

WELL COMPLETION REPORT
WEST HALIBUT-1
(W706)

**ESSO EXPLORATION AND PRODUCTION
AUSTRALIA INC.**

Rec'd 9-4-79

WELL COMPLETION REPORT

WEST HALIBUT-1

W706

GIPPSLAND BASIN - VICTORIA

OIL and GAS DIVISION

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ESSO AUSTRALIA LTD.
COMPLETION REPORT

1. WELL DATA RECORD

LOCATION

WELL NAME WEST HALIBUT-1	STATE VICTORIA	PERMIT or LICENCE VIC/L5	GEOLOGICAL BASIN GIPPSLAND	FIELD NFWC
CO-ORDINATES LATITUDE 38° 24' 13.28"S LONGITUDE 148° 16' 56.85"E X 611 978.97E Y 5 748 600.00N		MAP PROJECTION AMG-AGD ZONE 55	GEOGRAPHICAL LOCATION APPROXIMATELY 2.8 KMS DJE WEST OF HALIBUT PLATFCM.	
<u>ELEVATIONS & DEPTHS</u>				
ELEVATIONS Ground RKB to SB93.3M KB RKB to SL 25m RT Water Depth 68.3m	WATER DEPTH 68.3m	TOTAL DEPTH MEASURED DEPTH 2577.4m	Average Angle VERTICAL	
	PLUG BACK DEPTH #3 Cement plug Top 700m	REASONS FOR PLUGGING BACK PLUG AND ABANDON		
DEPART SEAHORSE-1: 02:30, 2/9/78 ARRIVE WEST HALIBUT-1: FIRST ANCHORS SET: <u>DATES</u> 12:30, 2/9/78				
MOVE IN FIRST ANCHOR 12:30 HOURS, 2 SEPT., 1978	RIG UP 21½ HOURS	SPUDED 10:00 HOURS, 3 SEPT., 1978		
RIG DOWN COMPLETE 03:10 HOURS, 27 SEPT., 1978	RIG RELEASED 03:15 HOURS, 27TH SEPT., 1978	PRODUCTION UNIT - RIG UP N/A		
PRODUCTION UNIT - RIG DOWN N/A	INITIAL PRODUCTION ESTABLISHED N/A			
<u>MISCELLANEOUS</u>				
OPERATOR ESSO AUSTRALIA LTD	PERMITTEE or LICENCEE ESSO EXPLORATION PRODUCTION AUSTRALIA INC., HEMATITE PETROLEUM PTY. LTD	ESSO INTEREST 50% OTHER INTEREST HEMATITE PETROLEUM PTY. LTD 50%		
CONTRACTOR AUSTRALIAN ODECO PTY. LTD.	RIG NAME "OCEAN ENDEAVOUR"	EQUIPMENT TYPE SEMI SUBMERSIBLE		
TOTAL RIG DAYS 26	DRILLING AFE NO. 5-238-007	COMPLETION NO. N/A	TYPE COMPLETION N/A	
LAHEE WELL	Before Drilling	STEP OUT		
CLASSIFICATION	After Drilling	NEW FIELD DISCOVERY WELL		

2. CASING - LINER - TUBING RECORD

Type	Size mm (in.)	Weight Kg/m lb/ft.	Grade	Thread	No. Joints	Depth m (ft.)
PILE JOINT	60.96m (24")	92.63 (670m)	-	CC	1	96.74 (317.39)
CONDUCTOR	50.80m (20")	12.96 (94m)	X-52	JV	11	239.46 (785.63)
SURFACE	33.97m (13 ³ / ₈ ")	7.54m (54.5m)	K-55	BUTT	64	862.00 2828.08)
PRODUCTION	24.45 (9 ⁵ / ₈ ")	6.50 (47m)	N-80	BUTT	212	2557.14 (8391.21)

3. CEMENT RECORD

String	50.80mm 20"		33.97mm 13 ³ / ₈ "		24.45mm 9 ⁵ / ₈ "	
Type of Cement	AUST 'N' neat + 12% gel	AUST 'N' NEAT	AUST 'N' neat + fresh water	AUST 'N' neat + sea water	AUST 'N' neat + 12% gel	AUST 'N' NEAT
Slurry Volume m ³ (ft ³)	42.25 (1501.50)	11.55 (413.00)	23.93 (855.50)	7.92 (283.20)	11.70 (415.80)	26.66 (953.44)
Slurry Density S.G. (ppg)	1.45 (12.1)	1.87 (15.6)	1.87 (15.6)	1.87 (15.6)	1.45 (12.1)	1.87 (15.6)
Cement Top	Sea floor		405m (1329 ft.)		1800m (5906m)	
Casing Tested Kpa (psi)	3.45 x 10 ³ (500)		10.34 x 10 ³ (1500)		13.79 x 10 ³ (2000)	
Number of Centralizers	5		8		23	
Number of Scratchers						
Stage Collar						
Remarks						

4X. CEMENT PLUGS

Plug	1	2
Cement Type	AUST 'N' Neat with 0.2% HR-4 retarder.	AUST 'N' neat + fresh water.
Slurry Volume m ³ (ft ³)	6.40 (228.92)	3.76 (134.52)
Slurry Density S.G. (ppg)	1.87 (15.6)	1.87 (15.6)
Cement Base	2350m	800m
Cement Top	2216m	700m
Remarks		

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K. 4. SAMPLES, CONVENTIONAL CORES, SIDEWALL CORES.			
INTERVAL	TYPE	INTERVAL	TYPE
229m-1190m	<u>CUTTINGS SAMPLES</u> 5 sets of 10 metre washed and dried and one set unwashed. 5 sets of 5 metre washed and dried, and one set unwashed.	<u>SIDEWALL CORES</u> RUN 1 860m-240m RUN 2 2565m-880m RUN 3 2385m-1826.8m RUN 4 2381m-1121.6m	Recovered 29/30 " 49/51 " 20/30 " 19/26
1190m-2577m		30 metre intervals of unwashed canned samples.	<u>CONVENTIONAL CORES</u> 1. 2387m-2400.3m 2. 2400.3m-2413.0m 3. 2413.0m-2424.8m 4. 2425.0m-2436.6m 5. 2436.6m-2438.8m 6. 2444.0m-2457.0m

K. 5. WIRELINE LOGS AND SURVEYS

Type & Scale	From To	Type & Scale	From To
ISF-Sonic 1:200 1:500		FIT _a	2433
RUN 1	229m-874m	FIT _#	2430.5
RUN 2 (MSFL incl.)	861.5m-2567m	FIT ₅	2392
FDC-Gr 1:200 1:500		FIT ₆	
RUN 1	228.5m-873.5m	RFT ₁₃	
RUN 2 (CNL incl.)	861m-2568m	RFT ₁₅	
HDT 1:100	861m-2568m		
VELOCITY SURVEY	21 intervals 44 shots		

SUMMARY OF FORMATION TEST PROGRAMME

WEST HALIBUT-1

TEST	SEAT	DEPTH (METRES) K. B.	CHAMBER	RECOVERY (LITRES)					HEWLETT-PACKARD FORMATION PRESSURE		HEWLETT-PACKARD HYDROSTATIC PRESSURE		HORIZONTAL PERMEABILITY	REMARKS
				OIL	COND.	GAS	FORMATION WATER	FILTRATE	MPag	Psig	MPag	Psig	millidarcys	
RFT 2	20	2485m	PRETEST						23.85	3459.11	27.88	4043.84		
	21	2469m	"						-	-	27.67	4012.84		Seal failure.
	22	2469m	"						23.65	3430.24	27.67	4012.84		
	23	2456m	"						23.53	3412.18	27.53	3993.12		
	24	2448.5m	"						23.46	3402.71	27.44	3979.13		
	25	2439m	"						23.52	3410.90	27.32	3963.03		
	26	2435m	"						-	-	27.29	3957.42		Dry test.
	27	2435.5m	"						-	-	27.29	3958.64		Seal failure.
	28	2434.5m	"						-	-	27.28	3956.66		Dry test.
	29	2432m	"						23.48	3404.94	27.25	3952.71		
	30	2415m	"						23.35	3386.68	27.06	3925.42		
	31	2390m	"						23.17	3360.37	26.80	3886.56		

SUMMARY OF FORMATION TEST PROGRAMME

WEST HALIBUT-1

FORMATION INTERVAL TESTER

TEST	SEAT	DEPTH (METRES) K. B.	CHAMBER	RECOVERY (LITRES)					HEWLETT-PACKARD FORMATION PRESSURE		HEWLETT-PACKARD HYDROSTATIC PRESSURE		HORIZONTAL PERMEABILITY	REMARKS
				OIL	COND.	GAS	FORMATION WATER	FILTRATE	MPag	Psig	MPag	Psig	millidarcys	
														H.P. GAUGE NO. 319
FIT1		2433m	M	2.5	-	-	2	10	(?) 27.36	(?) 3968.63	-	-	-	Seal failure. Oil test.
					6 litres oil/filtrate emulsion									
FIT2		2430.5m	M	7.5	-	72.2	-	14	23.39	3392.46	27.26	3954.2	2170	Oil test.
FIT3		2423.5m	M	3.25	-	-	-	16	-	-	27.17	3940.16	-	Seal failure-Oil test.
FIT4		2439m	M	-	-	-	21	-	23.46	3402.56	27.29	3957.53	520	Water test.
FIT5		2392m	M	17	-	158.6	-	2	23.12	3353.65	26.78	3884.70	940	Gas and oil test.
FIT6		2405m	M	12	-	150.1	-	6.5	23.19	3363.40	26.91	3902.27	1380	Gas and oil test.
* M	=	Main chamber												
S	=	Segregator												

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STRATIGRAPHIC TABLE

MM YEARS	EPOCH	SERIES	FORMATION HORIZON	PALYNOLOGICAL	PLANKTONIC	DRILL DEPTH (METRES)	SUBSEA DEPTH (METRES)	THICKNESS (METRES)
				ZONATION SPORE - POLLEN ASSEMBLAGE ZONES A.D. PARTRIDGE / H.E. STACEY	FORAMINIFERAL ZONATIONS D. TAYLOR			
0			SEAFLOOR			93.5	68.3	68.3
0-5	PLEIST PLIO	E L E L E L E L	GIPPSLAND LIMESTONE		A 1			2033.5
					A 2			
					A 3			
					A 4			
5-10	LATE				B 1			
					B 2			
10-15	MIDDLE		ENTRANCE		C			
					D 1			
15-20	EARLY		LAKES		D 2			252
					E 1			
20-25	EARLY				E 2			
					F			
25-30	LATE			<i>P. tuberculatus</i>	G			
					H 1			
30-35	LATE				H 2			
					I 1			
35-40	EARLY		LATROBE GROUP		I 2			
					J 1			
40-45	EARLY		COARSE CLASTICS		J 2		2372	2347
					K			
45-50	LATE			Upper <i>N. asperus</i>				198.5
50-55	MIDDLE			Lower <i>N. asperus</i>				
55-60	EARLY			Upper <i>M. diversus</i>			2374	2349
60-65	LATE		T.D.	Lower <i>M. diversus</i>			2403.7	2478.7
65-70	EARLY			Upper <i>L. balmei</i>			2515	2490
70-75	LATE			<i>T. longus</i>			2577.5	2552.5

DESCRIPTIONS OF LITHOLOGICAL UNITS

WEST HALIBUT-1

<u>DEPTH</u>	<u>%</u>	<u>DESCRIPTION</u>
240m-440m		<p><u>GIPPSLAND LIMESTONE</u> (93.3m-2127m KB)</p> <p><u>Calcarenite</u> - white to light grey, very fine to granule size, predominantly fine to medium, most is moderately well sorted, composed mainly of fossil fragments of forams, coral stems, echinoid spines, bryozoa and shell debris, trace glauconite and carbonaceous flecks. Section contains 5-25%.</p> <p><u>Siltstone</u> - light grey to medium light grey, silt to very fine sand size grains, firm, slightly calcareous, occasional fossil fragments.</p>
440m-650m		<p><u>Packed Micrite</u> - white to light grey, silt size to fine calcareous grains with 25-40% calcareous clay matrix, firm to hard, trace glauconite, trace pyrite. Section contains 5-15%.</p> <p><u>Fossil Fragments</u> - generally loose, forams, coral stems and shell debris.</p>
650m-920m		<p><u>Calcisiltite</u> - white to light grey, mainly silt size with occasional fine grained calcareous grains in a calcareous clay matrix, 15-25% non-calcareous clay to silt fraction, firm to hard, trace glauconite, trace carbonaceous flecks. Section contains trace to 5%.</p> <p><u>Fossil Fragments</u> - loose forams, coral fragments, echinoid spines and shell debris.</p>
920m-1050m		<p>Predominantly <u>Calcarenite</u> - light grey to cream, silt size to very fine with occasional medium grained, moderately sorted, calcareous grains in a calcareous clay matrix, sparry in part, occasional calcite veins, occasional fossil fragments, mainly forams. Interbedded with and gradational to <u>Calcisiltite</u> - trace to 60% of section, light grey to light yellow brown, firm, fossiliferous and, <u>Marl</u> - up to 50% of section, light to medium grey, soft to firm.</p>
1050m-1725m		<p><u>Calcisiltite Grading to and Interbedded with Marl, Minor Sparry Limestone.</u></p> <p><u>Calcisiltite</u> - light grey to yellow grey to yellow brown, soft to firm, 10-30% non-calcareous argillaceous fraction, occasional fossil fragments, mainly forams, trace glauconite, trace pyrite, trace carbonaceous flecks.</p> <p><u>Marl</u> - gradational with <u>Calcisiltite</u>, dominant lithology 1240m-1290m, light grey to medium light grey, soft to firm, estimated 40% non-calcareous clay size fraction, trace carbonaceous material, fossiliferous in part, mainly forams</p> <p><u>Sparry Limestone</u> - pale brown, hard, massive, dolomitic.</p>
1725m-2127m		<p><u>Subequal portions of Calcisiltite and Marl with Marl becoming dominant below 1820 metres.</u></p> <p><u>Calcisiltite</u> - light grey to medium light grey to yellow brown, soft to firm, trace glauconite, trace pyrite, occasional forams, mainly in part, estimated 40% non-calcareous clay to silt fraction.</p> <p><u>Marl</u> - light grey to yellow grey, soft to firm, silty in part, forams common, some replaced by pyrite, estimated 2/.....</p>

DESCRIPTIONS OF LITHOLOGICAL UNITS

WEST HALIBUT-1

<u>DEPTH</u>	<u>%</u>	<u>DESCRIPTION</u>
2127m-2374m		<p><u>Marl Continued/.....</u></p> <p>40-50% non-calcareous clay fraction, trace carbonaceous material, trace glauconite.</p> <p><u>LAKES ENTRANCE FORMATION (2127m-2379m KB)</u></p> <p><u>Marl gradational downward to Calcareous Mudstone</u></p> <p><u>Marl</u> - medium light grey, firm, silty in part, trace pyrite, trace carbonaceous flecks.</p> <p><u>Calcareous Mudstone</u> - light grey to medium light grey to green grey, clay with minor silt size, glauconitic in part increasing toward bottom of section, moderately calcareous, pyritic, trace carbonaceous flecks, occasional forams and skeletal debris.</p>
2374m -2436m		<p><u>LATROBE GROUP (2379m-2577.4m KB)</u></p> <p><u>Sandstone with Minor Siltstone Laminations and Interbeds</u></p> <p><u>Sandstone</u> - light grey to brown, loose to friable, massive to faintly banded with grain size variation making generally horizontal bedding planes, grain size ranges from very fine to occasionally granule size, sorting very poor to good, minor white clay matrix, polished to frosted quartz grains, generally massive, but occasional graded bedding and cross bedding, trace white mica, but locally abundant, trace carbonaceous flecks, trace disseminated pyrite, trace limonite cement near top of section, trace glauconite at top of section, but decreasing to rarity with depths.</p> <p><u>Siltstone</u> - dark grey, firm to hard, very carbonaceous, pyritic, micaceous in part.</p>
2436m-2577.4m		<p><u>Interbedded Sandstone, Siltstone and Coal</u></p> <p><u>Sandstone</u> - white to very light grey, firm to friable, fine to coarse grained, predominantly medium grained, moderate to well sorted, subangular to subrounded, generally clean, but with locally abundant white clay matrix, clear to frosted quartz grains, occasional pyrite.</p> <p><u>Sandstone</u> - loose to very friable (seen predominantly as loose quartz grains in cuttings, medium to very coarse grained, occasional granule size, predominantly coarse grained, moderate to well sorted, clear to frosted quartz grains, rounded to subrounded, trace pyrite as grain coatings.</p> <p><u>Siltstone</u> - light grey, brown to dark brown, firm to hard, carbonaceous flecks and locally abundant coal laminations, white clay matrix, sandy in part, micaceous, pyritic.</p> <p><u>Coal</u> - black, hard, blocky, conchoidal fracture, pyritic.</p>

GEOLOGICAL AND GEOPHYSICAL ANALYSISSTRATIGRAPHY

<u>AGE</u>	<u>UNIT/HORIZON</u>	<u>DEPTH (m)</u>			<u>THICKNESS (m)</u>
		<u>PREDICTED</u>	<u>ACTUAL</u>		
		<u>KB</u>	<u>KB</u>	<u>SUBSEA</u>	
<u>Pliocene/Miocene</u>	Gippsland Limestone	93	93.5	- 68.5	2033.5
<u>Miocene</u>	Base of High Velocity Channel	1723	1695	- 1670	
	Mid-Miocene Marker	2210	2205	- 2180	
<u>Miocene/Oligocene</u>	Lakes Entrance Formation		2127	- 2102	252
<u>Eocene/Paleocene</u>	Latrobe Group	2390	2374	- 2349	203.5+
	M-1.3.1	2520	2512	- 2487	
	Total Depth		2577.5	- 2552.5	

GEOLOGICAL ANALYSIS

West Halibut-1 was drilled as an appraisal well for the following reasons:

1. To confirm the structural interpretation of the Top of Latrobe Group on the western flank of the Halibut field.
2. To evaluate the stratigraphy and reservoir potential of the upper part of the Latrobe Group, which had not been evaluated in the Halibut-A platform wells.
3. To intercept both the original and existing oil/water contacts, in order to determine how much the original contact had risen as a result of Halibut production.

The Latrobe Group section intercepted in West Halibut-1 comprised marginal marine to alluvial plain sediments. These can be correlated well with those in Fortescue-1 to the north-west & Halibut A-12 and A-8 to the south-east.

The uppermost units at Fortescue-1 (F1 and most of F2; see geological cross section) pinch out to the west of West Halibut-1, where the top of Latrobe Group is represented by nearshore marine siltstones and fine grained sandstone of the F3 unit. With depth, the facies progressively change from marginal marine to alluvial plain sandstones, shales and coals.

A 58 metre gross oil column was fully cored. The oil/water contact was not intersected because at 2436 metres the well intersected the M-1.0.0 shale and interbedded coal unit, which is interpreted to be a base seal. Formation pressure data indicate that the M-1.0.0 base seal is any hydraulic barrier which prevents fluid communication between the overlying and underlying sands. The formation pressure above the barrier is about 18 psig greater than below it. Formation pressures in the lower sands equate with Halibut field pressures.

The reservoir sandstones above the M-1.0.0 base seal pinch out up dip from West Halibut-1. Consequently, they were not penetrated by any of the Halibut exploration or development wells.

GEOPHYSICAL ANALYSIS

The West Halibut area is covered by both G74A and G77A seismic data. The Top of Latrobe Group reflector is a well defined, high amplitude event throughout most of the area. However, channelling in the Miocene section causes some problems in precise velocity prediction. As can be seen from the above table, the well came in 16 metres high to prediction at the Top of Latrobe Group (i.e. 1/2% off prediction), indicating that the pre-drill mapping was essentially correct. At the level of the M-1.3.1 marker the discrepancy was only 8 metres. Details of the Time-Depth-Velocity relationships for this well may be found in Appendix 7.

Updated time and depth structure maps to the Top of Latrobe are enclosed. These incorporate the drilling results of both West Halibut-1 and a later well, Fortescue-3 which is 2 kms north-west of West Halibut-1.

APPENDIX - 1

APPENDIX 1

CUTTING SAMPLE DESCRIPTIONS

LITHOLOGICAL DESCRIPTIONS

J.D. ALDER

WEST HALIBUT-1

5/9/78

DEPTH	%	DESCRIPTION
240m-250m	95%	<u>Calcarenite</u> - white, fine to granule size grains, well sorted, predominantly fossil fragments - forams, coral stems, echinoid spines, indeterminate shell debris, and bryozoa.
	5%	<u>Siltstone</u> - light grey, silt to very fine sand size grains, slightly calcareous, occasional fossil inclusions.
		Trace Quartz.
250m-260m	90%	<u>Calcarenite</u> - As above.
		Trace carbonaceous material.
		Trace Glauconite.
	10%	<u>Siltstone</u> - As above, occasionally has thin coating of calcite all over grain.
260m-270m	90%	<u>Calcarenite</u> - As above.
	10%	<u>Siltstone</u> - As above.
270m-280m	85%	<u>Calcarenite</u> - As above.
	15%	<u>Siltstone</u> - As above.
280m-290m	75%	<u>Calcarenite</u> - As above.
	25%	<u>Siltstone</u> - As above.
290m-300m	80%	<u>Calcarenite</u> - As above.
	20%	<u>Siltstone</u> - As above.
300m-310m	80%	<u>Calcarenite</u> - As above.
	20%	<u>Siltstone</u> - As above.
310m-320m		Samples missed drilling too fast.
320m-330m		
330m-340m	70%	<u>Calcarenite</u> - white, fine to granule size grains, well sorted, predominantly fossil fragments - forams, coral stems, echinoid spines, bryozoa and shell debris.
	30%	<u>Siltstone</u> - light grey, silt to very fine sand, slightly calcareous, occasional fossil inclusions, occasionally has thin coating of calcite all over grain.
		Trace carbonaceous material.
340m-350m	70%	<u>Calcarenite</u> - As above.
	30%	<u>Siltstone</u> - As above.
350m-360m	70%	<u>Calcarenite</u> - white, fine to granule size grains, moderately sorted, predominantly fossil fragments - forams, coral stems, and fragments, echinoid spines, bryozoa, shell debris and other indeterminate polished calcareous grains.
	30%	<u>Siltstone</u> - medium light grey to yellow grey, silt to very

LITHOLOGICAL DESCRIPTIONS

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DEPTH	%	DESCRIPTION
350m-360m		Continued/.... fine grains, slightly calcareous, occasionally with very thin calcareous coating. Trace carbonaceous material.
360m-370m	85%	<u>Calcarenite</u> - white to light grey, very fine to granule, predominantly fine to medium grained, moderately sorted, large grains predominantly fossil fragments - corals, forams and shell debris, fine material in calcareous grains in a white calcareous cement. Trace Glauconite.
	15%	<u>Siltstone</u> - As above.
370m-380m	90%	<u>Calcarenite</u> - As above, only about 15% coarse granular grains, remainder very fine to medium grained.
	10%	<u>Siltstone</u> - As above.
380m-390m	85%	<u>Calcarenite</u> - As above.
	15%	<u>Siltstone</u> - As above. Trace Pyrite.
390m-400m	90%	<u>Calcarenite</u> - white to medium light grey, very fine to medium grained, moderately to well sorted. 5% coarse grained fossil fragments, corals, forams and shell debris, fine material in a white calcareous cement (30% of rock) trace glauconite. Trace carbonaceous flecks.
	10%	<u>Siltstone</u> - yellow grey, silt to very fine sand grains, firm, slightly calcareous.
400m-410m	80%	<u>Calcarenite</u> - As above.
	20%	<u>Siltstone</u> - As above.
410m-420m	90%	<u>Calcarenite</u> - As above.
	10%	<u>Siltstone</u> - As above.
420m-430m	95%	<u>Calcarenite</u> - white to light grey, very fine to fine grained, well sorted, angular to subrounded grains. 10% coarse to granule fossil fragments and subangular to subrounded, clear calcite grain Fossil fragments - shell debris and coral fragments occasionally forams. Trace of glauconite and carbonaceous flecks in fine material.
	5%	<u>Siltstone</u> - yellow grey, silt to very fine sand, firm, slightly calcareous.
430m-440m		LOST SAMPLE.
440m-450m	90%	<u>Packed Micrite</u> - white to light grey, very fine to fine grained, calcareous grains in 40% calcareous clay. Trace glauconite and carbonaceous flecks.
		3/....

LITHOLOGICAL DESCRIPTIONS

J.D. ALDER

WEST HALIBUT-1

5/9/78

<u>DEPTH</u>	<u>%</u>	<u>DESCRIPTION</u>
440m-450m		Continued/....
	5%	<u>Siltstone</u> - As above.
	5%	Fossil Fragments loose, coral fragments and shell debris, and polished subangular to subrounded calcite grains, clear to milky.
450m-460m	90%	<u>Packed Micrite</u> - As above.
	5%	Loose Fossil fragments shell debris, coral fragments, echinoid spines, forams and polished calcareous grains.
	5%	<u>Siltstone</u> - As above.
460m-470m	90%	<u>Packed Micrite</u> - As above.
	5%	Loose Fossil fragments - As above.
	5%	<u>Siltstone</u> - As above.
470m-480m		Poor sample large portion being washed away as clay size material.
	90%	<u>Packed Micrite</u> - As above.
	5%	Fossil Fragments - As above.
	5%	<u>Siltstone</u> - As above.
480m-490m		Poor sample. Large portion being washed away as clay.
	90%	<u>Packed Micrite</u> - As above.
	5%	<u>Fossil Fragments</u> - As above.
	5%	<u>Siltstone</u> - As above.
490m-500m		Poor sample.
	90%	<u>Packed Micrite</u> - As above.
	5%	<u>Fossil Fragments</u> - As above.
	5%	<u>Siltstone</u> - As above.
500m-510m		Very poor sample. 80% calcareous clay gumbo. When dissolved in acid, leaves clay-silt residue, about 10%. Remainder of sample mainly loose fossil fragments, forams common, shell debris and coral fragments.
510m-520m		Very poor sample. 50% calcareous gumbo when dissolved in acid leaves 10% clay-silt residue.
	50%	Fossil Fragments predominantly forams.
520m-530m		As above.
530m-540m		LOST SAMPLE.
540m-550m		Very poor sample. 40% calcareous gumbo, as above.
		4/....

