						fine bedded						
2426.0												Pyrite nodules @ 2426.66m
.2						Intense bioturb						
.4												
.6												

Dwg. 1107/OP/87

NOTE: Depth Correction
add 6.0m to ALL Depths

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL FORTESCUE-1

SCALE 1:10

CORE No. 1

Interval Cored 2416.6-2431.0 m Cut 14.49 Recovered 14.49m (100%) Fm. Latrobe

Bit Type C20 Bit Size 8 15/32" in., Desc by Burns/Swarbrick Date 5.7.78

DEPTH & CORING RATE MIN/m	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2426.6 (0 10 20)	MM		MARINE	NEARSHORE								Pyrite infill burrows @ 2427.25 m
.8	MM											
2427.0	MM											
.2	MM											
.4		2-30			vf laminated to med bedded		S	med gry			fAIR	2427.27-2427.56 m sandstone; vf; well sorted, rare mica & pyrite, no fluor or cut.
.6	MM				vf to silt intensely bioturb.		S	med brn to med gy			negligible	2427.56-2429.82m Siltstone/ Sandstone, med-dk grey, very minor f-med gr, minor mica; very carbon-aceous; abundant pyrite (infilling woody material) very low porosity; very minor spotty yell. fluor with very weak milky white cut.
.8	MM											
2428.0	MM											
.2	MM											
.4	MM											Bedding obliberated by burrowing
.6												

Dwg. 1107/OP/87

NOTE: Depth Correction add 6.0m to ALL Depths

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

WELL FORTESCUE-1

SCALE 1:10

CORE No. 1

Interval Cored 2416.6-2431.09m Cut 14.49 m Recovered 14.49m (100%) Fm. Latrobe

Bit Type C20 Bit Size 8 15/32" in. Desc by Burns/Swarbrick Date 5.7.78

SAMPLING	DEPTH & CORING RATE MIN/m	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
	2428.6 0 10 20			MARINE	NEARSHORE	vf to silt; intensly bioturb.			med brn to med gy			negligible	Muscovite common & minor carbonaceous flecks Coarse sand infilling burrow @ 2429.42 m Isolated c-vc quartz grains from 2429.55m to base of unit.
	2429.0												
P	30												
	2430.0				SHOREFACE	vf - gran poorly sorted	very bioturb	G	med gy, gy-brn			low	2429.82-2430.07:m Sandstone,med.gy,gy-brn, vf-granl,ang-subang qtz grs,well rnd,granl, mod consd-friable,matrix is vf sst-stst containing glauconite & musc.,minor carb.mat & py; low Ø, no fluor or cut
SYD	07												
	2.27					gran to med	friable	C	med gy			good inter gran	2430.27-2430.46,m Sandstone,pred.granular, minor med qtz grs,friable good intergran.por.,trace yell.fluor,no-weak wh.cut
CA	33 4 46					med-coarse		S	med gy			good	
P	60 6												

2430.46-2431.09m Sandstone, med gy, mod consd-semi friable, subang-sub rnd, med-crse-granl, qrtz grs, 2-3% glauconite grs; trace brn stain (probably iron-lines burrows), tr. mica; good porosity, only trace spotty yell fluor w/ v. weak wh cut; no odour or taste, majority of rock has no fluor or cut.

NOTE: Depth Corrections
add 6.0m to ALL Depths

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL FORTESCUE - 1

SCALE 1:10

CORE No. 1

Interval Cored 2416.6-2431.0m Cut 14.49 m Recovered 14.49m (100%) Fm. Latrobe

Bit Type C20 Bit Size 8 15/32" in., Desc by Burns/Swarbrick Date 5.7.78

SAMPLING DEPTH & CORING RATE MIN/m	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2430.6 0 10 20 76 76 .8 SP 85 2431.0		H	MARINE	SHOREFACE	gran – med – fine	mod consd		med gy			good intergranular	Poorly sorted, glauconite common approx. 5-7%. No odour or taste BOTTOM CORE #1 2431.09m Samples seal pealed for EPRCo:2422.24-2422.35 m 2430.76-2430.85 m Samples for onsite core analysis:2420.62-2420.76 Samples for palynology : 2417.20 m 2418.10 m 2420.85 m 2422.30 m 2423.00 m 2429.30 m 2430.10 m 2425.60 m 2430.60 m Samples taken to Sydney: 2433.07-2430.16 m

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

WELL FORTESCUE-1 SCALE 1:10

CORE No. 2

Interval Cored 2431.09-2443.3m Cut 12.21m Recovered 8.29m (.1..68%) Fm.LATROBE

Bit Type C22 Bit Size 8.15/32" in. Desc by Burns, Swarbrick & Do Rozario Date 6-7-78

DEPTH & CORING RATE MIN/M	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2431.0 0 16 32	48											2431.09-2432.48m
.2			MARINE	SHOREFACE	gran - med - f; matrix becoming silty	incrg silt	g	med gy; brn-gy			FAIR	sst-med gy-gy brn, pred granl (2-5mm) subrnd-rnd qtz grs, set in mtx of f-med sub ang qtz grs, with incrg silt fraction from 2431.4; mod consd, poorly srtd, 2-3% glaucon, tr py replacing woddy struct., 1-2% musc & biot. Ø is fair (reduced by poor srtg and abundance slty mtx) numerous burrows infill w/granl concentrate and partly obliterating slty bands; no fluor or cut, one spot with yell fluor & wh cut; no odour or taste.
.4												
.6												
.8												
2432.0												
.2												
.4												
.6					silty - vf	burrows incrg		med gy; gy; brn			LOW	2432.48-2437.67 m Finely interbedded silt-stone & vf sandstone, bedding partly or totally eliminated by burrowing giving a 'churned effect'. Cont'd over:
.8												
2433.0												

CORE ANALYSIS:	K1	%Ø	So	Stw	Sd	Gd	Remarks
(1) 2431.63-.78	5.5	6.34	0	80.08	2.57	2.67	H2S & sulphur
(2) 2438.29-.40	6.2	9.68	0	69.34	2.35	2.51	No odour

For sampling details - Page 6.

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

WELL FORTESCUE-1

SCALE 1:10

CORE No. 2

Interval Cored 2431.09-2443.3m Cut 12.21m Recovered 8.29m (68%) Fm. LATROBE

Bit Type C22 Bit Size 8.15/32" in., Desc by BURNS/SWARBRICK Date 6.7.78

DEPTH & CORING RATE MIN/M	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2433.0 00 16 32	48											SILTSTONE: gy-brn, soft w/biotite common along bedding planes & traces blck carbonaceous mat. Sandstone: gy-brn, vf-f ang-sub ang, mod consd, abundant glauc. grs (≈ 5%), some mica, pyrite nodules, no fluoresence or cut, no odour or taste.
.2					vf - silt			med gy				
.4		py						gy brn				
.6												
.8												
2434.0			MARINE	NEARSHORE							VERY LOW	Churned bedding.
.2												
.4												
.6												Long burrow approx. 7cm.
5005												
.8												
2435.0												

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

WELL FORTESCUE-1 SCALE 1:10

CORE No. 2

Interval Cored 2431.09-2443.3m Cut 12.21 Recovered 8.29m (68 %) Fm. LATROBE

Bit Type C22 Bit Size 8.15/32" in., Desc by BURNS/SWARBRICK Date 6.7.78

DEPTH & CORING RATE MIN/M	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
435.0 0 16 32 48					vf-f - silty			med gy				sandstone/siltstone as above; poorly srtd, sub-ang qtz grs, mod. consd; thin carb. grains,
.2								gy				
								brn				
.4												pyritic, no fluor or cut, no odour.
.6		<2-3°				siltier ↓						parallel silty laminat. partly destroyed by burrowing.
.8			MARINE	NEARSHORE							VERY LOW	
436.0												
.2												
.4												
.6												
.8												
437.0												

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

WELL FORTESCUE-1 SCALE 1:10

CORE No. 2

Interval Cored 2431.09-2443.3m Cut 12.21 Recovered 8.29m (68%) Fm. LATROBE

Bit Type C22 Bit Size 8.15/32" in., Desc by BURNS/SWARBRICK Date 6.7.78

DEPTH & CORING RATE MIN/M	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2437.0 16 32 48												
.2												
.4												
.6											VERY LOW	
.8		H	MARINE	NEARSHORE	vf	↑fining	g	grey			POOR-FAIR	2437.67-.84m- SST, gy partly slty, vf qtz, fair sorting, tr mica, no fluor or cut.
2438.0		H			vf	↑fining	g	grey				2437.84-2438.85m SST - as above, cyclical units with sst/stst lam. at base grading to a fairly homogeneous well srtd sst, grading to v.bioturbated sst/stst at top.
.2		H			vf	↑fining	g	grey				
.4												2438.15-2438.44m- SST, vf, silty as above.
.6					vf - silt		s	grey - brn			VERY LOW	2438.44-2439.38m siltstone, sandy; mod. hard, pyritic common as burrow infillings and replacing woody? structures, some black carbonaceous grains; tr mica; highly bioturbated eliminating bedding; no fluor or cut, no odour.
.8												
2439.0												

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

WELL FORTESQUE-1

SCALE 1:10

CORE No. 2

Interval Cored 2431.09-2443.3m Cut 12.21m Recovered 8.29m (68 %) Fm. LATROBE

Bit Type C22 Bit Size 8.15/32" in., Desc by BURNS/SWARBRICK Date 6.7.78

DEPTH & CORING RATE MIN/M	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2439.0 16 32	48											
.2												
.4												BOTTOM OF CORE 2439.38m
50.6												
.6												
.8												
2440.0												
.2												NO RECOVERY
.4												
.6												
.8												
2441.0m												

REMARKS:

Lost section of core is most likely from bottom as top of core has good core barrel mark, most of core is continuous with no out of place lithology, and bottom of core is broken off.

ESSO AUSTRALIA LTD.

CORE DESCRIPTION

WELL FORTESCUE-1

SCALE 1:10

CORE No. 2

Interval Cored 2431.09-2443.3m Cut 12.21 m Recovered 8.29m (68 %) Fm. LATROBE

Bit Type C22 Bit Size 8.15/32" in., Desc by BURNS/SWARBRICK Date 6.7.78

DEPTH & CORING RATE MIN/M	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
41.0 0 16 32	48											
.2												
.4												
.6												
.8												NO RECOVERY
42.0												Samples for Core Analysis:
.2												1) 2431.63-2431.78m
.4												2) 2438.29-2438.40m
.6												Blender Samples
.8												1) 2432.1m
43.0												2) 2437.7m
												Samples for Palynology
												1) 2433.60m
												2) 2435.60m
												3) 2437.70m
												4) 2438.29m
												5) 2438.60m

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ESSO AUSTRALIA LTD.

CORE DESCRIPTION

WELL FORTESCUE-1 SCALE 1:10

CORE No. 2

Interval Cored 2431.09-2443.3m Cut 12.21 m Recovered 8.29m (68%) Fm. LATROBE

Bit Type C22 Bit Size 8.15/32" in., Desc by BURNS/SWARBRICK Date 6.7.78

DEPTH & CORING RATE MIN/M	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2443.0 0 16 32	48											
.2												
.4												BOTTOM OF CORED INTERVAL 2443.3m

APPENDIX 3

APPENDIX 3

SIDEWALL CORE DESCRIPTIONS

PAGE 1 OF 3

ATT 30 REC 22

DATE 12th July, 1978

ESSO AUSTRALIA LTD.

SIDEWALL CORE DESCRIPTIONS

IES RUN NO 2 SWC RUN NO 1

SERVICE CO SCHLUMBERGER

GEOLOGIST R.C.N. THORNTON

WELL FORTESCUE-1

NO.	DEPTH	REC	ROCK TYPE	MODIFIERS	CAL	COLOR	INDUR DEG	GRAIN SIZE	SRTG	RND	DISS CLAY	STAIN	FLOURESCENCE %	FLOURESCENCE DISTR	FLOURESCENCE INTEN	FLOURESCENCE COLOR	CUT FLUOR. INTEN	CUT FLUOR. COLOR	CUT RESIDUE QUAN	CUT RESIDUE COLOR	SHOW	PROB PROD	REMARKS - GAS
1a	1	2	3	4	5	6	7	8	9	10	11	12	RK	14	15	16	17	18	19	20	21	22	23
1	2679		SAND-STONE	quartz, slightly laminated	-	light to medium grey	soft -	very fine to fine grained	good	sa-sr	20%												
2	2672		SILT-STONE	quartz, carbonaceous, pyrite.		dark grey	firm		good		-												
3	2670		SAND-STONE	quartz, mica, pyrite.		light grey	soft	very fine	good														
4	2666		SILT-STONE	quartz, carbonaceous, pyrite.		medium to dark grey	firm		good														
5	2664.5		-																				MISFIRE
6	2655		SAND-STONE	quartz, pyrite, carbonaceous, mica.		light grey	soft to firm	very fine	good														
7	2645		SILT-STONE/SAND-STONE	laminated		dark to light grey	firm	very fine	good														
8	2636		SHALE	silty		dark brown to grey	firm																
9	2627		SILT-STONE	quartz, slightly micaceous.		light grey to brown	firm																
10	2616		SILT-STONE/SAND-STONE	finely laminated		dark to light grey	firm	fine	good	sa-sr													
11	2606		-																				MISFIRE
12	2595		SAND-STONE	quartz, carbonaceous, mica		light to medium grey	firm	fine	good	sa-sr	10%												
13	2585		SAND-STONE	quartz, carbonaceous, mica.		light to medium grey	firm	very fine grained	good	sa-sr	10-20%												
14	2571		-																				MISFIRE
15	2559		SAND-STONE	quartz, clear -		light grey	soft	medium to very coarse	poor	sa-sr	5%												

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ATT 30 REC 22
DATE 12th July, 1978
IES RUN NO 1 SWC RUN NO 2

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL FORTESCUE-1
GEOLOGIST R.C.N. THORNTON
SERVICE CO. SCHLUMBERGER

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
16	2551	-	SAND-STONE	quartz, micaceous carbonaceous		light grey to brown	soft -	fine to very coarse	poor	sa-sr	5-10%												
17	2543		-																				MISFIRE
18	2532		SAND-STONE	quartz		brown	soft	fine to very coarse	poor	sa-sr	5-10%												
19	2525		SHALE	micaceous silty		dark grey	sub-fissile																
20	2515		-																				MISFIRE
21	2500		SAND-STONE	quartz, clear		light grey	fri-able	fine to very coarse	very poor	a-sr	<5%												
22	2465.5		SAND STONE	quartz, clean		light grey	fri-able	fine grain to gran-ular	very poor	a - sr	<5%												
23	2457		-																				MISFIRE
24	2444		SAND STONE	quartz		dark grey	fri-able	very fine grain to gran-ular	fair		20%												
25	2416		SAND	quartz		light grey	fri-able	fine	good	sa-sr	<5%		0										

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ATT 30 REC 22

DATE 12th July, 1978

1 SWC RUN NO

2 IES RUN NO

SERVICE CO SCHLUMBERGER

GEOLOGIST R. C. N. THORNTON

WELL FORTESCUE-1

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
26	2415	-	-																				MISFIRE
27	2414		SAND	quartz		light	fri-	fine	med-	sa-	5%		0										
			STONE			grey	able	to	ium	sr	10%												
								medi-															
								um															
								grain															
28	2413		SAND			ochre	firm	fine	very	sa-	10%-		0										
			STONE/			dark		to	poor	sr	20%												
			SHALE			grey		very coarse															
29	2412		-																				MISFIRE
30	2411		SHALE	glauconite,		dark	firm																
				quartz,		grey																	
				forams																			

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ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL FORTESCUE-1 PAGE 1 OF 3
GEOLOGIST R. DO ROZARIO ATT 30 REC 28
SERVICE CO SCHLUMBERGER DATE July 12, 1978
IES RUN NO 2 SWC RUN NO 2

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
31	2606	20	SAND STONE	mica, few carbonaceous specks and silty ~~laminae~~		light grey	moderate	fine	well	sa	20	-	-	No fluorescence or			cut.						No odour.
32	2571	28	SAND STONE	mica	-	medium grey	weakly consolidated.	fine to granular	poor	sa r	5	-		No fluorescence or			cut.						No odour.
33	2515	15	SAND STONE	mica	-	light grey	weak-con-soli-dated	fine pebbly	very poor	sa r	5	-		No fluorescence or			cut						No odour.
34	2454.5	15	SAND STONE	mica, silt	-	light grey	moderately con-soli-dated	very fine to fine	moderatly well	sa	10	-		No fluorescence or			cut.						No odour.
35	2435	20	SAND STONE/ SILT-STONE	mica, silt	-	medium to dark grey	moderately consolidated	very fine to fine	moderatly well	sa	20			No fluorescence or			cut.						No odour.
36	2415	20	SHALE	silty, carbonaceous specks	mod	medium grey	well con-soli-dated	silty in part	-	-	-												Brittle
37	2412	15	SILT-STONE	very sandy trace mica, glauconite	-	medium grey	moderately con-soli-dated	very fine to coarse to very coarse	poor	sa r	20			No fluorescence or			cut						H_2S odour.

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ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL FORTESCUE-1 | PAGE 2 OF 3
GEOLOGIST R. DO ROZARIO | ATT 30 REC 28
SERVICE CO. SCHLUMBERGER | DATE July 12, 1978
IES RUN NO 2 | SWC RUN NO 2

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
38	2410	35	MARL	mica, glauconite, pyrite	V	dark grey	well -	-	-	-	50												Bottom of SWC sticky where hydrated.
39	2409	MISFIRE - LOST BULLET																					
40	2408	40	MARL	shaley,mica brittle	V	dark grey	well	-	-	-	50												
41	2407	40	MARL	glauconite, mica, silt	V	dark grey	well	-	-		50												
42	2406	LOST BULLET																					
43	2405	38	MARL	mica, glauconite, trace sand	V	medium grey	moderate to sticky	-	-		50												
44	2404	40	MARL	mica, glauconite	V	medium grey	moderate to sticky	-	-		50												
45	2403	35	MARL	silty,trace glauconite and mica.	mod	medium grey	well	-	-	-	60												
46	2402	38	MUDST	trace mica, silty	mod	dark grey	well				70												
47	2401	42	MARL	trace pyrite mica, silt	V	medium grey	well				50												
48	2400	40	MARL	silty,mica,	V	medium grey	well				50												Few dark brown silty laminae
49	2399	40	MARL	mica, carbonaceous	V	medium grey	well to sticky				50												
50	2398	42	MUDST	shaley,mica	mod	dark grey	well consolidated.				70												

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ATT 30 REC 28

DATE July 12, 1978

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SWC RUN NO 2

IES RUN NO

ESSO AUSTRALIA LTD.

SIDEWALL CORE DESCRIPTIONS

WELL FORTESCUE-1

GEOLOGIST R. DO ROZARIO

SERVICE CO. SCHLUMBERGER

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
51	2397	45	MARL	mica	V	mod-erat-ly grey	well to sticky				50												
52	2396	40	MARL	mica	V	medi-um grey	moder-ately consol-idated				50												Sticky.
53	2395	45	MUDST	micromic-aceous marly	V	medi-um to dark grey	well consol-idated				80												
54	2356	40	MUDST	micromica-ceous shaley	V	medi-um grey	well consol-idated				80												
55	2336	48	MUDST	slight silty micromica	mod	medi-um grey	well consol-idated				85												Globular forams Pyritized burrows.
56	2310	50	MUDST	slight micromica-ceous	mod	medi-um grey	well				90												Pyritized
57	2277	58	MUDST	shaley	mod	medi-um grey	well				90												
58	2240	46	MARL	micromic-aceous	str	medi-um to light grey	well				45												Trace pyrite.
59	2217	40	MUDST	micromic-	mod	medi-um to light brown grey	consol-idated				70												Rare pyrite to 1mm.
60	2188	41	MUDST	silty, micromic-aceous	mod	medi-um grey	consol-idated				80												Silt size fossil fragments

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ATT 30 REC 29

DATE 12.7.78

SWC RUN NO 3

IES RUN NO 2

ESSO AUSTRALIA LTD.

SIDEWALL CORE DESCRIPTIONS

GEOLOGIST SWARBRICK, DO ROZARIO

SERVICE CO SCHLUMBERGER

WELL FORTESCUE-1

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
61	2158	55	MUDST	silty, fossiliferous, micromicaceous	mod	medium grey to medium grey brown	consolidated				70												Siltsize fossil (?foram) fragments abundant.
62	2123	45	MUDST		mod	medium grey	moderately consolidated				80												Siltsize fossil fragments common
63	2097	40	MUDST	slightly Marly	mod	medium grey	moderately consolidated				90												Blocky
64	2063	35	MUDST	Marly micromicaceous	str	medium grey	moderately consolidated				60												Blocky
65	2038	35	MUDST	slightly Marly micromicaceous	mod	medium grey	moderately consolidated				80												Blocky, trace fossil fragments and carbonaceous streaks.
66	2000	32	MUDST	slightly Marly	mod	medium grey medium grey brown	moderately consolidated				80												Thin pyritized burrows.

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ATT 30 REC 29

DATE 12.7.78

ESSO AUSTRALIA LTD.