LITHOLOGICAL DESCRIPTIONS

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DEPTH	%	DESCRIPTION
540m-550m	40%	Continued/.... <u>Packed Micrite</u> - white to light grey, very fine to fine grained. Calcareous grains in 40% calcareous clay. Trace Glauconite. Trace carbonaceous flecks.
	5%	<u>Siltstone</u> - yellow grey to medium light grey, silt to very fine sand, firm, slightly calcareous.
	15%	Fossil fragments predominantly forams with shell debris and coral fragments.
550m-560m		Poor sample 30% calcareous gumbo.
	55%	<u>Packed Micrite</u> - As above, glauconite abundant.
	5%	<u>Siltstone</u> - As above.
	10%	Fossil Fragments - As above.
560m-570m	95%	<u>Packed Micrite</u> - white to light grey, very fine to fine grained, angular to subrounded, well sorted calcareous grains in 40% calcareous clay matrix, firm to hard.
	5%	Loose fossil fragments - forams, coral stems and shell debris some fragments occasionally incorporated in the micrite. Glauconite common.
570m-580m	95%	<u>Packed Micrite</u> - As above. When dissolved in acid leaves 5% clay-silt residue.
	5%	Loose Fossil fragments - As above. Glauconite common.
580m-590m	100%	<u>Packed Micrite</u> - white to medium light grey, silt to very fine grained, well sorted grains in calcareous clay matrix, hard, when dissolved leaves trace clay-silt residue, trace Glauconite, trace Pyrite. Occasional loose fossil fragments, as above.
590m-600m	100%	<u>Packed Micrite</u> - As above.
600m-610m	100%	<u>Packed Micrite</u> - As above.
610m-620m	100%	<u>Packed Micrite</u> - silt to very fine grained, well sorted grains, 40% in calcareous clay matrix, firm to hard, trace glauconite, trace clay and silt, occasional loose fossil fragments and forams.
620m-630m	100%	<u>Packed Micrite</u> - As above, becoming more silty less clayey.
630m-640m	95%	<u>Packed Micrite</u> - silt to very fine grained in 20% calcareous clay matrix, predominantly silt, firm to hard. Trace glauconite.
		Trace Siltstone, slightly calcareous, yellow grey to pale brown, firm.
	5%	Loose Fossil Fragments, forams, coral stems and shell debris.
		5/....

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DEPTH	%	DESCRIPTION
640m-650m	95%	<u>Packed Micrite</u> - silt to very fine grained in 25% calcareous clay matrix - predominantly silt, firm to hard, trace glauconite trace pyrite. Approximately 20% clay-silt residue after dissolving in acid.
		Trace Siltstone, slightly carbonaceous, as above.
	5%	Loose Fossil Fragments - As above.
650m-660m	100%	<u>Calcisiltite</u> - white to light grey, silt to minor very fine calcareous grains in calcareous clay matrix, predominantly silt, firm to hard, trace glauconite, trace pyrite. Approximately 25% clay silt residue after dissolving in acid occasional fossil fragments, as above.
660m-670m	100%	<u>Calcisiltite</u> - As above.
670m-680m	100%	<u>Calcisiltite</u> - As above.
680m-690m	100%	<u>Calcisiltite</u> - As above.
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690m-700m	94%	<u>Calcisiltite</u> - As above.
	1%	<u>Siltstone</u> -slightly calcareous, yellow brown, firm to hard grains usually have very thin calcareous coating.
	5%	Loose Fossil Fragments - mainly forams, coral fragments, echinoid spines, and shell debris.
700m-710m	95%	<u>Calcisiltite</u> - white to light grey, silt to minor very fine calcareous grains in calcareous clay matrix, firm to hard. Trace glauconite, trace carbonaceous flecks, trace only non-calcareous clay.
	5%	Loose Fossil Fragments - As above.
710m-720m	95%	<u>Calcisiltite</u> - As above. Loose fossil fragments.
720m-730m	100%	<u>Calcisiltite</u> - As above. Occasionally loose fossil fragments.
730m-740m	95%	<u>Calcisiltite</u> - white to light grey, silt with minor very fine calcareous grains in a calcareous clay matrix, firm to hard. Trace glauconite.
	5%	Loose Fossil Fragments - coral fragments, forams and shell debris.
740m-750m	95%	<u>Calcisiltite</u> - As above.
	5%	Loose Fossil Fragments - As above.
750m-760m	95%	<u>Calcisiltite</u> - As above.
	5%	Loose Fossil Fragments - As above.
760m-770m	100%	<u>Calcisiltite</u> - As above. Occasional forams and coral fragments.
770m-780m	95%	<u>Calcisiltite</u> - As above. Approximately 15% residual clay-silt on dissolving in acid.
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<u>DEPTH</u>	<u>%</u>	<u>DESCRIPTION</u>
770m-780m		Continued/....
	5%	Loose Fossil Fragments - As above.
780m-790m	95%	<u>Calcsiltite</u> - white to light grey silt grains in a calcareous clay matrix, firm to hard, insoluble clay silt portion approximately 20%. Trace of glauconite and carbonaceous flecks.
	5%	Loose Fossil Fragments - As above.
790m-800m	95%	<u>Calcsiltite</u> - As above.
	5%	Loose Fossil Fragments - forams, coral fragments and shell debris
800m-810m	100%	<u>Calcsiltite</u> - As above, with occasional fossil fragments, as above.
810m-820m	100%	<u>Calcsiltite</u> - As above.
820m-830m	100%	<u>Calcsiltite</u> - light to medium light grey, calcareous silt grain in calcareous clay matrix, firm to hard, trace glauconite and carbonaceous flecks. 20% insoluble clay-silt residue. Loose fossil fragments of forams and coral stems.
830m-840m	100%	<u>Calcsiltite</u> - As above.
840m-850m	100%	<u>Calcsiltite</u> - As above.
850m-860m	100%	<u>Calcsiltite</u> - As above.
860m-870m	100%	<u>Calcsiltite</u> - As above.
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876m-880m	100%	<u>Calcareous Siltstone</u> - yellow grey, coarse, silty, slightly calcareous, firm to hard, trace carbonaceous flecks.
880m-890m		Very poor sample. Mostly clay which is being washed away.
	50%	<u>Marl</u> - medium light grey, soft to firm, very calcareous, trace carbonaceous flecks.
	50%	<u>Calcareous Siltstone</u> - As above.
890m-900m		Very poor sample. Mostly clay.
	50%	<u>Marl</u> - medium light grey, soft to firm, very calcareous, trace carbonaceous flecks.
	50%	<u>Calcareous Siltstone</u> - yellow grey, coarse, silty, slightly calcareous, firm to hard, trace carbonaceous flecks. Trace forams.
900m-910m		Very poor sample. Mostly clay.
	50%	<u>Marl</u> - As above.
	50%	<u>Calcareous Siltstone</u> - As above.
910m-920m		Very poor sample. Mostly clay, which is being washed away.
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DEPTH	%	DESCRIPTION
910m-920m		Continued/....
	50%	<u>Marl</u> - As above.
	50%	<u>Calcareous Siltstone</u> - As above.
920m-930m	100%	<u>Calcareenite</u> - light grey to cream, firm to hard, fine to medium, angular to subrounded, poor to moderately sorted, calcareous grains in a calcareous clay matrix - sparry in part. Some veins of calcite, occasional forams, trace carbonaceous flecks.
930m-940m	100%	<u>Calcareenite</u> - light grey to yellow brown, firm to hard, silty to very fine, moderately sorted, calcareous grains in a calcareous clay matrix - sparry in part. Some veins of calcite, occasional fossil fragments - forams.
940m-950m	98%	<u>Calcareenite</u> - light grey, silty to very fine, firm to hard, moderately sorted, calcareous grains.
	1%	<u>Sparry Limestone</u>
	1%	Fossil Fragments - forams, coral stems.
950m-960m	60%	<u>Calcsiltite</u> - light grey, firm, very calcareous, fossiliferous - forams, coral stems. Poor sample large amount of clay.
	40%	<u>Calcareenite</u> - As above.
960m-970m	100%	<u>Calcsiltite</u> - As above. Very poor sample, mostly clay.
970m-980m	60%	<u>Calcsiltite</u> - As above.
	40%	<u>Marl</u> - medium light grey, soft to firm, very calcareous.
980m-990m	50%	<u>Calcsiltite</u> - As above.
	50%	<u>Marl</u> - As above. Poor sample, mostly clay.
990m-1000m	50%	<u>Calcareenite</u> - white to medium light grey, firm, silty to very fine, moderately sorted, calcareous grains in calcareous clay matrix.
	50%	<u>Marl</u> - As above.
1000m-1010m	5%	<u>Limestone</u> - crystalline, brown, hard.
	65%	<u>Calcsiltite</u> - light yellow brown, firm, very calcareous.
	25%	<u>Calcareenite</u> - white to light yellow brown, firm, very fine grains moderately sorted.
	5%	Loose Fossil Fragments, forams and coral stems.
1010m-1020m	70%	<u>Calcareenite</u> - As above.
	30%	<u>Calcsiltite</u> - As above. Occasional loose fossil fragments - forams and crystalline Limestone.
1020m-1030m	60%	<u>Calcareenite</u> - As above.
	40%	<u>Calcsiltite</u> - As above.
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DEPTH	%	DESCRIPTION
1030m-1040m	75%	<u>Calcarenite</u> - white to yellow brown, firm to hard, very fine grained, moderately sorted, fossiliferous - forams.
	25%	<u>Marl</u> - light to medium grey, soft to firm, very calcareous.
1040m-1050m	60%	<u>Calcisiltite</u> - medium light grey to light yellow brown, firm, very calcareous.
	40%	<u>Calcarenite</u> - As above. Occasional loose fossil fragments, mainly forams.
1050m-1060m	100%	<u>Calcisiltite</u> - As above.
1060m-1070m	90%	<u>Calcisiltite</u> - As above.
	5%	<u>Marl</u> - medium light grey, soft to firm, very calcareous.
	5%	<u>Sparry Limestone</u> - pale brown, hard, massive, dolomitic.
1070m-1080m	85%	<u>Calcisiltite</u> - As above.
	5%	<u>Marl</u> - As above.
	10%	<u>Sparry Limestone</u> - As above.
1080m-1090m	90%	<u>Calcisiltite</u> - As above.
	5%	<u>Marl</u> - As above.
	5%	<u>Sparry Calcite</u> - As above.
1090m-1110m	90%	<u>Calcisiltite</u> - As above.
	10%	<u>Marl</u> - As above. Loose fossil fragments common, mainly forams.
1110m-1120m	100%	<u>Calcisiltite</u> - light grey to yellow grey, firm, very calcareous approximately 10% residual clay undissolved in HCL. Trace Pyrite. Trace Glauconite. Loose fossil fragments common mainly forams.
1120m-1130m	90%	<u>Calcisiltite</u> - As above.
	5%	<u>Marl</u> - medium light grey, soft to firm, very calcareous.
	5%	<u>Sparry Limestone</u> - white to pale brown, hard, massive. Loose fossil fragments, common mainly forams and coral stems.
1130m-1140m		Sample quality much better, very little clay.
	100%	<u>Calcisiltite</u> - fine, silt, yellow to grey, medium to light grey, firm, very calcareous.
1140m-1150m	100%	<u>Calcisiltite</u> - As above.
1150m-1160m	100%	<u>Calcisiltite</u> - very fine, silt, light grey to medium light grey, firm, very calcareous.
1160m-1170m	100%	<u>Calcisiltite</u> - As above.
1170m-1180m	50%	<u>Calcisiltite</u> - As above.
	50%	<u>Marl</u> - light to medium light grey, soft to firm, very calcareous
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WEST HALIBUT-1

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DEPTH	%	DESCRIPTION
1180m-1190m	50%	<u>Calcsiltite</u> - As above.
	50%	<u>Marl</u> - As above.
1190m-1195m	50%	<u>Calcsiltite</u> - As above.
	40%	<u>Marl</u> - As above.
	10%	<u>Sparry Limestone</u> - pale brown, hard, massive.
1195m-1200m	70%	<u>Calcsiltite</u> - As above.
	25%	<u>Sparry Limestone</u> - pale brown, hard, massive crystalline.
	5%	<u>Marl</u> - As above. Loose fossil fragments of coral stems and forams.
1200m-1205m	75%	<u>Calcsiltite</u> - medium to coarse, silt, yellow grey to medium light grey, firm, very calcareous, only minor amount of insoluble silt and clay in HCL.
	25%	<u>Sparry Limestone</u> - pale brown, hard, massive crystalline, dolomitic. Loose fossil fragments of forams and coral stems. Trace Pyrite.
1205m-1210m	95%	<u>Calcsiltite</u> - As above.
	5%	<u>Sparry Limestone</u> - As above. Loose fossil fragments of forams and coral stems, trace Pyrite. Trace carbonaceous flecks.
1210m-1215m	95%	<u>Calcsiltite</u> - As above.
	5%	<u>Sparry Limestone</u> - As above.
1215m-1220m	85%	<u>Calcsiltite</u> - As above.
	10%	<u>Micrite</u> - light grey, firm to hard, only trace of undissolved clay in HCL.
	5%	<u>Sparry Limestone</u> - As above, fossiliferous with forams, coral stems and indeterminate debris. Trace carbonaceous flecks, trace pyrite.
1220m-1225m	100%	<u>Calcsiltite</u> - medium coarse, silt, yellow grey to medium light grey, firm, very calcareous. 10-30% insoluble silt and clay in HCL. Trace of carbonaceous flecks, trace pyrite forams and coral stems.
1225m-1230m		Poor sample mostly clay.
	50%	<u>Calcsiltite</u> - As above.
	50%	<u>Micrite</u> - very light grey to light grey, soft to firm, only trace of undissolved clay in HCL.
		Trace pyrite, trace carbonaceous material, occasional forams and coral stems.
1230m-1235m	100%	<u>Calcsiltite</u> - As above.
1235m-1240m	95%	<u>Calcsiltite</u> - As above.
	5%	<u>Micrite</u> - As above.
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DEPTH	%	DESCRIPTION
1240m-1245m	100%	<u>Marl</u> - light to medium light grey, firm, very calcareous, about 40% undissolved clay in HCL. Trace carbonaceous matter, trace quartz, very fine grained, occasional forams, coral stems and indeterminate fossil debris.
1245m-1250m	100%	<u>Marl</u> - As above.
1250m-1255m	100%	<u>Marl</u> - As above.
1255m-1260m	100%	<u>Marl</u> - As above.
1260m-1265m	100%	<u>Marl</u> - As above, slightly silty, trace of pyrite associated with Quartz.
1265m-1270m	100%	<u>Marl</u> - As above.
1270m-1275m	100%	<u>Marl</u> - As above.
1275m-1280m	70%	<u>Marl</u> - As above.
1280m-1285m	30%	<u>Calcisiltite</u> - light grey to yellow grey, firm, very calcareous, trace carbonaceous matter.
1280m-1285m	50%	<u>Marl</u> - As above.
1285m-1290m	50%	<u>Calcisiltite</u> - As above.
1285m-1290m	50%	<u>Marl</u> - As above.
1290m-1295m	50%	<u>Calcisiltite</u> - As above.
1290m-1295m	70%	<u>Calcisiltite</u> - light grey to yellow grey, firm to hard, very calcareous, trace carbonaceous matter about 30% undissolved clay-silt in HCL.
1290m-1295m	20%	<u>Limestone</u> - sparry, hard, dolomitic, massive crystalline. Pale brown to medium light grey.
1295m-1300m	10%	<u>Marl</u> - light to medium light grey, firm, very calcareous, trace carbonaceous matter, trace pyrite. Occasional forams, coral stems and indeterminate fossil debris. Trace Quartz, fine grained, milky.
1295m-1300m	85%	<u>Calcisiltite</u> - As above, trace pyrite, rare sparry Limestone.
1300m-1305m	15%	<u>Marl</u> - As above. Occasional fossil fragments, as above.
1300m-1305m	100%	<u>Calcisiltite</u> - As above.
1305m-1310m	100%	<u>Calcisiltite</u> - light grey to yellow brown, firm, trace carbonaceous matter, very calcareous. 20% undissolved clay-silt in HCL.
1310m-1315m	100%	<u>Calcisiltite</u> - As above.
1315m-1320m	100%	<u>Calcisiltite</u> - As above. Trace Quartz, fine grained, clear to milky.
1320m-1325m	100%	<u>Calcisiltite</u> - As above.

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WEST HALIBUT-1

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DEPTH	%	DESCRIPTION
1325m-1330m	100%	<u>Calcisiltite</u> - light grey to yellow brown, firm, trace carbonaceous material. Marly in part, very calcareous. 40% undissolved in HCL. Loose fossil fragments, mainly forams.
1330m-1335m	100%	<u>Calcisiltite</u> - As above.
1335m-1340m	100%	<u>Calcisiltite</u> - As above.
1340m-1345m	100%	<u>Calcisiltite</u> - As above.
1345m-1350m	100%	<u>Calcisiltite</u> - As above.
1350m-1355m	100%	<u>Calcisiltite</u> - As above.
1355m-1360m	100%	<u>Calcisiltite</u> - light grey to yellow brown, firm to hard. Sparry cement in part, marly in part, very calcareous, trace carbonaceous. 30% undissolved in HCL. Loose fossil fragments mainly forams.
1360m-1365m	100%	<u>Calcisiltite</u> - As above.
1365m-1370m	100%	<u>Calcisiltite</u> - As above.
1370m-1375m	100%	<u>Calcisiltite</u> - As above.
1375m-1380m	100%	<u>Calcisiltite</u> - As above.
1380m-1385m	100%	<u>Calcisiltite</u> - As above, becoming harder contains greater percentage sparry cement and less argillaceous material. Trace Quartz, fine to coarse grained, clear to milky.
1385m-1390m	100%	<u>Calcisiltite</u> - light grey to yellow brown, firm, trace carbonaceous material. Micritic in part, hard. Little or no argillaceous material <10%. Marly in part, soft to firm. Calcisiltite generally is about 25% argillaceous material. Loose fossil fragments - forams.
1390m-1395m	100%	<u>Calcisiltite</u> - As above.
1395m-1400m	100%	<u>Calcisiltite</u> - As above.
1400m-1405m	100%	<u>Calcisiltite</u> - As above.
1405m-1410m	100%	<u>Calcisiltite</u> - As above.
1410m-1415m	100%	<u>Calcisiltite</u> - As above.
1415m-1420m	100%	<u>Calcisiltite</u> - As above.
1420m-1425m	100%	<u>Calcisiltite</u> - As above.
1425m-1430m	100%	<u>Calcisiltite</u> - light grey to yellow brown, firm to hard, trace carbonaceous material, Marly in part, soft to firm, up to 5% argillaceous material. Fossiliferous in part-forams and coral stems.
1430m-1435m	100%	<u>Calcisiltite</u> - As above.
1435m-1440m	100%	<u>Calcisiltite</u> - As above.
1440m-1445m	100%	<u>Calcisiltite</u> - As above.

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<u>DEPTH</u>	<u>%</u>	<u>DESCRIPTION</u>
1445m-1450m.	100%	<u>Calcisiltite</u> - As above.
1450m-1455m	100%	<u>Calcisiltite</u> - As above.
1455m-1460m	100%	<u>Calcisiltite</u> - light grey to yellow brown, firm, trace carbonaceous matter, marly in part, soft to firm, up to 30% argillaceous material, fossiliferous in part, mainly forams.
1460m-1465m	100%	<u>Calcisiltite</u> - As above.
1465m-1470m	100%	<u>Calcisiltite</u> - As above.
1470m-1475m	100%	<u>Calcisiltite</u> - As above.
1475m-1480m	100%	<u>Calcisiltite</u> - As above.
1480m-1485m	100%	<u>Calcisiltite</u> - As above.
1485m-1490m	100%	<u>Calcisiltite</u> - As above.
1490m-1495m	100%	<u>Calcisiltite</u> - light grey to yellow brown, soft to firm, trace carbonaceous matter, marly in part, up to 30% argillaceous matter. Fossiliferous in part, mainly forams and coral stems some indeterminate shell debris.
1495m-1500m	100%	<u>Calcisiltite</u> - As above.
1500m-1505m	100%	<u>Calcisiltite</u> - As above.
1505m-1510m	100%	<u>Calcisiltite</u> - As above.
1510m-1515m	100%	<u>Calcisiltite</u> - As above.
1515m-1520m	100%	<u>Calcisiltite</u> - As above.
1520m-1525m	90%	<u>Calcisiltite</u> - light grey to yellow brown, firm, trace carbonaceous material, approximately 30% argillaceous residue.
	10%	<u>Marl</u> - light to medium light grey, soft to firm, approximately 25% undissolved argillaceous residue in HCL. Occasional forams and coral stems.
1525m-1530m	90%	<u>Calcisiltite</u> - As above.
	10%	<u>Marl</u> - As above.
1530m-1535m	90%	<u>Calcisiltite</u> - As above.
	10%	<u>Marl</u> - As above.
1535m-1540m	80%	<u>Calcisiltite</u> - As above.
	20%	<u>Marl</u> - As above.
1540m-1545m	90%	<u>Calcisiltite</u> - As above, light grey to yellow, brown to pale brown, trace carbonaceous matter and occasional sparry cement.
	10%	<u>Marl</u> - As above.
1545m-1550m	100%	<u>Calcisiltite</u> - light grey to medium light grey to yellow brown, trace carbonaceous matter, approximately 35% argillaceous

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WEST HALIBUT-1

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DEPTH	%	DESCRIPTION
1545m-1550m	100%	Continued/.... residue, soft to firm. Marly in part. Fossiliferous, mainly forams and coral stems.
1550m-1555m	60%	<u>Calcisiltite</u> - As above.
	40%	<u>Sparry Limestone</u> - white, cream to light brown, hard to very hard, massive crystalline, dolomitic, trace pyrite, trace quartz..
1555m-1560m	60%	<u>Calcisiltite</u> - As above.
	10%	<u>Sparry Limestone</u> - As above.
	30%	<u>Micrite</u> - yellow brown to pale brown, hard to very hard, massive.
1560m-1565m	95%	<u>Calcisiltite</u> - As above.
	5%	<u>Micrite</u> - As above.
1565m-1570m	50%	<u>Calcisiltite</u> - As above.
	35%	<u>Micrite</u> - As above.
	15%	<u>Sparry Limestone</u> - As above.
1570m-1575m	70%	<u>Calcisiltite</u> - As above.
	25%	<u>Micrite</u> - As above.
	5%	<u>Sparry Limestone</u> - As above.
1575m-1580m	90%	<u>Calcisiltite</u> - As above.
	10%	<u>Micrite</u> - As above. 10/9/78
1580m-1585m	90%	<u>Calcisiltite</u> - light grey to medium light grey to yellow brown, trace carbonaceous flecks, approximately 30% argillaceous residue, firm. Marly in part, occasional forams.
	10%	<u>Micrite</u> - yellow brown to pale brown, hard to very hard, massive Dolomitic in part.
1585m-1590m	100%	<u>Calcisiltite</u> - As above.
1590m-1595m	100%	<u>Calcisiltite</u> - light grey to medium light grey to yellow brown, trace carbonaceous flecks, soft to firm, occasional fossil fragments, mainly forams and coral debris. Approximately 35% argillaceous residue in HCL.
1595m-1600m	100%	<u>Calcisiltite</u> - As above.
1600m-1605m	100%	<u>Calcisiltite</u> - As above.
1605m-1610m	100%	<u>Calcisiltite</u> - light to medium light grey to yellow brown, trace carbonaceous flecks, soft to firm, occasional fossil fragments, mainly forams and coral debris, approximately 35% Argillaceous residue in HCL.
1610m-1615m	100%	<u>Calcisiltite</u> - As above.
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<u>DEPTH</u>	<u>%</u>	<u>DESCRIPTION</u>
1615m-1620m	100%	<u>Calcisiltite</u> - As above.
1620m-1625m	100%	<u>Calcisiltite</u> - As above.
1625m-1630m	50%	<u>Calcisiltite</u> - As above.
	50%	<u>Marl</u> - soft to firm, light grey to yellow brown, very calcareous, trace carbonaceous flecks, rare trace of glauconite, occasional forams. 40% argillaceous residue in HCL.
1630m-1635m	50%	<u>Calcisiltite</u> - As above.
	50%	<u>Marl</u> - As above.
1635m-1640m	70%	<u>Calcisiltite</u> - light grey to medium light grey to yellow brown, soft to firm. Trace carbonaceous, trace quartz, very calcareous, occasional forams. 40% argillaceous residue in HCL.
	30%	<u>Marl</u> - As above.
1640m-1645m	30%	<u>Calcisiltite</u> - As above.
	50%	<u>Marl</u> - As above.
	10%	<u>Micrite</u> - hard to very hard. Yellow brown, massive, dolomitic in part.
1645m-1650m	100%	<u>Calcisiltite</u> - As above.
1650m-1655m	100%	<u>Calcisiltite</u> - As above.
1655m-1660m	100%	<u>Calcisiltite</u> - As above.
1660m-1665m	100%	<u>Calcisiltite</u> - light to medium light grey, yellow brown, firm, trace carbonaceous flecks, rare trace glauconite. Trace quartz, very calcareous. 30% argillaceous residue in HCL.
1665m-1670m	100%	<u>Calcisiltite</u> - As above. Quartz becoming more common, fine granule size, milky, angular.
1670m-1675m	100%	<u>Calcisiltite</u> - As above.
1675m-1680m	95%	<u>Calcisiltite</u> - As above.
	5%	<u>Calcarenite</u> - white to cream, friable, very calcareous. 10% argillaceous residue in HCL. Glauconite abundant. Dolomitic in part.
1680m-1685m	95%	<u>Calcisiltite</u> - As above.
	5%	<u>Calcarenite</u> - As above.
1685m-1690m	100%	<u>Calcisiltite</u> - light to medium light grey, yellow brown, firm, trace carbonaceous flecks, trace quartz, very calcareous. 30% argillaceous residue in HCL. Trace calcarenite, as above.
1690m-1695m	100%	<u>Calcisiltite</u> - As above.
1695m-1700m	100%	<u>Calcisiltite</u> - As above.

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DEPTH	%	DESCRIPTION
1700m-1705m	100%	<u>Calcisiltite</u> - light to medium light grey, yellow brown, soft to firm. Trace glauconite, trace pyrite. Trace carbonaceous flecks. 30% argillaceous residue in HCL. Fossiliferous in part, mainly forams.
1705m-1710m	100%	<u>Calcisiltite</u> - As above.
1710m-1715m	100%	<u>Calcisiltite</u> - As above. Poor sample, as it contains mostly clay which is washed away.
1715m-1720m	100%	<u>Calcisiltite</u> - As above, good sample.
1720m-1725m	100%	Poor sample mainly balled clay. Large portion of sample washed away.
1725m-1730m	50%	<u>Calcisiltite</u> - light to medium light grey to yellow brown, marly in part, soft to firm, trace glauconite, trace pyrite, trace carbonaceous flecks, very calcareous, fossiliferous in part.
1730m-1735m	50%	<u>Calcisiltite</u> - As above.
1735m-1740m	50%	<u>Marl</u> - light grey to yellow grey, soft to firm, pyritic, trace glauconite, very calcareous, fossiliferous with forams and indeterminate debris. 40% clay-silt residue in HCL.
1740m-1745m	75%	<u>Marl</u> - As above. Pyrite common, particularly as replacement in fossils - forams.
1745m-1750m	25%	<u>Calcisiltite</u> - As above.
1750m-1755m	80%	<u>Marl</u> - As above.
1755m-1760m	20%	<u>Calcisiltite</u> - As above.
1760m-1765m	50%	<u>Marl</u> - As above.
1765m-1775m	50%	<u>Calcisiltite</u> - As above. Pyrite abundant, trace quartz.
1775m-1780m	50%	<u>Marl</u> - As above.
1780m-1785m	50%	<u>Calcisiltite</u> - As above. Trace Limestone crystalline, dolomitic.
1785m-1790m	50%	<u>Marl</u> - As above.
1790m-1795m	50%	<u>Calcisiltite</u> - As above.
1795m-1800m	80%	<u>Marl</u> - light grey to yellow grey, soft to firm, pyritic, trace glauconite, very calcareous, fossiliferous with forams and indeterminate debris. 40% clay residue in HCL. Trace Quartz. Some fossils replaced with pyrite.
1800m-1805m	20%	<u>Calcisiltite</u> - light to medium light grey to yellow brown, marly in part, soft to firm, trace glauconite, trace pyrite, very calcareous.
1805m-1810m	60%	<u>Marl</u> - As above.
1810m-1815m	40%	<u>Calcisiltite</u> - As above.
1815m-1820m	50%	<u>Calcisiltite</u> - As above.
1820m-1825m		16/....

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DEPTH	%	DESCRIPTION
1765m-1775m		Continued/....
1775m-1780m	50%	<u>Marl</u> - As above.
1775m-1780m	60%	<u>Calcisiltite</u> - As above.
1780m-1785m	40%	<u>Marl</u> - As above.
1780m-1785m	75%	<u>Calcisiltite</u> - As above.
1785m-1790m	25%	<u>Marl</u> - As above.
1785m-1790m	100%	<u>Calcisiltite</u> - light to medium light grey to yellow brown, marly in part, soft to firm, trace glauconite, trace pyrite, very calcareous, occasional forams. 40% residual clay-silt in HCL.
1790m-1795m	100%	<u>Calcisiltite</u> - As above.
1795m-1800m	50%	<u>Marl</u> - light grey to yellow grey, soft to firm, slightly silty, trace glauconite, very calcareous forams, common.
1800m-1805m	50%	<u>Calcisiltite</u> - As above.
1800m-1805m	60%	<u>Marl</u> - As above, pyritic.
1805m-1810m	40%	<u>Calcisiltite</u> - As above.
1805m-1810m	40%	<u>Marl</u> - As above.
1810m-1815m	60%	<u>Calcisiltite</u> - As above.
1810m-1815m	75%	<u>Marl</u> - As above.
1815m-1820m	25%	<u>Calcisiltite</u>
1815m-1820m	60%	<u>Calcisiltite</u> - light to medium light grey to yellow brown, marly in part, soft to firm, trace glauconite, trace pyrite. Very calcareous, occasional forams. 40% residual clay in HCL.
1820m-1825m	40%	<u>Marl</u> - light grey to yellow grey, soft to firm, slightly silty, trace glauconite, very calcareous, forams common, some have been replaced with pyrite.
1820m-1825m	40%	<u>Calcisiltite</u> - As above.
1825m-1830m	60%	<u>Marl</u> - As above.
1825m-1830m	10%	<u>Calcisiltite</u> - As above.
1830m-1835m	90%	<u>Marl</u> - As above.
1830m-1835m	75%	<u>Marl</u> - As above.
1835m-1840m	25%	<u>Calcisiltite</u> - As above.
1835m-1840m	10%	<u>Calcisiltite</u> - light to medium light grey to yellow brown, marly in part, soft to firm, trace carbonaceous matter, occasional forams. 40% clay undissolved in HCL.
1835m-1840m	90%	<u>Marl</u> - light grey to yellow grey to medium light grey, soft to
1835m-1840m		17/....

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<u>DEPTH</u>	<u>%</u>	<u>DESCRIPTION</u>
1835m-1840m.	90%	Continued/.... firm, slightly silty, calcareous forams common, some have been replaced with pyrite.
1840m-1845m	100%	<u>Marl</u> - As above.
1845m-1850m	100%	<u>Marl</u> - As above.
1850m-1855m	100%	<u>Marl</u> - light to medium light grey to yellow brown, soft to firm, silty in part, very calcareous. 40% clay undissolved in HCL. Occasional forams, some replaced with pyrite. Trace pyrite.
1855m-1860m	100%	<u>Marl</u> - As above.
1860m-1865m	100%	<u>Marl</u> - As above.
1865m-1870m	100%	<u>Marl</u> - As above.
1870m-1875m	100%	<u>Marl</u> - light to medium light grey to yellow brown, soft to firm, silty in part, very calcareous, trace carbonaceous flecks. 40% clay undissolved in HCL. Fossiliferous, mainly forams, coral debris.
1875m-1880m	100%	<u>Marl</u> - As above.
1880m-1885m	100%	<u>Marl</u> - As above. Pyrite common as nodules, and fossil replacement
1885m-1890m	100%	<u>Marl</u> - light to medium light grey, soft to firm, silty in part, very calcareous, trace carbonaceous flecks, trace pyrite, trace quartz, fossiliferous - mainly forams with coral debris.
1890m-1895m	100%	<u>Marl</u> - As above.
1895m-1900m	100%	<u>Marl</u> - As above.
1900m-1905m	100%	<u>Marl</u> - As above.
1905m-1910m	100%	<u>Marl</u> - As above.
1910m-1915m	100%	<u>Marl</u> - As above.
1915m-1920m	100%	<u>Marl</u> - As above.
1920m-1925m	100%	<u>Marl</u> - As above.
1925m-1930m	100%	<u>Marl</u> - light to medium light grey, soft to firm, silty in part, very calcareous, trace pyrite, trace quartz, fossiliferous, mainly forams and coral debris. Rare trace of Gypsum?
1930m-1935m	100%	<u>Marl</u> - As above.
1935m-1940m	100%	<u>Marl</u> - As above.
1940m-1945m	100%	<u>Marl</u> - As above.
1945m-1950m	100%	<u>Marl</u> - As above.
1950m-1955m	100%	<u>Marl</u> - As above.
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DEPTH	%	DESCRIPTION
1955m-1960m	100%	<u>Marl</u> - medium light grey to yellow brown, soft to firm, silty in part, very calcareous. Trace pyrite. Trace glauconite, occasional forams, partly replaced by pyrite.
1960m-1965m	100%	<u>Marl</u> - As above.
1965m-1970m	100%	<u>Marl</u> - As above.
1970m-1975m	100%	<u>Marl</u> - As above.
1975m-1980m	100%	<u>Marl</u> - As above.
1980m-1985m	100%	<u>Marl</u> - As above.
1985m-1990m	100%	<u>Marl</u> - medium light grey to yellow brown, soft to firm, silty in part, very calcareous, trace pyrite, trace carbonaceous flecks. Occasional forams and coral debris.
1990m-1995m	100%	<u>Marl</u> - As above.
1995m-2000m	100%	<u>Marl</u> - As above.
2000m-2005m	100%	<u>Marl</u> - medium light grey to yellow brown, firm, becoming siltier, very calcareous, trace pyrite, trace carbonaceous flecks. Occasional forams and coral debris.
2005m-2010m	100%	<u>Marl</u> - As above.
2010m-2015m	100%	<u>Marl</u> - medium light grey to yellow brown, firm, slightly silty, very calcareous, trace pyrite, trace carbonaceous flecks, trace white pyritic crystalline limestone, hard, occasional forams.
2015m-2020m	100%	<u>Marl</u> - medium light grey to pale brown, firm, slightly silty, very calcareous, pyritic, trace carbonaceous flecks, occasional forams, and coral debris.
2020m-2025m	100%	<u>Marl</u> - As above.
2025m-2030m	100%	<u>Marl</u> - As above.
2030m-2035m	100%	<u>Marl</u> - As above.
2035m-2040m	100%	<u>Marl</u> - As above.
2040m-2045m	100%	<u>Marl</u> - As above.
2045m-2050m	100%	<u>Marl</u> - medium light grey to pale brown, firm, silty in part, very calcareous, pyritic, occasional forams and coral debris often replaced by pyrite. 50% undissolved clay-silt in HCL.
2050m-2025m	100%	<u>Marl</u> - As above.
2055m-2060m	100%	<u>Marl</u> - As above.
2060m-2065m	100%	<u>Marl</u> - As above.
2065m-2070m	100%	<u>Marl</u> - As above.
2070m-2075m	100%	<u>Marl</u> - As above.
2075m-2080m	100%	<u>Marl</u> - medium light grey to pale brown, silty in part, very

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DEPTH	%	DESCRIPTION
2075m-2080m	100%	Continued/.... calcareous, pyrite common, occasional forams and coral debris. Trace carbonaceous flecks.
2080m-2085m	100%	<u>Marl</u> - As above, trace Mudstone. Mudstone is very calcareous, glauconitic.
2085m-2090m	100%	<u>Marl</u> - As above.
2090m-2095m	100%	<u>Marl</u> - As above, trace very calcareous Mudstone, very silty in part, white to cream, glauconitic.
2095m-2100m	100%	<u>Marl</u> - As above.
2100m-2105m	100%	<u>Marl</u> - medium light grey to pale brown, silty in part, very calcareous. Pyrite common. Trace carbonaceous flecks, trace very calcareous Siltstone, white to cream, glauconitic, fossiliferous - forams, coral stems, brachiopods some replaced with pyrite.
2105m-2110m	100%	<u>Marl</u> - As above.
2110m-2115m	100%	<u>Marl</u> - As above.
2115m-2120m	90%	<u>Marl</u> - medium light grey, silty in part, very calcareous, trace Pyrite. Trace carbonaceous flecks, firm.
	10%	<u>Calcareous Mudstone</u> - medium light grey to pale brown, very calcareous, firm, trace glauconite, occasional fossils - forams and coral stems.
2120m-2125m	70%	<u>Marl</u> - As above.
	30%	<u>Calcareous Mudstone</u> - As above.
2125m-2130m	75%	<u>Marl</u> - As above.
	25%	<u>Calcareous Mudstone</u> - As above.
2130m-2135m	65%	<u>Marl</u> - As above.
	35%	<u>Calcareous Mudstone</u> - As above.
2135m-2140m	65%	<u>Marl</u> - As above.
	35%	<u>Calcareous Mudstone</u> - As above.
2140m-2145m	60%	<u>Marl</u> - medium light grey, silty in part, trace pyrite, trace carbonaceous flecks, firm.
	40%	<u>Calcareous Mudstone</u> - medium light grey, pale brown to green grey. Trace glauconitic, clay with minor silt, occasional forams, and coral stems, firm.
2145m-2150m	50%	<u>Marl</u> - As above.
	50%	<u>Calcareous Mudstone</u> - As above.
2150m-2155m	50%	<u>Marl</u> - As above.
	50%	<u>Calcareous Mudstone</u> - As above.
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<u>DEPTH</u>	<u>%</u>	<u>DESCRIPTION</u>
2155m-2160m	50%	<u>Marl</u> - As above.
	50%	<u>Calcareous Mudstone</u> - As above.
2160m-2165m	50%	<u>Marl</u> - As above.
	50%	<u>Calcareous Mudstone</u> - As above.
2165m-2170m	60%	<u>Calcareous Mudstone</u> - medium light grey to green grey, trace glauconite, clay with minor silt. Occasional forams and coral stems, firm.
	40%	<u>Marl</u> - medium light grey, silty in part, trace pyrite, trace carbonaceous flecks, firm.
2170m-2175m	60%	<u>Calcareous Mudstone</u> - As above.
	40%	<u>Marl</u> - As above.
2175m-2180m	70%	<u>Calcareous Mudstone</u> - As above.
	30%	<u>Marl</u> - As above.
2180m-2185m	70%	<u>Calcareous Mudstone</u> - As above.
	30%	<u>Marl</u> - As above.
2185m-2190m	70%	<u>Calcareous Mudstone</u> - As above.
	30%	<u>Marl</u> - As above.
2190m-2195m	75%	<u>Calcareous Mudstone</u> - As above.
	25%	<u>Marl</u> - As above.
2195m-2200m	80%	<u>Calcareous Mudstone</u> - medium light grey to green grey. Trace glauconite, clay with minor silt, rare forams and coral stems, firm.
	20%	<u>Marl</u> - medium light grey, silty in part, trace pyrite, trace carbonaceous flecks, firm.
2200m-2205m	80%	<u>Calcareous Mudstone</u> - As above.
	20%	<u>Marl</u> - As above.
2205m-2210m	90%	<u>Calcareous Mudstone</u> - As above.
	10%	<u>Marl</u> - As above.
2210m-2215m	90%	<u>Calcareous Mudstone</u> - As above.
	10%	<u>Marl</u> - As above.
2215m-2220m	100%	<u>Calcareous Mudstone</u> - light to medium light grey to green grey to green. Glauconitic, clay with minor silt. Trace glauconite pellets, trace pyrite, firm, rare forams.
2220m-2225m	100%	<u>Calcareous Mudstone</u> - As above.
2225m-2230m	100%	<u>Calcareous Mudstone</u> - As above.

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DEPTH	%	DESCRIPTION
2230m-2235m	100%	<u>Calcareous Mudstone</u> - As above.
2235m-2240m	100%	<u>Calcareous Mudstone</u>
2240m-2245m	100%	<u>Calcareous Mudstone</u> - light to medium light grey to green grey to green, glauconitic in part, clay with minor silt, trace glauconite pellets. Trace Pyrite, firm, rare forams and coral debris.
2245m-2250m	100%	<u>Calcareous Mudstone</u> - As above.
2250m-2255m	100%	<u>Calcareous Mudstone</u> - light to medium grey to green grey, clay with minor silt, trace pyrite, firm, rare forams, trace carbonaceous flecks.
2255m-2260m	100%	<u>Calcareous Mudstone</u> - As above.
2260m-2265m	100%	<u>Calcareous Mudstone</u> - light to medium grey to green grey, clay with minor silt, becoming slightly less calcareous, pyrite common, trace glauconite, firm, trace carbonaceous flecks. Occasional forams and coral debris.
2265m-2270m	100%	<u>Calcareous Mudstone</u> - As above.
2270m-2275m	100%	<u>Calcareous Mudstone</u> - As above.
2275m-2280m	100%	<u>Calcareous Mudstone</u> - As above.
2280m-2285m	100%	<u>Calcareous Mudstone</u> - light to medium light grey to green grey, clay with minor silt, trace pyrite, trace glauconite, trace carbonaceous flecks, occasional forams and coral debris.
2285m-2290m	100%	<u>Calcareous Mudstone</u> - As above.
2290m-2295m	100%	<u>Calcareous Mudstone</u> - As above.
2295m-2300m	100%	<u>Calcareous Mudstone</u> - As above.
2300m-2305m	100%	<u>Calcareous Mudstone</u> - light to medium light grey to green grey to green, firm, clay with minor silt, trace pyrite, glauconitic in part, trace carbonaceous flecks, moderately calcareous. Occasional forams and indeterminate fossil debris.
		12/9/78
2305m-2310m	100%	<u>Calcareous Mudstone</u> - light to medium light grey to green grey, clay with minor silt, pyritic, trace carbonaceous flecks, moderately calcareous. Rare forams and coral debris, trace glauconite.
2310m-2315m	100%	<u>Calcareous Mudstone</u> - As above.
2315m-2320m	100%	<u>Calcareous Mudstone</u> - As above.
2320m-2325m	100%	<u>Calcareous Mudstone</u> - medium light grey to green grey to greyish red, firm, clay with minor silt and calcareous pyritic, trace carbonaceous flecks.
2325m-2330m	100%	<u>Calcareous Mudstone</u> - As above.
2330m-2335m	100%	<u>Calcareous Mudstone</u> - As above.

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DEPTH	%	DESCRIPTION
2335m-2340m	100%	<u>Calcareous Mudstone</u> - As above.
2340m-2345m	100%	<u>Calcareous Mudstone</u> - medium light grey to green grey to greyish red, firm, clay with minor silt, moderately calcareous, pyritic, trace carbonaceous flecks. No fluorescence or odour.
2345m-2350m	100%	<u>Calcareous Mudstone</u> - As above.
2350m-2355m	100%	<u>Calcareous Mudstone</u> - As above.
2355m-2360m	100%	<u>Calcareous Mudstone</u> - As above. Trace glauconite.
2360m-2365m	100%	<u>Calcareous Mudstone</u> - medium light grey green grey to yellow brown, firm, clay with minor silt, moderately calcareous, pyritic, trace carbonaceous flecks, trace glauconitic. No fluorescence.
2365m-2370m	100%	<u>Calcareous Mudstone</u> - As above, increasing glauconite.
2370m-2375m	100%	<u>Calcareous Mudstone</u> - medium light grey to green grey to green, firm, clay with minor silt, moderately calcareous, trace pyrite, glauconite becoming common. No fluorescence.
2375m-2380m	100%	<u>Calcareous Mudstone</u> - As above.
2380m-2385m	90%	<u>Calcareous Mudstone</u> - As above.
	10%	<u>Sandstone</u> - fine to very coarse grained, some granular, subangular to subrounded, poorly sorted quartz grains, clear to frosted grains, pyrite common as encrustations and cement, glauconitic. Calcareous cement. Trace limonite cement, porosity visually poor. Patchy bright yellow fluorescence with very slow milky cut.
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2457m-2460m	10%	<u>Siltstone</u> - light grey to brown, micaceous, sandy in part, firm, some is trace carbonaceous in part.
	5%	<u>Sandstone</u> - white to light grey, white clay matrix, clean, moderately to well sorted, subrounded to subangular quartz grains, firm, fine to coarse grained, predominantly medium grained, carbonaceous in part.
	10%	<u>Coal</u> - black, some showing conchoidal fracture, blocky. Trace pyrite. Trace fine quartz grains, coarse to very coarse, subrounded white to transparent.
	75%	<u>Marl and Limestone</u> - medium grey to light grey, (cavings) silty? no fluorescence or cut.
2465m	50%	<u>Fine Quartz Grains</u> - medium to coarse to very coarse, subrounded, white to transparent.
	Tr-5%	<u>Coal</u> - As above.
	40%	<u>Marl and Limestone</u> - As above.
	10%	<u>Siltstone</u> - As above. Trace Pyrite.
2470m	100%	<u>Fine Quartz Grains</u> - medium to coarse, some very coarse, predominantly coarse, very clean, trace pyrite, subrounded to subangular,

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DEPTH	%	DESCRIPTION
2470m	100%	Continued/.... transparent to translucent. Trace coal, as above, no fluorescence. Trace Marl/Limestone, as above.
2475m	75%	<u>Fine Quartz</u> - As above.
	5-10%	<u>Coal</u> - As above.
	10%	<u>Marl</u> - As above, cavings?
	Tr-5%	<u>Sandstone</u> - white to very light grey, fine grained, moderate to well sorted, white clay cement, firm, carbonaceous.
2480m	Tr-5%	<u>Loose Quartz Grains</u> - As above.
	20%	<u>Sandstone</u> - As above.
	45%	<u>Marl</u> - As above.
	100%	<u>Coal</u> - As above.
	10-20%	<u>Siltstone</u> - medium grey to red, pyritic, carbonaceous, moderate to poorly sorted, sandy in parts.
2485m	50%	<u>Loose Quartz Grains</u> - medium to coarse grained, majority coarse grained, subrounded to subangular.
	20%	<u>Siltstone</u> - pyritic, as above.
	20%	<u>Marl</u> - (cavings).
	5%	<u>Coal</u> - As above.
	5%	<u>Sandstone</u> - As above, no fluorescence.
2490m	80%	<u>Loose Quartz Sand</u> - As above.
	10%	<u>Siltstone</u> - pyritic, medium grey to red (mostly red), carbonaceous moderate to poorly sorted, sandy in parts.
	5%	<u>Coal</u> - As above.
	10%	<u>Marl</u> - As above.
		Trace Pyrite.
2495m	90%	<u>Loose Quartz Sand</u> - very coarse to medium grained, rounded to subrounded, majority coarse grained, transparent to translucent.
	5%	<u>Marl</u> - As above.
	5%	<u>Siltstone</u> - As above, pyritic, no fluorescence.
		Trace Coal - As above.
2500m	90%	<u>Loose Quartz Sand</u> - As above.
	5%	<u>Siltstone</u> - pyritic, as above.
		Trace Coal.
		24/....

LITHOLOGICAL DESCRIPTIONS

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WEST HALIBUT-1

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DEPTH	%	DESCRIPTION
2500m		Continued/....
	5%	<u>Marl</u>
2505m	50%	<u>Loose Quartz Sand</u> - As above.
	30%	<u>Fine Pyritic Siltstone</u> - As above.
	20%	<u>Marl</u> - As above.
		Trace Coal.
2510m	10%	<u>Loose Quartz Sand</u> - As above.
	40%	<u>Fine Pyrite Siltstone</u> - As above, red brown.
	5%	<u>Sandstone</u> - white to very light grey, white clay matrix, moderate to well sorted, medium grained.
	45%	<u>Marl</u>
		Trace Pyrite.
2515.0m		Trace <u>Loose Quartz Sand</u> - As above.
	10%	<u>Fine Pyritic Siltstone</u> - As above.
	Tr-5%	<u>Sandstone</u> - As above.
	90%	<u>Marl</u> - As above.
		Trace Pyrite.
2520m	30%	<u>Loose Quartz Sand</u> - medium grained to very coarse grained.
	10%	<u>Fine Pyritic Siltstone</u> - pyritic.
		Trace Sandstone - As above.
	60%	<u>Marl</u> - As above.
		Trace Coal, no fluorescence.
2525m	20%	<u>Loose Quartz Sand</u>
	20%	<u>Fine Pyritic Siltstone</u>
		Trace Sandstone - As above.
	60%	<u>Marl</u> - As above.
		Trace Coal.
		Trace Pyrite, no fluorescence or cut.
2526m	60%	<u>Limestone</u> - light grey, firm to hard, silty in part (?) some associated soft white to calcareous to marl. Reacts violently to HCL.
	20%	<u>Loose Quartz Sand</u> - medium grained to very coarse grained, subrounded to subangular. Predominantly coarse grained, clear to frosty.
		25/....

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DEPTH	%	DESCRIPTION
2526m	20%	<p><u>Siltstone</u> - rust to brown to dark brown, pyritic, some sand, moderate to well sorted, some white to light grey showing banding.</p> <p>Trace Coal - black, conchoidal fracture.</p> <p>Trace Sandstone - white, white clay matrix, medium grained, moderate to well sorted, clean, tight, some very pyritic, to the exclusions of other matrix. No fluorescence or cut.</p>
2530m	60%	<p><u>Loose Quartz Sand</u> - As above.</p>
	30%	<p><u>Limestone</u> - As above, trace pyrite.</p>
	10%	<p><u>Siltstone</u> - As above, no fluorescence, good porosity.</p>
2535m	70%	<p><u>Loose Quartz Sand</u> - As above.</p>
	10%	<p><u>Siltstone</u> - As above.</p>
	20%	<p><u>Limestone</u> - As above.</p>
		<p>Trace Pyrite.</p>
2540m	90%	<p><u>Loose Quartz Sand</u> - As above.</p>
	10%	<p><u>Siltstone</u> - As above.</p>
		<p>Trace Coal.</p>
		<p>Trace Pyrite.</p>
	~5%	<p><u>Limestone</u> - As above.</p>
2545m	50%	<p><u>Loose Quartz Sand</u> - As above.</p>
	40%	<p><u>Siltstone</u> - brown, firm, sandy in part, micaceous, moderate to well sorted, carbonaceous.</p>
	10%	<p><u>Limestone</u> - As above, trace pyrite.</p>
		<p>Trace Sandstone - white to very light grey, clean, fine grained, well sorted, no fluorescence.</p>
2550m	30%	<p><u>Loose Quartz Sand</u> - As above.</p>
	30%	<p><u>Siltstone</u> - As above.</p>
	30%	<p><u>Limestone</u> - As above.</p>
	Tr-5%	<p><u>Coal</u></p>
	Tr-5%	<p><u>Sandstone</u> - As above.</p>
2555m	100%	<p><u>Coal</u> - black, vitreous, some exhibiting conchoidal fracture.</p>
		<p>Trace Loose Quartz Sand - As above.</p>
		<p>Trace Siltstone - As above.</p>
2560m	50%	<p><u>Loose Quartz Sand</u> - As above.</p>
	40%	<p><u>Siltstone</u> - As above.</p>

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<u>DEPTH</u>	<u>%</u>	<u>DESCRIPTION</u>
2560m	10%	<u>Coal</u> - As above.
		Trace Limestone - As above.
2565m	100%	<u>Loose Quartz Sand</u> - As above.
		Trace Coal.
		Trace Siltstone.
2570m	40%	<u>Loose Quartz Sand</u> - As above.
	50%	<u>Siltstone</u> - As above.
	10%	<u>Limestone</u> - As above.
		Trace Coal.
2575.0m	40%	<u>Loose Quartz Sand</u> - As above.
	30%	<u>Siltstone</u> - As above.
	20%	<u>Limestone</u> - As above.
	10%	<u>Coal</u>
		Trace Pyrite.
2577.4m	40%	<u>Loose Quartz Sand</u> - As above.
	20%	<u>Siltstone</u> - As above.
	40%	<u>Limestone</u> - As above.
		Trace Coal - As above.
		Trace Pyrite.