SIDEWALL CORE DESCRIPTIONS

SWC RUN NO 3

IES RUN NO 2

WELL FORTESCUE-1

GEOLOGIST SWARBRICK, DO ROZARIO

SERVICE CO SCHLUMBERGER

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
67	1975	24	MUDST	slightly marly	mod	medium grey	moderately consolidated				80												Mainly blocky ~~subfissile in~~ part.
68	1947	30	MUDSTN	fossiliferous silty	str	medium grey brown	moderately consolidated				70												~~Fossil fragments~~ mainly forams trace glauconite
69	1917	30	MUDSTN		wk	medium grey	moderately consolidated				80												Fossil fragments ~~and rare~~ glauconite.
70	1885	28	MUDSTN		mod	medium grey to medium grey brown	moderately consolidated				85												Fossil fragments common
71	1855	22	MUDSTN		mod	medium grey	moderately consolidated				90												Fossiliferous
72	1825	20	MUDSTN	80%	mod	medium grey	moderately consolidated																
			~~Calcarenite~~	~~20%~~	v	white	~~firm~~	fine to very fine	good	sa	30												As thin band

FORM R 257 3.72

PAGE 3 OF 5 ATT 30 REC 29

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL FORTESCUE-1 IES RUN NO 2 SWC RUN NO 3 DATE
GEOLOGIST SWARBRICK,DO ROZARIO
SERVICE CO SCHLUMBERGER

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
73	1795	T8	MUDSTN	silty	mod	medium grey to medium grey brown	moderately consolidated				90												
74	1765	32	MUDSTN	silty	mod	medium grey to medium grey brown	moderately consolidated				80												Micromicaceous Blocky
75	1740	20	SILT-STONE	argill.	mod	medium grey brown	moderately consolidated	SLT	Well		30												
76	1705	22	MUDSTN	silty	mod	medium grey to medium grey green	firm to soft				80												Micromicaceous
77	1670	20	MUDSTN	silty	mod	medium grey green	firm				60												Globular forams, rare Benthonic forams.
78	1585	18	MUDSTN	slightly silty	mod	medium grey green	firm				80												

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ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL FORTESCUE-1 | PAGE 4 OF 5
GEOLOGIST SWARBRICK, DO ROZARIO | ATT 30 REC 29
SERVICE CO SCHLUMBERGER | DATE 12.7.78
IES RUN NO 2 | SWC RUN NO 3

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
79	1520	27	MUDSTN	marly	mod	medium grey green	firm to soft				95												
80	1460	15	MUDSTN	marly	mod	medium grey green	firm to soft				90												Trace pyrite, slightly micromicaceous.
81	1400	45	MUDSTN	marly	mod	medium grey green	soft				70												
82	1340	15	MARL		str	light grey green	soft				<50%												Benthonic Forams
83	1280	18	MUDSTN	marly	str	medium grey green to light grey green	soft to firm				50												Benthonic Forams
84	1220	18	MARL		str	light grey to light grey green	soft				<50												
85	1160	22	MUDSTN	marly	str	medium grey green	firm to soft				60												

FORM R 257 3.72

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ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL FORTESCUE-1 PAGE 5 OF 5
GEOLOGIST SWARBRICK,DO ROZARIO ATT 30 REC 29
SERVICE CO SCHLUMBERGER DATE 12.7.78
IES RUN NO 2 SWC RUN NO 3

NO. 1a	DEPTH 1	REC 2	ROCK TYPE 3	MODIFIERS 4	CAL 5	COLOR 6	INDUR DEG 7	GRAIN SIZE 8	SRTG 9	RND 10	DISS CLAY 11	STAIN 12	FLOURESCENCE % RK	FLOURESCENCE DISTR 14	FLOURESCENCE INTEN 15	FLOURESCENCE COLOR 16	CUT FLUOR. INTEN 17	CUT FLUOR. COLOR 18	CUT RESIDUE QUAN 19	CUT RESIDUE COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
86	1100	18	MUDSTN	marly	str	medium light grey green	firm to soft				70												Trace fine laminations
87	1040	20	MUDSTN	marly	str	medium to light grey green	firm to soft				70												Fine burrows containing pyritiferous infilling
88	980	22	MUDSTN	marly	str	medium to light grey green	firm to soft				80												Contains 2mm thick fracture fill of sparry calcite.
89	920	0																					
90	870	20	MUDSTN	marly	str	light grey green	mainly firm				70												Scattered silt size fossil fragments. Rare mica flakes.

FORM R 257 3 72

SIDEWALL CORE DESCRIPTIONS

R. C. N. Thornton

FORTESCUE-1 - RUN 1

12/7/78

SWC NO.	DEPTH m.	RECOVERED	DESCRIPTION
1	2679		Sandstone - light to medium grey, soft, clear quartz, fine to very fine grain, subangular to subrounded, in light grey clay matrix. Fine laminations indicated by darker band, and minor carbonaceous layers.
2	2672		Siltstone - dark grey, firm, quartz, pyritic finely disseminated, and as nodules, carbonaceous flecks, minor lens of pale grey very fine grain quartz sandstone.
3	2670		Sandstone - light grey, soft, clear quartz, well sorted, plus mica (both muscovite and biotite), pyrite and carbonaceous flecks, no visible porosity.
4	2666		Siltstone - medium to dark grey, firm to moderately hard quartz, finely disseminated pyrite, carbonaceous flecks.
5	2664.5		MISFIRE
6	2655		Sandstone - light grey, soft to firm, clear quartz plus minor amounts of disseminated pyrite, mica, carbonaceous flecks. Minor clay matrix. No visible porosity.
7	2645		Interbedded Siltstone and Sandstone - Siltstone dark grey, firm, quartz, carbonaceous, slightly micritic, pyrite, with a few 1-2mm laminae of sandstone, light grey, firm, quartz, very fine grain, subangular to subrounded, clean.
8	2636		Silty Shale - dark brown to grey, firm to subfissile, carbonaceous, slightly micritic, very minor 1mm thick lenses of sandstone, clean, very fine grain.
9	2627		Siltstone - light grey to brown, firm, quartz, minor mica, carbonaceous flecks.
10	2616		Finely laminated Siltstone and Sandstone - Siltstone dark grey, firm, quartz, highly carbonaceous, sandstone, light grey, firm, clear quartz, fine grain, well sorted, subangular to subrounded, set in white clay matrix.
11	2606		MISFIRE
12	2595		Sandstone - light to medium grey, firm, semifissile, clear quartz, fine grain, well sorted, subangular to subrounded, plus minor carbonaceous flecks and mica, set in clay matrix . Poor porosity.
13	2585		Sandstone - light to medium grey, firm to soft, clear quartz, very fine grain, well sorted, subangular to subrounded, trace mica, very thin carbonaceous laminae, set in clay matrix. No visible porosity.

SIDEWALL CORE DESCRIPTIONS

R. C. N. Thornton

FORTESCUE-1 RUN 1

12/7/78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
14	2571		MISFIRE
15	2559		Sandstone - light grey, soft to simifriable, interbedded clear quartz, medium grain, subangular to subrounded, well sorted, clean, trace mica, red ferruginous staining, carbonaceous laminae, good porosity; and clear quartz, coarse to very coarse grain, subangular to subrounded, poorly sorted clean, trace mica, red ferruginous staining, excellent porosity.
16	2551		Sandstone - light grey to brown, firm, quartz, fine to very coarse grain, mostly medium grain, poorly sorted, subangular to subrounded, trace mica, carbonaceous flecks, iron staining, pyrite, set in brown clay matrix. Good porosity.
17	2543		MISFIRE
18	2532		Sandstone - brown, soft, quartz, fine to very coarse grain, mostly medium grain, poorly sorted, subangular, subrounded, minor red iron staining, pyrite, trace mica, carbonaceous flecks, set in brown clay matrix. Fair porosity.
19	2525		Shale - dark grey to dark brown, subfissile, highly micaceous, slightly silty.
20	2515		MISFIRE
21	2500		Sandstone - light grey, friable, clear quartz, fractured grains, fine to very coarse grain, very poorly sorted, angular to subrounded, clean. Excellent porosity.
22	2465.5		Sandstone - light grey, friable, clear quartz, fractured grains, some frosted, fine to very coarse grains & granules, very poorly sorted, angular to subrounded, clean, trace yellow-red iron staining. Excellent porosity.
23	2457		MISFIRE
24	2444.0		Sandstone - dark grey, friable, quartz, very fine grain with very few very coarse grains and granules, well rounded, frosted quartz grains, mica, pyrite, set in up to 20% clay matrix. Poor visual porosity.
25	2416		Sandstone - light grey, friable, clear quartz, fine grain, subangular to subrounded, trace mica, pyrite, carbonaceous flecks, excellent porosity. No fluorescence.
26	2415		MISFIRE

SIDEWALL CORE DESCRIPTIONS

R. C. N. Thornton

FORTESCUE-1 - RUN 1

12/7/78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
27	2414		Sandstone - light grey, friable, clear quartz, fine to medium grain, medium sorted, trace mica, pyrite, carbonaceous flecks, excellent porosity. No fluorescence.
28	2413		Compact Sandstone/Shale - Sandstone mainly ochre yellow-brown, firm, clear quartz, polished to frosted, fine to very coarse grain, subangular, very poorly sorted, in ochre clay matrix, minor light grey laminae of clear quartz, medium grain. Shale, slightly silty, dark grey. No fluorescence.
29	2412		MISFIRE
30	2411		Shale - dark grey, firm to subfissile, slightly silty, trace mica, pyrite, glauconite grains, coarse grain, well rounded, quartz grains, forams.

SIDEWALL CORE DESCRIPTIONS

FORTESCUE-1-RUN 2 R. DO ROZARIO

12.7.78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
			Shot 30, recovered 28.
31	2606m	20mm	Sandstone - light grey, fine grained, subangular, clear quartz grains, well sorted, moderately consolidated white to off white clay, non-calcareous matrix, trace muscovite, black carbonaceous specks, few dark grey to brown silty laminae, .5mm thick, low porosity, no fluorescence or cut, no odour.
32	2571m	28mm	Sandstone - medium grey, fine to very coarse to granular, quartzose, predominantly subangular, clear grains, however granules are usually rounded and milky to frosted, poorly sorted, weakly consolidated, little white clay matrix, very good porosity, no fluorescence or cut, trace mica and lithic grains.
33	2515m	15mm	Sandstone - light grey, fine to pebble, quartzose, predominantly subangular clear grains, however granules and pebbles are usually rounded, milky to light grey, weakly consolidated, little white clay matrix, very poor sorting, very good porosity, no fluorescence or cut, trace mica.
34	2454.5m	15mm	Sandstone - medium grey, very fine to fine, quartzose, subangular clear grains, moderately consolidated, white to light grey clay matrix, silty in part, trace mica trace silty laminae - dark grey to brown <0.5mm, poor porosity, no fluorescence or cut.
35	2435m	20mm	Sandstone/Siltstone - medium to dark grey, very fine to fine, quartzose, subangular clear to off white grains, moderately consolidated, medium to dark grey, light to dark grey clay and silty matrix, trace mica, very poor porosity, no fluorescence or cut.
36	2415m	20mm	Shale - medium grey, calcareous, brittle, well consolidated, silty in part, trace fine black carbonaceous specks.
37	2412m	15mm	Siltstone - very sandy, dark grey, non-calcareous, trace green glauconite, muscovite, moderate to well consolidated, scattered, coarse to very coarse quartz grains, subrounded to rounded, clear to smokey, no porosity.
38	2410m	35mm	Marl - dark grey, well consolidated, trace pyrite, glauconite and mica, silty, very calcareous, bottom of core is sticky where hydrated.
39	2409m		NO RECOVERY - LOST BULLET.
40	2408m	40mm	Marl - dark grey, shaley, well consolidated, trace mica.
41	2407m	40mm	Marl - dark grey, silty, well consolidated, trace mica, glauconite, few dark grey to brown silty laminae.
42	2406m		NO RECOVERY - LOST BULLET.
43	2405m	38mm	Marl - medium grey, moderately consolidated to sticky,

2/....

SIDEWALL CORE DESCRIPTIONS

FORTESCUE-1-RUN 2 — R. DO ROZARIO

12.7.78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
43	2405m	38mm	Continued/.... few rounded coarse quartz grains, few forams, trace mica, glauconite.
44	2404m	40mm	Marl - medium grey, moderately consolidated, sticky, trace mica and glauconite.
45	2403m	35mm	Marl - medium grey, silty, well consolidated, trace mica and glauconite.
46	2402m	38mm	Mudstone - dark grey, moderately calcareous, well consolidated, trace mica.
47	2401m	42mm	Marl - medium grey, well consolidated, silty in part, trace mica, pyrite, black carbonaceous specks.
48	2400m	40mm	Marl - medium grey, silty in part, well consolidated, trace mica, silty laminae, granular texture.
49	2399m	40mm	Marl - medium grey, trace mica, black carbonaceous specks, well consolidated and brittle in middle to sticky on outer zone.
50	2398m	42mm	Mudstone - dark grey, shaley, moderately calcareous, well consolidated, trace mica.
51	2397m	45mm	Marl - medium grey, well consolidated to sticky, trace mica, very finely granular.
52	2396m	40mm	Marl - medium grey, moderately consolidated, sticky, micromicaceous, moderately calcareous.
53	2395m	45mm	Mudstone - medium to dark grey, marly, strongly calcareous, well consolidated, slightly micromicaceous, distinguished from Marl above by amount of residue after dissolving in diluted HCL, and darker colour.
54	2356m	40mm	Mudstone - medium grey, shaley, slightly silty, strongly calcareous, well consolidated, micromicaceous.
55	2336m	48mm	Mudstone - medium grey, slightly silty, micro-micaceous, moderately calcareous, small? forams (globular), well consolidated, pyritized burrows.
56	2310m	50mm	Mudstone - medium grey, slightly micromicaceous, moderately calcareous, well consolidated, pyritized burrows.
57	2277m	58mm	Mudstone - medium grey, shaley, moderately calcareous, well consolidated. Slightly micromicaceous.
58	2240m	46mm	Marl - medium to light grey to light brown, strongly calcareous, well consolidated, sticky and soft when wet, micromicaceous, trace pyrite.
59	2217m	40mm	Mudstone - medium grey, moderately calcareous, well consolidated, micromicaceous, rare pyrite masses up to 1mm, trace carbonaceous streaks.

3/....

SIDEWALL CORE DESCRIPTIONS

FORTESCUE-1-RUN 2

C.F.J. SWARBRICK
R. DO ROZARIO

12.7.78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
60	2188m	41mm	Mudstone - medium grey, moderately calcareous, silty, micromicaceous, consolidated silt size fossil (? foram) fragments.

SIDEWALL CORE DESCRIPTIONS

FORTESCUE-1-RUN 3

C.F. SWARBRICK
R.D. ROZARIO
B. BURNS

12.7.78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
61	2158m	55mm	Mudstone - medium grey to medium grey brown, consolidated, silty, subfissile to blocky, micromicaceous. Trace carbonaceous streaks, silt size fossil (? foram) fragments.
62	2123m	45mm	Mudstone - medium grey, consolidated, subfissile, slightly calcareous, silt size fossil fragments.
63	2097m	40mm	Mudstone - medium grey, slightly marly, moderately calcareous, blocky, moderately consolidated, rare fossil fragments.
64	2063m	35mm	Mudstone - medium grey, strongly calcareous, marly, blocky, moderately consolidated, micromicaceous.
65	2038m	35mm	Mudstone - medium grey, slightly marly, moderately calcareous, blocky, moderately consolidated, micromicaceous, trace silt size fossil fragments, trace carbonaceous streaks.
66	2000m	32mm	Mudstone - medium grey to medium grey brown, slightly marly, moderately calcareous, blocky, moderately consolidated, thin pyritzed burrows.
67	1975m	24mm	Mudstone - medium grey, slightly marly, moderately calcareous, blocky, moderately consolidated, subfissile in part.
68	1947m	30mm	Mudstone - medium grey brown, moderately consolidated, silty, strongly calcareous, containing up to 20% visible forams and fossil fragments up to fine sand size, and glauconite grains. Fossil fragments show preferred orientation parallel to bedding.
69	1917m	30mm	Mudstone - medium grey, moderately consolidated, weakly calcareous, containing silt size fossil fragments and rare glauconite grains.
70	1885m	28mm	Mudstone - medium grey to medium grey brown, moderately calcareous, blocky containing scattered silt size fossil fragments, most probably forams.
71	1855m	22mm	Mudstone - medium grey, moderately calcareous, moderately consolidated, blocky, containing rare silt size and very fine sand size fossil fragments including a possible echinoid spine.
72	1825m	20mm	Mudstone - As above. Calcarenite - (As twin band) white, very fine to fine, firm to disaggregated, light grey clay matrix, very low porosity.
73	1795m	18mm	Mudstone - medium grey to medium grey brown, silty, moderately calcareous, moderately consolidated, blocky.
74	1765m	32mm	Mudstone - medium grey to medium grey brown, silty, moderately calcareous, moderately consolidated, micromicaceous, blocky.
75	1740m	20mm	Siltstone - argillaceous, medium grey brown, moderate-

SIDEWALL CORE DESCRIPTIONS

FORTESCUE-1-RUN 3

C.F. SWARBRICK
B. BURNS

12.7.78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
75	1740m	20mm	Continued/.... ly consolidated, moderately calcareous, rare micro-micaceous flakes, trace pyrite linings on burrows.
76	1705m	22mm	Mudstone - silty, medium grey to medium grey green, moderately calcareous, firm to soft, micromicaceous.
77	1670m	20mm	Mudstone - silty, medium grey green, moderately calcareous, firm, slightly micromicaceous, suspended forams up to ¼mm, mainly globular, possible trace benthonics.
78	1585m		Mudstone - slightly silty, medium grey green, moderately calcareous, firm, unidentifiable fossil fragments 0.3mm, possibly benthonic forams, some irregular areas of brown staining possibly related to burrows. Staining appears to be ferruginous.
79	1520m	25mm	Mudstone - marly, medium grey green, soft to firm, moderately calcareous, thin burrows up to 3mm long detailed by brown burrow filling - probably ferruginous.
80	1460m	15mm	Mudstone - marly, medium grey green, soft to firm, moderately calcareous, small, polygonal in cross section (¼mm) columnar fossil fragments, globular forams, trace pyrite, slightly micromicaceous.
81	1400m	45mm	Mudstone - very marly, medium grey green to light grey green, mainly soft, waxy, moderately calcareous, slightly micromicaceous, contains unidentifiable fossil fragments up to ¼mm.
82	1340m	15mm	Marl - light grey green, soft, calcareous, slightly micromicaceous, containing benthonic forams. NOTE: Extract after dissolving in Diluted HCL indicates clay content ≈ 50%.
83	1280m	18mm	Mudstone - very marly, medium grey green to light grey green, soft to firm, strongly calcareous, suspended benthonic forams.
84	1220m	18mm	Marl - light grey to light grey green, soft, strongly calcareous, two unidentifiable fossil fragments observed
85	1160m	22mm	Mudstone - medium grey green, soft to firm, strongly calcareous, marly.
86	1100m	18mm	Mudstone - medium grey green to light grey green, marly, soft to firm, strongly calcareous. Trace of fine laminations.
87	1040m	20mm	Mudstone - marly, medium to light grey green, strongly calcareous, soft to firm, fine burrows with associated pyritiferous infilling. Scattered silt size? forams (mainly planktonic).
88	980m	22mm	Mudstone - marl, medium to light grey green, soft to firm, strongly calcareous with 2mm thick band of sparry calcite (possibly fracture filling because crystals

3/....

SIDEWALL CORE DESCRIPTIONS

FORTESCUE-1-RUN 3 C.F. SWARBRICK

12.7.78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
88	980m	22mm	Continued/....
			aligned perpendicular to axis of band).
89	920m		NO RECOVERY.
90	870m	20mm	Mudstone - marly, slightly silty, light grey green, mainly firm, strongly calcareous, rare micromicaceous flakes. Scattered size indeterminate fossil fragments.

APPENDIX 4

APPENDIX 4

PALYNOLOGICAL ANALYSIS OF FORTESCUE-1, GIPPSLAND BASIN

by

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and

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Esso Australia Ltd.,

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INTRODUCTION

Thirty-eight samples were examined from Fortescue-1, consisting of six cores, twenty-seven sidewall cores, and five cuttings samples. Overall, the preservation of the fossils was poor owing to extensive pyrite pitting of the spore-pollen and dinoflagellate specimens. Yield varied from very low to abundant.

Zones and environmental/lithological subdivision of the basal part of the Lakes Entrance Formation and Latrobe Group examined is summarised below. All samples examined are listed on Table-1 while fossil assembages are given on accompanying distribution charts.

SUMMARY

UNIT/FACIES	ZONE	DEPTH
LAKES ENTRANCE FM. Deep-water marine marl	*P. tuberculatus*	2410-2415m
2415m	Unconformity	
LATROBE GROUP "Offshore marine facies" Fine-grained clastics with accessory glauconite	Upper *M. diversus*	2416-2444m
2452m		
"Shore-face sand facies" Coarse clean sands with rare fine grained usually carbonaceous layers	Middle *M. diversus*	2454.5-2551m
2522m		
"Deltaic facies" Interbedded coals, sands and shales, with varying marine influence in both sands and shales	Lower *M. diversus*	2559-2655m
	Upper *L. balmei*	2666-2679m
T.D. 2691m		

GEOLOGICAL COMMENTS

1. The Middle Malvacipollis diversus Zone is recognised in Fortescue-1 as an additional subdivision between the Lower and Upper M. diversus Zones. The Middle M. diversus Zone was originally erected and used in the Bass Basin where several wells contain exceptionally thick Early Eocene sections. The zone has not previously been utilised in the Gippsland Basin because the Early Eocene section is thinner and sample control, particularly in the early wells, has prevented it being recognised throughout the basin. Better sample control in Fortescue-1 and the need for more refinement of the zones in the Fortescue-Halibut-Cobia area necessitates resuscitation of this zone.

   The base of the Middle M. diversus Zone is picked principally on the first occurrence of Proteacidites tuberculiformis and/or P. xestoformis. An additional morphologically similar species Proteacidites obesolabrus is also used in the Bass Basin, but is exceptionally rare in the Gippsland Basin. Accessory species indicative of the base of this zone as identified in Fortescue-1 are Diporites delicatus and Polycolpites esobalteus.

2. The boundary between the Latrobe Group and overlying Lakes Entrance Formation is believed to be a non-depositional disconformity rather than an erosional unconformity at the Fortescue-1 location. The Latrobe section penetrated at Fortescue-1 shows a typical downhole progression through :

   (a) An "Offshore marine facies", which is characterised by burrowed, fine grained sediments with accessory glauconite and pyrite. In other wells, this is the Gurnard Formation or facies. The fact that the section in Fortescue-1 contains less glauconite is probably because the original depositional rate was slightly higher (i.e., there was a greater contribution of clastics) and the original depositional site was in slightly shallower water in comparison to the main development of Gurnard Formation of Lower N. asperus Zone age.

   This offshore marine facies section (between 2415m-2452m) is 37m thick and was deposited in a maximum of 2 million years. This gives a deposition rate of 19 millimetres per 1,000 years. The Gurnard facies in Kingfish-7 which is much more glauconitic has a depositional rate between 3.5mm/1000 years to 8.8mm/1000 years, half the rate (see Partridge 1977). Typical rates for the younger Lower N. asperus Zone Gurnard Formation are even less.

(b) A unit of massive clean sands underlies this fine grained facies. These sands are interpreted as a "Shore-face sand facies". The sand can be characterised by the lack of fine shale beds and virtual absence of coal. The environment of deposition is considered to lie immediately offshore from the shoreline out to an estimated water depth of 150m. The thin coal stringers identified in cuttings between 2505-2520m could easily have been reworked into a shore face environment.

Compared to the overlying section, the depositional rates within this unit is 46mm/1000 years. This is 2 to 3 times greater than the overlying unit.

(c) Next, the sequence merges into a predominently "Deltaic facies", from 2522m to T.D. at 2691m. The occurrence of significant coal seams suggesting that most of the deposition occurred behind the shoreline.

The presence of dinoflagellates in both sand and shales does, however, indicate that there are significant marine beds within this unit.

Deposition rates within this deltaic facies is of the order of 75mm/1000 years.