APPENDIX 2

APPENDIX 2

SIDEWALL CORE DESCRIPTIONS

FORM R 257 372

NO.	DEPTH M	REC Mm	ROCK TYPE	MODIFIERS	CAL	COLOR	INDUR DEG	GRAIN SIZE	SRTG	RND	DISS CLAY	STAIN	% RK	FLOURESCENCE			CUT FLUOR.		CUT RESIDUE		SHOW	PROB PROD	REMARKS - GAS	
														14	15	16	17	18	19	20				21
1	860	25	SILT- STONE	calcareous	V	medium light grey	firm	silt	-	-	-	-	NIL										Micromicaceous	
2	842.5	15	SILT- STONE	calcareous, fossiliferous	V	medium light grey	firm to blocky	silt	-	-	-	-	NIL											Forams common.
3	825	15	CALCI- SILT- TYPE	calcareous, micro- micaceous	V	light grey to medium light grey	firm	silt	-	-	-	-	NIL											Trace Glauconite Trace Pyrite. Trace carbonaceous flecks. Forams.
4	802	20	CALCI- SILT- TYPE	calcareous	V	medium light grey	firm	silt	-	-	-	-	NIL											Trace Glauconite.
5	769	40	CALCI- SILT- TYPE	calcareous, fossil- ferous.	V	medium grey	firm	very fine silt	-	-	-	-	NIL											Trace Glauconite Forams.
6	753.5	40	CALCI- SILT- TYPE	calcareous, micro- micaceous.	V	medium light grey	firm	very fine silt	-	-	-	-	NIL											Trace Glauconite Forams.
7	727.5	20	CALCI- SILT- TYPE	calcareous, fossil- ferous.	V	light to medium light grey	firm to hard	silt	-	-	-	-	NIL											Trace Glauconite Forams.
8	704	25	CALCI- SILT- TYPE	calcareous, fossil- ferous	V	medium light grey	firm	fine to medium	-	-	-	-	NIL											Trace Glauconite Forams.
9	685	30	CALCI- SILT- TYPE	calcareous	V	medium light grey	firm	silt medium silt	-	-	-	-	NIL											Trace Glauconite Calcareous nodules
10	660	55	CALCI- SILT- TYPE	calcareous	V	medium light grey	soft	coarse silt	-	-	-	-	NIL											Trace Glauconite forams and calca- reous nodules.
11	640	25	CALCI- SILT- TYPE	calcareous	V	medium light grey	firm	fine to medium	-	-	-	-	NIL											Trace Glauconite
12	620	40	CALCI- SILT- TYPE	calcareous	V	medium light grey	firm	fine silt fine silt	-	-	-	-	NIL											Trace Glauconite forams, coral stems

FORM R 257 372

NO.	DEPTH M	REC Mm	ROCK TYPE	MODIFIERS	CAL	COLOR	INDUR DEG	GRAIN SIZE	SRTG	RND	DISS CLAY	STAIN	FLOURESCENCE			CUT FLUOR.			CUT RESIDUE			SHOW	PROB PROD	REMARKS - GAS
													INTEN	COLOR	INTEN	COLOR	QUAN	COLOR	QUAN	COLOR				
1 a	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
13	597	40	CALCI SILT TITE	calcareous	V	medium light grey	firm	coarse silt	-	-	-	-	NIL										Trace Glauconite. Trace Pyrite.	
14	581.5	45	CALCA- RENITTE	calcareous	V	medium light grey to green	firm	very fine sand	poor	-	30	-	NIL										Glauconitic.	
15	557.5	40	CALCA- RENITTE	calcareous glauconitic	V	green grey	firm	very fine sand	poor	sr	30	-	NIL										Forams.	
16	542	50	MIC- RITTE	calcareous	V	medium light grey	firm	clay	-	-	-	-	NIL										Trace silty.	
17	525	35	MIC- RITTE	calcareous	V	light grey	firm	clay	-	-	-	-	NIL										Slightly silty. Forams.	
18	506.5	50	CALCI SILT TITE	calcareous	V	grey	firm	fine to medium silt	-	-	-	-	NIL										Disseminated Pyrite	
19	485	50	MIC- RITTE	calcareous	V	medium light grey	firm	clay	-	-	-	-	NIL										Disseminated Pyrite	
20	468	45	MIC- RITTE	calcareous	V	medium light grey	firm	clay	-	-	-	-	NIL										Disseminated Pyrite	
21	445	40	CALCI SILT TITE	calcareous	V	light to medium light grey	firm	silt	-	-	-	-	NIL											
22	425	50	CALCI SILT TITE	calcareous	V	medium light grey	firm	coarse silt	-	-	-	-	NIL											Trace Pyrite.
23	401	50	CALCA- RENITTE	calcareous	V	medium light grey	firm	very fine	poor	sr	30	-	NIL										Trace Pyrite.	
24	371.5	-		NO RECOVERY																				
25	357	50	CALCA- RENITTE	calcareous	V	medium light grey	firm	fine	mod- eratesr to well sorted	sa- sr	25	-	NIL											
26	336	50	CALCA- RENITTE	calcareous	V	medium light grey	firm	fine	mod- eratesr	sa- sr	25	-	NIL											

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to
well
sorted

3/....

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

ESSO AUSTRALIA LTD.
 SIDEWALL CORE DESCRIPTIONS

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 ATT 51 REC 49

IES RUN NO 2 SWC RUN NO 2 DATE 22/9/78

FORM R 257 372

NO.	DEPTH M	REC m	ROCK TYPE	MODIFIERS		CAL	COLOR	INDUR DEG	GRAIN SIZE	SRTG	FND	DISS CLAY	STAIN	FLOURESCENCE		CUT FLUOR.		CUT RESIDUE		SHOW	PROB	REMARKS - GAS
				1a	3									4	5	6	7	8	9			
31	2565	35	SILT- STONE				dark grey	firm	fine			10- 20%										
32	2563.530		SAND- STONE				grey to brown	fri- able	fine to coarse	poor	sa- sr	20%										
33	2549	30	SHALE				dark grey	firm														
34	2545	40	SHALE				dark grey	firm														
35	2541	30	SHALE				dark grey	firm														
			SAND- STONE				light to dark grey	fri- able	fine to very coarse	very poor	sa- sr	20%										
36	2537	30	SHALE				grey dark	hard														
37	2522	25	SHALE				dark grey	firm														
			SHALE				dark grey															
38	2518	25	SHALE				dark grey	film														
			COAL				black grey															
39	2515	20	SAND- STONE				black grey to brown	firm	fine to granule	very poor	sa- sr	20%										
			SILT- STONE				grey light	soft fri- able	very fine	well		20%										
40	2510.520		SILT- STONE				grey light	soft fri- able	very fine	well		20%										
41	2507.525		SAND- STONE				grey	fri- able	fine	well		20%										
			SAND- STONE				light grey	fri- able	fine	well	sa- sr	10%										
42	2502.520		SAND- STONE				light grey	fri- able	fine	well	sa- sr	10%										
43	2488.530		SAND- STONE				light grey	fri- able	fine to very coarse	very poor	sa- sr	10%										
44	2479	25	SAND- STONE				grey to brown	fri- able	very fine to fine	mod		20%										
			SHALE				dark grey to pyritic	hard														
45	2427.5	20	SHALE				dark grey to pyritic	hard														
46	2464.5	25	SAND- STONE				light grey	fri- able	fine to medium	mod	sa- sr	10%										

FORM R 257 3 72

NO.	DEPTH M	REC M	ROCK TYPE	MODIFIERS	CAL	COLOR	INDUR DEG	GRAIN SIZE	SRTG	RND	DISS CLAY	STAIN	FLOURESCENCE			CUT FLUOR.			CUT RESIDUE		SHOW	PROB PROD	REMARKS - GAS		
													% RK	DISTR	INTEN	COLOR	INTEN	COLOR	QUAN	COLOR					
47	2450	25	SAND- STONE	trace mica	-	light grey	Fri- able	fine well	sr	a-	20%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	2442	20	SAND- STONE	banded	-	light grey/ brown	Fri- able	fine well	sr	a-	20%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	2439	40	SAND- STONE	carbonaceous	-	grey to brown	Fri- able	fine very to poor	sr	a-	10%	-	-	60	even	dull	blue to yellow	faint white	-	-	-	-	-	-	-
50	2427.5	25	SAND- STONE	carbonaceous flecks	-	light grey	Fri- able	fine well	sr	a-	10%	-	-	100	even	dull	pale yellow	bright white	-	-	-	-	-	-	-
51	2424	25	SAND- STONE	Carbonaceous flecks	-	light grey	Fri- able	fine well	sr	a-	10%	-	-	100	even	bright	pale yellow to green	bright white	-	-	-	-	-	-	-
52	2411	30	SAND- STONE	carbonaceous flecks	-	light grey	Fri- able	fine to poor	sr	a-	10%	-	-	60	even	bright	pale yellow to green	bright white	-	-	-	-	-	-	-
53	2387	20	SAND- STONE	clean	-	light grey	Fri- able	fine to poor	sr	a-	10%	-	-	100	even	bright	very pale yellow	bright white	-	-	-	-	-	-	-
54	2383	20	SAND- STONE	carbonaceous flecks	-	light grey	Fri- able	fine to poor	sr	a-	10%	-	-	100	even	dull	very pale yellow	bright white	-	-	-	-	-	-	-
55	2379.5	20	SILT- STONE	banded	-	light grey	Fri- able	fine very to poor	sr	a-	20%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
56	2376	15	CLAY- STONE	carbonaceous flecks pyritic, banded	-	light grey	hard fri- able	very fine well	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
57	2374	20	CLAY- STONE	banded	-	grey	Fri- able	fine well	-	-	20%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
58	2372	35	CLAY- STONE	silty	-	medium grey	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	2370	50	CLAY- STONE	silty	-	medium grey	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	2368	60	CLAY- STONE	carbonaceous	-	medium grey	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
61	2363	50	CLAY- STONE	silty, carbonaceous	-	medium grey	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62	2360	40	CLAY- STONE	carbonaceous, pyritic.	-	medium grey	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
63	1800	25	MARL	forams, pyrite	V	light grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
64	1775	25	MARL	forams, pyrite	V	light grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65	1750	20	MARL	forams, pyrite	V	light grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	-	-	-

FORM R 257 3 72

NO.	DEPTH	REC	ROCK	MODIFIERS		CAL	COLOR	INDUR	DEG	GRAIN	SRTG	RND	DISS	CLAY	STAIN	%	FLOURESCENCE			CUT FLUOR.		CUT RESIDUE		SHOW	PROB	REMARKS - GAS										
				1a	1												2	3	4	5	6	7	8				9	10	11	12	13	14	15	16	17	18
66	1725	30	MARL	minor pyrite	V		light grey	-	-	-	-	-	30%	-	-	-																				
67	1698	20	MARL	minor pyrite	V		medium grey	-	-	-	-	-	30%	-	-	-																				
68	1665	15	MARL	Forams, minor pyrite	V		light grey	-	-	-	-	-	30%	-	-	-																				
69	1605	20	MARL	pyrite	V		light grey	-	-	-	-	-	30%	-	-	-																				
70	1545	-		NOT RECOVERED																																
71	1488	20	MARL	pyrite	V		light grey	-	-	-	-	-	30%	-	-	-																				
72	1425	15	MARL	dense pyritic.	V		light grey	-	-	-	-	-	30%	-	-	-																				
73	1365	15	MARL	clean pyritic	V		light grey	-	-	-	-	-	30%	-	-	-																				
74	1305	15	MARL	clean pyritic.	V		light grey	-	-	-	-	-	30%	-	-	-																				
75	1240	20	MARL	clean pyritic.	V		light grey	-	-	-	-	-	30%	-	-	-																				
76	1180	10	MARL	Forams, pyritic	V		light grey	-	-	-	-	-	30%	-	-	-																				
77	1120	-		NOT RECOVERED.																																
78	1060	15	MARL	clean	V		light grey	-	-	-	-	-	30%	-	-	-																				
79	1000	30	MARL	banded	V		light grey	-	-	-	-	-	30%	-	-	-																				
80	940	35	MARL	Forams	V		light grey	-	-	-	-	-	30%	-	-	-																				
81	880	30	MARL	clean	V		light grey	-	-	-	-	-	30%	-	-	-																				
82	2385	20	MARL	forams	V		light grey	-	-	-	-	-	30%	-	-	-																				
83	2381	-		NOT RECOVERED																																
84	2377.5	20	MARL	forams	V		light grey	-	-	-	-	-	30%	-	-	-																				
85	2375	20	MARL	forams	V		light grey	-	-	-	-	-	30%	-	-	-																				
86	2373	-		NOT RECOVERED																																
87	2371	20	MARL	forams, clean	V		light grey	-	-	-	-	-	30%	-	-	-																				
88	2366	20	MARL	forams, clean	V		light grey	-	-	-	-	-	30%	-	-	-																				
89	2362	-		NOT RECOVERED																																
90	2350	25	MARL	forams, clean	V		light grey	-	-	-	-	-	30%	-	-	-																				
91	2325	20	MARL	forams, clean	V		light grey	-	-	-	-	-	30%	-	-	-																				
92	2299	-		NOT RECOVERED																																

Possibly misplaced.
Misplaced should be Sandstone.

FORM R 257 3 72

NO.	DEPTH	FEET	ROCK TYPE	MODIFIERS	CAL	COLOR	INDUR DEG	GRAIN SIZE	SRTG	RND	DISS CLAY	STAIN	FLOURESCENCE			CUT FLUOR.		CUT RESIDUE		SHOW	PROB	REMARKS - GAS	
													%	DISTR	INTEN	INTEN	COLOR	INTEN	COLOR				QUAN
1a	1	2	3	4	5	6	7	8	9	10	11	12	RK	14	15	16	17	18	19	20	21	22	23
93	2277.5	30	MARL	Forams, clean	V	light grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	
94	2249	20	MARL	Forams	V	grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	
95	2225	-		NOT RECOVERED	-	NO FIRE																	
96	2200	50	MARL	Forams	V	light grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	
97	2175	30	MARL	Forams	V	light grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	
98	2150	-		NOT RECOVERED	-	NO FIRE																	
99	2125	50	MARL	Forams	V	grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	
100	2100	30	MARL	Forams	V	light grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	
101	2075	-		NOT RECOVERED																			
102	2050	50	MARL	Forams	V	light grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	
103	2025	40	MARL	Forams	V	light grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	
104	2000	-		NOT RECOVERED																			
105	1975	10	MARL	Forams	V	light grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	
106	1950	30	MARL	Forams	V	light grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	
107	1925	-		NOT RECOVERED																			
108	1900	50	MARL	Forams	V	light grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	
109	1875	50	MARL	Forams	V	medium grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	
110	1850	-		NOT RECOVERED																			
111	1825	15	SAND- STONE	clean	-	light grey	fri- able	fine grained	well	sa-	10%	-	-	100	even	dull	very pale yellow	bright white	??				Suspect sample mis- placed from latrobe
	RUN 4																						
112	2381	30	SAND- STONE	carbonaceous	-	medium grey	fri- able	fine grained	well	sa-	10%	-	-	-	-	-	-	-	-	-	-	-	
113	2373	50	MARL		V	medium grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	
114	2369	50	MARL	clean	V	light grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	
115	2367	50	MARL	clean	V	light grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	
116	2365	50	MARL		V	light grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	
117	2364	-		CORE NOT RECOVERED		light																	
118	2362	40	MARL	Forams	V	grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	
119	2361	50	MARL	Forams	V	light grey	-	-	-	-	30%	-	-	-	-	-	-	-	-	-	-	-	

SIDEWALL CORE DESCRIPTIONS

J.D. ALDER

WEST HALIBUT-1

6/9/78

WC NO.	DEPTH	RECOVERED	DESCRIPTION
			<u>RUN-1</u>
1	860m	25mm	<u>Siltstone</u> - medium light grey, minor yellow brown mottling, silt, firm, very calcareous, micromicaceous, some calcareous nodules - silt size grains.
2	842.5m	15mm	<u>Siltstone</u> - medium light grey, firm, blocky, silt, very calcareous. Slightly more cemented than previous sample. Fossiliferous - forams common.
3	825m	15mm	<u>Calcsiltite</u> - light grey to medium light grey, silt, very calcareous, firm, trace pyrite. Micromicaceous, trace glauconite, trace carbonaceous flecks, calcareous nodules common.
4	802m	20mm	<u>Calcsiltite</u> - medium light grey, silt, very calcareous, firm to hard, trace glauconite matrix is crystalline in part, occasional forams present.
5	769m	40mm	<u>Calcsiltite</u> - medium grey, very fine silt, firm, massive, trace glauconite. Fossiliferous - forams, very calcareous.
6	753.5m	40mm	<u>Calcsiltite</u> - medium light grey, very fine silt, firm, massive matrix is crystalline in part, trace glauconite, fossiliferous - forams, micromicaceous. Very calcareous, sample has a number of white calcite veinlets.
7	727.5m	20mm	<u>Calcsiltite</u> - light to medium light grey, silt to coarse silt, firm to hard, massive crystalline matrix in part, fossiliferous - forams, trace glauconite, very calcareous.
8	704m	25mm	<u>Calcsiltite</u> - medium light grey, fine to medium silt, firm to hard, massive fossiliferous - forams, trace glauconite, very calcareous.
9	685m	30mm	<u>Calcsiltite</u> - medium light grey, medium silt, firm, massive, some colour mottling, trace glauconite, very calcareous, some calcareous nodules.
10	660m	55mm	<u>Calcsiltite</u> - medium light grey, coarse silt, soft massive, trace glauconite, very calcareous, some calcareous nodules. Occasional forams.
11	640m	25mm	<u>Calcsiltite</u> - medium light grey, fine to medium, silt, firm, massive, very calcareous, trace glauconite.
12	620m	40mm	<u>Calcsiltite</u> - medium light grey, fine, silt, firm, massive, very calcareous, trace glauconite, occasional fossils - forams, coral stems.
13	597m	40mm	<u>Calcsiltite</u> - medium light grey, coarse silt, firm massive, very calcareous, trace glauconite, trace pyrite.
14	581.5m	45mm	<u>Calcarenite</u> - medium light grey to green grey, very fine sand in a clay matrix, very poorly sorted, firm, massive, very calcareous, abundant glauconite.
15	557.5m	40mm	<u>Calcarenite</u> - green grey, very fine sand in clay
			2/....

SIDEWALL CORE DESCRIPTIONS

J.D. ALDER

WEST HALIBUT-1

6/9/78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
15	557.5m	40mm	Continued/.... matrix, angular to subrounded, very poorly sorted, firm, massive, very calcareous, fossiliferous - forams, approximately 5% glauconite.
16	542m	50mm	<u>Micrite</u> - medium light grey, trace fine silt, firm, massive, very calcareous, trace glauconite.
17	525m	35mm	<u>Micrite</u> - light grey, firm, massive, very calcareous, slightly silty.
18	506.5m	50mm	<u>Calcsiltite</u> - light grey, fine to medium, silt, firm, massive, very calcareous, occasional forams. 7/9/78
19	485m	50mm	<u>Micrite</u> - medium light grey, slightly silty, firm, massive, very calcareous, very finely disseminated, Pyrite?
20	468m	45mm	<u>Micrite</u> - medium light grey, silty in part, firm, massive, very calcareous, some green colour mottling, disseminated pyrite.
21	445m	40mm	<u>Calcsiltite</u> - light to medium light grey, silty, very calcareous, firm, massive. Occasional forams.
22	425m	50mm	<u>Calcsiltite</u> - medium light grey, coarse, silt, very calcareous, firm, massive, occasional forams, trace pyrite.
23	401m	50mm	<u>Calcarenite</u> - medium light grey, very fine grained, angular to subrounded, poorly sorted in calcareous clay matrix, firm, massive, very calcareous, trace pyrite.
24	371.5m	-	NO RECOVERY.
25	357m	50mm	<u>Calcarenite</u> - medium light grey, fine grained, subangular to subrounded, moderately well sorted. 25% white clay matrix, friable.
26	336m	50mm	<u>Calcarenite</u> - medium light grey, fine grained, subangular to subrounded, moderate to well sorted, friable, 25% white clay matrix.
27	309m	40mm	<u>Calcarenite</u> - medium light grey, fine to very fine grained, subangular to subrounded, moderate to well sorted, friable, 25% white clay matrix.
28	283m	30mm	Cavings - nodules of cement, metal fragments and calcarenite stuck together by lumps of drilling mud.
29	264m	<5mm	Loose Fossil Fragments mainly shell debris.
30	240m	<5mm	Loose Fossil fragments, mainly shell debris, one piece 40mm.

SIDEWALL CORE DESCRIPTIONS

R.C.N. THORNTON/A.W. JAMES

WEST HALIBUT-1

22/9/78

WC NO.	DEPTH	RECOVERED	DESCRIPTION
			<u>RUN-2</u>
31	2565m	35mm	<u>Siltstone</u> - dark grey, firm, silty, carbonaceous, trace medium grained quartz grains.
32	2553.5m	30mm	<u>Sandstone</u> - grey to brown, friable, quartz, clear, polished, subangular to subrounded, poorly sorted, fine to coarse grained, carbonaceous, 10-20% clay matrix, low porosity.
33	2549m	30mm	<u>Shale</u> - dark grey, semi-fissile, micaceous, carbonaceous.
34	2545m	40mm	<u>Shale</u> - dark grey, firm, micaceous, carbonaceous, pyritic, patches of clear silt.
35	2541m	30mm	<u>Interbedded Shale and minor Sandstone</u> <u>Shale</u> - dark grey, firm, carbonaceous, micaceous, pyritic. <u>Sandstone</u> - light to dark grey, friable, quartz, clear to light grey, polished to frosted, subangular to rounded, very poorly sorted, fine to very coarse grained, dark grey clay matrix.
36	2537m	30mm	<u>Shale</u> - dark grey, hard, micaceous, pyritic, carbonaceous.
37	2522m	25mm	<u>Shale</u> - dark grey, firm, silty, micaceous, pyritic, carbonaceous.
38	2518m	25mm	<u>Shale</u> - dark grey, firm, silty, micaceous, pyritic, with interbeds of coal - black, shiny.
39	2515m	20mm	<u>Sandstone</u> - grey to brown, friable, quartz, clear, subangular to subrounded, polished, well sorted, fine grained, with trace granules of quartz, carbonaceous streaks and blebs common.
40	2510.5m	20mm	<u>Siltstone</u> - grey, soft, quartz, mica, clay matrix.
41	2507.5m	25mm	<u>Sandstone</u> - light grey, friable, quartz, clear, very fine grained, well sorted, micaceous, pyritic, carbonaceous streaks, clay matrix.
42	2502.5m	20mm	<u>Sandstone</u> - light grey, friable, quartz, clear, polished, subangular to subrounded, well sorted, fine grained, clean, low porosity, minor clay matrix.
43	2488.5m	30mm	<u>Sandstone</u> - light grey, friable, quartz, clear, polished, angular to rounded, poorly sorted, mostly fine to medium grained, trace very coarse grained, clean minor carbonaceous bands, trace pyrite, moderate porosity.
44	2479m	25mm	<u>Sandstone</u> - grey brown, friable, quartz, very fine to fine grained, moderately sorted, dirty, dark grey carbonaceous streaks, pyritic, banding grey brown, due to variations in amount of carbonaceous material.
			2/....

SIDEWALL CORE DESCRIPTIONS

R.C.N. THORNTON/A.W. JAMES

WEST HALIBUT-1

22/9/78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
45	2472.5m	20mm	<u>Shale</u> - dark grey to brown, hard, silty, micaceous, pyritic.
46	2464.5m	25mm	<u>Sandstone</u> - light grey, friable, quartz clear, polished, angular to subrounded, moderately sorted, fine to medium grained, micaceous, trace pyrite, carbonaceous white clay matrix, low porosity, no fluorescence.
47	2450m	25mm	<u>Sandstone</u> - light grey, friable, quartz, clear, polished, angular to subrounded, well sorted, fine grained, trace mica, clay matrix, low porosity, no fluorescence.
48	2442m	20mm	<u>Sandstone</u> - light grey brown banded, friable, quartz, clear, angular to subrounded, well sorted, fine grained, micaceous, carbonaceous flecks, banding caused by varying amounts of carbonaceous clay matrix, no fluorescence.
49	2439m	40mm	<u>Sandstone</u> - grey brown, friable, quartz, clear to light grey, polished to frosted, subangular to rounded, very poorly sorted, fine to very coarse grained, carbonaceous white clay matrix, poor porosity, very pale yellow fluorescence, slight white cut.
50	2427.5m	25mm	<u>Sandstone</u> - light grey, friable, quartz, clear, polished, subangular to rounded, well sorted, fine grained, carbonaceous flecks, clay matrix, poor porosity, very pale yellow fluorescence throughout, immediate dense white cut.
51	2424m	25mm	<u>Sandstone</u> - light grey, friable, quartz, well sorted, fine grained, carbonaceous flecks, clay matrix, very pale yellow to green fluorescence thru' whole rock, dense white cut.
52	2411m	30mm	<u>Sandstone</u> - light grey, friable, quartz, poorly sorted, fine grained to medium grained, abundant carbonaceous flecks, clay matrix, very pale yellow to green fluorescence, even dense white cut.
53	2387m	20mm	<u>Sandstone</u> - light grey, friable, very poorly sorted, quartz grains, up to 7.5mm, fine grained to very coarse grained, clean, white to light grey clay matrix, very pale yellow fluorescence, even dense white cut.
54	2383m	20mm	<u>Sandstone</u> - light grey, friable, very poorly sorted, quartz grains, up to 6-8mm, fine grained to very coarse grained, light grey clay matrix. Some minor carbonaceous flecks, very pale, even, yellow fluorescence, dense white cut, brittle.
55	2376m	20mm	<u>Siltstone</u> - light grey, friable, well sorted, micaceous some banding very fine grained clay matrix, no fluorescence, or cut.
56	2376m	15mm	<u>Claystone</u> - medium to light grey, hard, carbonaceous flecks, no fluorescence or cut, poor porosity.
57	2374m	20mm	<u>Siltstone</u> - light grey, friable, well sorted, carbonaceous 3/....

SIDEWALL CORE DESCRIPTIONS

R.C.N. THORNTON/A.W. JAMES

WEST HALIBUT-1

22/9/78

SWC NO.	DEPTH	RECOVERED	DESCRIPTION
57	2374m	20mm	Continued/.... ceous, fine grained pyrite, banded clay matrix, poor porosity, no fluorescence or cut.
58	2372m	35mm	<u>Claystone</u> - medium to light grey, firm to hard, some minor carbonaceous flecks, very poor porosity, no fluorescence or cut, silty.
59	2370m	50mm	<u>Claystone</u> - medium to light grey, firm to hard, silty in part, quartz, very poor porosity, no fluorescence or cut.
60	2368m	60mm	<u>Claystone</u> - medium to light grey, firm to hard, silty in part, (quartz), carbonaceous flecks and patches, very poor porosity, no fluorescence or cut.
61	2363m	50mm	<u>Claystone</u> - medium to light grey, firm to hard, silty in part, carbonaceous flecks and patches, very poor porosity, no fluorescence or cut.
62	2360m	40mm	<u>Claystone</u> - medium to light grey, firm to hard, silty in part, long thin pyritic structures, carbonaceous flecks, very poor porosity, no fluorescence or cut.
63	1800m	25mm	<u>Marl</u> - light grey, firm to hard, silty, minor pyrite foraminifera, very poor porosity, no fluorescence or cut, very calcareous.
64	1775m	25mm	<u>Marl</u> - light grey, firm to hard, silty, minor pyrite, forams, very poor porosity, ~ > 30% clay, no fluorescence or cut, very calcareous.
65	1750m	20mm	<u>Marl</u> - light grey, firm to hard, predominantly clayey, some silt, forams, minor fine grains, pyrite, very poor porosity, no fluorescence or cut.
66	1725m	30mm	<u>Marl</u> - light grey, firm to hard, very calcareous, clayey, minor fine grained pyrite, very poor porosity, no fluorescence or cut.
67	1698m	20mm	<u>Marl</u> - medium grey, firm, very calcareous, clayey, minor fine grained pyrite, very poor porosity, no fluorescence or cut, forams.
68	1665m	15mm	<u>Marl</u> - light grey, firm, very calcareous, forams, clayey, minor pyrite, very poor porosity, no fluorescence or cut.
69	1605m	20mm	<u>Marl</u> - light grey, patches medium grey, firm, very calcareous, clayey, minor pyrite, very poor porosity, no fluorescence or cut.
70	1545m	-	NOT RECOVERED.
71	1485m	20mm	<u>Marl</u> - light grey, firm, very calcareous, clayey, minor pyrite, very poor porosity, no fluorescence or cut.
72	1425m	15mm	<u>Marl</u> - light grey, firm, very calcareous, pyritic, clayey, very poor porosity, no fluorescence or cut. 4/....

SIDEWALL CORE DESCRIPTIONS

R.C.N. THORNTON/A.W. JAMES

WEST HALIBUT-1

22/9/78

<u>SWC NO.</u>	<u>DEPTH</u>	<u>RECOVERED</u>	<u>DESCRIPTION</u>
73	1365m	15mm	<u>Marl</u> - light grey, firm, very calcareous, clayey, no fluorescence or cut, very low porosity, carbonaceous flecks.
74	1305m	15mm	<u>Marl</u> - light grey, firm, very calcareous, clayey to silty, no fluorescence or cut, very low porosity, pyritic.
75	1240m	20mm	<u>Marl</u> - light grey, firm, very calcareous, clayey to clean, very low porosity, some pyrite (?), no fluorescence, or cut.
76	1180m	10mm	<u>Marl</u> - light grey, firm, very calcareous, clean, clayey, very low porosity, some pyrite, no fluorescence or cut, forams.
77	1120m	-	NOT RECOVERED.
78	1060m	15mm	<u>Marl</u> - light grey, firm, very calcareous, clean, silty, minor pyrite, very low porosity, no fluorescence or cut.
79	1000m	30mm	<u>Marl</u> - light grey, firm, very calcareous, forams, banded, minor pyrite, very low porosity, silty in part, no fluorescence or cut.
80	940m	35mm	<u>Marl</u> - light grey, firm, very calcareous, forams, minor pyrite, very low porosity, silty, no fluorescence or cut.
81	880m	30mm	<u>Marl</u> - light grey, firm, very calcareous, forams, minor pyrite, very low porosity, silty, no fluorescence or cut.
	<u>RUN 3</u>		
82	2385m	20mm	<u>Marl</u> - light grey, firm, very calcareous, forams, very clean, silty, low porosity, no fluorescence or cut.
83	2381m	-	NOT RECOVERED.
84	2377.5m	20mm	<u>Marl</u> - light grey, firm, very calcareous, forams, very clean, silty, low porosity, no fluorescence or cut.
85	2375m	20mm	<u>Marl</u> - light grey, firm, very calcareous, forams, very clean, silty, low porosity, no fluorescence or cut, trace pyrite.
86	2373m		NOT RECOVERED - NO FIRE.
87	2371m	20mm	<u>Marl</u> - light grey, firm, very calcareous, very clean, silty, low porosity, no fluorescence or cut.
88	2366m	20mm	<u>Marl</u> - light grey, firm, very calcareous, very clean, silty, low porosity, no fluorescence or cut.
89	2362m		NOT RECOVERED - NO FIRE.
90	2350m	25mm	<u>Marl</u> - light grey, firm, very calcareous, clean, silty, low porosity, no fluorescence or cut.
91	2325m	20mm	<u>Marl</u> - light grey, firm, very calcareous, forams, clean, silty, low porosity, no fluorescence or cut.
			5/....

SIDEWALL CORE DESCRIPTIONS

R.C.N. THORNTON/A.W. JAMES

WEST HALIBUT-1

22/9/78

WC NO.	DEPTH	RECOVERED	DESCRIPTION
92	2299m	-	NOT RECOVERED.
93	2277.5m	20mm	<u>Marl</u> - light grey, firm, very calcareous, forams, clean, silty, low porosity, no fluorescence or cut.
94	2249m	20mm	<u>Marl</u> - light grey, firm, very calcareous, forams, carbonaceous patches, silty in part, low porosity, no fluorescence or cut.
95	2225m	-	NOT RECOVERED - MISFIRE.
96	2200m	50mm	<u>MARL</u> - medium to light grey, firm, very calcareous, silty in part, low porosity, no fluorescence or cut.
97	2175m	30mm	<u>Marl</u> - medium to light grey, firm, very calcareous, silty in part, clayey, low porosity, has no fluorescence or cut.
98	2150m		NOT RECOVERED - NO FIRE.
99	2125m	50mm	<u>Marl</u> - medium grey, firm, very calcareous, forams, silty in part, trace pyrite, low porosity, no fluorescence or cut.
100	2100m	30mm	<u>Marl</u> - medium grey, firm, very calcareous, forams, silty in part, predominantly clayey, trace pyrite, low porosity, no fluorescence.
101	2075m		NOT RECOVERED - MISFIRE.
102	2050m	50mm	<u>Marl</u> - medium grey, firm, very calcareous, forams, silty in part, but predominantly clayey, trace pyrite, low porosity, no fluorescence or cut.
103	2025m	40mm	<u>Marl</u> - light grey, firm, very calcareous, forams, clayey, low porosity, no fluorescence or cut.
104	2000m		NO FIRE - NOT RECOVERED.
105	2975m	10mm	<u>Marl</u> - light grey, firm, very calcareous, clayey, very low porosity, no fluorescence or cut.
106	1950m	30mm	<u>Marl</u> - light grey, firm, very calcareous, "platy", "cleavage", clayey, very low porosity, no cut or fluorescence.
107	1925m		NOT RECOVERED - NO FIRE.
108	1900m	50mm	<u>Marl</u> - light grey, firm, very calcareous, "platy", clayey, very low porosity, no fluorescence.
109	1875m	50mm	<u>Marl</u> - medium grey, firm, very calcareous, forams, trace pyrite, very low porosity, no fluorescence.
110	1850m	-	NOT RECOVERED - MISFIRE.
111	1825m	15mm	<u>Sandstone</u> - light grey, fine grained, well sorted, friable, quartz clear, subrounded to subangular. 10-20% clay matrix, low porosity, carbonaceous flecks, even fluorescence pale yellow, bright white cut.
	<u>RUN 4</u>		
112	2381m	30mm	<u>Sandstone</u> - medium grey, very fine grained, well sorted

SIDEWALL CORE DESCRIPTIONS

R.C.N. THORNTON/A.W. JAMES

WEST HALIBUT-1

22/9/78

WC NO.	DEPTH	RECOVERED	DESCRIPTION
112	2381m	30mm	Continued/.... friable, quartz clear, subrounded to subangular. 10-20% clay matrix, low porosity, carbonaceous flecks, no fluorescence or cut.
113	2373m	50mm	<u>Marl</u> - medium grey, clean, clayey, low porosity, no fluorescence or cut.
114	2369m	50mm	<u>Marl</u> - light grey, firm, very calcareous, clayey, very low porosity, no fluorescence or cut.
115	2367m	50mm	<u>Marl</u> - light grey, firm, very calcareous, clayey, clean, very low porosity, no fluorescence, or shows.
116	2365m	50mm	<u>Marl</u> - light grey, firm, very calcareous, clayey, clean, very low porosity, no fluorescence or cut.
117	2364m	-	CORE NOT RECOVERED.
118	2362m	40mm	<u>Marl</u> - light grey, firm, very calcareous, clayey, clean, very low porosity, no fluorescence or cut.
119	2361m	50mm	<u>Marl</u> - light grey, firm, very calcareous, clayey, clean, very low porosity, no fluorescence or cut.
120	2359m	50mm	<u>Marl</u> - light grey, firm, very calcareous, clayey, clean, very low porosity, no fluorescence or cut.
121	2358m	50mm	<u>Marl</u> - light grey, firm, very calcareous, abundant forams, pyrite, no fluorescence or cut.
122	2357m	40mm	<u>Marl</u> - light grey, firm, very calcareous, abundant forams, trace pyrite, no fluorescence or cut.
123	2356m	40mm	<u>Marl</u> - light grey, firm, very calcareous, abundant forams, trace pyrite, no fluorescence or cut.
124	2355m	50mm	<u>Marl</u> - light grey, firm, very calcareous, abundant forams, trace pyrite, no fluorescence or cut.
125	2354m	60mm	<u>Marl</u> - light grey, firm, very calcareous, abundant forams, trace pyrite, no fluorescence, or cut.
126	2353m	30mm	<u>Marl</u> - light grey, firm, very calcareous, abundant forams, trace pyrite, no fluorescence or cut.
127	2352m	60mm	<u>Marl</u> - light grey, firm, very calcareous, abundant forams, trace pyrite, no fluorescence or cut.
128	2351m	40mm	<u>Marl</u> - light grey, firm, very calcareous, abundant forams, trace pyrite, no fluorescence or cut.
129	2299m	50mm	<u>Marl</u> - light grey, firm, very calcareous, some dark patches, abundant forams, trace pyrite, no fluorescence, clayey.
130			NOT RECOVERED.
131	2150m	20mm	<u>Marl</u> - light grey, firm to hard, very calcareous, some forams, trace pyrite, no fluorescence, very poor
			7/....

SIDEWALL CORE DESCRIPTIONS

R.C.N. THORNTON/A.W. JAMES

WEST HALIBUT-1

22/9/78

WC NO.	DEPTH	RECOVERED	DESCRIPTION
131	2150m	20mm	Continued/....
			porosity, clayey.
132	2075m	40mm	Marl - light grey, firm to hard, very calcareous, clayey, some forams, trace pyrite, no fluorescence, very poor porosity.
133	2000m	-)	
134	1925m	-)	
135	1850m	-)-	CORE NOT RECOVERED - NO FIRE.
136	1545m	-)	
137	1120m	-)	

APPENDIX 3

APPENDIX 3

CONVENTIONAL CORE DESCRIPTIONS AND ANALYSIS

CORE DESCRIPTIONS

R.C.N. THORNTON

WEST HALIBUT-1

13/9/78

CORE #1

DEPTH	DESCRIPTION
2387.7m	<u>Sandstone</u> - light grey, clean, friable quartz, clear, white, polished, subangular to rounded, very fine grained, well sorted, minor pyrite aggregates, red to brown carbonaceous flecks, trace grain size patches of white clay, rare trace glauconite, low visual porosity, very minor clay matrix, spotty very pale yellow fluorescence, in part concentrated along streaks of highest porosity, strong petroliferous odour.
2389.6m	<u>Sandstone</u> - light grey to brown, clean, friable, quartz, clear, light grey, white, polished to frosted, subangular to rounded, fine to rare coarse grained, very poorly sorted, minor pyrite aggregates, red to brown carbonaceous flecks, low visual porosity, very minor clay matrix; 100% massive very pale yellow fluorescence, immediate dense milky white cut, strong petroliferous odour.
2389.9m	<u>Sandstone</u> - light grey to brown, clean, friable, quartz, clear, light grey, white, polished to frosted, subangular to rounded, fine to coarse grained, rare very coarse grained, light grey and frosted, very poorly sorted, very minor pyrite, trace carbonaceous flecks, rare trace glauconite, low visual porosity, very minor clay matrix; 100% massive very pale yellow to white fluorescence, immediate dense milky white cut, strong petroliferous odour.
2391.5m	<u>Sandstone</u> - very light grey to brown, very clean, friable, quartz, clear, light grey, polished to frosted, subangular to rounded, coarse to very coarse grained, poorly sorted, very high visual porosity, almost no clay matrix; 100% massive very pale yellow to white fluorescence, immediate dense milky white cut, petroliferous odour.
2392.8m	<u>Sandstone</u> - very light grey to brown, very clean, loose, quartz, clear, light grey, milky, polished to frosted, subangular to rounded, coarse grained to granule, very poorly sorted, very high visual porosity, almost no clay matrix; 100% massive very pale yellow to white fluorescence, immediate dense milky white cut, petroliferous odour.
2396.5m	<u>Sandstone</u> - very light grey to brown, very clean, loose, quartz, clear, light grey, polished to frosted, subangular to rounded, coarse grained, well sorted, high visual porosity, almost no clay matrix minor pyrite aggregates, massive very pale yellow to white fluorescence, immediate dense milky white cut, petroliferous odour.
2398.5m	<u>Sandstone</u> - very light brown to light grey, very clean, friable, quartz, clear, light grey, polished to frosted, subangular to rounded, coarse grained, well sorted, high visual porosity, almost no clay matrix, very minor pyrite aggregates, massive very pale yellow to white fluorescence, immediate dense milky white cut, petroliferous odour.
2399.3m	<u>Sandstone</u> - light grey, friable, quartz, clear, light grey, fine grained, well sorted, low visual porosity, minor clay matrix, minor pyrite aggregates, trace carbonaceous flecks, oil stained yellow brown and bleeding yellow to light brown oil; 100% massive very pale yellow to white fluorescence, immediate dense milky white cut, petroliferous odour.
2400.1m	Interbedded with thin (1-5mm) laminae of Siltstone - dark grey, firm, very carbonaceous, pyritic.
2400.1m	<u>Sandstone</u> - light brown to grey, hard, quartz, clear, light grey, very fine grained, to trace granule size, low visual porosity, minor clay matrix, pyrite common, rare trace glauconite; 10% very thin carbonaceous laminae and stringers. 100% massive very pale yellow to white fluorescence, immediate dense milky white cut, petroliferous odour.

CORE DESCRIPTIONS

R.C.N. THORNTON

WEST HALIBUT-1

14/9/78

CORE #2

DEPTH	DESCRIPTION
2400.3m	<u>Sandstone</u> - grey to brown, friable, quartz, polished, subrounded to rounded, well sorted, fine grained, minor pyrite aggregates, carbonaceous flecks and stringers, trace red grains, rare trace light green, ? glauconite grains, low visual porosity, minor clay matrix, massive very pale yellow fluorescence, immediate dense milky white cut, strong petroliferous odour.
2402.0m	<u>Sandstone</u> - medium grey, hard, quartz, polished, subrounded to rounded, well sorted, fine grained, approximately 20% white to light grey clay matrix, pyrite aggregates, abundant carbonaceous flecks, and minor blebs, minor mica, low visual porosity, blotchy, very pale yellow fluorescence, dense white cut, strong petroliferous odour.
2403.7m	Finely interlaminated <u>Siltstone</u> and minor <u>Sandstone</u> - laminae vary < 1mm-10mm in thickness. <u>Siltstone</u> - dark grey, hard, highly pyritic, carbonaceous, micaceous, enclosing a pod of quartz Sandstone, 10-20mm diameter, very poor sorting, coarse to very coarse grained, frosted, subangular to rounded grains in clay matrix. <u>Sandstone</u> - light grey, hard, clay rich, quartz, fine grained, polished, subrounded to rounded, well sorted, pyritic, carbonaceous. Trace very pale yellow fluorescence.
2404.5m	<u>Sandstone</u> - light grey to brown, hard, quartz, polished, subangular to rounded, very poorly sorted, mainly fine to medium grained, trace coarse grain pyrite aggregates, carbonaceous flecks and fine laminae, approximately 20% clay matrix, low visual porosity. Massive pale yellow fluorescence, immediate milky white cut, strong petroliferous odour. Minor very thin wispy laminae of <u>Siltstone</u> , dark grey, highly carbonaceous and pyritic.
2406.5m	<u>Sandstone</u> - light grey to brown, friable, quartz, polished, subangular to rounded, well sorted, fine grained, minor pyrite, minor carbonaceous flecks, minor clay matrix, moderate visual porosity. Massive pale yellow fluorescence, immediate dense, milky white cut, very strong petroliferous odour, variations in intensity of fluorescence, brings out fine horizontal bedding caused by very minor grain size variation and increase in clay.
2408.5m	<u>Sandstone</u> - grey to brown, friable, quartz, mostly clear, polished to frosted, very poorly sorted, fine to very coarse grained, minor clay matrix, pyrite, mica, carbonaceous flecks common, rare trace light green? glauconite grains, moderate visual porosity, massive pale yellow fluorescence, dense milky white cut, strong petroliferous odour.
2409.9m	<u>Sandstone</u> - light grey to brown, unconsolidated, mostly clear, minor milky or blue to grey, polished to frosted, poorly sorted, coarse to very coarse grained and granule, trace clay matrix, very minor carbonaceous flecks, pyrite, very high porosity, massive pale yellow fluorescence, dense milky white cut, petroliferous odour.
2411.7m	<u>Sandstone</u> - light grey to brown, friable, quartz, mostly clear, minor milky or blue to grey, polished to frosted, very poor sorting, fine to very coarse grained and granule, banded, caused by slight variations in grain size and sorting, minor clay matrix, trace mica, minor fine carbonaceous flecks, porosity varies from moderate in finer bands to high in coarser bands, massive pale yellow fluorescence, dense milky white cut, petroliferous odour. Trace horizontal, carbonaceous, micaceous, very thin <u>Siltstone</u> laminae.
2413.0m	<u>Sandstone</u> - light grey to brown, friable, quartz, mostly clear, polished, well sorted, fine grained, minor carbonaceous flecks and very thin laminae, trace mica, trace red grains, minor clay matrix, moderate visual porosity, 2/....

CORE DESCRIPTIONS

R.C.N. THORNTON

WEST HALIBUT-1

CORE #2

DEPTH

DESCRIPTION

2413.0m

Continued/....

massive pale yellow fluorescence, dense milky white cut, strong petroliferous odour.

CORE DESCRIPTIONS

R.C.N. THORNTON

WEST HALIBUT-1

14/9/78

CORE #3

DEPTH

DESCRIPTION

2413.0m-
2413.12m

Sandstone - grey to brown, friable, quartz, mostly clear, minor light grey, milky, polished to frosted, well sorted, medium grained, trace mica, carbonaceous flecks, very minor clay matrix, high visual porosity, massive very pale yellow fluorescence, immediate dense milky white cut, strong petroliferous odour.

DEPTH	DESCRIPTION
2425.0m	<u>Sandstone</u> - grey, friable, quartz, predominantly clear, trace light grey, polished to frosted, predominantly well sorted, fine grained, trace coarse grained, subangular to subrounded, trace mica, trace carbonaceous flecks, moderate visual porosity, massive very pale yellow to white fluorescence over most of the rock, but a few thin (1mm) more silty bands are indicated by their relative lack of fluorescence, immediate milky white cut, petroliferous odour.
2425.8m	<u>Sandstone</u> - grey to brown, very friable, quartz, clear to blue grey, polished to frosted, very poorly sorted, fine grained to granule, subangular to rounded, trace mica, trace carbonaceous flecks, high porosity, massive pale yellow fluorescence, immediate milky white cut, strong petroliferous odour.
2426.9m	<u>Sandstone</u> - grey to brown, unconsolidated, quartz, clear to blue grey, polished to frosted, very poorly sorted, fine grained to granule, subangular to rounded, trace mica, trace carbonaceous flecks, trace pyrite, very high porosity, massive pale yellow fluorescence, immediate dense milky white cut, petroliferous odour.
2427.2m	<u>Sandstone</u> - grey to brown, friable, quartz, clear to minor grey, polished to frosted, subangular to subrounded, well sorted, fine grained, trace mica, moderate porosity, minor ½-1mm dark grey, micaceous bands, massive pale yellow fluorescence, dense milky white cut, petroliferous odour.
2428.9m	<u>Sandstone</u> - as for 2426.9m.
2429.7m	<u>Sandstone</u> - banded grey to dark grey, friable, 5mm thick grey bands comprise quartz, well sorted, very fine grained, clear, low porosity, 1-2mm thick dark grey bands comprise mostly large flakes of dark brown mica, quartz bands fluorescence with very pale yellow colour, petroliferous odour.
2432.0m	<u>Sandstone</u> - dark grey to brown, friable, quartz, clear to minor grey, polished to frosted, subangular to subrounded, well sorted, fine grained, trace mica, moderate porosity, minor very dark grey ½mm bands containing mica and carbonaceous flecks, grading into <u>Sandstone</u> - dark grey to brown, friable, quartz clear to grey, polished to frosted, subangular to rounded, very poorly sorted, fine grained to granule, mica common, both massive pale yellow fluorescence, milky white cut, strong petroliferous odour.
2432.9m	<u>Sandstone</u> - grey to brown, friable, quartz, mainly clear to light grey, polished to frosted, well sorted, fine grained, mica common, both disseminated throughout, and concentrated into very thin dark bands, minor carbonaceous flecks, moderate porosity, pale yellow fluorescence, immediate milky white cut, petroliferous odour.
2433.9m	<u>Sandstone</u> - brown, friable, quartz, clear to milky to light grey, frosted, well sorted, granule, subrounded to rounded, very fine pyrite aggregates, mica, carbonaceous flecks common, trace red to brown dolomite pebble, very high porosity, pale yellow fluorescence, immediate milky white cut, petroliferous odour.
2435.0m	<u>Sandstone</u> - brown, unconsolidated, quartz, clear to milky to light grey, frosted, well sorted, coarse grained to granule, subrounded to rounded, trace pyrite, mica, carbonaceous flecks, very high porosity, pale yellow fluorescence, immediate white cut, petroliferous odour.
2436.0m	Finely interbedded <u>Siltstone</u> and <u>Shale</u> - interbeds and lenses of Siltstone vary 1-3mm, shale bands more continuous and even thickness (1mm). Siltstone - light grey, hard, quartz, Shale - dark grey, fissile, highly micaceous, carbonaceous, prytic.

CORE DESCRIPTIONS

R.C.N. THORNTON

WEST HALIBUT-1

16/9/78

CORE #4

DEPTH

DESCRIPTION

2436.6m

Sandstone - grey to brown, friable, quartz, clear to blue grey, polished to frosted, very poorly sorted, fine to very coarse grained, subangular to rounded, mica common, minor carbonaceous flecks, trace pyrite, high porosity, pale yellow fluorescence, immediate white cut, petroliferous odour.

CORE DESCRIPTIONS

R.C.N. THORNTON

WEST HALIBUT-1

17/9.78

CORE #5

DEPTH

DESCRIPTION

2436.6m

Sandstone - grey to brown, friable, quartz, clear to minor milky and pale grey, polished to frosted, subangular to rounded, very poorly sorted, medium grained to granule, high porosity, trace pyrite encrusted on granules, trace carbonaceous flecks, massive pale yellow fluorescence, immediate milky white cut, petroliferous odour.

2437.2m

Coal - black, hard, bituminous, pyritic.

2438.6m

Shale - very dark grey to black, very hard, dense, silty, pyrite finely disseminated throughout, finely micaceous, black carbonaceous flecks, and very thin coal laminae.