3. The good sampling in Fortescue-1 has necessitated a revision of the Wetzeliella hyperacantha Dinoflagellate Zone.

For the first time, we have documented an overlap in the ranges of typical L. balmei Zone indicator species with that of W hyperacantha in the sidewall core samples at 2666m, 2670m, and 2672m.

Partridge (1976) proposed the idea that there was a significant disconformity between the Upper L. balmei Zone and overlying Lower M. diversus Zone reflecting a eustatic regression followed by a major transgression which penetrated onto the coastal plain up to 30 kilometres beyond the strand line, inundating 2500 square kilometres.

This transgression is the W. hyperacantha Zone and is characterised palynologically by the occurrence of the nominated species, the presence of reworked L. balmei Zone fossils and Early Cretaceous and Permian palynomorphs plus the presence and often abundance of pollen and spores from mangrove environments. Key species of the last are : Spinizonocolpites prominatus, Crassoretitriletes vanraadshoovenii, and Polypodiaceoisporites varus.

These features are all displayed by the sample at 2666m. However, this sample contains the key L. balmei Zone species : L. balmei, Australopollis obscurus, and Amosopollis cruciformis as such common elements that it is difficult to justify regarding them as reworked. The absence of Spinizonocolpites prominatus and I. notabilis suggests we are still not in the Lower M. diversus Zone. This sample therefore, must be placed in the Upper L. balmei Zone.

The overlap of L. balmei Zone fossils and W. hyperacantha is thus rationalised as a new refinement of the Upper L. balmei Zone previously unrecognised because of inadequate sampling control. How it relates to the eustatic transgressions and regressions in the basin is as yet uncertain. However, considering the Fortescue-1 location (in respect to the palaeogeography during Late Paleocene-Early Eocene) near the strandline of this time; it is not unreasonable to expect it to display an additional complication or detail of known transgressions.

4. It is worth commenting that the sample at 2551m is a special environment as it contains common Spinizonocolpites prominatus, Wetzeliella homomorpha, and rare Crassoretitriletas vanraadshoovenii. It is possible that this represents an additional transgression at the base of the Middle N. asperus Zone to those documented by Partridge (1976).

5. It should also be pointed out that, from the evidence at hand, the W. hyperacantha transgression at the base of the M. diversus zone is widespread and, therefore, the associated shales, such as the one at 2640m, would be expected to be more extended and continuous than most of the shales higher in the section. The shale at 2551m, because it also contains a mixture of mangrove environmental types (S. prominatus, C. vanraadshoovenii) and marine dinoflagellates (W. homomorpha, C. inodes) and is thus very similar to the W. hyperacantha Zone could also be one of the more extensive shale horizons.

DISCUSSION OF ZONES

The presence and distribution of all identified species are given in Table-1 and the distribution sheets. The basis for separating the well section into the floral zones is discussed below.

Upper Lygistepollenites balmei Zone - 2666m-2679m :

The top of this zone is picked on the highest "in-place" occurrence of L. balmei, A. obscurus, A. cruciformis, and C. bullatus. It is shown to be in the upper part of the L. balmei Zone by the presence of Wetzeliella homomorpha, Proteacidites grandis, and Proteacidites annularis. None of these forms are known to extend into the Lower L. balmei Zone, and P. grandis was quite common in the deepest sample (2979m). Wetzeliella homomorpha and Wetzeliella hyperacantha are present in fair abundance in the samples between 2666m and 2672m.

Wetzeliella hyperacantha Zone - 2636m-2672m :

This zone is the more marine equivalent of the uppermost part of the L. balmei zone and lower part of the M. diversus zone. With the exception of the nominate species and Kenleyia fimbriata, most associated dinoflagellates are long ranging forms.

Lower Malvacipollis diversus Zone - 2559m-2655m :

The base of this zone is recognised by the presence of S. prominatus and Polypodiaceoisporites varus and the absence of L. balmei index fossils. The top of the zone is considered to be just below the first occurrence of P. tuberculiformis, Diporites delicatus, and Polycolpites esobalteus. In general, this is a poorly developed flora, being recognised more by the lack of the zone fossils from above and below, than by specific marker species for this zone.

Middle Malvacipollis diversus Zone - 2454.5m-2551m :

Proteacidites tuberculiformis is recorded from only one sample (2532m) in this zone. However, other forms, such as Diporites delicatus, Triporopollenites helosus, and Polycolpites esobalteus, whose presence helps distinguish Middle from Lower M. diversus are found is several of the samples from this section.

The paucity of diagnostic forms in this and the Lower M. diversus zone is mainly a reflection of the overall poor preservation and low specimen recovery. Even the coal cuttings (2505-10m, 2510-20m, 2530-35m) yielded poor floras of low diversity that were not diagnostic enough to distinguish

between Lower and Middle subdivisions of the M. diversus zone. The bottom two samples in this zone (2532m and 2551m) show some evidence of marine influence by the presence of such dinoflagellates as Deflandria dartmooria, Dyphes colligerium, and Wetzeliella homomorpha (short spine var.).

Upper Malvacipollis diversus Zone - 2416m-2444m :

Samples from 2416m to 2429m are assigned to the Upper M. diversus zone based on the presence of P. pachypolus and M. tenuis through this interval. The frequent occurrence of Homotryblium tasmaniense in the samples down to 2444m suggest that everything from 2416m to 2444m should be assigned to this interval. The absence of P. pachypolus and M. tenuis in the lower part of this section is not surprising, considering the low yields and poor preservation of many of the samples concerned.

This interval is believed to be older than the P. asperopolus zone since neither the name species nor such forms as Conbaculites apiculatus or Sapotaceoidaepollenites rotundus are present and Santalumidites cainozoicus occurs only rarely. The presence, however, of Clavatistephanocolporites meleosus at 2432.3m, in Core #2, is somewhat anomalous, since this form has not been recorded previously from sediments below the P. asperopolus zone.

Evidence of marine influence, in the form of dinoflagellates is present in most of the samples in this section, and is completely lacking only at 2420m. Quite a varied assemblage is found in most samples and include such species as Deflandria flounderensis, Wetzeliella homomorpha (long spine var.) Hemicystidinium sp., Adnatosphaeridium reticulense, and Cordosphaeridium inodes.

Proteacidites tuberculatus Zone - 2410m-2415m :

The occurrence of rare specimens of Cyatheacidites annulatus in assemblages rich in dinoflagellates of the Spiniferites spp. and Dinosphaera simplex/mammlatus type is characteristic of this zone and is in agreement with what would be picked as base of Lakes Entrance Formation from electric logs.

REFERENCES

Partridge, A.D., 1977, Palynological Analysis Kingfish-7, Gippsland Basin, ESOA Palaeo Rept. 1977/25.

Partridge, A.D., 1976, The Geological Expression of Eustacy in the Early Tertiary of the Gippsland Basin.

ATTACHMENTS

1. Data Sheet.

2. Table-1.

3. Distribution Sheets.

BASIN GIPPSLAND DATE October 5, 1978.

WELL NAME FORTESCUE-1 ELEVATION +25.3m (+83 feet)

AGE	PALYNOLOGIC ZONES	HIGHEST DATA					LOWEST DATA				
		Preferred Depth	Rtg.	Alternate Depth	Rtg.	2 way time	Preferred Depth	Rtg.	Alternate Depth	Rtg.	2 way time
OLIG-MIO.	P. tuberculatus	2410m	0				2415m	0			
EOCENE	U. N. asperus										
	M. N. asperus										
	L. N. asperus										
	P. asperopolus										
	U. M. diversus	2416m	1				2449m	1			
	M. M. diversus	2454.5m	2				2551m	2			
	L. M. diversus	2559m	2				2655m	1			
PALEOCENE	U. L. balmei	2666m	0				2679m	1			
	L. L. balmei										
	T. longus										
LATE CRETACEOUS	T. lilliei										
	N. senectus										
	C. trip./T.pach.										
	C. distocarin.										
	T. pannosus										
EARLY CRETACEOUS											
PRE-CRETACEOUS											

COMMENTS: Wetzeliella hypercantha Dinoflagellate zone : 2636m - 2672m

T.D. : 2691m

RATINGS:
0; SWC or CORE, EXCELLENT CONFIDENCE, assemblage with zone species of spores, pollen and microplankton.
1; SWC or CORE, GOOD CONFIDENCE, assemblage with zone species of spores and pollen or microplankton.
2; SWC or CORE, POOR CONFIDENCE, assemblage with non-diagnostic spores, pollen and/or microplankton.
3; CUTTINGS, FAIR CONFIDENCE, assemblage with zone species of either spore and pollen or microplankton, or both.
4; CUTTINGS, NO CONFIDENCE, assemblage with non-diagnostic spores, pollen and/or microplankton.

NOTE: If a sample cannot be assigned to one particular zone, then no entry should be made. Also, if an entry is given a 3 or 4 confidence rating, an alternate depth with a better confidence rating should be entered, if possible.

DATA RECORDED BY: A. Partridge & H. Stacy DATE October 5, 1978.

DATA REVISED BY: _____ DATE _____

FORM [illegible] 72

TABLE 1 : SUMMARY OF PALYNOLOGICAL ANALYSES, FORTESCUE-1 GIPPSLAND BASIN

Sample	Depth (m)	Depth (ft.)	Zone	Age	Confidence Rating	Yield	Diversity	Comments
SWC38	2410	7907	P. tuberculatus	Oligocene	0	Good	Moderate	
SWC30	2411	7910	"	"	0	Good	Moderate	
SWC37	2412	7913	U. M. diversus	Early Eocene	0	Good	Moderate	Assumed mislabled & out of place
SWC28	2413	7917	Indeterminate	-	2	V.Poor	V.Low	Almost barren
SWC27	2414	7920	Indeterminate	-	2	V.Poor	V.Low	Almost barren
SWC36	2415	7923	P. tuberculatus	Oligocene	0	Fair	Low	Mostly long ranging forms, C. amulatus present
SWC25	2416	7926	U. M. diversus	Early Eocene	1	Good	Moderate	
Core #1	2417.2*	7930.4	"	"	0	V.Good	Moderate	
Core #1	2420.85*	7942.4	"	"	0	V.Good	High	
Core #1	2423*	7949.5	"	"	0	Good	Moderate	
Core #1	2425.6*	7958	"	"	0	V.Good	High	
Core #1	2429.3*	7970.1	"	"	0	V.Good	High	Lowest occurr. M. tenuis
Core #2	2432.29*	7979.9	"	"	1	V.Good	High	Lowest occurr. P. pachypolis
SWC35	2435	7989	"	"	2	Poor	V.Low	
SWC24	2449	8081	"	"	1	Good	Moderate	
SWC34	2454.5	8089	Middle M. diversus	"	2	Fair	Low	
SWC22	2465.5	8051	"	"	2	Poor	V.Low	
SWC21	2500	8202	Indeterminate	-	-	Barren	Barren	
Ctngs (coal)	2505-10	8218-35	Indeterminate	-	3	V.Poor	V.Low	Almost barren
Ctngs (coal)	2510-20	8235-68	Middle M. diversus	Early Eocene	3	Fair	Low	
SWC19	2525	8284	"	"	2	Good	Moderate	
Ctngs (coal)	2530-35	8300-17	"	"	3	Fair	Low	
SWC18	2532	8307	"	"	1	Good	Moderate	Lowest occurr. P. tuberculiformis
SWC16	2551	8369	"	"	2	V.Good	High	Common S. prominatus
SWC15	2559	8396	Lower M. diversus	"	2	Fair	Low	
SWC13	2585	8481	"	"	1	Poor	V.Low	
Ctngs (coal)	2590-95	8479-8514	"	"	3	Good	Moderate	
SWC12	2595	8514	"	"	1	Fair	Low	
SWC10	2616	8583	"	"	1	Fair	Low	
SWC9	2627	8619	"	"	1	Good	Moderate	
SWC8	2636	8648	"	"	1	Good	Moderate	
SWC7	2645	8678	"	"	1	Good	Moderate	
SWC6	2655	8711	"	"	1	Fair	Low	Rare S. prominatus
SWC4	2666	8747	Upper L. balmei	Paleocene	0	Good	High	Reworked Early Cretaceous
SWC3	2670	8760	"	"	0	Good	High	
Ctngs (coal)	2670-75	8760-76	"	"	3	Good	Moderate	
SWC2	2672	8766	"	"	1	Fair	Low	
SWC1	2679	8789	"	"	1	Fair	Low	

(*Core Depths Corrected)

Well Name Fortescue-1 Basin Gippsland Sheet No. 1 of 8

SAMPLE TYPE *	S	S	S	S	S	S	S	C	C	C	C	C	C	S	S	S	S	S	T	T	S	T	S	S	S	S	T	S
DEPTHS / PALYNOMORPHS	2410	2411	2412	2413	2414	2415	2416	2417.2	2420.85	2423	2425.6	2429.3	2432.29	2435	2444	2454.5	2465.5	2500	2505-10	2510-20	2525	2530-35	2532	2551	2559 —	2585	2590-95	2595
A. qualumis																												
A. acutullus									/																			
A. luteoides											/																	
A. oculatus												/																
A. sectus																												
A. triplaxis																												
A. obscurus																												
B. disconformis							/								/										/			
B. arcuatus																												
B. elongatus																												
B. mutabilis																												
B. otwayensis																												
B. elegansiformis																												
B. trigonalis																												
B. verrucosus																												
B. bombaxoides																												
B. emaciatus											/																	
C. bullatus																												
C. heskermensis																												
C. horrendus																												
C. meieosus													/															
C. apiculatus																												
C. leptos																												
C. striatus																												
C. vanraadshoovenii								/																/				
C. orthoteichus/major							/	/	/		/		/		/	/							/	/				
C. annulatus	/					/	/																					
C. gigantis																							/					
C. splendens							/					/				/								/		/		
D. australiensis																												
D. granulatus							/						/		/								/	/			/	
D. tuberculatus															/								/				/	
D. delicatus																					/			/				
D. semilunatus																												
E. notensis											cf																	
E. crassiexinus			/						/	/																		
F. balteus																	/											
F. crater																												
F. lucunosus																												
F. palaequetrus																												
G. edwardsii																												
G. rudata																												
G. divaricatus																												
G. gestus																												
G. catathus																												
G. cranwellae																												
G. wahooensis																												
G. bassensis																												
G. nebulosus																												
H. harrisii		/	/			/	/	/	/		/	/	/		/	/				/	/	/	/	/	/	/	/	
H. astrus																												
H. elliottii		/																										
I. anguloclavatus																												
I. antipodus																							/					
I. notabilis								/				/									/			/				
I. gremius									/		/					/												
I. irregularis																												
J. peiratus																												
K. waterbolkii																												
L. amplus																												
L. crassus							/																					
L. ohaiensis																												
L. bainii																												
L. lanceolatus																												
L. balmei								RW				RW					RW				RW				RW			
L. florinii								/				/					/								/			
M. diversus			/				/	/	/	/	/	/	/		/	/	/			/	/	/	/	/	/	/	/	
M. duratus																												
M. grandis																												
M. parmagnus																												

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

Well Name Fortescue-1 Basin Gippsland Sheet No. 2 of 8

SAMPLE TYPE *	S	S	S	S	S	S	S	T	S	S
DEPTHS / PALYNOMORPHS	2616	2627	2636	2645	2655	2666	2670	2670-75	2672	2679
A. qualumis										
A. acutullus										
A. luteoides										
A. oculatus										
A. sectus										
A. triplaxis										
A. obscurus						/			/	
B. disconformis	/			/		/		/	/	/
B. arcuatus										
B. elongatus										
B. mutabilis										
B. otwayensis										
B. elegansiformis										
B. trigonalis										
B. verrucosus										
B. bombaxoides										
B. emaciatus										
C. builatus						/				
C. heskermensis										
C. horrendus										
C. meleosus										
C. apiculatus										
C. leptos										
C. striatus										
C. vanraadshoovenii						/				
C. orthoteichus/major										
C. annulatus										
C. gigantis								/		
C. splendens		/	/	/	/	/		/	/	
D. australiensis										
D. granulatus		/	/				/		/	/
D. tuberculatus			/							
D. delicatus										
D. semilunatus										
E. notensis						/				
E. crassiexinus										
F. balteus						/				
F. crater										
F. lucunosus										
F. palaequetrus										
G. edwardsii										
G. rudata										
G. divaricatus										
G. gestus										
G. catathus										
G. cranwellae										
G. wahooensis										
G. bassensis										
G. nebulosus										
H. harrisii		/	/	/		/	/	/		/
H. astrus										
H. elliottii						/				
I. anguloclavatus							/			
I. antipodus										
I. notabilis		/								
I. gremius										
I. irregularis	/	/	/							
J. peiratus										
K. waterbolkii										
L. amplus								/		
L. crassus				/		/			/	
L. ohaiensis										
L. bainii										
L. lanceolatus										
L. balmei	RW					/	/	/	/	/
L. florinii					/		/		/	/
M. diversus				/	/					
M. duratus										
M. grandis										
M. perimagnus										

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

Well Name Fortescue-1 Basin Gippsland Sheet No. 3 of 8

SAMPLE TYPE *	S	S	S	S	S	S	S	C	C	C	C	C	C	S	S	S	S	S	T	T	S	T	S	S	S	S	T	S
DEPTHS / PALYNOMORPHS	2410	2411	2412	2413	2414	2415	2416	2417.2	2420.85	2423	2425.6	2429.3	2432.29	2435	2444	2454.5	2465.5	2500	2505-10	2510-20	2525	2530-35	2532	2551	2559-	2585	2590-95	2595
M. subtilis		/	/				/	/				/	/		A						/		/	/				
M. ornamentalis	cf																											
M. hypolaenoides																												
M. homeopunctatus																												
M. parvus/mesonesus							/	/	/	/	/	/	/		/	/								/				
M. tenuis			/							/	/	/																
M. verrucosus													/															
M. australis																								/				
N. asperus																												
N. asperoides																												
N. brachyspinulosus									/				/			/												
N. deminutus																												
N. emarcidus/heterus		/					/								/	/								/				
N. endurus																												
N. falcatus	/																											
N. flemingii								/	/		/		/			/	/					/	/	/				
N. goniatus			/			/	/																	1				
N. senectus																												
N. vansteenisii																												
O. sentosa																												
P. ochesis																												
P. catastus								cf.																				/
P. demarcatus								/	cf		/		/								/			/				
P. magnus																												
P. polyoratus																							/					/
P. vesicus																												
P. densus																												
P. velosus											/										/							
P. morganii/jubatus																												
P. mawsonii	/	/						/					/										/		/	/	/	
P. reticulosaccatus																												
P. verrucosus																												
P. crescentis																												
P. esobalteus								/				/			/						/							
P. langstonii																												
P. reticulatus																												
P. simplex																												
P. varus									/																			
P. adenanthoides (Prot.)			/				/	/	/	/	/	/	/		/	/								/			/	
P. alveolatus																												
P. amolosexinus																												
P. angulatus																												
P. annularis							/	/			/	/			/									/			/	
P. asperopolus																												
P. biornatus												/									/							
P. clarus																												
P. cleinei																												
P. confragosus																												
P. crassis																												
P. delicatus																					/							
P. formosus																												
P. grandis							/			/			/		/	/					A	/	/	/	/	/	/	/
P. grevillaensis																												
P. incurvatus			/																		/		/			/		
P. intricatus																												
P. kopiensis																												
P. lapis								/																				
P. latrobensis											/				/													
P. leightonii			/			cf	/	/				/	/															
P. obesolabrus																												
P. obscurus								/														/						
P. ornatus							/	/			/	/	/												/			
P. otwayensis																												
P. pachypolus			/					/	/	/	/	/	/															
P. palisadus																												
P. parvus																												
P. plemmelus																												
P. prodigus							/	/				/															/	
P. pseudomoides												/	/							/			/	/	cf		/	
P. recavus																												

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

Well Name Fortescue-1 Basin Gippsland Sheet No. 4 of 8

PALYNOMORPHS \ DEPTHS	2616	2627	2636	2645	2655	2666	2670	2670-75	2672	2679
SAMPLE TYPE *	S	S	S	S	S	S	S	T	S	S
M. subtilis			/		/		/		/	
M. ornamentalis										
M. hypolaenoides										
M. homeopunctatus										
M. parvus/mesonesus		/		/						
M. tenuis										
M. verrucosus										
M. australis										
N. asperus										
N. asperoides										
N. brachyspinulosus										
N. deminutus										
N. emarcidus/heterus							/			
N. endurus						/				
N. falcatus										
N. flemingii						/	/		/	
N. goniatus								/		
N. senectus										
N. vansteenisii										
O. sentosa										
P. ochesis										
P. catastus										
P. damarcatus										
P. magnus										
P. polyoratus		/	/			/	/			
P. vesicus										
P. densus					/	/				
P. veiosus										
P. morganii/jubatus										
P. mawsonii		/			/	/	/	/	/	
P. reticulosaccatus										
P. verrucosus										
P. crescentis										
P. esobalteus										
P. langstonii										
P. reticulatus										
P. simplex										
P. varus				/						
P. adenanthoides (Prot.)		/	/	/			/			
P. alveolatus										
P. amolosexinus										
P. angulatus							cf			
P. annularis			/				/	/		
P. asperopolus										
P. biornatus										
P. clarus										
P. cleinei										
P. confragosus										
P. crassis										
P. delicatus										
P. formosus										
P. grandis	/	/	/						/	
P. grevillaensis										
P. incurvatus										
P. intricatus										
P. kopiensis										
P. lapis								/		
P. latrobensis										
P. leightonii										
P. obesolabrus										
P. obscurus		/		/						
P. ornatus	/		/							
P. otwayensis										
P. pachypolus										
P. palisadus										
P. parvus										
P. plemmelus										
P. prodigus				/		/			/	
P. pseudomoides					/					
P. recavus										

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

Well Name Fortescue-1 Basin Gippsland Sheet No. 5 of 8

SAMPLE TYPE *	S	S	S	S	S	S	S	C	C	C	C	C	C	S	S	S	S	S	T	T	S	T	S	S	S	S	T	S
DEPTHS / PALYNOMORPHS	2410	2411	2412	2413	2414	2415	2416	2417.2	2420.85	2423	2425.6	2429.3	2432.29	2435	2444	2454.5	2465.5	2500	2505–10	2510–20	2525	2530–35	2532	2551	2559	2585	2590–95	2595
P. rectomarginis																												
P. reflexus																												
P. reticulatus																												
P. reticuloconcavus																												
P. reticuloscabratus			/				/				/	/															/	
P. rugulatus																												
P. scitus																												
P. stipplatus																												
P. tenuiexinus									/		/										/		/	/			/	/
P. truncatus																												
P. tuberculatus																												
P. tuberculiformis			/									/			/								/					
P. tuberculotumulatus																												
P. xestoformis (Prot.)																												
Q. brossus																												
R. boxatus																												
R. stellatus																												
R. mallatus	/	/					/	/			/					/								/	/			
R. trophus																												
S. cainozoicus										/				/														
S. rotundus																												
S. digitatoides																												
S. marlinensis																												
S. rarus												/																
S. meridianus			/									/	/		/	/					/		/	/				
S. prominatus								/	/		/	/	/											/			/	
S. uvatus																												
S. punctatus													/															
S. regium																												
T. multistrixus (CP4)																						/						
T. textus																												
T. verrucosus																												
T. securus																												
T. confessus (C3)																												
T. gillii																												
T. incisus																												
T. longus																												
T. phillipsii																												
T. renmarkensis																												
T. sabulosus																												
T. simatus																												
T. thomasii																												
T. waiparaensis																												
T. adelaidensis (CP3)												/									/	/						
T. angurium																				/	/							
T. delicatus							cf.																					
T. geraniodes																												
T. leuros																												
T. lilliei																												
T. marginatus																												
T. moultonii												/	/			/												
T. paenestriatus							/			/	/	/	/		/	/					/		/	/				
T. retequetrus																												
T. scabratus																								/				
T. sphaerica									/	/	/				/	/					cf.			/				
T. magnificus (P3)																												
T. spinosus																												
T. ambiguus											cf.				/													
T. chnosus																												
T. helosus																	/											
T. scabratus																												
T. sectilis																												
V. attinatus																												
V. cristatus																												
V. kopukuensis		/					/				/					/							/	/			/	/
Triceoporites reticulatus, sp.			/				/				/											/						
Clavifera triplex											/	/												/				
Amosopollis cruciformis																												

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

Well Name Fortescue-1 Basin Gippsland Sheet No. 6 of 8

SAMPLE TYPE *	S	S	S	S	S	S	S	T	S	S
DEPTHS / PALYNOMORPHS	2616	2627	2636	2645	2655	2666	2670	2670-75	2672	2679
P. rectomarginis										
P. reflexus										
P. reticulatus										
P. reticuloconcavus										
P. reticuloscabratus			/							
P. rugulatus										
P. scitus										
P. stipplatus										
P. tenuiexinus	/			/	/	/	/			/
P. truncatus										
P. tuberculatus										
P. tuberculiformis										
P. tuberculotumulatus										
P. xestoformis (Prot.)										
O. brossus										
R. boxatus										
R. stellatus										
R. mallatus		/			/	/	/		/	
R. trophus										
S. cainozoicus										
S. rotundus										
S. digitatoides										
S. marlinensis						/				
S. rarus										
S. meridianus						/		/	/	
S. prominatus					/					
S. uvatus										
S. punctatus						/		/		
S. regium										
T. multistrixus (CP4)						/	/	/		
T. textus								CR		
T. verrucosus										
T. securus										
T. confessus (C3)										
T. gillii										
T. incisus										
T. longus										
T. phillipsii						/				
T. renmarkensis										
T. sabulosus										
T. simatus										
T. thomasii										
T. waiparaensis										
T. adelaidensis (CP3)										
T. angurium										
T. delicatus										
T. geraniodes										
T. leuros										
T. lilliei										
T. marginatus										
T. moultonii				/						
T. paenestriatus										
T. retequetrus										
T. scabratus										
T. sphaerica										
T. magnificus (P3)										
T. spinosus										
T. ambiguus										
T. chnosus										
T. helosus										
T. scabratus										
T. sectilis										
V. attinatus										
V. cristatus										
V. kopukuensis	/	/	/	/		/	/		/	
Triadspurites retirelatus, sl.										
Clavifera triplex		/					/		/	
Amosopollis cruciformis						/	/		/	

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

Well Name Fortescue-1 Basin Gippsland Sheet No. 7 of 8

SAMPLE TYPE *	S	S	S	S	S	S	S	C	C	C	C	C	C	C	S	S	S	S	S	T	T	S	T	S	S	S	S	T	S
DEPTHS / PALYNOMORPHS	2410	2411	2412	2413	2414	2415	2416	2417.2	2420.85	2423	2425.6	2429.3	2432.29	2435	2444	2454.5	2465.5	2500	2505-10	2510-20	2525	2530-35	2532	2551	2559	2585	2590-95	2595
Achomosphaera spp.	/					/	/																					
Leptodinium spp.	/	/	/			/																						
Dino. scabroellipticus	/																											
Dino. simplex	/	/				/																						
Spiniferites spp.	/	/				/										/								/				
H'kolp. rigaudae	/	/																										
Nematosphaeropsis sp.	/																											
Oper. centocarpum	/	/		/																								
Dino. pontus		/				/A										/												
Dino. mamilatus		/A																										
Polysp. fibrosum		/																										
Nema balcombiana		/				/																						
Achom. alcicornu		/																										
H'kolp. varispinosa			/																									
Syst. placacantha			/																									
Defl. flounderensis							/	/													/							
Homot. tasmanensis							/	/		/		/																
Hemicystodinium sp.							/																					
Wetz. homomorpha (1.sp.)							/	/		/	/	/											/	/				
Para. indentata							/	/								/							/					
Tubios. filosa							/			/																		
Defl. delineata								cf																				
Adnat. reticulense								/																				
Cord. inodes								/		/						/								/				
Ken. lophophora								/																				
Hystr. tubiferum								/		/		/	/		/													
Spinidinium sp.																/												
Paleo. australinum																/												
Wetz. homomorpha (s.sp.)																							/					
Defl. dartmooria																							/					
Dyphes colligerum																								/				
Thal. pelagicus						cf																		/				
Cord. bipolar																								/				
Wetz. hyperacantha										cf					cf													
Ken. fimbriata																												

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

Well Name Fortescue-1 Basin Gippsland Sheet No. 8 of 8

PALYNOMORPHS \ DEPTHS	2616	2627	2636	2645	2655	2666	2670	2670-75	2672	2679
SAMPLE TYPE *	S	S	S	S	S	S	S	T	S	S
Achomosphaera spp.										
Leptodinium spp.										
Dino. scabroellipticus										
Dino. simplex										
Spiniferites spp.				/	/					
H'kolp. rigaudae										
Nematosphaeropsis sp.										
Oper. centocarpum				/						
Dino. pontus										
Dino. mamilatus										
Polysp. fibrosum										
Nema balcombiana										
Achom. alcicornu										
H'kolp. varispinosa										
Syst. placacantha										
Defl. flounderensis										
Homot. tasmanensis										
Hemicystodinium sp.										
Wetz. homomorpha (1.sp.)			/		/	/	/		/	
Para. indentata										
Tubios. filosa										
Defl. delineata										
Adnat. reticulense										
Cord. inodes										
Ken. lophophora										
Hystr. tubiferum										
Spinidinium sp.										
Paleo. australinum										
Wetz. homomorpha (s.sp.)							/			
Defl. dartmooria										
Dyphes colligerum										
Thal. pelagicus										cf
Cord. bipolar										
Wetz. hyperacantha			/ A			/ A	/		/	
Ken. fimbriata						/	/			

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

APPENDIX 5

APPENDIX 5

FORAMINIFERAL SEQUENCE - FORTESCUE-1

by

David Taylor

11 pages

FORAMINIFERAL SEQUENCE IN FORTESCUE-1,

GIPPSLAND BASIN

by

David Taylor, Consultant

ESSO AUSTRALIA LTD
PALEONTOLOGY REPORT 1979/7

MARCH 22, 1979

PE 3/4/79

FORAMINIFERAL SEQUENCE

- FORTESQUE # 1

by David Taylor
Consultant

March 22, 1979

Esso Australia Ltd.
Paleontology Report 1979/7

SUMMARY

This sequence appeared to be a normal one when compared with other Basin Deep wells in the vicinity. But detailed comparison shows that the timing and nature of similar events were not consistent, in that:-

(i) The time span of the Mid Oligocene sequence break of the COBIA EVENT was longer than in Cobia # 2 and other neighbouring wells.

(ii) The latest Oligocene and earliest Miocene sedimentation was condensed.

(iii) The commencement of canyon development was 1m.y. earlier.

The coincidence of these events lead to a conjecture that Fortesque #1 was structurally higher than neighbouring wells, from late Oliogcene to mid Miocene.

INTRODUCTION

Fiftysix sidewall core samples were examined from FORTESQUE # 1. One sample (at 1855) was an indurated limestone which could not be broken down. The sidewall cores at 2414 and 2413 (SWCs 27 & 28) contained out of sequence faunas (see Distribution Chart & Data Sheets). As the rest of the samples fit into the established Gippsland sequence, it is believed that these sidewall cores were mishot or mislabelled. The faunally barren quartz sand at 2412 (SWC 37) may be in sequence and represented the mid Oligocene unconformity surface.

All sample depths are in metres, as labelled on sample containers.

Data is collated on the following sheets.

FACTUAL Biostratigraphic Data Sheet

FACTUAL Sample Data Sheets

FACTUAL Distribution Chart of planktonic foraminifera.

BIOSTRATIGRAPHY

The lowest sample at 2416 was barren of foraminifera with the sequence commencing at 2415.

EARLY OLIGOCENE - ZONE J-2 at 2415 - The association of *Globigerina brevis*, *G. angiporoides* and *Globorotalia gemma* restricts this fauna precisely to Zone J-2 at the base of the Oligocene.

MID OLIGOCENE SEQUENCE BREAK - between 1415 & 1411 - Unfortunately this is not clear cut because of sampling muddling in that SWC 27 at 1414 contains a Zone G fauna and SWC 28 at 1413 contains a Zone D-2 fauna. This was apparently misfiring, rather than straight depth substitution as Zone J or H faunas do not occur out of sequence higher in well. The quartz sand of SWC 37 at 2412

may be erosive products of the break and represented the actual unconformity surface.

However a sequence jump is evident from J-2 at 1415 to H-2 at 1411 without Zones J-1, I-2 or I-1 faunas present. Furthermore Zone H-2 was abbreviated with the fauna at 1411 representing the very top of the Zone.

This sequence break represents the *COBIA EVENT* which has been documented in other sections in the vicinity of Fortesque # 1.

LATE OLIGOCENE - Zone H-2 at 1411 - The association of *Globoquadrina dehiscens* (S.L.)and *Globigerina woodi woodi* without *G. woodi connecta* identifies this fauna as Zone H-2. The presence of *Globorotalia bella* positions the fauna at the very top of the Zone. The Zone is represented by either a very condensed or probably abbreviated sequence with a later than usual resumption of sedimentation after the *COBIA EVENT*.

EARLY MIOCENE - ZONES H-1 to E-2 - 2410 to 2158 - The *Globigerina woodi connecta* FAD*at 2410 marks the base of the early Miocene. With the initial appearance of *Globigerinoides trilobus* (=base Zone G) being at 2400, Zone H-1 is obviously condensed when compared with neighbouring sections. This may have been a factor of structural growth.

Top of the early Miocene (=E-2) at 2158 is distinctly marked by the presence of *Praeorbulina glomerosa curva*.

MID MIOCENE - ZONES E-1 to C - 2123 to 1100 - The base of the mid Miocene is clear cut with the FAD of the *Orbulina* form as *O. suturalis* in a range overlap with *Praeorbulina glomerosa curva* at 2123.

Above this the record becomes fuzzy with a low diversity D-2 fauna being recorded at 2038. All the D-2 faunas are of a typically, under represented specifically, when compared with neighbouring sections. The boundary between D-2 & D-1 and between D-1 and C is hazy. The base of Zone C was recognised on the FAD*

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*FAD = Faunal Appearance Datum.

of *Globorotalia miotumida miotumida* in a fairly diverse association at 1400.

LATE MIOCENE - ZONE B-2 - 1040 to 980. - The base of late Miocene has been designated as the sample immediately above the *G. mayeri* LAD*. The Zone B-2 interval in Fortesque # 1 is of low reliability as it is based on absences of *G. mayeri* and other globorotalids, rather than on FADs.

ENVIRONMENT.

The J-2 fauna at 2415 consisted of 20 planktonic specimens with no benthic element, so that environmental interpretation was impossible. After the mid Oligocene depositional break there is some evidence of reworked detritus from older sediments, with the late Oligocene (= H-2) sample containing a dominance of apple green glauconitic pellets. This may also be the case for the angular quartz sand at 2412, if the SWC was correctly labelled.

The environmental sequence in Fortesque # 1 is the normal one for this Basin Deep location. There was a gradual transition during the early Miocene from a continental rise to lower slope situations in Zone H-1 and part of Zone G (to 2336). At 2310 (Zone G) there was a sudden influx of displaced shelf species mixed with an upper slope assemblage. This mixed association persisted to 2123 (Zone E-1) at base mid Miocene, where there was a 98% planktonic component. Abruptly at 2097 and still in E-1, there was a marked decline in faunal quality.

Base of the canyon fill was evident at 1947 (in D-2) with the presence of a dominance of pellet glauconite and quartz sand. The"Battered *Robulus*" fauna was recorded at 1912 and 1825. This association of large sized, abraded specimens of shallow water, usually lens shaped benthic foraminifera was a characteristic of the basal part of the canyon fill sequence in other wells (e.g. Halibut # 1). The poor faunas (both planktic and benthics) of the canyon

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*LAD = Last Appearance Datum.

fill facies persisted throughout the mid Miocene with one incursion of a rich planktonic fauna at 1400 (base Zone C). Top of the canyon fill was at or above 1100 (= Tope Zone C).

The late Miocene benthic fauna were of high specific diversity and had a mid continental shelf aspect.

Although the Fortesque # 1 environmental sequence was normal, the timing of the canyon cutting and filling episode was approximately 1m.y. earlier than in neighbouring wells, such as Halibut # 1, Cobia # 2 and probably West Halibut # 1. This is deduced from the facts that the Fortesque D-2 planktonic faunas are generally very poor, both numerically and in diversity, and that the D-2 sediment contain detrital material. In the neighbouring wells the D-2 planktonic faunas were well developed, with numerical and diversity decline and incoming of detrital material not occurring till the base of D-1.

At base mid Miocene, the Fortesque # 1 site may have been in a more susceptible location for commencement of the Canyon cycles than the other wells mentioned. There is the possibility that Fortesque # 1 was structurally higher at the top of the Oligocene as:-

(i) The mid Oligocene depositional break was of longer time span than in neighbouring wells.

(ii) Zones H-2 and H-1 were condensed sequences when compared with other wells.

Whether this relative structural elevation continued to mid Miocene (D-2) times is conjectural, but the coincidence of a condensed and interrupted Oliogcene to basal Miocene sequence with an earlier commencement of canyon development appears significant.

MICROPALEONTOLOGICAL MATERIAL

WELL NAME AND NO. FORTESQUE # 1 *DATE:* 10.1.1979.

PREPARED BY: David Taylor. *SHEET NO.* 1 of 3.

DRAW:

DEPTH	*SAMPLE TYPE*	*SLIDE*	*ADDITIONAL INFORMATION*
2416	SWC 25	N.F.F. - f-m ang. qtz snd.	
2415	SWC 36	J-2(0) - Calc. shale - some limonite - staining: r subrd. qtz.	
2414	SWC 27	G(1) - misplaced or contamination - f-m ang qtz + f. ang. qtz. sdst with limonite staining, r f qtz sdst. with mica & mafic. small pebble wh. qtz.	
2413	SWC 28	D-2(0) - Misplaced - 80% micrite, 20% f-c ang. qtz. r. glauc.	
2412	SWC 37	N.F.F. - f - c ang qtz.	
2411	SWC 30	H-2(1) - dom glauc.	
2410	SWC 38	H-1(1) - Dom planks - 10% deep water benths including *Cibidides wuellerstorfi* & Aren Dom.	
2408	SWC 40	H-1(2) *ibid*	
2407	SWC 40	H-1(2) *ibid*	
2405	SWC 43	H-1(2) *ibid*	
2404	SWC 44	H-1(1) *ibid*	
2403	SWC 45	H-1(1) *ibid*	
2402	SWC 46	H-1(1) *ibid*	
2401	SWC 47	H-1(1) *ibid*	
2400	SWC 48	G(0) *ibid*	
2399	SWC 49	G(2) *ibid*	
2398	SWC 50	G(1) *ibid*	
2397	SWC 51	G(0) *ibid*	
2396	SWC 52	G(0) *ibid*	
2395	SWC 53	G(1) - *ibid* + displaced benths.	
2356	SWC 54	G(1) *ibid*	
2336	SWC 55	G(0) - *ibid* with common glauc infilling	
2310	SWC 56	G(1) - Forams Dom - 60% planks - upper slope benths + ? displaced sp.	

MICROPALEONTOLOGICAL MATERIAL

WELL NAME AND NO. FORTESQUE # 1 *DATE:* 10.1.1979.

PREPARED BY: DAVID TAYLOR

SHEET NO. 2 of 3.

DRAW:

DEPTH	*SAMPLE TYPE*	*SLIDE*	*ADDITIONAL INFORMATION*
2277	SWC 57	F(0) - gy mdst - 80% planks - slope + displaced shelf benths.	
2240	SWC 58	F(0) - Foram Dom - 98% planks - displaced benths.	
2217	SWC 59	F(0) *ibid*	
2188	SWC 60	F(0) *ibid*	
2158	SWC 61	E-2(1), Forams Dom - 96% planks - slope benths incl. *Hoeglundina elegans*	
2123	SWC 62	E-1(0) - *ibid*	
2097	SWC 63	E-1(1) very poor fauna in micritic lst.	
2063	SWC 64	?? *ibid*	
2038	SWC 65	D-2(1) *ibid*	
2000	SWC 66	D-2(2) *ibid*	
1975	SWC 67	D-2(1) Dom Forams, 97% planks. poor benths.	
1947	SWC 68	D-2(2) Dom glauc & f-m ang qtz. 60% planks - displaced benths? Base canyon fill.	
1912	SWC 69	D-2(2) - Forams Dom. 99% planks - Displaced benths incl. "Battered *Robulus*".	
1885	SWC 70	D-1(2) - Dom Forams - r ang. qtz & limonite	
1855	SWC 71	indet. indurated lst - not processed.	
1825	SWC 72	D-1(1) - mdst - 95% planks displaced benths - incl. "Battered *Robulus*"	
1795	SWC 73	D-1(1) *ibid*	
1765	SWC 74	D-1(2) micrite v. poor fauna	
1740	SWC 75	D-1(2) - micrite - v. poor fauna	
1705	SWC 76	D-1(2) - micrite v. poor fauna	
1640	SWC 77	D-1(0) micrite - 92% planks all small specimens	

MICROPALEONTOLOGICAL MATERIAL

WELL NAME AND NO. FORTESQUE # 1. *DATE:* 10.1.79.

PREPARED BY: DAVID TAYLOR.

SHEET NO. 3 of 3.

DRAW:

DEPTH	*SAMPLE TYPE*	*SLIDE*	*ADDITIONAL INFORMATION*
1585	SWC 78	D-1(2) - micrite v. poor fauna - small specimens	
1520	SWC 79	D-1(2) *ibid*	
1460	SWC 80	indet -*ibid*	
1400	SWC 81	C(0) - mdst. + common limonite good fauna with some displaced. 96% planks.	
1340	SWC 82	C(2) - mdst - v. poor fauna	
1280	SWC 83	C(2) - *ibid*	
1270	SWC 84	C(1) - *ibid* + displaced benths	
1160	SWC 85	C(2) - *ibid*	
1100	SWC 86	C(1) - *ibid*, top canyon fill.	
1040	SWC 87	B-2(2) - mdst - large fauna - low plank diversity - high shelf benth diversity	
980	SWC 88	B-2(2) - *ibid*	
870	SWC 90	indet - v. poor fauna.	

MICROPALEONTOLOGICAL DATA SHEET

BASIN: GIPPSLAND ELEVATION: KB: +25.3m GL: -65m

WELL NAME: FORTESQUE # 1 TOTAL DEPTH: -2691m

AGE		FORAM. ZONULES	HIGHEST DATA					LOWEST DATA				
			Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time	Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time
PLEISTOCENE		A_1										
		A_2										
PLIOCENE		A_3										
		A_4										
		B_1										
MIOCENE	LATE	B_2	980	2				1040	2			
	MIDDLE	C	1100	2				1400	0			
		D_1	1520	2	1640	0		1885	2	1825	1	
		D_2	1912	2				2038	1			
		E_1	2097	1				2123	1			
		E_2	2158	1				2158	1			
	EARLY	F	2188	1				2277	0			
		G	2310	1				2400	0			
		H_1	2401	1				2410	1			
OLIGOCENE	LATE	H_2	2411	1				2411*	1			
		I_1										
		I_2										
	EARLY	J_1										
		J_2	2415*	1				2415	1			
EOCENE		K										
		Pre-K										

COMMENTS: * SWC # 28 at 2413 has excellent Zone D-2(0) fauna whilst SWC # 27 at 2414 has good Zone G (1) fauna. This suggests muddling as sequence is disrupted by these two determinations. SWC # 37 at 2412 was a barren quartz sand and could represent the H-2/J-2 surface of the Cobia Event.

CONFIDENCE RATING:

- 0: SWC or Core - Complete assemblage (very high confidence).
- 1: SWC or Core - Almost complete assemblage (high confidence).
- 2: SWC or Core - Close to zonule change but able to interpret (low confidence).
- 3: Cuttings - Complete assemblage (low confidence).
- 4: Cuttings - Incomplete assemblage, next to uninterpretable or SWC with depth suspicion (very low confidence).

NOTE: If an entry is given a 3 or 4 confidence rating, an alternative depth with a better confidence rating should be entered, if possible. If a sample cannot be assigned to one particular zone, then no entry should be made, unless a range of zones is given where the highest possible limit will appear in one zone and the lowest possible limit in another.

DATA RECORDED BY: David Taylor DATE: 7 DECEMBER 1978

DATA REVISED BY: David Taylor DATE: 15.2.1979.