CORE DESCRIPTIONS

R.C.N. THORNTON

WEST HALIBUT-1

18/9/78

CORE #6

DEPTH	DESCRIPTION
2444.0m	Thinly interlaminated <u>Siltstone</u> and <u>Shale</u> - slightly burrowed. <u>Siltstone</u> - light grey, hard quartz, white clay matrix, carbonaceous flecks, lenses (1-10mm thick). <u>Shale</u> - very dark grey, hard, laminae are more continuous and evenly thin (1-3mm) than Siltstone, carbonaceous, silty, micaceous, pyritic.
2444.8m	<u>Coal</u> - black, bituminous, conchoidal fracture, pyrite blebs and lenses.
2445.5m	<u>Sandstone</u> - grey, dark grey streaks, quartz, clear, polished, subangular to subrounded, moderately sorted, fine to medium grained, mica common, trace pyrite, carbonaceous flecks common, slight banding due to presence of "dirty" bands rich in carbonaceous material and mica, porosity poor to moderate, best porosity part is oil stained brown, strong pale yellow fluorescence, milky cut, no fluorescence in low porosity part.
2447.7m	<u>Shale</u> - very dark grey, hard, carbonaceous, silty, micaceous, pyritic, coal lenses and blebs.
2449.5m	Interlaminated <u>Sandstone</u> and <u>Shale</u> . <u>Sandstone</u> - dark grey, hard, quartz, clear, polished to frosted, poor sorting, fine to medium grained, angular to subrounded, micaceous, both white and brown, large flakes, carbonaceous flecks and streaks, slightly pyritic, very low porosity, no fluorescence 2-10mm thick. <u>Shale</u> - very dark grey, hard, carbonaceous, silty, micaceous, pyritic, 1.5mm thick.
2451.3m	<u>Sandstone</u> - light brown, friable, clean, quartz, clear to minor light grey, subangular to subrounded, well sorted, medium grained, trace mica, trace carbonaceous flecks, high porosity, massive pale yellow fluorescence (flushed by drilling mud up to 20mm from wall of core), immediate milky white fluorescence, petroliferous odour.
2451.75m	<u>Sandstone</u> - light brown, friable, clean, quartz, clear to minor light grey, subangular to subrounded, moderately sorted, mostly fine grained, minor coarse grained, trace mica and carbonaceous flecks, minor carbonaceous streaks, moderate porosity, very minor pale yellow fluorescence, especially close to carbonaceous streaks.
2451.8m	<u>Sandstone</u> - light brown, friable, quartz, very poorly sorted, fine grained to granule, fine grained quartz, clear, polished, subangular to subrounded, granule quartz, milky to pale grey, frosted, rounded, trace mica, carbonaceous flecks and coaly streaks common, moderate porosity, rare trace pale yellow fluorescent specks.
2452.3m	<u>Sandstone</u> - grey, hard, quartz, clear, subrounded to rounded, polished, well sorted, fine grained, carbonaceous flecks common, approximately 20% white clay matrix, very thin carbonaceous and micaceous laminae common, ripples and small scale cross-bedding faintly discernible as a result of being etched out by slightly darker very thin carbonaceous laminae. No fluorescence.
2453.5m	Very thinly interlaminated <u>Sandstone</u> and <u>Shale</u> - laminae 1-2mm thick and slightly burrowed (burrows sand filled). <u>Sandstone</u> - light grey, hard, quartz, very fine to fine grained, minor lenses and pods, mostly continuous laminae, trace mica and pyrite, tight, no fluorescence.

2/....

CORE DESCRIPTIONS

R.C.N. THORNTON

WEST HALIBUT-1

18/9/78

CORE #6

<u>DEPTH</u>	<u>DESCRIPTION</u>
2453.5m	Continued/....
	<u>Shale</u> - dark grey, hard, micaceous, pyritic, carbonaceous, silty, mostly continuous laminae.
2454.6m	<u>Sandstone</u> - grey, hard, quartz, clear, polished, subangular to subrounded, well sorted, fine grained, approximately 20% white clay matrix, bedding etched out faintly by thin darker and slightly carbonaceous and pyritic laminae, low porosity, no fluorescence.
2455.4m	<u>Sandstone</u> - grey to brown, friable, clean, quartz, clear to minor milky and light grey, polished, subangular to subrounded, well sorted, medium grained, mica common, trace carbonaceous flecks, moderate porosity, no fluorescence.
2456.5m	<u>Sandstone</u> - overlying <u>Coal</u> - contact sharp but slightly undulose.
	<u>Sandstone</u> - grey to brown, friable, clean, quartz, clear, polished to frosted, subangular to subrounded, well sorted, medium grained, moderate porosity, no fluorescence.
	<u>Coal</u> - black, fissile, pyritic, slightly micaceous, silty blebs and very thin laminae.
2457.0m	<u>Sandstone</u> - grey to brown, friable, clean, quartz, clear, polished, subangular to subrounded, well sorted, medium grained, high porosity, trace mica, carbonaceous flecks, no fluorescence.

CORE ANALYSIS RESULTS

Company ESSO AUSTRALIA LTD Formation _____ File WA-CA-23
 Well WEST HALIBUT NO 1 Core Type CONVENTIONAL DIAMOND Date Report 23 SEPT 78
 Field _____ Drilling Fluid _____ Analysts DS
 County AUSTRALIA State VIC Elev. _____ Location BASS STRAIT

Lithological Abbreviations

SAND - SD DOLOMITE - DOL ANHYDRITE - ANHY SANDY - SDY FINE - FN CRYSTALLINE - XLN BROWN - BRN FRACTURED - FRAC SLIGHTLY - SL/
 SHALE - SH CHERT - CH CONGLOMERATE - CONG SHALY - SHY MEDIUM - MED GRAIN - GRN GRAY - GY LAMINATION - LAM VERY - V/
 LIMY - LMY COARSE - CSE GRANULAR - GRNL VUGGY - VGY STYLOLITIC - STY WITH - W/

SAMPLE NUMBER	DEPTH M XXXX	PERMEABILITY MILLIDARCYS KL	POROSITY PER CENT	RESIDUAL SATURATION PER CENT PORE		CALC GRAIN DENS	SAMPLE DESCRIPTION AND REMARKS
				OIL	TOTAL WATER		
	2389.7-89.85	44	16.6	23.0	67.8	2.60	SST:lt gy,vf-f to occ crse grn, mod hd,poor sort,silica cmtd,dom subang,tr mica, bright wht yell flu with wht yell cut.
2	2391.5-91.6	1881	18.6	9.9	70.3	2.59	SST:lt gy,med-granular,v/friab, v/poor sort,sl silica cmtd, subang-rnd,tr mica and carb material,flu and cut a/a.
	2395.9-96	1549	21.3	15.1	68.3	2.60	SST:as above.
4	2397.6-97.7	2232	20.4	10.2	79.7	2.59	SST:as above.
	2399-99.05	0.4	7.5	1.3	86.5	2.68	SST:lt-med brn,vf-f grn,v/hd, mod sort,silica cmtd,subang to subrnd,silty,tr mica and carb material,patchy bright wht yell flu with wht yell cut.
	2402.7-02.8	0.8	13.0	10.8	80.9	2.62	SST:as above,dom f grn,hd,less silty,tr fine dissem py, flu & cut a/a.
	2404-04.1	8.5	15.3	24.8	70.2	2.63	SST:lt gy,vf-med to occ crse grn,mod hd,poor sort,silica cmtd,dom subang,tr mica, bright wht yell flu and wht yell cut.
8	2406.2-06.3	20	15.9	18.9	62.0	2.60	SST:as above.
	2409-09.1	305	19.3	21.1	65.4	2.61	SST:lt gy,med-granular,v/friab v/poor sort,sl silica cmtd, subang-rnd,tr mica,flu and cut as above.
10	2410.9-11.0	695	25.2	7.2	57.7	2.66	SST:as above.
11	2426.8-26.9	1967	21.5	12.4	45.2	2.64	SST:as above,no mica,patchy flu
12	2428.5-28.6	939	17.6	11.1	54.7	2.59	SST:as above,no mica,patchy flu
13	2434.2-34.3	8066	21.9	5.2	68.4	2.66	SST:dom granular,as above.

NOTE: Samples 2,3,4,9,10,11,12,13 were badly flushed with drilling fluid.
 These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations, as to the productivity, proper operations, or profitability of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT - 1

SCALE 1:100

CORE No. 1

Interval Cored 2387-2400.3 Cut 13.30m Recovered 10.25m (77%) Fm. LATROBE GROUP

Bit Type C22 Face Discharge Bit Size 8.15/32 in. Desc by R.C.N. THORNTON Date 13.9.78

DEPTH & CORING RATE m/Hr.	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2387.0	MM		NEARSHORE MARINE		Massive			Lt. grey	●		LOW	SANDSTONE: mostly massive, very minor dark grey silty interbeds.
2												Horizontal dip overall.
4	MM		NEARSHORE MARINE		Massive			Lt. grey	●		LOW	SANDSTONE: Light grey, clean, friable, quartz, clear-white, polished, subangular to rounded, very fine grained to very rare granule, well sorted, minor pyrite aggregates, red to brown carbonaceous flecks, trace grain size patches of white clay; rare trace glauconite; minor clay matrix. Spotty fluorescence, very pale yellow, in part concentrated along streaks of higher porosity; strong petroliferous odour; Oil bleeding from the more porous laminae.
6												
8	MM		NEARSHORE MARINE		Massive			Lt. grey	●		LOW	
2388.0												2
4	MM		NEARSHORE MARINE		Massive			Lt. grey	●		LOW	
6												2
8	MM		NEARSHORE MARINE		Massive			Lt. grey	●		LOW	
2389.0												2

NB: CORE RECOVERY: INTERVAL 2387.0-2390.2 = 3.20m = 100%
 2390.2-2398.5 = 5.30m = 63% - Loss due to grinding during coring. (Zones of no recovery not marked on sheets)
 2398.5-2400.3 = 1.80m = 100%.

NB: SP = SEAL PEEL SAMPLE
 CA = CORE ANALYSIS SAMPLE
 CA(P) = CORE ANALYSIS SAMPLE DISPATCHED TO CORELAB (PERTH)

→ = PALYNOLOGY SAMPLE.

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT -1

SCALE 1:100

CORE No. 1

Interval Cored 2387-2400.3 Cut 13.30m Recovered 10.25m (77%) Fm. LATROBE GROUP

Bit Type C22 FACE DISCHARGE Bit Size 8.15/32 in. Desc by R.C.N. THORNTON Date 13.9.78

DEPTH & CORING RATE m/Hr.	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
89-0												
2												
4												
6												
8												
90-0												
2												
4												
6												
8												
91-0												

NEARSHORE MARINE

Massive

Lt. gy. - brn.

LOW

SANDSTONE: light grey brown, clean, friable, quartz, clear, light grey to white, polished to frosted, subangular to rounded, fine to rare coarse grained, very poor sorted, minor pyrite aggregates, red brown carbonaceous flecks; very minor clay matrix. 100% very pale yellow fluorescence, immediate dense milky white cut; strong petroliferous odour.

N.B. 2387.0-2390.2 REC 3.20m = 100%

CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 1

Interval Cored 2387-2400.3

Cut 13.30m

Recovered 10.25m

(77%) Fm. LATROBE GROUP

Type C22 FACE DISCHARGE

Bit Size 8.15/32

in, Desc by R.C.N. THORNTON

Date 13.9.78

DEPTH & CORING RATE m/Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2387.0 SP 0 5 10 15			NEARSHORE MARINE				S		Yellow		Low	Interbedded SANDSTONE, minor carbonaceous laminae, dark grey to black, and 1mm thick SHALE bands. Pods of granule sized quartz in small slumps. Trace of horizontal burrows.
2390.0 CA (P) 0 5 10 15												
2392.0 SP 0 5 10 15					Massive			V. lt. gy. - brn.			V. high	SANDSTONE - massive, some indication of bedding due to slight grain size differentiation. Horizontal bedding overall, some indication of cross bedding. Sandstone is very light grey, very clean, friable, quartz, clear to light grey, polished to frosted, subangular to rounded, coarse to very coarse grained and granule, very poorly sorted, almost no clay matrix. 100% very pale yellow to white fluorescence; immediate dense white cut; strong petroliferous odour.
2394.0 0 5 10 15												
2396.0 0 5 10 15												
2398.0 0 5 10 15												
2400.0 0 5 10 15												

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 1

Interval Cored 2387-2400.3 Cut 13.30m Recovered 10.25m (77 %) Fm. LATROBE GROUP

Bit Type C22 FACE DISCHARGE Bit Size 8.15/32 in, Desc by R.C.N. THORNTON Date 13.9.78

DEPTH & CORING RATE m / Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
393-0					Massive - Bedded			Lt. gy. - brn.			V. high	SANDSTONE, massive to bedded, due to slight grain size differentiation.
-2												
SP												
-4												
-6												
-8												
CA												
SP												
394-0												
-2												
-4												
SP												
-6												
-8												
2395-0												

ESSO AUSTRALIA LTD. CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 1

Interval Cored . 2387-2400.3 Cut 13.30m Recovered 10.25m (. 77%) Fm. LATROBE GROUP

Type C22 FACE DISCHARGE Bit Size 8.15/32 in. Desc by R.C.N. THORNTON Date 13.9.78

DEPTH & CORING RATE m/Hr.	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
<div style="display: flex; justify-content: space-between;"> 2387-0 0 5 10 15 </div> <div style="font-size: small;"> SP .2 .4 .6 .8 SP CA (P) 2388-0 CA .2 .4 .6 .8 SP .6 .8 2389-0 </div>				v.c. gr. Interbed. c. - v.c. gr. c. gr.	Interbed. c. - v.c. gr.	Coarsening upwards Graded bedding		v. lt. gy. - brn.			high	<p>SANDSTONE: very light grey to brown, very clean, loose, quartz, clear to light grey, polished to frosted, sub-angular to rounded, coarse grained, well sorted; almost no clay matrix. Massive very pale yellow to white fluorescence; immediate dense milky white cut; petroliciferous odour.</p> <p>Graded beds 30-50 mm thick.</p>

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 1

Interval Cored 2387-2400.3 Cut 13.30m Recovered 10.25m (77 %) Fm. LATROBE GROUP

Bit Type C22 Face Discharge Bit Size 8.15/32 in., Desc by R.C.N. THORNTON Date 13.9.78

DEPTH & CORING RATE m/Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2 7.0 SP 0 5 10 15 -2 -4 -6 CA (P) SP -8 CA												Carbonaceous laminae interbedded with very poorly sorted coarse grained-granule SANDSTONE.
2 8.0 -2 -4 SP -6 CA					Massive	Overall coarsening upwards		v. lt. brn. - lt. gy.			high	SANDSTONE, very light brown to light grey, very clean, friable, quartz clear to light grey, polished to frosted, sub-angular to subrounded, coarse grained, well sorted, almost no clay matrix, very minor pyrite aggregates. Massive very pale yellow to white fluorescence; immediate dense milky white cut; petroliferous odour.
2 9.0 -8 SP -6 CA							S	Lt. gy.			low	SANDSTONE, very fine grained interbedded with carbonaceous

and silty laminae. Extensive bioturbation - mostly horizontal, some vertical burrows. Very minor light brown pods of clay, 3-5 mm thick.

NB: 2390.2-2398.5m REC 5 m = 63%

Loss due to grinding during coring.

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 1

Interval Cored 2387-2400.3 Cut 13.30m Recovered 10.25m (.77%) Fm. LATROBE GROUP

Bit Type C22 Face Discharge Bit Size 8.15/32 in, Desc by R.C.N. THORNTON Date 13.9.78

DEPTH & CORING RATE m/Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS		
2387.0 9.0 CA(P)		W U	NEARSHORE MARINE		Churned bedding									
		W U											Most burrows horizontal, some vertical.	
		W U						G						Horizontally interbedded very fine grained SANDSTONE + 10% SILTSTONE, carbonaceous laminae, light brown pods of clay; some burrows
		W U						Sharp						SILTSTONE: dark grey, firm very carbonaceous, pyritic
		W U				Churned bedding								
		W U												SANDSTONE, light brown to grey, hard, quartz, clear to light grey, very fine trace granule, minor clay matrix, pyrite common; massive very pale yellow white fluorescence; immediate dense white cut; petroliferous odour.
		W U						Grad.						
		W U					massive			Lt. brn. - gy.				
2400.0														

Palynology samples: 2387.7; 2389.6; 2391.5; 2396.5; 2398.5; 2399.5; 2400.1

NB: 2398.5-2400.3m REC = 1.75m = 100%

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

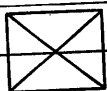
CORE No. 2

Interval Cored 2400.3-2413.0 Cut 12.7m... Recovered 7.8m (61%) Fm. LATROBE GROUP
Type C22 FACE DISCHARGE Bit Size 8.15/32 in. Desc by R.C.N. THORNTON/
Date 14/9/78 J.D. ALDER

DEPTH & DRILLING RATE m/Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
0-0.2												
0.2-0.4												
0.4-0.6		∩										
0.6-0.8		∩										
0.8-1.0		∩										
1.0-1.2		∩										
1.2-1.4		∩										
1.4-1.6		∩										
1.6-1.8		∩										
1.8-2.0		∩										
2.0-2.2		∩										
2.2-2.4		∩										
2.4-2.6		∩										
2.6-2.8		∩										
2.8-3.0		∩										
3.0-3.2		∩										
3.2-3.4		∩										
3.4-3.6		∩										
3.6-3.8		∩										
3.8-4.0		∩										
4.0-4.2		∩										
4.2-4.4		∩										
4.4-4.6		∩										
4.6-4.8		∩										
4.8-5.0		∩										
5.0-5.2		∩										
5.2-5.4		∩										
5.4-5.6		∩										
5.6-5.8		∩										
5.8-6.0		∩										
6.0-6.2		∩										
6.2-6.4		∩										
6.4-6.6		∩										
6.6-6.8		∩										
6.8-7.0		∩										
7.0-7.2		∩										
7.2-7.4		∩										
7.4-7.6		∩										
7.6-7.8		∩										
7.8-8.0		∩										
8.0-8.2		∩										
8.2-8.4		∩										
8.4-8.6		∩										
8.6-8.8		∩										
8.8-9.0		∩										
9.0-9.2		∩										
9.2-9.4		∩										
9.4-9.6		∩										
9.6-9.8		∩										
9.8-10.0		∩										

SANDSTONE: Grey to brown friable quartz; polished, subrounded to rounded, well sorted. Fine grained, minor pyrite aggregates. Carbonaceous flecks and stringers; trace red grains, rare trace light green? glauconite grains. Low visual porosity, minor clay matrix; Massive very pale yellow fluorescence. Immediate dense milky white cut. Strong petroliferous odour.

NB: SP = SEAL PEEL SAMPLE
CA = CORE ANALYSIS SAMPLE
CA(P) = CORE ANALYSIS SAMPLE DISPATCHED TO CORELAB (PERTH)
→ = PALYNOLOGY SAMPLE: Depths 2400.3, 2402.0; 2403.7; 2404.5, 2406.5; 2408.5; 2409.9; 2411.7; 2413.0.

 MAIN CORE LOSS ZONES DISTINGUISHED BY GROUND FACES BETWEEN BLOCKS OF CORE.

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 2

Interval Cored 2400.3-2413.0 Cut 12.7m Recovered 7.8m (61%) Fm. LATROBE GROUP

Bit Type C22 Face Discharge Bit Size 8.15/32 in., Desc by R.C.N. THORNTON Date 14/9/78
J.D. ALDER

DEPTH & CORING RATE m / Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
02.0 SP												
0.2		~			fine	Uniform		med. gy.			low	SANDSTONE: Medium grey, Hard quartz, polished. Subrounded to rounded. Well sorted. Fine grained; 20% white to light grey clay matrix. Pyrite aggregates Carbonaceous flecks and minor blebs; minor mica, low visual porosity; blotchy very pale yellow fluorescence. Dense white cut. Strong petroliferous odour.
0.4		~										
0.6		~										
0.8		~										
03.0 CA(P)												
0.2		~										
0.4												
0.6												
0.8					Silt sand f. granular	Inter-bedded	S	Lt.-dk. gy.			low	SANDSTONE: Finely interlaminated siltstone. SANDSTONE: 1mm-10mm thick; Light grey, hard, clay rich; quartz, fine grained, polished, subrounded to rounded, well sorted; pyritic, carbonaceous, trace very pale yellow fluorescence.
04.0 SP												

SILTSTONE: dark grey, hard, highly pyritic; carbonaceous; micaceous, enclosing a pod of quartz sandstone 10-20mm diameter. Very poorly sorted, coarse to very coarse grained. Frosted, subangular to rounded grains in clay matrix.

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 2

Interval Cored 2400.3-2413.0 Cut 12.7m Recovered 7.8m (61%) Fm. LATROBE GROUP
 Bit Type C22 Face Discharge. Bit Size 8.15/32 in. Desc by R.C.N. THORNTON Date 14/9/78
 J.D. ALDER.

DEPTH & DRILLING RATE m / Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2400.0 A(P)	M				silt fine granular sand	Inter-bedded	Sharp		●			
2400.2	M											
2400.4												
2400.6												
2400.8		∩										
2400.8 SP												
2400.5.0		∩										
2400.2 CA												
2400.2 SP												
2400.4												
2400.6												
2400.8												
2400.0		∩										

SANDSTONE: Light grey to brown, hard, quartz, polished. Subangular to rounded, very poorly sorted, mainly fine to medium grained, trace coarse grained pyrite aggregates, carbonaceous flecks and fine laminae. 20% clay matrix. Low visual porosity. Massive pale yellow fluorescence, immediate milky white cut. Strong petroliferous odour. Minor very thin wispy laminae of siltstone. Dark grey. Lightly carbonaceous and pyritic.

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 2

Interval Cored 2400.3-2413.0 Cut 12.7 Recovered 7.8m (61%) Fm. LATROBE GROUP

Bit Type C22 Face Discharge Bit Size 8.15/32 in. Desc by R.C.N. THORNTON J.D. ALDER Date 14/9/78

DEPTH & DRILLING RATE m / Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2405.0 0 5 10 CA(P) -2 -4 -6 SP -8		~							●			
2407.0 -2 SP -4 -6 SP CA -8		~			fine— med. sand	Massive		lt. gy. brn.	●		mod	<p>SANDSTONE: Light grey to brown, friable, quartz, polished, subangular to rounded, well sorted. Fine grained, minor pyrite, minor carbonaceous flecks. Minor clay matrix, moderate visual porosity. Massive pale yellow fluorescence immediate dense milky white cut. Very strong petroliferous odour. Variations in intensity of fluorescence bring out fine horizontal bedding caused by very minor grain size variations and increase in clay.</p>
2408.0		~							●			

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 2

Interval Cored 2400.3-2413.0 Cut 12.7m Recovered 7.8m (61%) Fm. LATROBE GROUP

Bit Type C22 Face Discharge Bit Size 8.15/32 in., Desc by R.C.N. Thornton Date 14.9.78
 J.D. ALDER

DEPTH & CORING RATE m/Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2408-0	[Pattern: dots]	∩			fine med. sand	Massive		gy. brn.	●		mod.	SANDSTONE Grey to brown, friable quartz, mostly clear, polished to frosted, very poorly sorted, fine to very coarse grained, minor clay matrix, pyrite, mica, carbonaceous flecks common, rare trace light green? glauconite grain. moderate visual porosity. Massive pale yellow fluorescence; dense milky white cut; Strong petroliferous odour.
-2					c. - vc. granule sand	general massive some grading	G	lt. gy. brn.	●	high		
-4	[Pattern: X's]											
-6	[Pattern: dots]											
-8	[Pattern: X's]											
2409-0	[Pattern: dots]											SANDSTONE: Light grey to brown, unconsolidated quartz, mostly clear minor milky or blue grey, polished to frosted, poorly sorted, coarse to very coarse grained and granule, trace clay matrix; very minor carbonaceous flecks, pyrite, very high porosity Massive pale yellow fluorescence; dense milky white cut. Petroliferous odour.
-2	[Pattern: dots]											
-4	[Pattern: X's]											
-6	[Pattern: dots]											
-8	[Pattern: X's]											
10-0	[Pattern: dots]											

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 2

Interval Cored 2400.3-2413.0 Cut 12.7m Recovered 7.8m (61%) Fm. LATROBE GROUP

Bit Type C22 Face Discharge Bit Size 8.15/32 in. Desc by R.C.N. THORNTON Date 14.9.78
 J.D. ALDER

DEPTH & CORING RATE m / Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
0-0												
-2												
-4					C. - vc. granule sand			lt. gy. brn.	●		high	
SP -6						Massive						
-8												
CA -1.0												
-2												
SP -4					f. - c. sand	bedded	S	med. lt. gy.			low	
-6		MM			silt f. - v.c. granule sand	inter-bedded to laminate	S	lt. gy.	●		low high	
-8		MM										
SP -2.0		MM										

SANDSTONE: Light grey to brown friable, quartz mostly clear, minor milky or blue grey, polished to frosted, very poorly sorted, fine to very coarse grained and granule, banded caused by slight variation in grain size and sorting; minor clay matrix, trace mica, minor fine carbonaceous flecks porosity varies from moderate to low in fine bands to high in coarser bands; Massive part yellow fluorescence; dense

milky white cut; petroliferous odour. SILTSTONE: dark grey; hard; highly pyritic, carbonaceous micaceous.

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST. HALIBUT-1

SCALE 1:100

CORE No. 2

Interval Cored 2400.3-2413.0 Cut 12.7m Recovered 7.8m (61%) Fm. LATROBE GROUP

Bit Type C22 FACE DISCHARGE Bit Size 8.15/32 in. Desc by R.C.N. THORNTON J.D. ALDER Date 14.9.78

DEPTH & CORING RATE	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2400.3 0 5 10	MM MM				silt f. - v.c. granule sand	inter-bedded	S	dk. gy. lt. gy.		●	low	<p>SANDSTONE: Light grey to brown, friable, quartz, mostly clear, polished, well sorted. Fine to coarse grained; minor carbonaceous flecks and very thin laminae. Trace mica, trace red grains. Minor clay matrix. Moderate visual porosity; massive pale yellow fluorescence; dense milky white cut; strong petroliferous odour.</p>
2413.0 SP 6					f. - c. sand	inter-bedded	G	lt. gy. - brn.		●	mod.	

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 3

Interval Cored 2413.0-2424.8 Cut 11.8m Recovered 120mm (1%) Fm. LATROBE GROUP

Type C22 Face Dis-charge Bit Size 8.15/32 in. Desc by R.C.N. Thornton Date 14.9.78

DEPTH & CORING RATE m/Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2413.0 SP 0 10 20 30 2 .2 .4 .6 .8 2424.0 .2 .4 .6 .8 2425.0					Massive		Gy. - brn.	Yellow ●			high	SANDSTONE: Grey to brown, friable; quartz, mostly clear, minor milky, light grey; polished to frosted, well sorted, medium grained. Trace mica, carbonaceous flecks, very minor clay matrix; high porosity; massive very pale yellow fluorescence, immediate dense, white milky cut; Strong Petroliferous odour.