FORTESQUE # 1

Sidewall cores in metres

PLANKTIC FORAMINIFERA	870	980	1040	1100	1160	1270	1280	1340	1400	1460	1520	1585	1640	1705	1740	1765	1795	1825	1855	1885	1912	1947	1975	2000	2038	2063	2097	2123	2158	2188	2217	2240	2277	2310	2336	2356	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2407	2408	2410	2411	2412	2413	2414	2415	2416
ORBULINA UNIVERSA	I	I	I	I	I	o		I	I		I	I	I	I	o	I	I	I		I	I	I	I	I	I																											N	I			N
GLOBOROTALIA SCITULA	?	?			cf			I			o		o						N																																					
GLOBIGERINA BULLOIDES	?		I						o				o						O	o								o		?	I			I	I	I	I	I	I													F				F
G. FALCONENSIS		o		o	o														T																																					
GLOBOROTALIA MIOZEA CONOIDEA		o	I		I				I			o				I	I	I		I	I	I	I	I	I	I	cf																									F				F
G. CONTINUOSA			cf						o																				o																											
GLOBIGERINOIDES TRILOBUS			I						I	I			o						P									I	I	I		I	I	I	I	o	o	I	o			o					?							I		
GLOBOROTALIA MAYERI MAYERI				o		o				N								o	R																																					
GLOBIGERINA DECORAPERTA					o					D									O											o																										
GLOBOROTALIA MIOTUMIDA MIOTUMIDA							o		o	E									C																																					
G. MENARDII									o	T									E																																					
G. CONICA																			S		o		o																														o			
G. MIOZEA MIOZEA															o		o		S				o					o		o		I																								
G. c.f. SPHERICOMIOZEA																o			E						o	o	cf																													
GLOBIGERINA NEPENTHES																	?		D				cf																																	
GLOBIGERINOIDES SICANUS																		o											o	I	I	I	o							?																
GLOBOROTALIA PRAESCITULA																		?	I		o							I	I		o	o	o							o														o		
GLOBOQUADRINA DEHISCENS (S.S.)																			N	o									I	o	I		I		I	I		I	I		I	I								o						
GLOBIGERINA WOODI													o						D			o						I	I		I	I	I	o	I	I		I	I	I	I	I	I	I	I	I		I	I	I	I			I		
GLOBOROTALIA PRAEMENARDII																			U				o					I	I	o			I	I	I																					
ORBULINA SUTURALIS																			R								o	I																												
GLOBIGERINA RUBESCENS																			A									o		o																										
PRAEORBULINA GLOMEROSA CURVA																			T									o	o																											
GLOBOROTALIA ZEALANDICA																			E													o		o	o																					
G. OPIMA NANA																			D													o	o							o				o	o	o	o		o	o						
GLOBIGERINA WOODI CONNECTA																																		I					o	I	I	I	o	o	o	I				I				I		
GLOBOQUADRINA ALTISPIRA (S.L.)																			S																																					
GLOBIGERINA CIPEROENSIS																			P																																					
GLOBOROTALIA BELLA																																				o												o			o			o		
GLOBOQUADRINA DEHISCENS (S.L.)																																											I	I	I	I	I	I	I	I	I			I		
GLOBIGERINA PREBULLOIDES																																																		o						
GLOBIGERINA EUAPERTURA																																																			I				o	
GLOBIGERINA BREVIS																																																							o	
G. ANGIPOROIDES																																																							o	
GLOBOROTALIA GEMMA																																																							o	

Base in metres of Zone	? 1040	1400		1885	2038	2123		2277	2400	2410						
	B-2	C	?	D-1	D-2	E-1	E 2	F	G	H-1	H 2	?	* D 2	* G	J 2	

* Misplaced

APPENDIX 6

APPENDIX 6

WELL LOG ANALYSIS

by

S. Patniyot

WELL LOG ANALYSIS REPORT

TO

OPERATOR Esso Australia Ltd. WELL Fortescue #1 DATE 24th July 1978

STATE Victoria ELEV. 25.0m KB

DEPTH INTERVAL (m) ISF Depths	POROSITY ESTIMATE %	WATER SAT. ESTIMATE %	REMARKS All intervals listed below are expected to be water productive.
2416.5 -17.0 (0.5)	12	Indeterminate	Very shaley
2417.5 -18.0 (0.5)	10	"	" "
2418.5 -20.0 (1.5)	11-13	100	V. shaley
2420.5 -21.0 0.5)	10	Indeterminate	Very Shaley
2421.5 -22.0 (0.5)	11	"	" "
2430.0 -31.0 (1.0)	16-19	100	V. Shaley
2431.5 -32.0 (9.5)	10-14	"	" "
2458.0 -58.5 (0.5)	10-13	"	" "
2458.5 -59.5 (1.0)	17-20	"	" "
2459.5 -62.0 (2.5)	15-17	"	Shaley
2462.0 -62.5 (0.5)	18-21	"	
2462.5 -64.5 (2.0)	23-26	"	Shaley in lower section
2464.5 -66.5 (2.0)	18-21	"	Shaley in the upper section
2466.5 -70.5 (4.0)	21-23	"	
2470.5 -75.5 (5.0)	23-26	"	
2475.5 -79.5 (4.0)	21-24	"	
2479.5 -84.0 (4.5)	19-21	"	
2484.0 -85.5 (1.5)	23-24	"	
2485.5 -87.0 (1.5)	21-22	"	
2487.0 -89.0 (2.0)	20-22	"	
2489.0 -92.0 (3.0)	22-24	"	
2492.0 -93.5 (0.5)	20-22	"	
2493.5 -95.0 (1.5)	21-23	"	
2495.0 -95.5 (0.5)	18-22	"	Shaley
2495.5 -96.0 (0.5)	16-18	"	
2496.0 -97.0 (1.0)	19-21	"	V. Shaley
2497.0 -98.0 (1.0)	20-22	"	Shaley
2498.0 -2501 (3.0)	18-20	"	V. Shaley
2501.0 -04.0 (3.0)	24-26	"	
2504.0 -05.5 (1.5)	21-23	"	
2505.5 -06.5 (1.0)	19-21	"	
2506.5 -07.0 (0.5)	23-26	"	
2507.0 -08.0 (1.0)	23-27	"	
2508.0 -08.5 (0.5)	22-24	"	
2508.5 -11.0 (2.5)	23-25	"	
2511.0 -13.5 (2.5)	21-23	"	
2513.5 -14.0 (0.5)	23-24	"	V. Shaley

TESTS:

Successful FIT's at 2652 + 2565 m produced formation water + filtrate

FORMATION:

Latrobe

LOGS:

ISF-MSFL-SONIC-GR
FDC-CNL- GR

COMMENTS: This interpretation uses the neutron & density logs as porosity indicators and gamma ray log as clay indicator. An RW value of 0.06 at 218°F was used in the estimation of water saturation and corresponds to 39,000 ppm Nacl. Actual calculation of water saturation although underestimated in some intervals has an average of 98% over the interpreted interval hence a fair saturation balance is obtained. An invasion sutdy carried out over some of the sands using Schlumberger Chart Rint-5 1977 chart book edition revealed depth of invasion in the range 13-20" had occurred at the time of resistivity logging. The top of the Latrobe formation is picked up at around 2416m.

S. Patnivat

BY S. Patnivat

WELL Fortescue #1

DEPTH INTERVAL (m) ISF Depths	POROSITY ESTIMATE %	WATER SAT. ESTIMATE %	REMARKS
2514.0 -16.5 (2.5)	19-21	100	V. Shaley
2516.5 -18.5 (2.0)	21-23	"	
2518.5 -22.0 (3.5)	23-25	"	
2524.0 -25.0 (1.0)	15-16	Indeterminate	
2525.5 -26.0 (0.5)	14-16	"	
2526.0 -27.0 (1.0)	19-22	"	
2527.0 -28.5 (1.5)	23-24	"	
2528.5- 29.0 (0.5)	22-24	"	
2529.0 -30.5 (1.5)	24-26	"	
2530.5 -31.0 (0.5)	16-20	"	Shaley
2531.0 -31.5 (0.5)	12	Indeterminate	
2532.5 -33.0 (0.5)	11-14	"	
2533.0 -34.5 (1.5)	14-16	100	Shaley
2534.5 -35.5 (1.0)	11-14	"	
2535.5 -36.0 (0.5)	18	"	
2536.0 -37.0 (1.0)	23-24	"	
2537.0 -38.0 (1.0)	18-20	"	
2538.0 -39.0 (1.0)	17-18	"	Shaley
2539.0 -40.0 (1.0)	20-22	"	Shaley
2540.0 -42.0 (2.0)	24-25	"	Shaley
2545.0 -45.5 (0.5)	11-13	Indeterminate	
2548.5 -51.0 (2.5)	11-13	100	V. shaley
2552.5 -53.0 (0.5)	11-13	"	
2553.0 -53.5 (0.5)	16-19	"	
2553.5 -54.0 (0.5)	22-24	"	
2554.0 -55.0 (1.0)	20-22	"	
2555.0 -56.0 (1.0)	23-25	"	
2556.0 -58.0 (2.0)	20-22	"	
2558.0 -59.0 (1.0)	16-18	"	Shaley
2559.0 -61.0 (2.0)	14-16	"	
2561.0 -61.5 (0.5)	17-18	"	
2561.5 -62.5 (1.0)	18-20	"	
2562.5 -64.0 (1.5)	21-23	"	
2564.0 -65.0 (1.0)	19-20	"	
2565.0 -67.0 (2.0)	22-24	"	
2567.0 -68.0 (1.0)	20-23	"	
2572.0 -74.0 (2.0)	16-19	"	
2574.0 -75.0 (1.0)	21-23	"	
2575.0 -76.0 (1.0)	19-22	"	
2576.0 -78.0 (2.0)	22-24	"	
2578.0 -78.5 (0.5)	19-21	"	
2578.5 -79.0 (0.5)	14-17	"	
2579.0 -80.0 (1.0)	11-12	"	
2584.0 -84.5 (0.5)	11	Indeterminate	
2590.5 -91.0 (0.5)	11-13	"	
2603.0 -2604.0 (1.0)	15-17	100	V. shaley
2604.0 -04.5 (0.5)	12-13	Indeterminate	
2607.0 -08.0 (1.0)	13-15	100	
2608.0 -13.0 (5.0)	16-18	"	V. shaley in part
2614.0 -15.0 (1.0)	11-12	Indeterminate	
2618.0 -19.0 (0.5)	13-14	100	V. shaley
2619.0 -20.0 (1.0)	14-16	"	
2620.0 -20.5 (0.5)	13-14	"	
2620.5 -21.5 (1.0)	17-20	"	
2621.5 -22.5 (1.0)	21-22	"	
2624.0 -24.5 (0.5)	12	Indeterminate	
2625.5 -26.5 (1.0)	11-12	"	
2634.0 -35.0 (1.0)	10-12	"	
2636.5 -37.5 (1.0)	11-12	"	
2646.5 -48.0 (1.5)	13-14	100	Shaley
2648.0 -49.0 (1.0)	16-17	"	"
2651.0 -51.5 (0.5)	11-16	"	
2651.5 -53.0 (1.5)	20-21	"	

APPENDIX 7

APPENDIX 7

VELOCITY SURVEY REPORT

VELOCITY SURVEY

Well ..... FORTESCUE #1

Basin ..... GIPPSLAND

INTRODUCTION

Esso personnel ...I. HAWKSHAW, J. HUGHES

Contractor ..... VELOCITY DATA PTY. LTD.

Supplied (1) Instruments

(2) Personnel

Seismic Observer ..... B. Potter

Marine Shooter ..... R. Doyle

Dynamite ..... -

(3) Seismic Souce

Gas Gun

Gas Pressures .....

Oxygen ..... 90 PSI .....

Propane ..... 50 PSI .....

(3) Licenced Shooting Boat

name .....

date loaded .....

date released .....

Agent .....

.....

amount of powder ..... lbs

size of cans ..... lbs

number of cans .....

number of caps .....

number of boosters .....

Personnel and Instruments

assembled at Ocean Endeavour ..... date 8/7/78

boarded (rig) Ocean Endeavour ..... date 8/7/78

date of survey 10/7/78

casing depth 13-3/8 @ 854m

T.D. when shot 2691m ..... FTD 2691m

water depth 65m .....

K.B. 25.3m

SURVEY PROCEDURE

Weather: sea ..... 2m .....

rig movement ..... slight .....

rig noise ..... moderate .....

Hydrophones: number ..... three .....

depth below sea level ...12.2m ..... ~~ft~~

position ..2 - 1m above bottom of gas gun

1 - in moon pool .....

Shot Positioning and Charges:

marker buoys (number .....

(distance .....

(direction .....

charge depth ..... ft

number of shots ..... charge size..... lbs.

number of shots .....charge size ..... lbs.

number of misfires .....

Gas gun

No. of pops per level:- 2 to 3 pops

amount of powder dumped .....lbs.

Well-phone positioning :

T-bar .....

number of depths ..14.....

Time: first shot .....

last shot .....!

rig time .....

RESULTS

Quality of records (good .....5.....
(fair .....18.....
(poor .....9.....
(not used ..1.....

Comparison of Interval Times with sonic log

/△/average ....13.68.....microsec/~~xxxx~~ m

/△max/ .....43.48.....microsec/~~xxxx~~ m

CONCLUSION

Reliability of T-D curve ....Fair.....

COMMENTS:

1. The triggering mechanism for the gas gun was faulty throughout the survey. Very often the firing button had to be pressed several times before the gun would fire.

2. The shallower levels were quite noisy especially when the wind was gusting.

3. Record No. 22 was not used due to a more than 50 msec difference between it and the other two shots at the same level. There is no apparent explanation for this difference.

FORTESCUE-1

VELOCITY SURVEY ERROR CHECK

Depth Rel. S.L.	Av. Vertical Travel Time (check shots)	Ti Check Shots (sec.)	Ti Sonic Log (sec.)	Δ (Millisecs.) Ti Check — Ti Sonic	Depth Interval (m)	Error (Microsec. per m)
850	.359	.036	.034	+2	112	17.86
962	.395					
962	.395	.024	.023	+1	79	12.66
1041	.419					
1041	.419	.047	.046	+1	157	6.37
1198	.466					
1198	.466	.035	.034	+1	115	8.70
1313	.501					
1313	.501	.037	.035	+2	113	17.70
1426	.538					
1426	.538	.052	.052	0	172	0
1598	.590					
1598	.590	.039	.036	+3	124	24.19
1722	.629					
1722	.629	.067	.064	+3	203	14.78
1925	.696					
1925	.696	.071	.0695	+1.5	210	7.14
2135	.767					
2135	.767	.035	.031	+4	92	43.48
2227	.802					
2227	.802	.054	.0525	+1.5	161	9.32
2388	.856					
2388	.856	.036	.037	-1	138	7.25
2526	.892					
2526	.892	.032	.033	-1	119	8.40
2645	.924					

Shothole information:- Elevation, Distance & Direction from Well

Company: ESSO EXPLORATION AUSTRALIA INC.

Well: FORTESCUE #1

Elevation (Derrick Floor): 25.3m

Total Depth: 2691m

LOCATION

Coordinates: Lat. 38°22'27.81"S, Long. 148°14'19.54"E

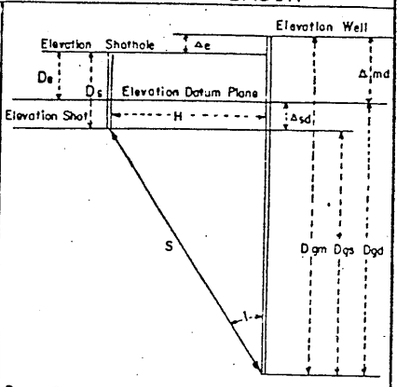
Section, Township, Range:

County:

Area or Field: GIPPSLAND BASIN

DATUM: M.S.L.

Record Number	Shothole Number	Time of Shot	Dgm (m)	Ds	tus	tr	T Reading	T Polarity	T Grade	Dgs	H	TAN i	Cos i	Tgs	Δsd	Δsd/V	Tgd	Tgd Average	Dgd	ΔDgd	ΔTgd	Vi Interval Velocity	Vo Average Velocity
1			875	12.2.008			.351	D	F	837.5	36.6	.0437	.9990	.350	12.2.008		.358						
2			875	"	"		.352	D	F					.351	"	"	.359	.359	849.7				2367
3			875	"	"		.352	D	G					.351	"	"	.359			112	.036	3111	
32			987	"	"		.386	D	F	949.5	36.6	.0385	.9993	.386	"	"	.394	.395	961.7				2435
33			987	"	"		.388	D	G					.388	"	"	.396			79	.024	3292	
4			1066	"	"		.411	D	G	1028.5	36.6	.0356	.9994	.411	"	"	.419	.419	1040.7				2484
5			1066	"	"		.411	D	G					.411	"	"	.419			157	.047	3340	
30			1223	"	"		.458	D	F	1185.5	36.6	.0309	.9996	.458	"	"	.466	.466	1197.7				2570
31			1223	"	"		.459	D	F					.459	"	"	.467			115	.035	3286	
6			1338	"	"		.492	D	P	1300.5	36.6	.0281	.9996	.492	"	"	.500						2620
7			1338	"	"		.493	D	F					.493	"	"	.501	.501	1312.7				
8			1338	"	"		.493	D	P					.493	"	"	.501			113	.037	3054	
28			1451	"	"		.530	D	G	1413.5	36.6	.0259	.9997	.530	"	"	.538	.538	1425.7				2650
29			1451	"	"		.530	D	F					.530	"	"	.538			172	.052	3308	
9			1623	"	"		.582	D	P	1585.5	36.6	.0231	.9997	.582	"	"	.590	.590	1597.7				2708
10			1623	"	"		.583	D	F					.583	"	"	.591			124	.039	3179	
25			1747	"	"		.621	D	F	1709.5	36.6	.0214	.9998	.621	"	"	.629						2737
26			1747	"	"		.621	D	F					.621	"	"	.629	.629	1721.7				
27			1747	"	"		.621	D	F					.621	"	"	.629			203	.067	3030	
11			1950	"	"		.688	D	F	1912.5	36.6	.0191	.9998	.688	"	"	.696	.696	1924.7				2765
12			1950	"	"		.689	D	P					.689	"	"	.697			210	.071	2958	
22			2160	"	"		.708	D	N/R	2122.5	36.6	.0172	.9998	NOT	USED								2783
23			2160	"	"		.759	D	P					.759			.767	.767	2134.7				
24			2160	"	"		.760	D	F					.760	"	"	.768			92	.035	2629	
13			2252	"	"		.794	D	F	2214.5	36.6	.0165	.9998	.794	"	"	.802	.802	2226.7				2776
14			2252	"	"		.793	D	F					.793	"	"	.803			161	.054	2981	
15			2413	"	"		.849	D	F	2375.5	36.6	.0154	.9999	.849	"	"	.857						2789
16			2413	"	"		.848	D	F					.848	"	"	.856	.856	2387.7				
17			2413	"	"		.848	D	F					.848	"	"	.856			138	.036	3833	
20			2551	"	"		.884	D	P	2513.5	36.6	.0146	.9999	.884	"	"	.892	.892	2525.7				2832
21			2551	"	"		.884	D	P					.884	"	"	.892			119	.032	3719	
18			2670	"	"		.916	D	P	2632.5	36.6	.0139	.9999	.916	"	"	.924	.924	2644.7				2862
19			2670	"	"		.917	D	P					.917	"	"	.925						



Dgm = Geophone depth measured from well elevation

Dgs = " " " " shot "

Dgd = " " " " datum "

Ds = Depth of shot

De = Shothole elevation to datum plane

H = Horizontal distance from well to shotpoint

S = Straight line travel path from shot to well geophone

tus = Uphole time at shotpoint

T = Observed time from shotpoint to well geophone.

tr = " " to reference geophone.

Δe = Difference in elevation between well & shotpoint.

Δsd = " " " " shot & datum plane

Δsd = Ds - De

Dgs = Dgm - Ds ± Δe ; $\tan i = \frac{H}{Dgs}$

Tgs = .COS i ; T = Vert. travel time from shot elev. to geophone

Tgd = $Tgs \pm \frac{\Delta sd}{V}$ = " " " " datum plane " "

Dgd = Dgm - Δmd

Vi = Interval velocity = $\frac{\Delta Dgd}{\Delta Tgd}$

Vo = Average = $\frac{Dgd}{Tgd}$

Surveyed by: I. Hawkshaw

Date: 10.7.78

Weathering Data:

Casing Record

13-3/8" @ 854m

Shothole Information:- Elevation, Distance & Direction from Well

Company: ESSO EXPLORATION AUSTRALIA INC.

Well: FORTESCUE #1

Elevation (Derrick Floor)	Total Depth
25.3	2691m

LOCATION

Coordinates: LAT. 38°22'27.81"S LONG. 148°14'19.54"E DATUM : M.S.L.

Section, Township, Range:

County:

Area or Field: Gippsland Basin

Record Number	Shothole Number	Time of Shot	Dgm (m)	Ds	tus	tr	T Reading	T Polarity	T Grade	Dgs	H	TAN I	Cos I	Tgs	Δsd	Δsd/V	Tgd	Tgd Average	Dgd	ΔDgd	ΔTgd	VI Interval Velocity	Va Average Velocity
1			875	12.2	.008		.351	D	F	837.5	36.6	.0437	.9990	.350	12.2	.008	.358						
2			875	"	"		.352	D	F					.351	"	"	.359	.359	849.7				2367
3			875	"	"		.352	D	G					.351	"	"	.359							
32			987	"	"		.386	D	F	949.5	36.6	.0385	.9993	.386	"	"	.394	.359	961.7	112	.036	3111	2435
33			987	"	"		.388	D	G					.388	"	"	.396							
4			1066	"	"		.411	D	G	1028.5	36.6	.0356	.9994	.411	"	"	.419	.419	1040.7	79	.024	3292	2484
5			1066	"	"		.411	D	G					.411	"	"	.419							
30			1223	"	"		.458	D	F	1185.5	36.6	.0309	.9996	.458	"	"	.466	.466	1197.7	157	.047	3340	2570
31			1223	"	"		.459	D	F					.459	"	"	.467							
6			1338	"	"		.492	D	P	1300.5	36.6	.0281	.9996	.492	"	"	.500			115	.035	3286	
7			1338	"	"		.493	D	F					.493	"	"	.501	.501	1312.7				2620
8			1338	"	"		.493	D	P					.493	"	"	.501							
28			1451	"	"		.530	D	G	1413.5	36.6	.0259	.9997	.530	"	"	.538	.538	1425.7	113	.037	3054	2650
29			1451	"	"		.530	D	F					.530	"	"	.538							
9			1623	"	"		.582	D	P	1585.5	36.6	.0231	.9997	.582	"	"	.590	.590	1597.7	172	.052	3308	2708
10			1623	"	"		.583	D	F					.583	"	"	.591							
25			1747	"	"		.621	D	F	1709.5	36.6	.0214	.9998	.621	"	"	.629			124	.039	3179	
26			1747	"	"		.621	D	F					.621	"	"	.629	.629	1721.7				2737
27			1747	"	"		.621	D	F					.621	"	"	.629							
11			1950	"	"		.688	D	F	1912.5	36.6	.0191	.9998	.688	"	"	.696	.696	1924.7	203	.067	3030	2765
12			1950	"	"		.689	D	P					.689	"	"	.697							
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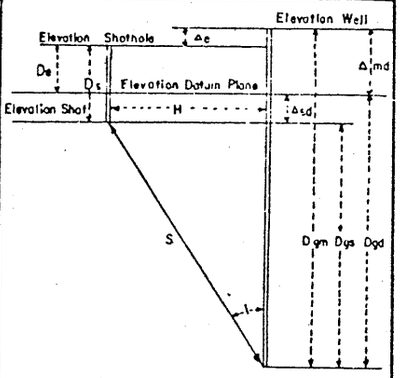
24			2160	"	"		.760	D	F					.760	"	"	.768							
13			2252	"	"		.794	D	F	2214.5	36.6	.0165	.9998	.794	"	"	.802	.802	2226.7	92	.035	2629	2776
14			2252	"	"		.793	D	F					.793	"	"	.803							
15			2413	"	"		.849	D	F	2375.5	36.6	.0154	.9999	.849	"	"	.857			161	.054	2981	
16			2413	"	"		.848	D	F					.848	"	"	.856	.856	2387.7				2789
17			2413	"	"		.848	D	F					.848	"	"	.856							
20			2551	"	"		.884	D	P	2513.5	36.6	.0146	.9998	.884	"	"	.892	.892	2525.7	138	.036	3833	2832
21			2551	"	"		.884	D	P					.884	"	"	.892							
18			2670	"	"		.916	D	P	2632.5	36.6	.0139	.9999	.916	"	"	.924	.924	2644.7	119	.032	3719	2862
19			2670	"	"		.917	D	P					.917	"	"	.925							



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tr = " " " to reference geophone.

Δe = Difference in elevation between well & shotpoint.

Δsd = " " " " shot & datum plane

Δsd = Ds - De

Dgs = Dgm - Ds ± Δe ; $\tan i = \frac{H}{Dgs}$

Tgs = cos i × Vert. travel time from shot elev. to geophone

$Tgd = Tgs \pm \frac{\Delta sd}{V}$ = " " " datum plane " "

Dgd = Dgm - Δmd

VI = Interval velocity = $\frac{\Delta Dgd}{\Delta Tgd}$

Va = Average " = $\frac{D\,gd}{T\,gd}$

Surveyed by: L. Hawkshaw

Date: 10.7.78

Weathering Data:

Casing Record 13-3/8" @ 854m

DWG. 1107/OP/3

ESSO COPY.

VELOCITY DATA PTY. LTD.

P.O. Box 141, Kenmore, Queensland, 4069.
Telephone (072) 78 4860 (Office)
(072) 93 1514 (Field Operations)

DATE OF SURVEY: 10 July 78

CLIENT: ESSO

WELL: FORTESCUE # 1.

OBSERVERS REPORT

ENERGY SOURCE: GAS GUN. RECORDING INSTRUMENTS: RS44 LOGGER: SCHLUMBERGER

GEOPHONES: WELL: WLS 1000 REFERENCE: PRESSURE SEA FLOOR: — REFRACTION: —

REFERENCE SENSOR OFFSET: 5 m. DEPTH: 40' DRILL SHIP: Ocean Endeavour SHIP HEADING:

WEATHER: Very Cold & Windy SEAS: Very Rough @ heavy Swell

KB DEPTH	Record (~~BEARING~~)	CHARGE	SHOT DEPTH	SHOT LOCATION	SHOT OFFSET	AMPLIFIER GAIN		TIME	COMMENTS
875 m	1	15 Sec	40 ft	Port Crane	150 ft	2/1	4	0129	V. noisey
"	2						2	0130	"
"	3						2	0131	"
1066 m	4						4	0147	
	5						4	0148	
1338 M	6						4	0203	
	7						4	0204	
	8						4	0205	
1623 M	9						4	0214	
	10						4	0215	
1950 M	11						5	0227	
	12						5	0228	
2252 M	13						6	0244	
	14						6	0245	
2413 M	15						8	0255	
	16						8	0256	
	17						8	0257	
2670 M	18	20					10	0310	
	19						10	0311	
2551 M	20						10	0323	
	21						10	0324	
2160 M	22						8	0339	
	23						8	0340	
	24						8	0343	
1747 M	25						5	0401	V. Noisey
	26						5	0402	"
	27						5	0403	"
1451 M	28						5	0421	
	29						5	0422	
1223 M	30						4	0453	
	31						4	0454	
987 M	32						2	0453	
	33						2	0454	

NUMBER OF RECORDS: 33 EXPLOSIVES USED: CAPS — PRIMERS — EXPLOSIVE —

DEPART ~~BRISBANE~~ Perth: 6 July 78 RETURN ~~BRISBANE~~ Perth: 10 July 78 OBSERVER: BK Potter

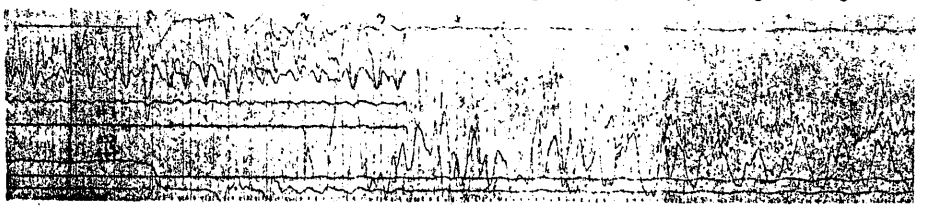
FORTESCUE - 1

WELL VELOCITY RECORD

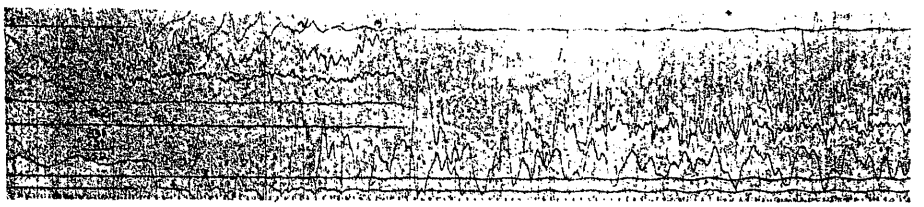
10 JULY, 1978

0 1 2 3 4 5 6 7 8 9

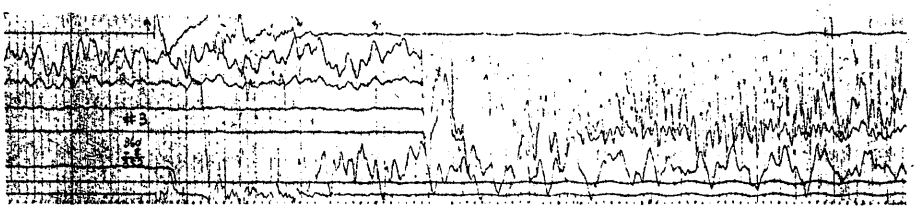
REC. No. 1
875 m. K.B.



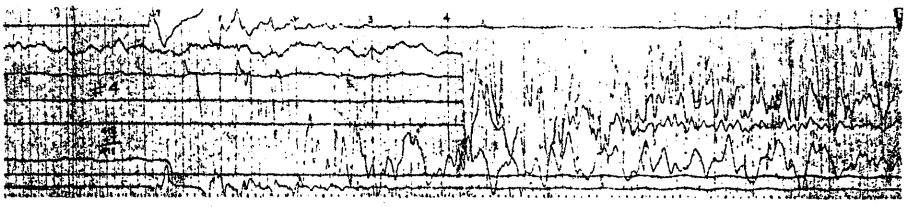
REC. No. 2
875 m. K.B.



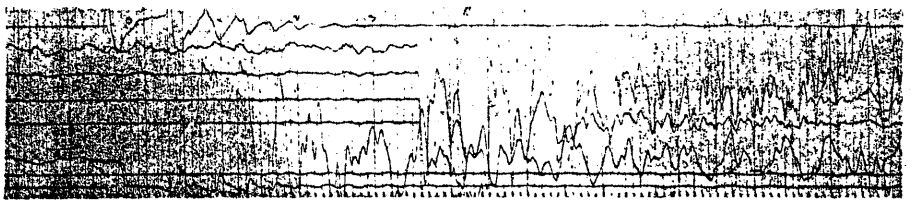
REC. No. 3
875 m. K.B.



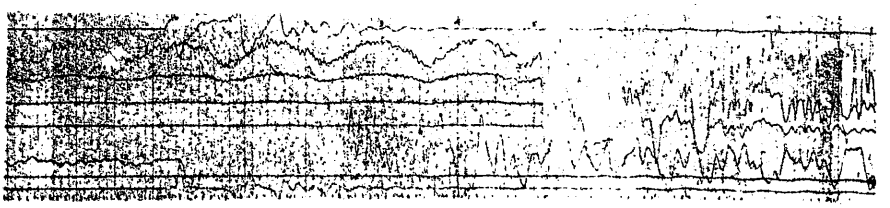
REC. No. 4
1066 m. K.B.



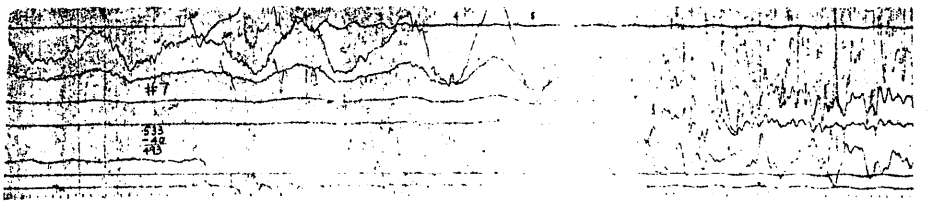
REC. No. 5
1066 m. K.B.



REC. No. 6
1338 m. K.B.



REC. No. 7
1338 m. K.B.



Dwg. 1892/OP/2

FORTESCUE - 1

WELL VELOCITY RECORD

10 JULY, 1978

REC. No. 8
1338m. K.B.

REC. No. 9
1623m. K.B.

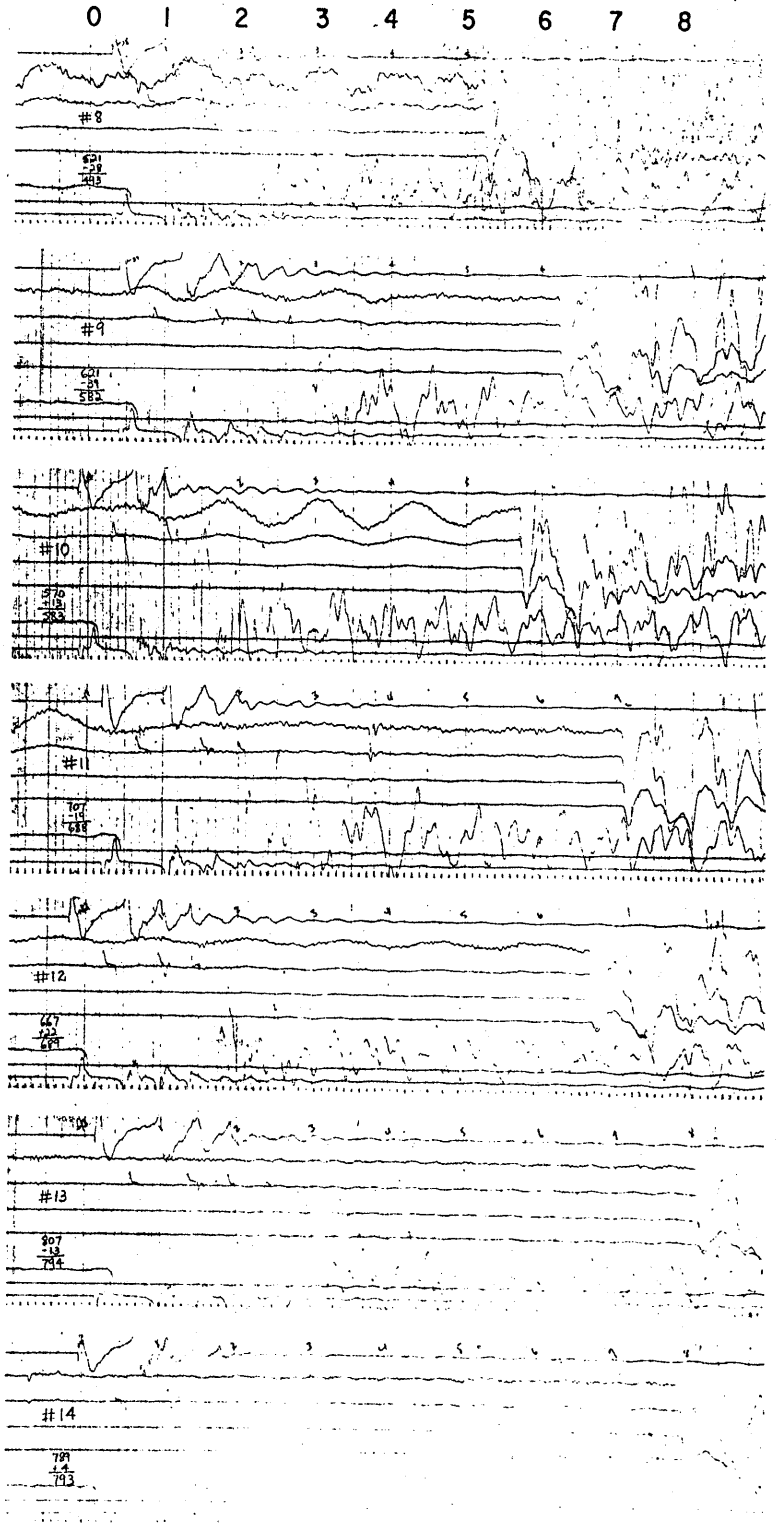
REC. No. 10
1623m. K.B.

REC. No. 11
1950 m. K.B.

REC. No. 12
1950 m. K.B.

REC. No. 13
2252 m. K.B.

REC. No. 14
2252 m. K.B.

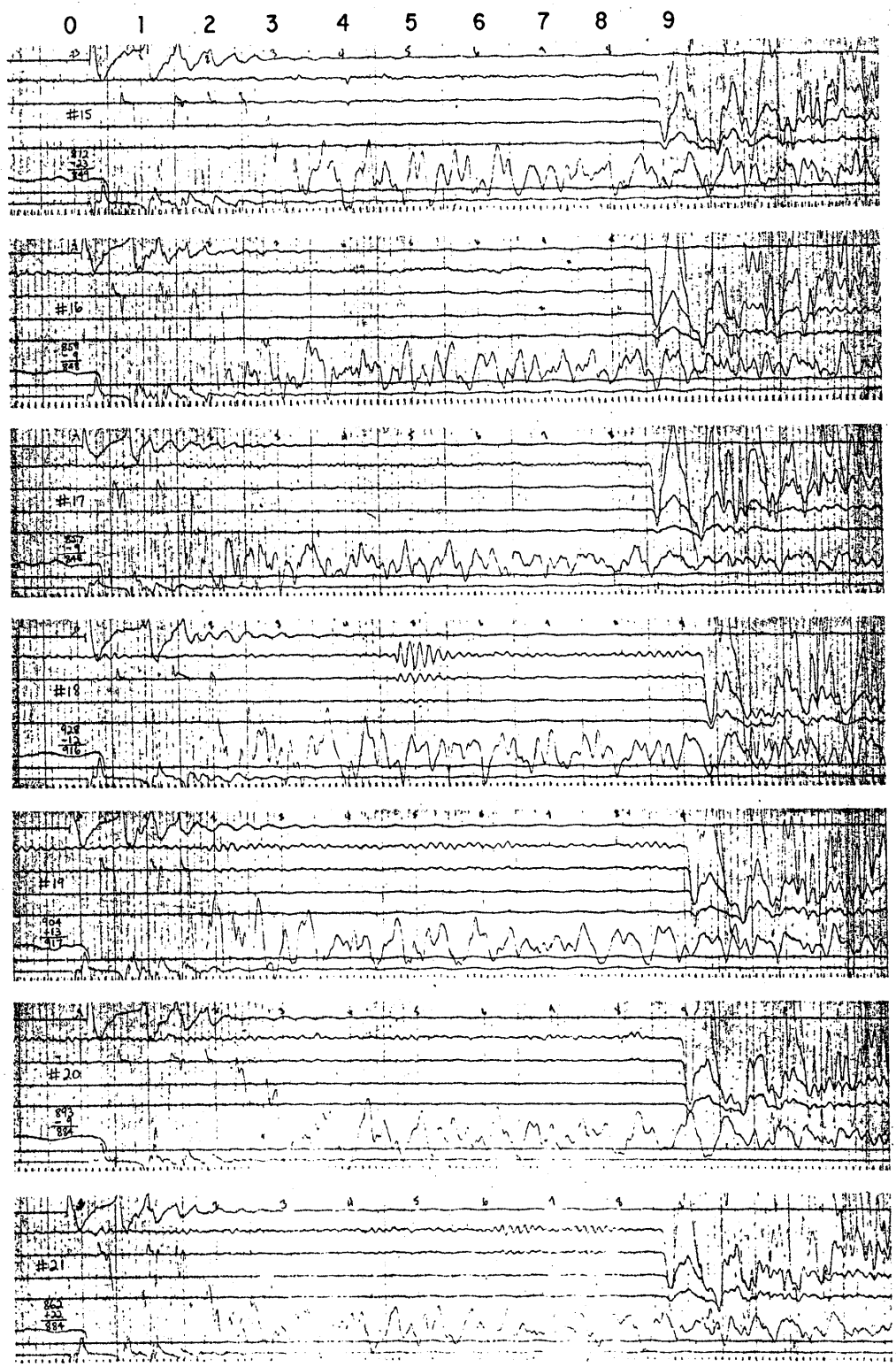


Dwg. 1892/OP/3

FORTESCUE - 1

WELL VELOCITY RECORD

10 JULY, 1978



REC. No. 15
2413 m. K.B.

REC. No. 16
2413 m. K.B.

REC. No. 17
2413 m. K.B.

REC. No. 18
2670 m. K.B.

REC. No. 19
2670 m. K.B.

REC. No. 20
2551 m. K.B.

REC. No. 21
2551 m. K.B.

Dwg. 1892 / OP/4

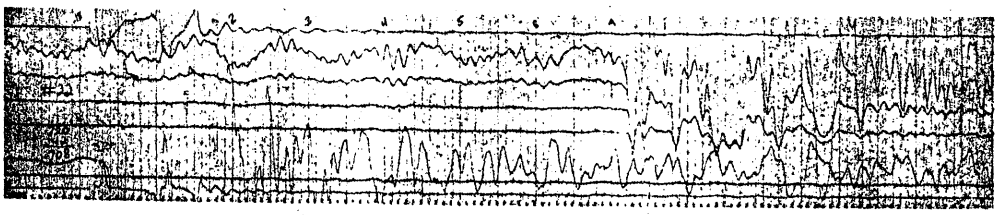
FORTESCUE -1

WELL VELOCITY RECORD

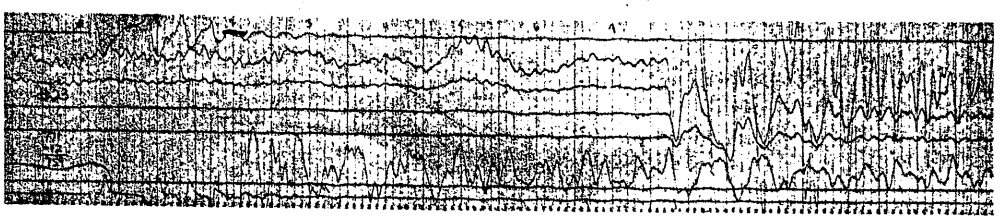
10 JULY, 1978

0 1 2 3 4 5 6 7 8 9

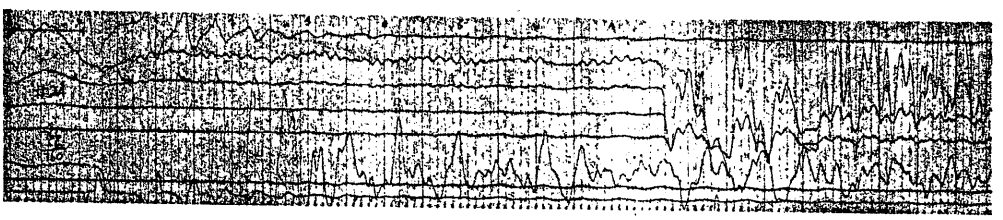
REC. No. 22
2160 m. K.B.



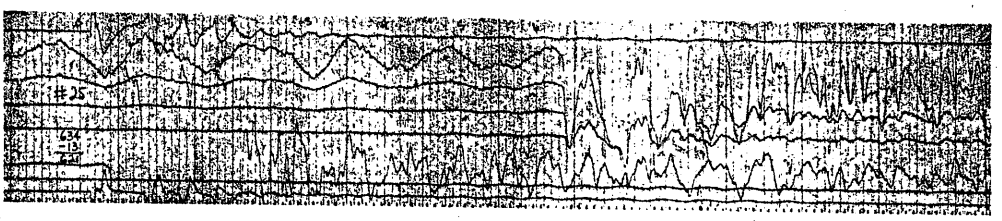
REC. No. 23
2160 m. K.B.



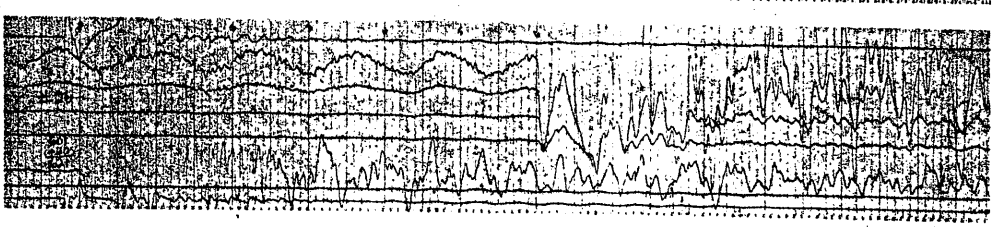
REC. No. 24
2160 m. K.B.



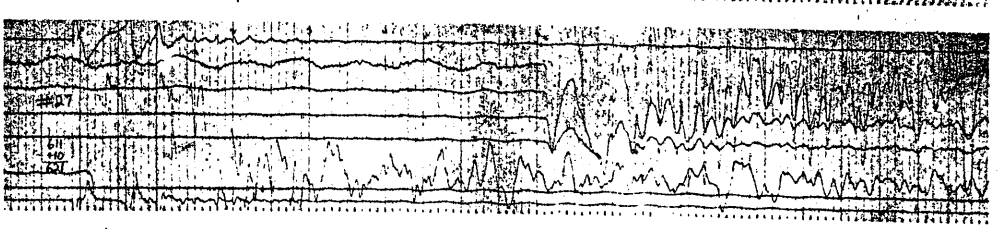
REC. No. 25
1747 m. K.B.



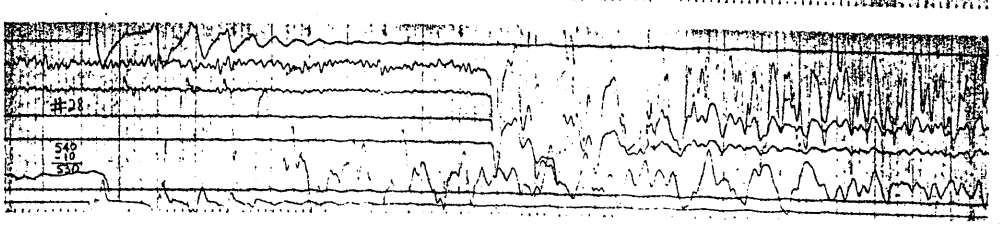
REC. No. 26
1747 m. K.B.