SP: SEAL PEEL SAMPLE

→: PALYNOLOGY SAMPLE AT 2413.12m.

**ESSO AUSTRALIA LTD.
CORE DESCRIPTION**

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 3

Interval Cored 2413.0-2424.8 Cut 11.8m Recovered 120mm () Fm. LATROBE GROUP

Bit Type C22 Face Discharge Bit Size 8.15/32 in. Desc by R.C.N. Thornton Date 14.9.78

DEPTH & CORING RATE m/Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2415.0 0 10 20 30 -2 -4 -6 -8 2416.0 -2 -4 -6 -8 2417.0												

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

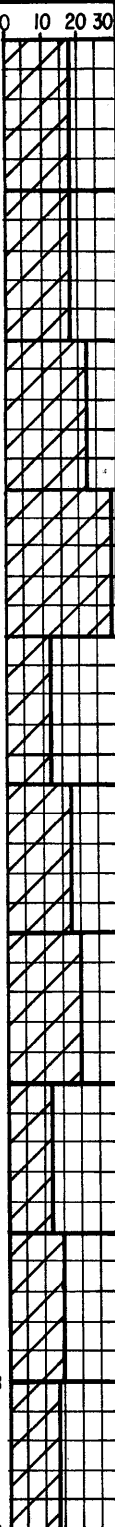
WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 3

Interval Cored 2413.0-2424.8 Cut 11.8m Recovered 120mm (1%) Fm. LATROBE GROUP

Bit Type C22 Face Discharge Bit Size 8.15/32 in., Desc by R.C.N. THORNTON Date 14.9.78

DEPTH & CORING RATE m / Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2417.0 0 10 20 30 												
2418.0 2 4 6 8												
2419.0												

**ESSO AUSTRALIA LTD.
CORE DESCRIPTION**

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 3

Interval Cored 2413.0-2424.8 Cut 11.8m Recovered 120mm (1%) Fm. LATROBE GROUP
 Bit Type C22 Face Discharge Bit Size 8.15/32 in., Desc by R.C.N. THORNTON Date 14.9.78

DEPTH & CORING RATE m / Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2419.0 												

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 3

Interval Cored 2413.0-2424.8 Cut 11.8m Recovered 120mm (1%) Fm. LATROBE GROUP

Bit Type C22 Face Discharge Bit Size 8.15/32 in. Desc by R.C.N. THORNTON Date 14.9.78

DEPTH & CORING RATE m / Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">421.0</div> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 100px; height: 15px; position: relative;"> <div style="position: absolute; top: -5px; left: 0; right: 0; text-align: center;">0 10 20</div> <div style="position: absolute; top: 5px; left: 0; right: 0; text-align: center;">/</div> </div> </div> <div style="margin-top: 10px;"> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">.2</div> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 100px; height: 15px; position: relative;"> <div style="position: absolute; top: -5px; left: 0; right: 0; text-align: center;">0 10 20</div> <div style="position: absolute; top: 5px; left: 0; right: 0; text-align: center;">/</div> </div> </div> <div style="margin-top: 10px;"> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">.4</div> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 100px; height: 15px; position: relative;"> <div style="position: absolute; top: -5px; left: 0; right: 0; text-align: center;">0 10 20</div> <div style="position: absolute; top: 5px; left: 0; right: 0; text-align: center;">/</div> </div> </div> <div style="margin-top: 10px;"> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">.6</div> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 100px; height: 15px; position: relative;"> <div style="position: absolute; top: -5px; left: 0; right: 0; text-align: center;">0 10 20</div> <div style="position: absolute; top: 5px; left: 0; right: 0; text-align: center;">/</div> </div> </div> <div style="margin-top: 10px;"> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">.8</div> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 100px; height: 15px; position: relative;"> <div style="position: absolute; top: -5px; left: 0; right: 0; text-align: center;">0 10 20</div> <div style="position: absolute; top: 5px; left: 0; right: 0; text-align: center;">/</div> </div> </div> <div style="margin-top: 10px;"> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">422.0</div> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 100px; height: 15px; position: relative;"> <div style="position: absolute; top: -5px; left: 0; right: 0; text-align: center;">0 10 20</div> <div style="position: absolute; top: 5px; left: 0; right: 0; text-align: center;">/</div> </div> </div> <div style="margin-top: 10px;"> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">.2</div> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 100px; height: 15px; position: relative;"> <div style="position: absolute; top: -5px; left: 0; right: 0; text-align: center;">0 10 20</div> <div style="position: absolute; top: 5px; left: 0; right: 0; text-align: center;">/</div> </div> </div> <div style="margin-top: 10px;"> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">.4</div> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 100px; height: 15px; position: relative;"> <div style="position: absolute; top: -5px; left: 0; right: 0; text-align: center;">0 10 20</div> <div style="position: absolute; top: 5px; left: 0; right: 0; text-align: center;">/</div> </div> </div> <div style="margin-top: 10px;"> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">.6</div> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 100px; height: 15px; position: relative;"> <div style="position: absolute; top: -5px; left: 0; right: 0; text-align: center;">0 10 20</div> <div style="position: absolute; top: 5px; left: 0; right: 0; text-align: center;">/</div> </div> </div> <div style="margin-top: 10px;"> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">.8</div> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 100px; height: 15px; position: relative;"> <div style="position: absolute; top: -5px; left: 0; right: 0; text-align: center;">0 10 20</div> <div style="position: absolute; top: 5px; left: 0; right: 0; text-align: center;">/</div> </div> </div> <div style="margin-top: 10px;"> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">423.0</div> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 100px; height: 15px; position: relative;"> <div style="position: absolute; top: -5px; left: 0; right: 0; text-align: center;">0 10 20</div> <div style="position: absolute; top: 5px; left: 0; right: 0; text-align: center;">/</div> </div> </div> </div> </div> </div> </div> </div> </div> </div> </div> <div> <p>Dwg. 1107/OP/87</p> </div></div></div>												

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 3

Interval Cored 2413.0-2424.8 Cut 11.8m Recovered 120mm (1 %) Fm. LATROBE GROUP

Bit Type C22 Face Discharge Bit Size 8.15/32 in., Desc by R.C.N. THORNTON Date 14.9.78

DEPTH & CORING RATE m / Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
23.0												
23.2												
23.4												
23.6												
23.8												
24.0												
24.2												
24.4												
24.6												
24.8												
25.0												

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 4

Interval Cored 2425.0-2436.6 Cut 11.6m Recovered 5.07m (44 %) Fm. LATROBE GROUP

Bit Type C22 Face Discharge Bit Size 8.15/32 in., Desc by R.C.N. Thornton Date 16.9.78

DEPTH & CORING RATE m / Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
425.0 SP 0 10 20 30 -2 -4 -6 -8 CA	W W W	—	FLUVIAL		f. gr.			gy.	●		moderate	SANDSTONE: Grey, friable quartz, predominantly clear to trace light grey, polished to frosted, well sorted fine grained, trace coarse grained, sub-angular to subrounded; trace pyrite, trace carbonaceous flecks. A few very thin (1mm) bands of SILTSTONE.
2426.0 SP -2 -4 -6 -8 CA(P)					grit bands f. gr. granule			gy - brn.	●		high	SANDSTONE: Is generally fine grained, well sorted, except for a few coarse grained. However, GRIT BANDS of grey, frosted, sub-rounded to rounded, quartz granules occur.
2427.0					f. gr. granule				●		v. high	FLUORESCENCE: Pale yellow throughout; immediate milky white cut; petroliferous odour. Carbonaceous streaks Carbonaceous streaks

NB: SP = SEAL PEEL SAMPLE

CA(P) = CORE ANALYSIS SAMPLE DESPATCHED TO CORELAB (PERTH)

CA: = CORE ANALYSIS SAMPLE

→ = PALYNOLOGY SAMPLE AT: 2425.0; 2425.8; 2426.9; 2427.2; 2428.9; 2429.7; 2432.0; 2432.9; 2433.9; 2435.0; 2436.0; 2436.6.

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL... WEST. HALIBUT-1

SCALE 1:100

CORE No. 4

Interval Cored 2425.0-2436.6 Cut 11.6m Recovered 5.07m (44 %) Fm. LATROBE GROUP

Bit Type C22 Face Discharge Bit Size 8.15/32 in., Desc by R.C.N. THORNTON Date 16.9.78

DEPTH & CORING RATE m / Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2427.0					f. gr.			gy. - brn.			moderate	SANDSTONE: Grey to brown friable, quartz, clear to minor grey, polished to frosted, subangular to subrounded, well sorted, fine grained, 1/2-1mm dark grey, micaceous bands.
			FLUVIAL									Carbonaceous laminae around sand lens.
												FLUORESCENCE: Pale yellow throughout; immediate milky white cut; petroliferous odour.
2428.0												Upwards graded bedding granule to siltstone at least 7 times. Graded beds 10-30mm.
												? Pillar structures
					f. gr granule			gy. - brn.			v. high	Cut & fill, which includes contorted carbonaceous laminae; very few horizontal burrows.
2429.0					1-2 mm silt bands							

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

PAGE 3 of 6

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 4

Interval Cored 2425.0-2436.6 Cut 11.6m Recovered 5.07m (44%) Fm. LATROBE GROUP

Bit Type C22 Face Discharge Bit Size 8. 15/32 in., Desc by R.C.N. THORNTON Date 16.9.78

DEPTH & CORING RATE m/Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2429.0 SP 0 10 20												
0											low	
0.2					v f gr ab sh							
0.4												
0.6					c gr minor sh							
0.8					v f gr m gr v few granules			gy				
2430.0			FLUVIAL								high	At 2429.7:- ?Ripples etched out by carbonaceous laminae and siltstone. SANDSTONE, banded grey to dark grey, friable, 5mm thick grey bands comprise quartz, well sorted, very fine grained; 1-2mm thick, dark grey bands comprise mostly large flakes of dark brown mica.
0.2												
0.4												
0.6												
0.8												FLUORESCENCE: Pale yellow throughout; immediate milky white cut; petroliferous odour.
2431.0												

CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 4

Interval Cored 2425.0-2436.6 Cut 11.6m Recovered 5.07m (44%) Fm. LATROBE GROUP

Bit Type C22 Face Discharge Bit Size 8.15/32 in. Desc by R.C.N. THORNTON Date 16.9.78

DEPTH & CORING RATE m / Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2431.0												
0												
2												
SP												
4												
6					f gr - granule							
8					interbed. v f gr / silt			dk gy brn			high - moderate	At 2432.0:-
2432.0			FLUVIAL		interbed. grit band / ss / silt							SANDSTONE, dark grey to brown, friable, quartz, clear to minor grey, polished to frosted, subangular to subrounded, well sorted, fine grained trace mica, moderate porosity, minor very dark grey 1/2mm bands containing mica and carbonaceous flecks; gradational with
2												
4												
SP												
6					m gr						moderate	SANDSTONE, dark grey to brown, friable, quartz, clear to grey, polished to frosted, subangular to rounded, very poor sorted, fine grained to
8								gy brn				
2433.0					f. gr							granule, mica common. FLUORESCENCE: Pale yellow throughout; immediate milky white cut, Strong petroliferous odour.

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

PAGE 5 of 6

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 4

Interval Cored 2425.0-2436.6 Cut 11.6m Recovered 5.07m (44.%) Fm. LATROBE GROUP

Bit Type C22 Face Discharge Bit Size 8.15/32 in. Desc by R.C.N. THORNTON Date 16.9.78

DEPTH & CORING RATE m / Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2433.0												
0												
2							cut & fill					Cut and fill. Grit band eroded, leaving 40mm high, steep (near vertical) walls. Infill comprises fine grained sandstone with very thin grit bands.
4												
6												
8												
2434.0			FLUVIAL									
0												
2					interbed. f gr ss/slt		cut & fill	brn			high	at 2433.9:- SANDSTONE, brown, friable, quartz, clear, milky, light grey, frosted, well sorted, granule, subrounded to rounded, very fine pyrite aggregates, mica carbonaceous flecks common; trace red to brown, ?dolomite. pebble.
4					f gr ss minor slt laminae							
6												
8					c gr-granule							
2435.0												
0												At 2435.0:- SANDSTONE, brown, unconsolidated, quartz, clear to milky to light grey, frosted, well sorted, coarse grained to granule, subrounded to rounded, trace pyrite, mica, carbonaceous flecks.

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 4

Interval Cored 2425.0-2436.6 Cut 11.6m Recovered 5.07m (44%) Fm. LATROBE GROUP

Bit Type C22 Face Discharge Bit Size 8.15/32 in, Desc by R.C.N. THORNTON Date 16.9.78

DEPTH & CORING RATE m / Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2435.0			FLUVIAL		inter lam. v f gr ss/slt / sh				●		low	Finely to very finely grained SANDSTONE, SILTSTONE, SHALE. Interbeds and lenses of siltstone vary 1-3mm; shale bands are more continuous with even thickness (1mm) Siltstone is light grey, hard, quartz; shale is dark grey, fissile, highly micaceous, carbonaceous, pyritic.
2436.0					f -vc gr				●		high	SANDSTONE, Grey to brown, friable, quartz, clear to blue to grey, polished to frosted, very poorly sorted, fine to very coarse grained, subangular; mica common; minor carbonaceous flecks; trace pyrite. FLUORESCENCE: Pale yellow; immediate milky white cut; petroliferous odour.
2437.0												

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 5

Interval Cored 2436.6-2438.8 Cut 2.2m Recovered 1.5m (68%) Fm. LATROBE GROUP

Bit Type C20 Bit Size 8.15/32 in., Desc by R.C.N. THORNTON Date 18/9/78

DEPTH & CORING RATE m/Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
36.0												
2												
4												
6												
8												
SP 37.0							S	Gy - brn.			high	SANDSTONE: Grey to brown, friable, quartz, clear-minor milky and pale grey; polished to frosted, sub-angular; very poorly sorted, medium grained to granule, trace pyrite encrusted on granules; trace carbonaceous flecks.
2			ALLUVIAL	COAL SWAMP FLUVIAL	m. gr. to gran.							FLUORESCENCE: massive pale yellow; immediate milky white cut; petroliferous odour.
4							G	Black				COAL: Black hard bituminous, pyritic.
6												
8												
38.0												COALY SHALE.

NB: SP : SEAL PEEL SAMPLE

→ : PALYNOLOGY SAMPLE: 2436.6; 2437.2; 2438.6.

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 5

Interval Cored 2436.6-2438.8 Cut 2.2m Recovered 1.5m (68%) Fm. LATROBE GROUP

Bit Type C20 Bit Size 8.15/32 in. Desc by R.C.N. THORNTON Date 18/9/78

DEPTH & CORING RATE m/Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
38.0			ALLUVIAL	BLACKSWAMP	Sh. with thin coal laminae	↑ Increase in proportion of coal laminae		Black				CARBONACEOUS SHALE
2					Massive			V. dk. gy. - black				SHALE: very dark grey to black, very hard, dense, silty, pyrite finely disseminated throughout, finely micaceous, black carbonaceous flecks and very thin coal laminae.
4												
6												
8												
39.0												

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 6

Interval Cored 2444.0-2457.0 Cut 13m Recovered 13m (100%) Fm. LATROBE GROUP

Bit Type C20 Bit Size 8.15/32 in. Desc by R.C.N. THORNTON Date 18.9.78

DEPTH & CORING RATE m / Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
444.0		Wavy bedding	ALLUVIAL					Lt. - v. dk. gy.				Thinly interlaminated SILTSTONE & SHALE, slightly burrowed
445.0		Wavy bedding					G					SILTSTONE: light grey to hard, quartz, white clay matrix, carbonaceous flecks, lensy (1-10mm thick), SHALE: very dark grey, hard, laminae more continuous and evenly thin (1-3mm) than siltstone, carbonaceous, silty, micaceous, pyrite.
446.0		Wavy bedding						Lt. - dk. gy.				COAL: black, bituminous, conchoidal fracture, pyrite blebs and lenses.
447.0		Wavy bedding						Lt. - dk. gy.				? horizontal-burrows infilled with pyrite
448.0		Wavy bedding						Lt. - dk. gy.				SANDSTONE: grey to dark grey streaks, hard, quartz, clear, polished, subangular to subrounded, moderately sorted, fine to medium grained, mica common, trace pyrite, carbonaceous flecks common
449.0		Wavy bedding						Lt. - dk. gy.				slight banding due to
450.0		Wavy bedding						Lt. - dk. gy.				presence "dirty" bands rich in carbonaceous material. Porosity poor-to-moderate. Best porosity zones oil stained brown, with strong pale yellow fluorescence, milky cut. No fluorescence in low porosity zones

NB: SP : SEAL PEEL SAMPLE

CA : CORE ANALYSIS SAMPLE

→ : PALYNOLOGY SAMPLE AT: 2440.0; 2444.8; 2445.5; 2447.7; 2449.5; 2451.3; 2451.75; 2451.8; 2452.3; 2453.5; 2454.6; 2455.4; 2456.5; 2457.0

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

PAGE 2 of 7

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 6

Interval Cored 2444.0-2457.0 Cut 13m Recovered 13m (100%) Fm. LATROBE GROUP

Bit Type C20 Bit Size 8.15/32 in, Desc by R.C.N. THORNTON Date 18.9.78

DEPTH & CORING RATE m/Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
446.0		∩	ALLUVIAL		mostly v. f. gr., f. gr. tight			Gy.				Very fine carbonaceous laminae in SANDSTONE.
0.2		∩										
0.4		∩										
0.6		∩					S					
0.8		∩					S					
447.0		∩			Interbed. sh/sltst/ss. 1-2 mm Laminae							Long vertical burrows (50 x 3mm) * Pod of fine grained SANDSTONE stained brown.
0.2	W	∩					G		*			
0.4	W	∩				G						COAL - pyritic, burrowed, roots.
0.6	W	∩				G						
0.8	W	∩			Interbed. Sltst/sh							SHALE: very dark grey, hard, carbonaceous silty, micaceous, pyrite, coal lenses and blebs.
448.0	W	∩										

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 6

Interval Cored 2444.0-2457.0 Cut 13m Recovered 13m (100%) Fm. LATROBE GROUP

Bit Type C20 Bit Size 8.15/32 in. Desc by R.C.N. THORNTON Date 18.9.78

DEPTH & CORING RATE m/Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
448.0												
0												
2												
4												
6												
8												
49.0												
2												
4												
6												
8												
450.0												

ALLUVIAL

v. finely interlam. sh./sltst.

Ss. laminated v.f./f/m gr. 5-10 mm. thick

Dk. gy. - v. dk. gy.

Ss. laminae & beds stained brn.

Interlaminated SANDSTONE (2-10mm thick)
 SILTSTONE, SHALE (1-5mm thick). SANDSTONE: dark grey, hard, quartz, clear, polished to frosted, poorly sorted, fine to medium grained, angular to subrounded; micaceous both white and brown, large flakes; carbonaceous flecks and streaks; slightly pyritic, very low porosity.
 SHALE: very dark grey, hard, carbonaceous, silty, micaceous, pyritic.
 Bedding severely disturbed by soft sediment deformation.

ESSO AUSTRALIA, LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 6

Interval Cored 2444.0-2457.0 Cut 13m Recovered 13m (100%) Fm. LATROBE GROUP

Bit Type C20 Bit Size 8.15/32 in. Desc by R.C.N. THORNTON Date 18.9.78

DEPTH & CORING RATE m/Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
450.0					v. f. gr. ss							
-2												
-4					m. gr. ss.							
-6					v. f./f. gr. ss.							
-8			ALLUVIAL									
451.0					Interbed. f./m. gr. ss.							
-2												
CA												
SP												
-4												
-6												
-8												
SP												
452.0					v. f. gr. ss.							

Bedding severely disturbed by soft sediment deformation.

SANDSTONE: Fine grain to medium grain interbedded, 20-50mm thick; finely grained beds are grey; medium grained beds: brown oil stained.

SANDSTONE: light brown, friable, quartz, clear to minor light grey, subangular to subrounded; trace mica, carbonaceous flecks; thin carbonaceous laminae common; minor shale laminae 1-10mm.

SANDSTONE: Light brown, friable, quartz, very poorly sorted, finely grained-granule, trace mica. Carbonaceous flecks and coaly streaks common.

FLUORESCENCE:

At 2451.3: Massive pale yellow fluorescence (flushed by drilling mud up to 20mm from wall of core); immediate milky white cut; petroliferous odour.

2451.75: Very minor pale yellow fluorescence, especially close to carbonaceous streaks.

2451.8: Rare trace pale yellow fluorescence specks.

OIL/WATER CONTACT = 2451.8

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 6

Interval Cored 2444.0-2457.0 Cut 1.3m Recovered 1.3m (100%) Fm. LATROBE GROUP

Bit Type C20 Bit Size 8.15/32 in. Desc by R.C.N. THORNTON Date 18.9.78

DEPTH & CORING RATE m/Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
452.0					f gr ss	↑					low	Ripples and small scale crossbeds faintly discernible as a result of being etched out by slightly darker very thin carbonaceous laminae.
												SANDSTONE: grey, hard, quartz, clear, subrounded to rounded, polished, well sorted, finely grained; carbonaceous flecks common; 20% white clay matrix.
453.0			ALLUVIAL	FLUVIAL		↑		gy brn			tight	Very thin carbonaceous laminae. Sandstone extensively burrowed, mainly vertical (60 x 4mm).
					vf fgr ss	fining upwards						Very thin carbonaceous laminae.
												Very thinly laminated SANDSTONE & SHALE: Laminae 1-2mm thick and slightly burrowed (sand infilled), Sandstone mostly continuous, minor lenses and pods. Shale continuous
454.0												Very thin carbonaceous laminae. Crossbedding is etched out faintly by very thin coal streaks, carbonaceous laminae, or slight grain size and colour changes.
												Very fine grained to fine grained sandstone; horizontally laminated, shown by slight colour variation.

ESSO AUSTRALIA LTD.
CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 6

Interval Cored 2444.0-2457.0 Cut 13m Recovered 13m (100%) Fm. LATROBE GROUP

Bit Type C20 Bit Size 8.15/32 in. Desc by R.C.N. THORNTON Date 18.9.78

DEPTH & CORING RATE m/Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
2454.0					interlam. vf gr/ f gr ss	↑		gy			low	Interlaminations shown by slight variations in grain size, colour, and carbonaceous streaks, which are pyritic.
2455.0			ALLUVIAL	FLUVIAL	f gr ss	↑					low	Very thin carbonaceous laminae.
2456.0					m gr ss	↑		gy brn			moderate	SANDSTONE: Grey, hard quartz, clear, polished, subangular to subrounded, well sorted, fine grained, 20% white clay matrix.
						fining						SANDSTONE: Grey to brown, friable, clean, quartz, clear, minor milky, light grey, polished, subangular to subrounded, medium grained, well sorted, mica common. Coaly blebs occur in sandstone. Very thin carbonaceous laminae. Crossbedding etched out by very minor carbonaceous streaks, and slight variations in grain size.

ESSO AUSTRALIA LTD. CORE DESCRIPTION

WELL WEST HALIBUT-1

SCALE 1:100

CORE No. 6

Interval Cored 2444.0-2457.0 Cut 13m Recovered 13m (100%) Fm. LATROBE GROUP

Bit Type C20 Bit Size 8.15/32 in, Desc by R.C.N. THORNTON Date 18.9.78

DEPTH & CORING RATE m/Hr	COMPOSITION	BEDDING & STRUCTURES	ENVIRONMENT	FACIES	TEXTURE	TEXTURAL CHANGE	CONTACTS	COLOR	OIL STN.	CEMENT	POROSITY	REMARKS
<div style="display: flex; justify-content: space-between;"> 456.0 0 5 10 </div> <div style="display: flex; justify-content: space-between;"> 2 CA </div> <div style="display: flex; justify-content: space-between;"> 4 CA </div> <div style="display: flex; justify-content: space-between;"> 6 CA </div> <div style="display: flex; justify-content: space-between;"> 8 CA </div> <div style="display: flex; justify-content: space-between;"> 457.0 </div>			ALLUVIAL	FLUVIAL	massive friable	↑ overall ↑ upwards ↓ fining		gy brn			moderate high	<p>SANDSTONE: Grey to brown, friable, clean, quartz, clear, polished to frosted, subangular to subrounded, well sorted, medium grained; trace mica, carbonaceous flecks.</p> <p>COAL: Black, fissile, pyritic, slightly mica-ceous, silty blebs and very thin laminae.</p>

APPENDIX 4

APPENDIX 4

PALYNOLOGICAL REPORT

PALYNOLOGICAL ANALYSIS OF
WEST HALIBUT-1, GIPPSLAND BASIN

by

H.E. Stacy

and

A.D. Partridge

Esso Australia Ltd
Paleontology Report 1979/3

March 28, 1979.

WEST HALIBUT-1

I N T R O D U C T I O N

Twenty-one sidewall cores, eleven core samples and one cuttings sample were processed and examined for palynology. Yield varied from very good to very poor, however, age determinations could be made in most cases.

Formation and zone subdivisions from the basal part of the Lakes Entrance Formation to the bottom of the well are summarized below. Table 1 lists all of the samples examined and summarises the findings, while individual fossil occurrence is noted on the accompanying distribution charts.

S U M M A R Y

<u>UNIT/FACIES</u>	<u>ZONE</u>	<u>DEPTH (in metres)</u>
Lakes Entrance Formation	<u>P. tuberculatus</u>	2372
UNCONFORMITY		
Latrobe Group (Coarse clastics)	Middle <u>M. diversus</u>	2374-2403.7
	Lower <u>M. diversus</u>	2411-2510.5
	Upper <u>L. balmei</u>	2515-2577
		T.D. 2577

G E O L O G I C A L C O M M E N T S

1. Most of the samples from the Latrobe Group showed some evidence of marine influence by the presence of at least a few dinoflagellates in the residues.
2. In contrast to the adjacent Fortescue-1 well where the Middle M. diversus Zone sediments were predominantly of non-marine character the highest Eocene (of the Middle M. diversus Zone) samples in West Halibut-1 at 2374m and 2377.5m contain almost entirely dinoflagellate assemblages with very few non-marine (i.e. spores and pollen) specimens present. This difference is probably a function of the more distal or seaward position of West Halibut-1 compared to Fortescue-1.

Even though the highest Eocene assemblage in West Halibut-1 contains predominantly dinoflagellates, the actual species composition makes it clearly distinct from the sample from the immediately overlying and much younger Lakes Entrance Formation.