REC. No. 27
1747 m. K.B.



REC. No. 28
1451 m. K.B.

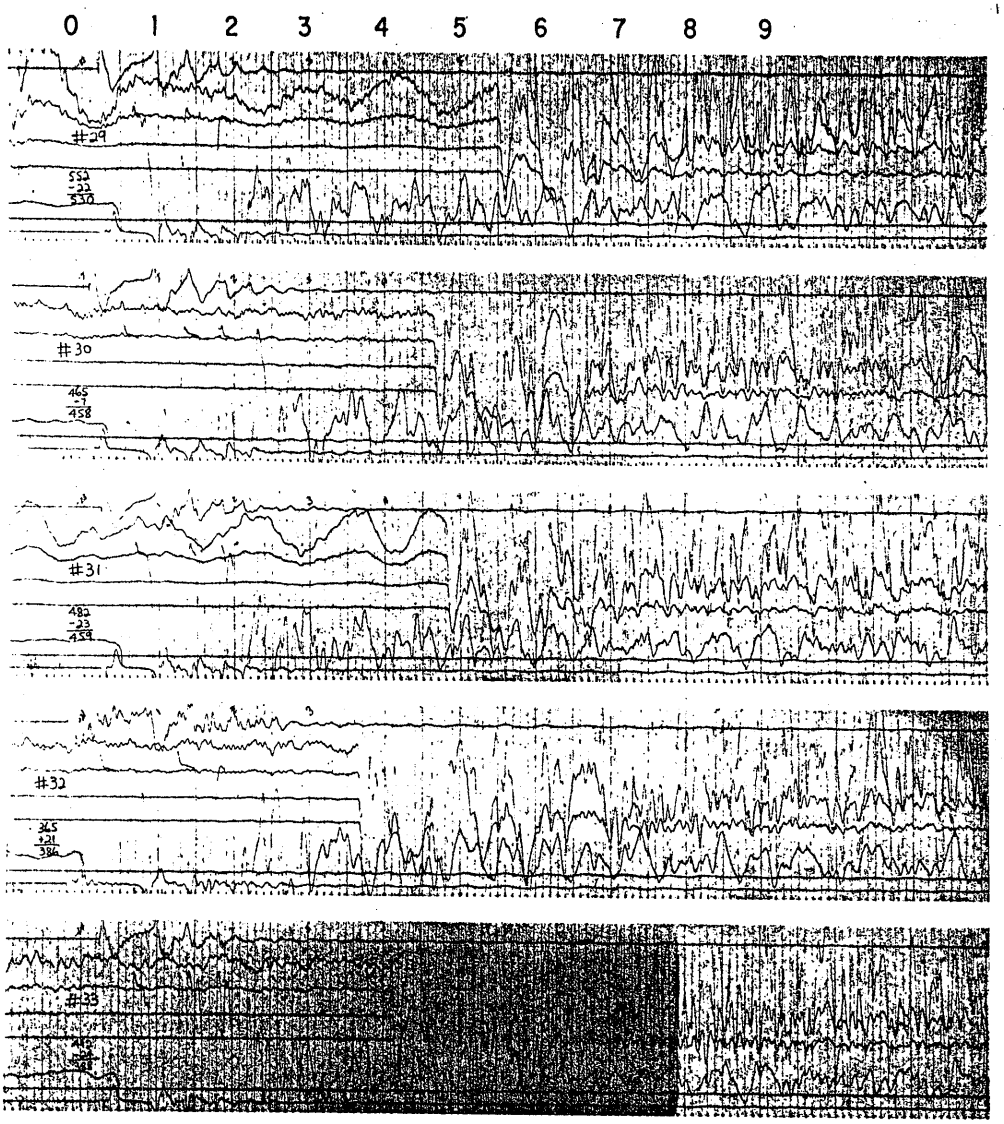


Dwg. 1892 /OP/5

FORTESCUE -1

WELL VELOCITY RECORD

10 JULY, 1978



REC. No. 29
1451 m. K.B.

REC. No. 30
1223 m. K.B.

REC. No. 31
1223 m. K.B.

REC. No. 32
987 m. K.B.

REC. No. 33
987 m. K.B.

Dwg. 1892/OP/6

APPENDIX 8

APPENDIX 8

FORMATION INTERVAL TESTS ANALYSIS AND RECORDS

FIT & RFT PRESSURE ANALYSIS

We have analysed the pressure data from RFT-1, FIT-1 and FIT 2 of Fortescue-1 to determine the formation capacity (kh) and possible pressure correlation with Cobia and Halibut Fields. The results are summarised on the attached Table 1, and the pressures are plotted on the attached Figure 1 in comparison with similar data from Cobia-2.

The Fortescue pressures appear to correlate with those of Cobia-2 except the RFT-1 pressure. Since both RFT-1 and FIT-2 were tested in the sand unit which has been correlated with the M-1.0 sand of Halibut, the smaller drawdown seen in RFT-1 could suggest that the upper part of the interval is more related to the M-1.0 Unevaluated Sand which has not been produced, and the lower part of the interval could be in communication with the M-1.0 Evaluated Sand of Halibut which is being drained by two wells.

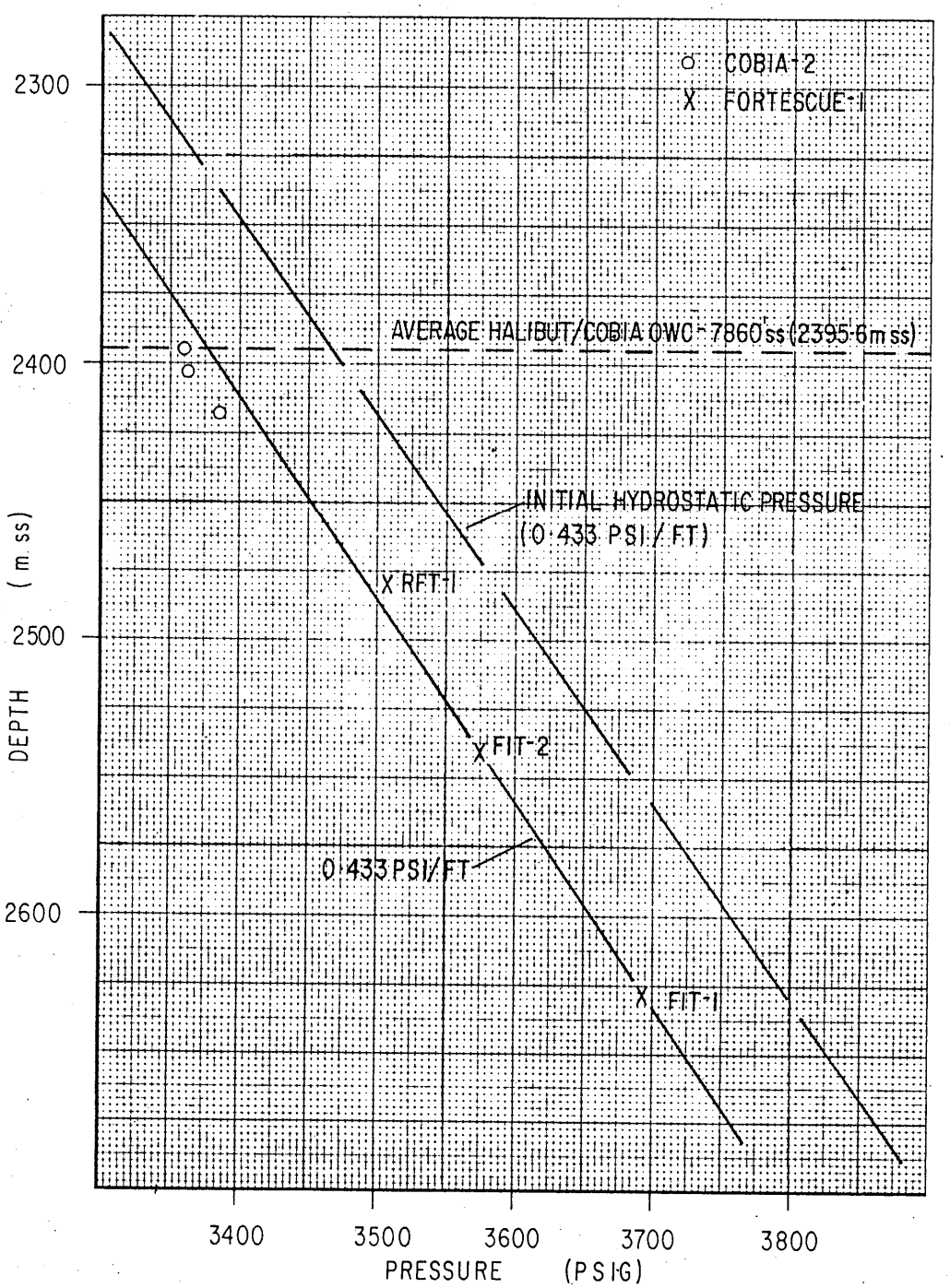
D.A. Collins

TABLE-1

FORTESCUE-1 PRESSURE ANALYSIS

		RFT 1	FIT-1	FIT-2
Depth	m.MDKB	2505	2652	2565
Final shut-in pressure (main chamber)	psig	3523.0	3702.7	3589.1
Extrapolated pressures to infinite shut-in time	psig	3523.0	3705.2	3589.1
Hydrostatic pressure	psig	3588.2	3797.1	3673.5
Drawdown	psi	65.2	91.9	84.4
Formation capacity (kh)	md-ft.	78	76	366

FIG 1 FORTESCUE-1 PRESSURE TESTS



F.I.T. RECORD

GEOLOGIST/S: BURNS/DO ROZARIO

WELL: FORTESCUE-1 F.I.T. NO: 1 @ 2652 m (KB) DATE: 11.7.78

TEST RESULT: GOOD TEST, VALID PRESSURES, REC. FILTRATE.

FIRING METHOD: NORMAL CHOKE SIZES: 0.030"

TIMES: Tool Set: 00:00:44 Tool Open: 00:02:23 Min.Open: 12 MIN. 45 SECS.

Shaped Charge Shot: ~~YES~~/No at: _____ Min. Open: _____ Full After: 8MIN. 44 SECS.

Segregator Open: 00:15:08 Mins.Open: 2MIN. 39 SECS Full After: 19 SECS.

Tool Closed: 00:17:47 Tool Off: 00:19:21

Segregator Type: SFAB Number: 28

Segregator opened/transferred container No.: B465

MUD DATA: In Hole

Resistivity Rmf 1.44 Ω @ 58°F °C, Equiv. Na. Cl. 4800 ppm

Titration Cl^-: 1000 ppm NO^-3: 118 ppm

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER 0 kPa Surface Pressure

_____ L. Gas 20.8 L. Filtrate

_____ L. Oil _____ L. Mud

_____ L. Formation Water _____ L. Other

PROPERTIES - MAIN CHAMBER

GAS	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

OIL _____ °API @ _____ °F; Pour Point _____ °F

_____ Colour; _____ Fluorescent Colour

_____ G.O.R.

RESISTIVITY WATER/FILTRATE 0.600 Ω @ 58 °F Equiv. Na. Cl. 12000 ppm

Titration Cl^-: 7000 ppm NO^-3: 8 ppm

PRESSURES - MAIN CHAMBER

	MPa-g	Schlumberger	~~Amerada~~	Agnew	~~Amerada~~	MPa-g	Hewlett Packard*
Initial Hydrostatic	32.38MPa	(4700 psi)				29.75	(4315.4 psig)
Sampling	26.35-26.18	(3825-3800 ")				23.03-24.44	(3339.7-3254.7psig)
Final Shut-in	27.90MPa	(4050 ")				25.53	(3702.7 psig)
Hydrostatic	32.04MPa	(4650 ")				29.78	(4319.7 psig)
Formation Pressure (Horner)						25.55	(3705.2 psig)

Sampling Time Min. 8 MIN 44 SECS.

Shut-in Time Min. 4 MIN. 1 SEC.

(*Corrected for Atmospheric pressure)

TEMPERATURES: (max recorded) 93.9 °C 94.4 °C

MAX. DEPTH TOOL REACHED: 2636 m

TIME SINCE CIRCULATION: 17.5 Hrs

FORMATION TEMPERATURE (HORNER) 104.4 °C

REMARKS:

F.I.T. SEGREGATOR REPORT

GEOLOGIST/S: BURNS/DoROZARIO

WELL: FORTESCUE-1 F.I.T. NO.: 1 @ 2652 m (KB) DATE: 11.7.78

SEGREGATOR TYPE: SFAB NUMBER: 28

RECOVERY - SEGREGATOR _____ kPa Surface Pressure

_____ L. Gas _____ L. Filtrate

_____ L. Oil _____ L. Mud

_____ L. Formation Water _____ L. Other

PROPERTIES - SEGREGATOR

GAS	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

OIL _____ °API @ _____ °F, Pour Point _____ °F

_____ Colour; _____ Fluorescent Colour

_____ G.O.R.

RESISTIVITY WATER/FILTRATE _____ Ω @ _____ °F Equiv. Na.Cl. _____ ppm

Titration Cl^- _____ ppm NO_3 _____ ppm

PRESSURES - SEGREGATOR

MPa-g	Schlumberger	~~xxxxxxx~~ Agnew	~~xxxxxxx~~ MPa-g	Hewlett Packard*
Sampling	27.73MPa (4025 psi)		0.21-2.89	(31-419 psig)
Final Shut-in	28.59MPa (4150 ")		25.53	(3703.4 ")
Formation Pressure (Horner)			25.55	(3705.2 ")
Sampling Time (Min)				19 SECS.
Shut-in Time (Min)				2MIN. 20 SEC.

REMARKS: SEGREGATOR OPENED BY GO-INTERNATIONAL, SALE, AND CONTENTS SENT TO AMDEL FOR "Q_1" ANALYSIS.

F.I.T. RECORD

GEOLOGIST/S: BURNS/DO ROZARIO/ SWARBRICK

WELL: FORTESCUE-1 F.I.T. NO: 2 @ 2565 m (KB) DATE: 11.7.78

TEST RESULT: GOOD TEST, VALID PRESSURES, RECOVERED FORM. WATER & FILTRATE.

FIRING METHOD: NORMAL CHOKE SIZES: 0.030"

TIMES: Tool Set: 01:20 Tool Open: 03:02 Min.Open: 13 MINS. 49 SECS

Shaped Charge Shot: ~~Xxx~~/No at: _____ Min. Open: _____ Full After: 7 MINS. 50 SECS

Segregator Open: 00:16:51 Mins.Open: 2 MINS 14 SECS Full After: 08 SECS.

Tool Closed: 00:19:05 Tool Off: 00:21:02

Segregator Type: SFA Number: 16

Segregator opened/transferred container No.: B466

MUD DATA: In Hole

Resistivity Rmf 1.44 Ω @ 58 °F °C, Equiv. Na. Cl. 4800 ppm

Titration Cl^-: 1000 ppm NO^-3: 118 ppm

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER 0 kPa Surface Pressure

-	L. Gas	-	L. Filtrate
-	L. Oil	-	L. Mud
19,700 cc	L. Formation Water & Filtrate.	-	L. Other

PROPERTIES - MAIN CHAMBER

GAS	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

OIL _____ °API @ _____ °F; Pour Point _____ °F

_____ Colour; _____ Fluorescent Colour

_____ G.O.R.

RESISTIVITY WATER/FILTRATE 0.400Ω @ 62 °F Equiv. Na. Cl. 18000 ppm

Titration Cl^-: 10,300 ppm NO^-3: 4 ppm

PRESSURES - MAIN CHAMBER

MPa-g	Schlumberger	~~Xxxxxxx~~ Agnew	~~Xxxxxxx~~	Hewlett Packard*
	27.39MPa		MPa-g	
Initial Hydrostatic	(3975 psi)		28.76	(4172 psig)
Sampling	22.74MPa(3300 ")		24.21-24.24	(3511-3516 psig)
Final Shut-in	22.91MPa(3325 ")		24.75	(3589.5 psig)
Hydrostatic	26.35MPa(3825 ")		27.26	(3954 ")
Formation Pressure (Horner)			24.75	(3589.1 ")

Sampling Time Min. 7 MIN. 50 SECS.

Shut-in Time Min. 5 MIN. 59 SECS.

(*Corrected for Atmospheric pressure)

TEMPERATURES: (max recorded) 94.4 °C 94.4 °C

MAX. DEPTH TOOL REACHED: 2575 m

TIME SINCE CIRCULATION: 21:57 Hrs

FORMATION TEMPERATURE (HORNER) 104.4 °C

REMARKS:

F.I.T. SEGREGATOR REPORT

GEOLOGIST/S: BURNS/SWARBRICK

WELL: FORTESCUE-1 F.I.T. NO.: 2 @ 2565 m (KB) DATE: 11.7.78

SEGREGATOR TYPE: SFA NUMBER: 16

RECOVERY - SEGREGATOR ______ kPa Surface Pressure

______ L. Gas ______ L. Filtrate

______ L. Oil ______ L. Mud

______ L. Formation Water ______ L. Other

PROPERTIES - SEGREGATOR

GAS	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

OIL ______ °API @ ______ °F, Pour Point ______ °F

______ Colour; ______ Fluorescent Colour

______ G.O.R.

RESISTIVITY WATER/FILTRATE ______ Ω @ ______ °F Equiv. Na.Cl. ______ ppm

Titration Cl^- ______ ppm NO_3 ______ ppm

PRESSURES - SEGREGATOR

MPa-g	Schlumberger	~~XXXXXXX~~ Agnew	~~XXXXXXX~~ MPa-g	Hewlett Packard*
Sampling	-		0.34-4.51	(50.00-654.0 psig)
Final Shut-in 24.11MPa	(3500 psi)		24.74	(3588.8 psig)
Formation Pressure (Horner)			24.76	(3590.5 psig)
Sampling Time (Min)				8 secs
Shut-in Time (Min)				2 min. 6 secs.

REMARKS: SEGREGATOR OPENED BY GO-INTERNATIONAL SALE AND CONTENTS SENT TO AMDEL FOR NORMAL "Q1" ANALYSIS.

F.I.T. RECORD

GEOLOGIST/S: SWARBRICK/DoROZARIO

WELL: FORTESCUE-1 F.I.T. NO: 3 @ 2418.5 m (KB) DATE: 11.7.78

TEST RESULT: MECHANICALLY SUCCESSFUL, BUT TIGHT TEST, VERY SLOW BUILD UP, NO RECOVERY.

FIRING METHOD: NORMAL CHOKE SIZES: 0.03"

TIMES: Tool Set: 00:00:05 Tool Open: 00:02:05 Min.Open: 8 MIN. 54 SECS.

Shaped Charge Shot: ~~YES~~/No at: _____ Min. Open: _____ Full After: NOT FULL

SEALED MAIN CHAMBER & SEGREGATOR @ 00:10:59

Tool Closed: 00:13:15 Tool Off: 00:13:47

Segregator Type: _____ Number: _____

Segregator opened/transferred container No.: _____

MUD DATA: In Hole

Resistivity Rmf 1.44 Ω @ 58°F °C, Equiv. Na. Cl. 4800 ppm

Titration Cl^-: 1000 ppm NO^-3: 118 ppm

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER 0 kPa Surface Pressure

_____ L. Gas _____ L. Filtrate

_____ L. Oil _____ L. Mud

_____ L. Formation Water _____ L. Other

PROPERTIES - MAIN CHAMBER

GAS	C_1	C_2	C_3	C_4	C_5	C_6	H_2S

OIL _____ °API @ _____ °F; Pour Point _____ °F

_____ Colour; _____ Fluorescent Colour

_____ G.O.R.

RESISTIVITY WATER/FILTRATE _____ Ω @ _____ °F Equiv. Na. Cl. _____ ppm

Titration Cl^-: _____ ppm NO^-3: _____ ppm

PRESSURES - MAIN CHAMBER

MPa-g	Schlumberger	~~XXXXXX~~	Agnew _____	~~Xxxxxx~~ _____	Hewlett Packard*
Initial Hydrostatic 29.97MPa	(4350 psi)			27.17MPa-g	(3940.2 psig)
Sampling 1.378MPa	(200 psi)			0.03-0.08 KPag	(4.0-11 psig)
Final Shut-in					
Hydrostatic 29.76MPa	(4320 psi)			27.19 MPa-g	(3943.9 psig)

Formation Pressure (Horner) _____ Sampling Time Min. 8 min. 54 secs.

Shut-in Time Min. 0

'(*Corrected for Atmospheric pressure)

TEMPERATURES: (max recorded) 94.4 °C 95 °C

MAX. DEPTH TOOL REACHED: 2444 m

TIME SINCE CIRCULATION: 25.10 Hrs

FORMATION TEMPERATURE (HORNER) 220°F °C

REMARKS: ON OPENING TOOL, PRESSURE DROPPED TO MINIMUM OF 4 psi, THEN INCREASED VERY VERY SLOWLY (10-109 sec/psi) INDICATING TIGHT TEST, SEALED MAIN CHAMBER AND SEGREGATOR BUT PRESSURE IN FLOW [illegible] ONLY [illegible] MAXIMUM [illegible]

Fortescue-1

RFT RECORD

RFT NO: 1 @ 2505m KB DATE: 11.7.78

TEST RESULT: Valid pressures but due to tool malfunction unable to obtain sample.

TIMES: Tool Set: 00:00 Tool open: 00:25 Pretest full: 00:44
Full after: 19 secs Tool off: 03:56

PRESSURES: Initial Hydrostatic: 4084.7 psig (28.16 MPa-g)
Final Hydrostatic: Not recorded
Sampling Pressure: 3522.7-3510.00 psig (24.29-24.20 MPa-g)
Final Shut-in Pressure (pre test chamber): 3523 psig (24.29 MPa-g)
Formation Pressure: 3523 psig (24.29 MPa-g)
Formation Capacity (Kh): 78md-ft

REMARKS: Pretest chamber was filled in 19 sec and an attempt was made to open the main sample chamber. An immediate power loss occurred indicating tool malfunction, and the emergency retract was used as tool failed to retract. Then pulled out of hole and on inspection it was found that the tool malfunction was due to a cable fault.

RFT NO: 2 @ 2652 m KB DATE: 11.7.78

TEST RESULT: Unsuccessful due to possible blocked flowline.

TIMES: Tool Set: 00:00 Tool open: 00:27 Pretest full: Not ful
Full after: - Tool off: N/R

PRESSURES: Initial Hydrostatic: 4311.3 psig (29.73 MPa-g)
Final Hydrostatic: Not recorded
Sampling Pressure: -15 to -11.30 psig (-0.10 to -0.08 MPa-g)
Final Shut-in Pressure (pre test chamber): -11.3 psig (-0.08 MPa-g)
Formation Pressure: - psig
Formation Capacity (Kh): -

REMARKS: Test aborted as being tight.

RFT NO: 3 @ 2651.5m KB DATE: 11.7.78

TEST RESULT: Unsuccessful due to possible blocked flowline.

TIMES: Tool Set: 00:00 Tool open: 00:28 Pretest full: Not full
Full after: - Tool off: 02:17

PRESSURES: Initial Hydrostatic: 4315.3 psig (29.75 MPa-g)
Final Hydrostatic: 3943.9 psig (27.19 MPa-g)
Sampling Pressure: -16.90 to -11.8 psig(-9.12 to -0.08 Mpa-g)
Final Shut-in Pressure (pre test chamber): -12.1 psig(-0.08 MPa-g)
Formation Pressure: - psig
Formation Capacity (Kh): -

REMARKS: Test aborted as being tight.

RFT RECORD

RFT NO: 4 @ 2648m KB DATE: 11.7.78

TEST RESULT: Unsuccessful due to possible blocked flowline.

TIMES: Tool Set: 00:00 Tool open: 00:28 Pretest full: Not full

Full after: - Tool off: 02:33

PRESSURES: Initial Hydrostatic: 4311.6 psig (29.73 MPa-g)

Final Hydrostatic: 4314.4 psig (29.75 MPa-g)

Sampling Pressure: -14.1 to-09.2 psig(-0.10 to -0.06 MPa-g)

Final Shut-in Pressure (pre test chamber): -9.2 psig(-0.06 MPa-g)

Formation Pressure: - psig

Formation Capacity (Kh): -

REMARKS: Test aborted as being tight.

RFT NO: 5 @ 2622.3m KB DATE: 11.7.78

TEST RESULT: Unsuccessful due to possible blocked flowline.

TIMES: Tool Set: 00:00 Tool open: 00:25 Pretest full: Not full

Full after: - Tool off: 02:44

PRESSURES: Initial Hydrostatic: 4274.3 psig (29.47 MPa-g)

Final Hydrostatic: 4275.4 psig (29.48 MPa-g)

Sampling Pressure: -10.8 to-08.4 psig (-.074 to -0.058 MPa-g)

Final Shut-in Pressure (pre test chamber): -8.5 psig (-0.059 MPa-g)

Formation Pressure: - psig

Formation Capacity (Kh): -

REMARKS: Test was aborted and flowline blockage suspected.

RFT NO: 6 @ 2621.8m KB DATE: 11.7.78

TEST RESULT: Unsuccessful due to possible flowline blockage.

TIMES: Tool Set: 00:00 Tool open: 00:34 Pretest full: Not full

Full after: - Tool off: 01:36

PRESSURES: Initial Hydrostatic: 4273.0 psig (29.46 MPa-g)

Final Hydrostatic: 4274.7 psig (29.47 MPa-g)

Sampling Pressure: -14.4 to -7.2 psig (-0.099 to -0.049 MPa-g)

Final Shut-in Pressure (pre test chamber): -7.2 psig(-0.50 MPa-g)

Formation Pressure: - psig

Formation Capacity (Kh): -

REMARKS: Test was aborted and flowline blockage suspected.

RFT RECORD

RFT NO: 7 @ 2610.5m KB DATE: 11.7.78

TEST RESULT: Unsuccessful due to possible flowline blockage.

TIMES: Tool Set: 00:00 Tool open: 00:31 Pretest full: Not full
Full after: - Tool off: 01:32

PRESSURES: Initial Hydrostatic: 4255.6 psig (29.34 MPa-g)
Final Hydrostatic: 4256.7 psig (29.35 MPa-g)
Sampling Pressure: -11.6 to -7.6 psig (-0.079 to -0.052 MPa-g)
Final Shut-in Pressure (pre test chamber): -7.6 psig (-0.052 MPa-g)
Formation Pressure: - psig
Formation Capacity (Kh): -

REMARKS: Test was aborted and flowline blockage suspected.

RFT NO: 8 @ 2577m KB DATE: 11.7.78

TEST RESULT: Unsuccessful due to possible flowline blockage.

TIMES: Tool Set: 00:00 Tool open: 00:31 Pretest full: Not full
Full after: - Tool off: 01:55

PRESSURES: Initial Hydrostatic: 4198.5 psig (28.95 MPa-g)
Final Hydrostatic: 4200 psig (28.96 MPa-g)
Sampling Pressure: -7.4 to -7.2 psig (-0.051 to -0.049 MPa-g)
Final Shut-in Pressure (pre test chamber): -7.2 psig (-0.050 MPa-g)
Formation Pressure: - psig
Formation Capacity (Kh): -

REMARKS: Test was aborted after several attempts at partially closing and opening the pretest chamber to clear any blockage.

RFT NO: 9 @ 2565m KB DATE: 11.6.78

TEST RESULT: Unsuccessful due to possible flowline blockage.

TIMES: Tool Set: 00:00 Tool open: 00:32 Pretest full: Not full
Full after: - Tool off: N/R

PRESSURES: Initial Hydrostatic: 4179.1 psig (28.81 MPa-g)
Final Hydrostatic: Not recorded
Sampling Pressure: -10.5 to -8.3 psig (-0.072 to -0.057 MPa-g)
Final Shut-in Pressure (pre test chamber): -8.3 psig (first set) (-0.057 MPa-g)
Formation Pressure: - psig
Formation Capacity (Kh): -

REMARKS: Test was aborted after four attempts at resetting the tool still gave negative pretest pressures (2565m - chosen as cleanest zone in 2552-2579m sand).

RFT RECORD

RFT NO: 10 @ 2555m KB DATE: 11.7.78

TEST RESULT: Unsuccessful due to possible blocked flowline.

TIMES: Tool Set: 00:00 Tool open: 00:32 Pretest full: Not full
Full after: - Tool off: 02:22

PRESSURES: Initial Hydrostatic: 4160 psig (28.68 MPa-g)
Final Hydrostatic: 4161.6 psig (28.69 MPa-g)
Sampling Pressure: -13.1 to -8.1 psig (-0.090 to -0.056 MPa-g)
Final Shut-in Pressure (pre test chamber): -8.1 psig (first set) (-0.056 MPa-g)
Formation Pressure: - psig
Formation Capacity (Kh): -

REMARKS: Test was aborted after one attempt was made at partially retracting and setting the tool with no success.

RFT NO: 11 @ 2505m KB DATE: 11.7.78

TEST RESULT: Unsuccessful due to possible blocked flowline.

TIMES: Tool Set: 00:00 Tool open: 00:33 Pretest full: Not full
Full after: - Tool off: 06:18

PRESSURES: Initial Hydrostatic: 4076.8 psig (28.11 MPa-g)
Final Hydrostatic: 3894.3 psig (26.85 MPa-g) (not valid as tool plugged)
Sampling Pressure: -14.7 to -11.1 psig (-0.089 to -0.077 MPa-g)
Final Shut-in Pressure (pre test chamber): -9.3 psig (first set) (-0.064 MPa-g)
Formation Pressure: - psig
Formation Capacity (Kh): -

REMARKS: Test was aborted after tool was retracted and reset twice with preset pressures still negative. Final hydrostatic low to expected pressure indicating flowline had become plugged.

RFT NO: 12 @ 2487m KB DATE: 11.7.78

TEST RESULT: Unsuccessful due to possible flowline blockage.

TIMES: Tool Set: 00:00 Tool open: 04:09 Pretest full: Not full
Full after: - Tool off: 04:57

PRESSURES: Initial Hydrostatic: 3870.7 psig (26.69 MPa-g) (not steady)
Final Hydrostatic: 3699.1 psig (23.50 MPa-g) (full pressure not recorded)
Sampling Pressure: -12.5 to -10.7 psig (-0.086 to -0.074 MPa-g)
Final Shut-in Pressure (pre test chamber): -10.7 psig (-0.074 MPa-g)
Formation Pressure: - psig
Formation Capacity (Kh): -

REMARKS: Pretest pressure negative indicating tool still malfunctioning. Retracted and reset tool several times. Hydrostatic pressure returned to normal indicating tool unplugged.

RFT RECORD

RFT NO: 13 @ 2486.3m KB DATE: 11.7.78

TEST RESULT: Unsuccessful due to possible flowline blockage

TIMES: Tool Set: 00:00 Tool open: 00:29 Pretest full: Not full

Full after: - Tool off: N/R

PRESSURES: Initial Hydrostatic: 4047.2 psig (27.90 MPa-g)

(Hewlett Packard) Final Hydrostatic: Not recorded

Sampling Pressure: -3.2 to -0.9 psig (-0.022 to-0.006 MPa-g)

Final Shut-in Pressure (pre test chamber): -0.9 psig (first set) (-0.006 MPa-g)

Formation Pressure: - psig

Formation Capacity (Kh): -

REMARKS:

RFT NO: 14 @ 2473m KB DATE: 11.7.78

TEST RESULT: Unsuccessful due to possible flowline blockage

TIMES: Tool Set: 00:00 Tool open: 00:30 Pretest full: Not full

Full after: - Tool off: N/R

PRESSURES: Initial Hydrostatic: 4025.5 psig (27.76 MPa-g)

Final Hydrostatic: Not recorded

Sampling Pressure: -15.4 psig -0.0106 MPa-g)

Final Shut-in Pressure (pre test chamber): N/R psig

Formation Pressure: - psig

Formation Capacity (Kh): -

REMARKS: Test was aborted after several resets were attempted with negative pretest chamber pressures still recorded. Then P.O.H.; Inspection of tool on surface showed no obvious plugging of pretest chamber. Prepared F.I.T. to run.

RFT NO: _____ @ _____ KB DATE:

TEST RESULT:

TIMES: Tool Set: _____ Tool open: _____ Pretest full: _____

Full after: _____ Tool off: _____

PRESSURES: Initial Hydrostatic: _____ psig

Final Hydrostatic: _____

Sampling Pressure: _____ psig

Final Shut-in Pressure (pre test chamber): _____ psig

Formation Pressure: _____ psig

Formation Capacity (Kh): _____

REMARKS:

ANALYSIS OF FORMATION INTERVAL TESTS - FORTESCUE-1

Designation	Depth (KB)	Details
FIT-1	2652m	Recovered: 20.8 litres of filtrate. Zero surface pressure. Pressures (Hewlett Packard): Initial hydrostatic 4315.4 psig. Sampling pressure3339.7-3254.7psig. Final shut in pressure:3702.7psig. Final hydrostatic: 4305 psig. Formation pressure: 3705.2 psig Formation capacity (Kh): 76 md-ft The tool was opened for 12 mins 45 sec and was full after 8 mins 44 sec. The segregator was opened for 2 min 39 sec and was full after 19 secs. Test was valid.
FIT-2	2565m	Recovered: 19.7 litres of filtrate/formation water. Zero surface pressure. Pressures (Hewlett Packard): Initial hydrostatic: 4172 psig. Sampling pressure:3511-3516 psig. Final shut-in pressure:3509.5 psig Final hydrostatic pressure: 3954 psig Formation pressure: 3589.1 psig Formation capacity (Kh): 366 md-ft The tool was opened for 13 mins 49 secs and was full after 7 mins 50 secs. The segregator was opened for 2 mins 14 secs and was full after 8 secs. Test was valid.
FIT-3	2418.5m	Recovered: No recovery. Zero surface pressure. Pressures (Hewlett Packard): Initial hydrostatic: 3940.2 psig. Sampling pressure: 4-11 psia. Final hydrostatic 3943.9 psig. Tool was opened for 8 mins 54 secs and did not fill up. On opening tool, pressure dropped to a minimum of 4 psia, then increased very slowly (10-109 sec/psi) indicating a tight test. Main chamber and segregator were sealed but flow-line pressure only reached a maximum of 30.5 psia after. 2 mins 16 secs. Test valid but zone tight.
RFT 1	2505 m	Recovered: Sample chamber not opened due to tool malfunction. Pressures: Initial hydrostatic:4084.7psig (Sampling pressure 3522.7-3510 psig). Final shut in pressure (pre test chamber): 3523 psig. Formation Pressure: 3523 psig Formation capacity (Kh): 78 md-ft. Pretest chamber was full 19 secs after setting and an attempt to open main chamber failed due to cable malfunction.
RFT-2	2652m	Pressures: Initial hydrostatic 4311.3 psig, Pretest chamber: pressure dropped to minimum of -- 15 psig on setting. Final hydrostatic: Not recorded. On opening pretest chamber pressure dropped to a minimum of -15 psig in 31 sec. after 1 min 38 sec, pressure was still negative and almost static. Test was then aborted as being tight.

Designation	Depth (KB)	Details
RFT-3	2651.5m	Pressures: Initial hydrostatic: 4315.3 psig. Pretest chamber: pressure dropped to minimum of -16.9 psig on setting. Final hydrostatic: 4317.7psig. On opening pretest chamber pressure dropped to a minimum of - 31.6 psig in 27 sec, and after 1 min 53 sec pressure was still negative -0.09 psig. Test was then aborted as being tight.
RFT-4	2648m	Pressures: Initial hydrostatic: 4311.6 psig. Pretest chamber: pressure dropped to minimum of -14.1 psig on setting. Final hydrostatic: 4314.4 psig. On opening tool pressure dropped to a minimum of -14.1 psig after 21 sec, and after 37 sec. pressure was still negative - 1.1 psig. Tool was then retracted and reset but Pressure remained negative (-10.8 psig minimum) and toolwas retracted 2 min 37 sec. after commencing test.
RFT-5	2622.3m	Pressures: Initial hydrostatic: 4274.3 psig. Pretest chamber: Pressure dropped to minimum of -10.8 psig. Final hydrostatic: 4275.4 psig. On opening tool pressure dropped to a minimum of -10.8 psig in 26 secs, and after 1 min pressure was still negative -0.6 psig. Tool was then retracted and reset but pressure remained negative (-9.9 psig), and tool was retracted 2 min 44 sec. after commencing test.
RFT-6	2621.8m	Pressures: Initial hydrostatic: 4273.0 psig. Pretest chamber: Pressure dropped to minimum of -10.4 psig. Final hydrostatic: 4274.7 psig. On opening tool pressure dropped to a minimum of -10.4 psig in 16 secs, and after 1 min. 5 sec. pressure was still negative (-3. psig) and tool was then retracted.
RFT-7	2610.5m	Pressures: Initial hydrostatic: 4255.6 psig. Pretest chamber: Pressure dropped to minimum of -11.6 psig. Final hydrostatic: 4256.7 psig. On opening tool pressure dropped to a minimum of -11.6 psig in 16 secs, and after 49 secs pressure was still negative (-0.08 psig) and tool was then retracted.
RFT-8	2577m	Pressures: Initial hydrostatic 4198.5 psig. Pretest chamber: pressure dropped to minimum of - 7.4 psig. Final hydrostatic: 4200 psig. On opening tool pressure dropped to minimum of -7.4 psig after 14 secs and several attempts were made at partially closing and opening the pretest chamber to try to clear any blockage. 1 min 21 secs after commencing test the pretest chamber was fully open again, however pressure remained negative (-8.3 psig). Tool was retracted 1 min 59 secs after commencing test.

Designation	Depth (KB)	Details
RFT-9	2565m	Pressures: Initial hydrostatic: 4179.1 psig. Pretest chamber: pressure dropped to a minimum of -10.5 psig. Final hydrostatic: not recorded. On opening tool pressure dropped to minimum of-10.5 psig after 20 secs. Four attempts were made at resetting the tool with negative pressures still recorded on opening pretest chamber.
RFT-10	2555m	Pressures: Initial hydrostatic: 4160 psig. Pretest chamber: pressure dropped to a minimum of -13.1 psig. Final hydrostatic: 4161.6 psig. On opening tool pressure dropped to a minimum of -13.1 psig after 16 secs. 51 secs after opening pressure was still negative (-8.1 psig) and one attempt was made at partially retracting and setting the tool, however pressure remained negative and tool was retracted.
RFT-11	2505m	Pressures: Initial hydrostatic: 4076.8 psig Pretest Chamber: Pressure dropped to a minimum of -14.2 psig onsetting. Final hydrostatic: 3894.3 psig (not valid as tool plugged). On opening tool pressure dropped to a minimum of -14.2 psig after 17 secs. 1 min. 15 secs after opening pressure was still negative (-10.3 psig). Tool was retracted and reset twice however pretest pressures remained negative. The final hydrostatic pressure of 3879.6 psig was below expected hydrostatic indicating tool had become partially plugged.
RFT-12	2487m	Pressures: Initial hydrostatic:3870.7psig (not steady). Pretest chamber: Pressure dropped to minimum of -12.5 psig. Final hydrostatic: 3699.1 psig. (not full pressure). Tool was partially opened and pressure dropped to a minimum of 350.1 psig after 7 secs. On opening tool fully pressure dropped to a minimum of -12.5 psig, indicating tool still malfunctioning. Retracted and set tool several times with negative pretest pressures still recorded.
RFT-13	2486.3m	Pressures: Initial hydrostatic: 4047.2 psig. Pretest chamber: pressure dropped to a minimum of -3.2 psig. Final hydrostatic: not recorded. On opening tool pressure dropped to a minimum of -3.2 psig in 22 secs. After 1 min. 35 secs. the tool was retracted and set several times with negative pretest pressures still recorded. Test was then aborted.
RFT-14	2473m	Pressures: Initial hydrostatic: 4025.5psig. Pretest chamber: pressure dropped to a minimum of -15.4 psig. Final hydrostatic: not recorded. On opening tool pressure dropped to a minimum of -15.4 psig in 18 secs. Several tests were attempted with negative pretest pressures still recorded. The main sample chamber was then opened however negative pressure indicated no flow and tool was retracted.

ENCLOSURE

PE902753

This is an enclosure indicator page.
The enclosure PE902753 is enclosed within the container PE902752 at this location in this document.

The enclosure PE902753 has the following characteristics:

ITEM_BARCODE	= PE902753
CONTAINER_BARCODE	= PE902752
NAME	= Structure Map Top of Latrobe Group
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= SEISMIC
SUBTYPE	= HRZN_CONTR_MAP
DESCRIPTION	= Structure Map Top of Latrobe Group. Plate 2 of WCR.
REMARKS	=
DATE_CREATED	= 31/08/1978
DATE_RECEIVED	=
W_NO	= W702
WELL_NAME	= Fortescue-1
CONTRACTOR	= ESSO
CLIENT_OP_CO	= ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902754

This is an enclosure indicator page.
The enclosure PE902754 is enclosed within the container PE902752 at this location in this document.

The enclosure PE902754 has the following characteristics:

ITEM_BARCODE	= PE902754
CONTAINER_BARCODE	= PE902752
NAME	= Time Structure Map Top of Latrobe Group
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= SEISMIC
SUBTYPE	= HRZN_CONTR_MAP
DESCRIPTION	= Time Structure Map Top of Latrobe Group. Plate 1 of WCR.
REMARKS	=
DATE_CREATED	= 31/08/1978
DATE_RECEIVED	=
W_NO	= W702
WELL_NAME	= Fortescue-1
CONTRACTOR	= ESSO
CLIENT_OP_CO	= ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902755

This is an enclosure indicator page.
The enclosure PE902755 is enclosed within the container PE902752 at this location in this document.

The enclosure PE902755 has the following characteristics:

ITEM_BARCODE	= PE902755
CONTAINER_BARCODE	= PE902752
NAME	= Structural Cross Section Fortescue-West Halibut-Halibut
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= WELL
SUBTYPE	= CROSS_SECTION
DESCRIPTION	= Structural Cross Section Fortescue-West Halibut-Halibut. Plate 3 of WCR.
REMARKS	=
DATE_CREATED	= 31/08/1978
DATE_RECEIVED	=
W_NO	= W702
WELL_NAME	= Fortescue-1
CONTRACTOR	= ESSO
CLIENT_OP_CO	= ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902756

This is an enclosure indicator page.
The enclosure PE902756 is enclosed within the container PE902752 at this location in this document.

The enclosure PE902756 has the following characteristics:

ITEM_BARCODE	= PE902756
CONTAINER_BARCODE	= PE902752
NAME	= Sonic Calibration Curve
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= WELL
SUBTYPE	= VELOCITY_CHART
DESCRIPTION	= Sonic Calibration Curve. Enclosure 5 of WCR.
REMARKS	=
DATE_CREATED	= 10/07/1978
DATE_RECEIVED	=
W_NO	= W702
WELL_NAME	= Fortescue-1
CONTRACTOR	= ESSO
CLIENT_OP_CO	= ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902757

This is an enclosure indicator page.
The enclosure PE902757 is enclosed within the container PE902752 at this location in this document.

The enclosure PE902757 has the following characteristics:

ITEM_BARCODE	= PE902757
CONTAINER_BARCODE	= PE902752
NAME	= Time Depth Curve
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= WELL
SUBTYPE	= VELOCITY_CHART
DESCRIPTION	= Time Depth Curve. Enclosure 4 of WCR.
REMARKS	=
DATE_CREATED	= 05/09/1978
DATE_RECEIVED	=
W_NO	= W702
WELL_NAME	= Fortescue-1
CONTRACTOR	= ESSO
CLIENT_OP_CO	= ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902758

This is an enclosure indicator page.
The enclosure PE902758 is enclosed within the container PE902752 at this location in this document.

The enclosure PE902758 has the following characteristics:

ITEM_BARCODE	= PE902758
CONTAINER_BARCODE	= PE902752
NAME	= Drilling History Curve
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= WELL
SUBTYPE	= DIAGRAM
DESCRIPTION	= Drilling History Curve. Enclosure 6 of WCR.
REMARKS	=
DATE_CREATED	= 19/04/1978
DATE_RECEIVED	=
W_NO	= W702
WELL_NAME	= Fortescue-1
CONTRACTOR	= ESSO
CLIENT_OP_CO	= ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE601419

This is an enclosure indicator page.
The enclosure PE601419 is enclosed within the container PE902752 at this location in this document.

The enclosure PE601419 has the following characteristics:

ITEM_BARCODE	= PE601419
CONTAINER_BARCODE	= PE902752
NAME	= Well Completion Log
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= WELL
SUBTYPE	= COMPLETION_LOG
DESCRIPTION	= Well Completion Log. Enclosure 7 of WCR.
REMARKS	=
DATE_CREATED	= 31/08/1978
DATE_RECEIVED	=
W_NO	= W702
WELL_NAME	= Fortescue-1
CONTRACTOR	= ESSO
CLIENT_OP_CO	= ESSO

(Inserted by DNRE - Vic Govt Mines Dept)