3. The top of the Latrobe at West Halibut-1 is stratigraphically lower (Middle M. diversus) than the top of the section encountered at Fortescue-1 (Upper M. diversus).
4. The Wetzeliella hyperacantha Zone, which was noted in Fortescue-1 to straddle the boundary between the Upper L. balmei and Lower M. diversus Zones, was found to do the same thing in this well. It extends from 2510.5 to 2522 metres.
5. The separation between the Lower and Middle M. diversus Zones is based on the rare occurrence of Proteacidites tuberculiformis at 2403.7 metres. Since no other species, whose first appearances are diagnostic of the Middle M. diversus Zone were found, the separation between the Lower and Middle subzones should be considered tentative at this time.

DISCUSSION OF ZONES

The presence and distribution of all identified species are marked on the distribution sheets. The basis for separation this well section into stratigraphic zones is given below:

Upper Lygistepollenites balmei Zone: 2515-2577 metres.

The top of this zone is picked on the highest "in place" occurrence of L. balmei and A. obscurus and below the first occurrence of such Early Eocene species as Spinizonocolpites prominatus and Polypodiaceoisporites varus. The presence of such species as Proteacidites grandis, Cyathidites gigantis and Wetzeliella homomorpha, which occur throughout this section demonstrate that only Upper L. balmei sediments were penetrated.

Wetzeliella hyperacantha Zone: 2510.5 - 2522 metres.

As noted in the Geological Comments, Wetzeliella hyperacantha occurs in the samples on each side of the boundary between the Upper L. balmei and Lower M. diversus Zones. A similar occurrence was noted in Fortescue-1. The only occurrence of Kenleyia fimbriata, at 2515 metres, is also in this zone.

Lower Malvacipollis diversus Zone: 2411 - 2510.5 metres.

The base of the Lower M. diversus Zone is placed in West Halibut-1 at 2510.5 metres which contains the first appearances of Spinizonocolpites prominatus (frequent), Crassoretitriletes vanraadshoovenii and Polypodiaceoisporites varus, while the top is taken at the sample below the first occurrence of Proteacidites tuberculiformis. Supporting the assignment of this section to the Lower part of the Middle subdivision is the frequent occurrence of Tetracolporites multistrius which ranges up into only the lower part of the Middle subdivision.

Overall the samples in the Lower M. diversus Zone can be characterised by the common occurrence of Proteacidites grandis. In this aspect the samples can be readily distinguished from the underlying Upper L. balmei Zone, for although P. grandis may be common in this latter zone it is invariably associated with abundant pollen of Lygistepollenites balmei.

Middle Malvacipollis diversus Zone: 2374 - 2403.5 metres.

The occurrence of Proteacidites tuberculiformis at 2403.7 metres confirms the presence of the Middle M. diversus Zone at this depth. Unfortunately other indicator species (e.g. Proteacidites ornatus, P. xestiformis, P. plummelus and Diporites delicatus) whose first appearance can be used to recognise the base of this zone are absent from this well, and consequently the differentiation of the zone in this well is very poor. Two of the samples from the upper part of this zone (e.g. 2374m and 2377.5m) contained an almost entirely dinoflagellate flora. Compared to Fortescue-1 this suggests that the West Halibut-1 location is in a more distal or seaward location during the Middle M. diversus Zone time.

Proteacidites tuberculatus Zone: 2372 metres.

The sample from 2372 yielded Cyatheacidites annulata, Dinospherea simplex and other species from the P. tuberculatus Zone. The one sidewall core above this depth (1825), that was processed for palynology, was barren.

REFERENCES

- Stacy, H.E., and Partridge, A.D., 1978, Palynological Analysis of Fortescue-1, Gippsland Basin, ESOA Paléo. Report 1978/19.

TABLE 1 : SUMMARY OF PALEONOLOGICAL ANALYSES, WEST HALIBUT-1, GIPPSLAND BASIN

Sample	Depth (m)	Depth (ft)	Zone	Age	Confidence Rating	Yield	Diversity	Comments
SWC111	1825	5986	Indeterminate	-	-	Barren	Barren	
SWC 58	2372	7782	<u>P. tuberculatus</u>	Oligocene	0	Good	Moderate	
SWC 57	2374	7789	Middle M. <u>diversus</u>	Early Eocene	2	Fair	Low	Early Eocene dinoflagellate flora
SWC 55	2376	7795	Middle M. <u>diversus</u>	Early Eocene	1	Poor	Low	Highest occurrence of <u>P. grandis</u>
SWC 84	2377.5	7800	Middle M. <u>diversus</u>	Early Eocene	2	Poor	Low	
SWC 112	2381	7812	Middle M. <u>diversus</u>	Early Eocene	1	Poor	Low	
SWC 82	2385	7825	Middle M. <u>diversus</u>	Early Eocene	2	Poor	Low	
Core-1	2387.7	7834	Indeterminate	-	-	V. Poor	V. Low	Almost barren
Core-1	2389.9	7841.	Indeterminate	-	-	Barren	Barren	
Core-1	2399.3	7872	Middle M. <u>diversus</u>	Early Eocene	2	Fair	Moderate	
Core-2	2403.7	7886	Middle M. <u>diversus</u>	Early Eocene	1	Good	High	Lowest <u>P. tuberculiformis</u> , Highest <u>T. multistrius</u>
SWC 52	2411	7910	Lower M. <u>diversus</u>	Early Eocene	2	Poor	Moderate	
Core-4	2427.2	7963	Lower M. <u>diversus</u>	Early Eocene	2	V. Poor	V. Low	
Core-5	2437.2	7996	Lower M. <u>diversus</u>	Early Eocene	2	Poor	Low	
Core-5	2438.6	8001	Lower M. <u>diversus</u>	Early Eocene	1	Very Good	High	
Core-6	2440	8005	Lower M. <u>diversus</u>	Early Eocene	1	Good	Moderate	
Core-6	2444.8	8021	Lower M. <u>diversus</u>	Early Eocene	2	Poor	Low	Coal sample
Core-6	2447.7	8031	Lower M. <u>diversus</u>	Early Eocene	2	Fair	Moderate	
Core-6	2453.5	8050	Lower M. <u>diversus</u>	Early Eocene	1	Good	High	
SWC 45	2472.5	8112	Lower M. <u>diversus</u>	Early Eocene	1	Good	High	
SWC 44	2479	8133	Lower M. <u>diversus</u>	Early Eocene	1	Good	High	Mud contamination (<u>P. tuberculatus</u> flora)
SWC 41	2507.5	8227	Lower M. <u>diversus</u>	Early Eocene	2	Fair	Moderate	<u>S. prominatus</u>
SWC 40	2510.5	8237	Lower M. <u>diversus</u>	Early Eocene	0	Good	High	Several reworked? <u>L. balmei</u>
SWC 39	2515	8251	Upper L. <u>balmei</u>	Paleocene	0	V. Good	Very High	
SWC 38	2518	8261	Upper L. <u>balmei</u>	Paleocene	1	Good	High	
SWC 37	2522	8274	Upper L. <u>balmei</u>	Paleocene	1	Good	High	
SWC 36	2537	8323	Upper L. <u>balmei</u>	Paleocene	1	Good	High	
SWC 35	2541	8337	Upper L. <u>balmei</u>	Paleocene	0	V. Good	Very High	
SWC 34	2545	8350	Upper L. <u>balmei</u>	Paleocene	0	V. Good	Very High	
SWC 33	2549	8363	Upper L. <u>balmei</u>	Paleocene	0	Good	High	
SWC 32	2553.5	8378	Upper L. <u>balmei</u>	Paleocene	1	Fair	Moderate	
SWC 31	2565	8415	Upper L. <u>balmei</u>	Paleocene	1	Good	High	Abundant <u>W. homomorpha</u>
Cuttings	2577	8455	Upper L. <u>balmei</u>	Paleocene	3	Good	High	Abundant <u>W. homomorpha</u>

P A L Y N O L O G Y D A T A S H E E T

B A S I N: GIPPSLAND ELEVATION: KB: 25 GL: 68
WELL NAME: WEST HALIBUT-1 TOTAL DEPTH: 2577m

A G E	PALYNOLOGICAL ZONES	H I G H E S T D A T A					L O W E S T D A T A				
		Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time	Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time
NEOGENE	<i>T. pleistocenicus</i>										
	<i>M. lipsis</i>										
	<i>C. bifurcatus</i>										
	<i>T. bellus</i>										
PALEOGENE	<i>P. tuberculatus</i>	2372	0				2372	0			
	Upper <i>N. asperus</i>										
	Mid <i>N. asperus</i>										
	Lower <i>N. asperus</i>										
	<i>P. asperopolus</i>										
	Upper <i>M. diversus</i>										
	Mid <i>M. diversus</i>	2374	2	2376	1		2403.7	1			
	Lower <i>M. diversus</i>	2411	2	2438.6	1		2510.5	0			
	Upper <i>L. balmei</i>	2515	0				2577	3	2565	1	
	Lower <i>L. balmei</i>										
LATE CRETACEOUS	<i>T. longus</i>										
	<i>T. lilliei</i>										
	<i>N. senectus</i>										
	U. <i>T. pachyexinus</i>										
	L. <i>T. pachyexinus</i>										
	<i>C. triplex</i>										
EARLY CRET.	<i>A. distocarinatus</i>										
	<i>C. paradoxus</i>										
	<i>C. striatus</i>										
	<i>F. asymmetricus</i>										
	<i>F. wonthaggiensis</i>										
PRE-CRETACEOUS											

COMMENTS: Wetzeliella hyperacantha Zone: 2510.5 - 2522

CONFIDENCE 0: SWC or Core, Excellent Confidence, assemblage with zone species of spores, pollen and microplankton.
RATING: 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 spores and pollen or microplankton, or both.
 4: Cuttings, No Confidence, assemblage with non-diagnostic spores, pollen and/or microplankton.

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: H.E. STACY DATE: MARCH 1, 1979
DATA REVISED BY: _____ DATE: _____

Well Name WEST HALIBUT-1

Basin GIPPSLAND

Sheet No. 1 of 4

SAMPLE TYPE *	S	S	S	S	S	S	C	C	S	C	C	C	C	C	S	S	S	S	S	S	S	S	S	S	S					
DEPTHS	2372	2374	2376	2377.5	2381	2385	2399.3	2403.7	2411	2437.2	2438.5	2440	2444.8	2447.7	2453.5	2472.5	2479	2507.5	2510.5	2515	2518	2522	2537	2541	2545	2549	2553.5	2565		
PALYNOMORPHS																														
<i>A. qualumis</i>																														
<i>A. acutullus</i>																														
<i>A. luteoides</i>																														
<i>A. oculatus</i>																														
<i>A. sectus</i>																														
<i>A. triplaxis</i>																														
<i>A. obscurus</i>																														
<i>B. disconformis</i>											/	/																		
<i>B. arcuatus</i>																														
<i>B. elongatus</i>																						/	/	/	/	/	/	/	/	/
<i>B. mutabilis</i>																														
<i>B. otwayensis</i>																														
<i>B. elegansiformis</i>																														
<i>B. trigonalis</i>											?																			
<i>B. verrucosus</i>																														
<i>B. bombaxoides</i>																														
<i>B. emaciatus</i>										/																				
<i>C. bullatus</i>																														
<i>C. heskermensis</i>																														
<i>C. horrendus</i>																														
<i>C. meleosus</i>																														
<i>C. apiculatus</i>																														
<i>C. leptos</i>																														
<i>C. striatus</i>																														
<i>C. vanraadshoovenii</i>																						/	/	/	/	/	/	/	/	/
<i>C. orthoteichus/major</i>																						/	/	/	/	/	/	/	/	/
<i>C. annulatus</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>C. gigantis</i>																														
<i>C. splendens</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>D. australiensis</i>																														
<i>D. granulatus</i>											/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>D. tuberculatus</i>											/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>D. delicatus</i>																														
<i>D. semilunatus</i>																														
<i>E. notensis</i>																														
<i>E. crassiexinus</i>																														
<i>F. balteus</i>																														
<i>F. crater</i>																														
<i>F. lucunosus</i>																														
<i>F. palaequetrus</i>																														
<i>G. edwardsii</i>																														
<i>G. rudata</i>																														
<i>G. divaricatus</i>																														
<i>G. gestus</i>																														
<i>G. catathus</i>																														
<i>G. cranwellae</i>																														
<i>G. wahoensis</i>																														
<i>G. bassensis</i>																														
<i>G. nebulosus</i>																														
<i>H. harrisii</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>H. astrus</i>																														
<i>H. elliotii</i>																														
<i>I. anguloclavatus</i>																														
<i>I. antipodus</i>																														
<i>I. notabilis</i>																														
<i>I. gremius</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>I. irregularis</i>																														
<i>J. peiratus</i>																														
<i>K. waterbolkii</i>																														
<i>L. amplus</i>																														
<i>L. crassus</i>																														
<i>L. ohaiensis</i>																														
<i>L. bainii</i>																														
<i>L. lanceolatus</i>																														
<i>L. balmei</i>																														
<i>L. florinii</i>																														
<i>M. diversus</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>M. duratus</i>																														
<i>M. grandis</i>																														
<i>M. perimagnus</i>																														

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

SAMPLE TYPE *	DEPTHS																													
	S	S	S	S	S	S	C	C	S	C	C	C	C	C	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
PALYNOMORPHS	2372	2374	2376	2377.5	2381	2385	2399.3	2403.7	2411	2437.2	2438.6	2440	2444.8	2447.7	2453.5	2472.5	2479	2507.5	2510.5	2515	2518	2522	2537	2541	2545	2549	2553.5	2565		
<i>M. subtilis</i>																														
<i>M. ornamentalis</i>																														
<i>M. hypolaenoides</i>																														
<i>M. homeopunctatus</i>																														
<i>M. parvus/mesonesus</i>			/		/		/										/	/							/					
<i>M. tenuis</i>																														
<i>M. verrucosus</i>																														
<i>M. australis</i>																														
<i>N. asperus</i>																														
<i>N. asperoides</i>																														
<i>N. brachyspinulosus</i>	/																													
<i>N. deminutus</i>																														
<i>N. emarcidus/heterus</i>								/	/														/	/						
<i>N. endurus</i>																														
<i>N. falcatus</i>	/																													
<i>N. flemingii</i>																														
<i>N. goniatus</i>																														
<i>N. senectus</i>																														
<i>N. vansteenisii</i>																														
<i>O. sentosa</i>																														
<i>P. ochesis</i>																														
<i>P. catastus</i>																														
<i>P. demarcatus</i>												/																		
<i>P. magnus</i>																														
<i>P. polyoratus</i>					/		/									/	/			/	/	/			/	/	/		/	/
<i>P. vesicus</i>																														
<i>P. densus</i>																														
<i>P. velosus</i>																														
<i>P. morganiifubatus</i>																														
<i>P. mawsonii</i>					/		/				/	/	/		/				/			/								
<i>P. reticulosaccatus</i>																														
<i>P. verrucosus</i>																														
<i>P. crescentis</i>																														
<i>P. esobalteus</i>																														
<i>P. langstonii</i>														cf																
<i>P. reticulatus</i>																														
<i>P. simplex</i>																														
<i>P. varus</i>																														
<i>P. adenanthoides (Prot.)</i>								/		/	/	/	/		/			/				/		/	/	/	/	/	/	/
<i>P. alveolatus</i>																														
<i>P. amolosexinus</i>																														
<i>P. angulatus</i>																														
<i>P. annularis</i>								/			/	/	/		/			/				/	/		/	/	/		/	/
<i>P. asperopolus</i>																														
<i>P. biornatus</i>																														
<i>P. clarus</i>																														
<i>P. cleinei</i>																														
<i>P. confragosus</i>																														
<i>P. crassis</i>																														
<i>P. delicatus</i>																														
<i>P. formosus</i>																														
<i>P. grandis</i>		/		/	/	/	/	A	A		A	A		A	A	A	/				A									
<i>P. grevillaensis</i>																														
<i>P. incurvatus</i>					/		/				/	/	/		/												/			
<i>P. intricatus</i>																														
<i>P. kopiensis</i>																														
<i>P. lapis</i>					/																									
<i>P. latrobensis</i>																														
<i>P. leightonii</i>											/																			
<i>P. obesolabrus</i>																														
<i>P. obscurus</i>																														
<i>P. ornatus</i>																														
<i>P. otwayensis</i>																														
<i>P. pachypolus</i>																														
<i>P. palisadus</i>																														
<i>P. parvus</i>																														
<i>P. plemmelus</i>																														
<i>P. prodigus</i>																														
<i>P. pseudomoides</i>											/	/			/			/				/								
<i>P. recavus</i>											/	/			/			/				/								

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

SAMPLE TYPE *	DEPTHS																											
	S	S	S	S	S	S	C	C	S	C	C	C	C	C	C	S	S	S	S	S	S	S	S	S	S	S	S	
PALYNOMORPHS	2372	2374	2376	2377.5	2381	2385	2399.3	2403.7	2411	2437.2	2438.6	2440	2444.8	2447.7	2453.5	2472.5	2579	2507.5	2510.5	2515	2518	2522	2537	2541	2545	2549	2553.5	2565
<i>P. rectomarginis</i>																												
<i>P. reflexus</i>																												
<i>P. reticulatus</i>																												
<i>P. reticuloconcavus</i>																												
<i>P. reticulosabratus</i>											/				/				/				/			/		
<i>P. rugulatus</i>																												
<i>P. scitus</i>																												
<i>P. stipplatus</i>																												
<i>P. tenuixinus</i>											/	/	/		/				/	/	/	/	/	/	/	/	/	/
<i>P. truncatus</i>											/	/	/		/				/	/	/	/	/	/	/	/	/	/
<i>P. tuberculatus</i>																												
<i>P. tuberculiformis</i>								/																				
<i>P. tuberculotumulatus</i>																												
<i>P. xestoformis</i> (Prot.)																												
<i>O. brossus</i>																												
<i>R. boxatus</i>																												
<i>R. stellatus</i>											/																	
<i>R. mallatus</i>							/	/			/				/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>R. trophus</i>																												
<i>S. cainozoicus</i>																												
<i>S. rotundus</i>																												
<i>S. digitatoides</i>																												
<i>S. marlinensis</i>																												
<i>S. rarus</i>																												
<i>S. meridianus</i>							/												/	/	/	/	/	/	/	/	/	/
<i>S. prominatus</i>																												
<i>S. uvatus</i>																												
<i>S. punctatus</i>					/																							
<i>S. regium</i>																												
<i>T. multistrius</i> (CP4)							/	/		/				/		/		/	/	/	/	/	/	/	/	/	/	/
<i>T. textus</i>																												
<i>T. verrucosus</i>																												
<i>T. securus</i>																												
<i>T. confessus</i> (C3)																												
<i>T. gillii</i>																												
<i>T. incisus</i>																												
<i>T. longus</i>																												
<i>T. phillipsii</i>											/			/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>T. renmarkensis</i>																												
<i>T. sabulosus</i>																												
<i>T. simatus</i>																												
<i>T. thomasi</i>																												
<i>T. waiparaensis</i>																												
<i>T. adelaidensis</i> (CP3)											/	/	/															
<i>T. angurium</i>																												
<i>T. delicatus</i>																												
<i>T. geraniodes</i>																												
<i>T. leuros</i>																												
<i>T. lilliei</i>																												
<i>T. marginatus</i>																												
<i>T. moultonii</i>																		/	/	/	/	/	/	/	/	/	/	/
<i>T. paenestriatus</i>							/			/																		
<i>T. retequetrus</i>																												
<i>T. scabratus</i>																												
<i>T. sphaerica</i>																												
<i>T. magnificus</i> (P3)																												
<i>T. spinosus</i>																												
<i>T. ambiguus</i>							/																					
<i>T. chnosus</i>																												
<i>T. helosus</i>																												
<i>T. scabratus</i>																												
<i>T. sectilis</i>																												
<i>V. attinatus</i>																												
<i>V. cristatus</i>																												
<i>V. kopukuensis</i>							/	/		/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/

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

SAMPLE TYPE *	DEPTHS																												
	S	S	S	S	S	S	C	C	C	C	C	C	C	C	S	S	S	S	S	S									
PALYNOMORPHS	2372	2374	2376	2377.5	2381	2385	2399.3	2403.7	2411	2437.2	2438.6	2440	2444.8	2447.7	2453.5	2472.5	2479	2507.5	2510.5	2515	2518	2522	2537	2541	2545	2549	2553.5	2565	
<i>Nemat. balcombiana</i>	/																												
<i>Operc. centrocarpum</i>	/																												
<i>Achom. ramulifera</i>	/																												
<i>Spiniferites spp.</i>	/																												
<i>Dinosphere sp.</i>	/																												
<i>Hyshichokol. rigaudae</i>	/	cf																											
<i>Dinosphere simplex</i>	/																												
<i>D. scabroellipticus</i>	/																												
<i>Systematophora placacantha</i>	/																												
<i>Hystrich sp.</i>	/																												
<i>Nemat. divergens</i>	/																												
<i>Leptodinium spp.</i>	/																												
<i>Ling. machaerophorum</i>	/																												
<i>Defl. dartmooria</i>	/																												
<i>Thal. pelagica</i>	/																												
<i>P. indentata</i>	/																												
<i>Defl. sp.</i>	/																												
<i>Spinidinium sp.</i>	/																												
<i>Palaeocysto australiense</i>	/																												
<i>Wetz. hyperacantha</i>	/																												
<i>Dyphes colligerun</i>	/																												
<i>Wetz homomorpha</i>	/																												
<i>Adnat sp.</i>	/																												
<i>Tubiosphaera filosa</i>	/																												
<i>Dinosphere pontus</i>	/																												
<i>Histiocysta variata</i>	/																												
<i>Rosnaesph. biformoides</i>	/																												
<i>Areoligeria sp.</i>	/																												
<i>Kenleyia lophophora</i>	/																												
<i>Spinif. lanceolatus</i>	/																												
<i>Kenleyia fimbriata</i>	/																												
<i>Emmetrocysta sp.</i>	/																												
<i>Fibrocysta sp.</i>	/																												
<i>Danea sp.</i>	/																												
<i>Delf. medcalfi</i>	/																												
<i>A. dictyoplokus</i>	/																												
<i>Spiniferites ramulifera</i>	/																												
<i>Thalassiphora sp.</i>	/																												
<i>Achomosphaera septata</i>	/																												
<i>Kenleyia spp.</i>	/																												

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

Rec'd 18/4/79

V D M E

THE FORAMINIFERAL SEQUENCE

IN WEST HALIBUT-1,

GIPPSLAND BASIN

by

David Taylor

Esso Australia Ltd
Palaeontology Report: 1979/9

April 9, 1979

ADDED BY DNRE ON 10/5/99

FORAMINIFERAL SEQUENCE

- WEST HALIBUT # 1

by DAVID TAYLOR

March 26, 1979.

Submitted April 9, 1979.

for
ESSO AUSTRALIA LTD.,
Paleontology Report 1979/9

SUMMARY

Precise biostratigraphic designations within this sequence was impossible. Mid Miocene to Pliocene planktonic foraminifera were poorly represented in this sequence due to the rapidity and high energy of canyon cut and fill mechanisms. Catastrophic slumping down canyon may account for muddled sample sequence of early and mid Miocene faunas between 2385 and 2075. Another explanation for this muddling, was that one or more guns of sidewall were misfired. This is by no means the only example of a muddled biostratigraphic sequence in the Gippsland Basin.

INTRODUCTION

Ninety two sidewall cores were processed and examined from HALIBUT WEST # 1. All sidewall core depths in metres listed were as labelled on sample containers.

Samples from 2385 to 2075 were muddled when compared to the established foraminiferal biostratigraphic sequence for the Gippsland Basin. Prior warning had been given of this possibility, but the extent was greater than was realized. No conclusions can be drawn because of this and only abstract data is presented in this report. Documentation accompanying the report is:-

Six sample data sheets with note of diagnostic planktonic species
Distribution chart for Late Neogene planktonic foraminifera from
240 to 860.

LATE NEOGENE - 240 to 860 (see distribution chart).

This interval contained generally poor planktonic faunas due to shallow water deposition at and above 425 and the rapidity and high energy of canyon cut and fill mechanisms below 425.

Poor quality Zone A-4 (=early Pliocene) faunas were recorded at 753.5 and 727.5. Between 557.5 and 309 the association of *Globorotalia puncticulata*, *G. inflata* and *G. crassaformis* in the absence of *G. tosaensis* and/or *G. truncatulinoides* indicates Zone A-3 (=mid Pliocene). The dominance of *G. crassaformis* over *G. inflata* is unusual and suggests a warm temperate surface water layer rather than the usual cool temperate surface layer above the Gippsland continental shelf.

LATE to MID MIOCENE - 880 to 2050.

No biostratigraphic control was possible due to recrystallization of the fine grained carbonate canyon fill of this section.

MUDDLED SEQUENCE of MID and EARLY MIOCENE - 2075 to 2385.

The biostratigraphic results from forty sidewall cores are listed on page 2 and briefly detailed on the sample data sheets.

SUMMARY OF MUDDLED SEQUENCE
IN HALIBUT WEST # 1.

<u>Depth</u>	<u>SWC No.</u>	<u>Zone & Quality</u>
2025*	SWC 103	?? canyon fill
2050	SWC 102	?? canyon fill
2075	SWC 132	D-2 (1)
2100	SWC 100	?? canyon fill
2125	SWC 99	?? canyon fill
2150	SWC 131	F- (1)
2175	SWC 97	D-1 (2) canyon fill
2220	SWC 96	D-1 (2) canyon fill
2277.5	SWC 93	D-2 (1)
2294	SWC 94	D-1 (2)
2299	SWC 129	E-2 (2) or F (2)
2325	SWC 91	D-1 (1) canyon fill
2350	SWC 90	D-2 (0)
2351	SWC 128	F (1)
2352	SWC 127	F (0)
2354	SWC 125	F (1)
2355	SWC 124	F (2)
2356	SWC 123	F (1)
2357	SWC 122	F (1)
2358	SWC 121	G/F (2)
2359	SWC 120	G/F (2)
2360	SWC 62	G/F (2)
2361	SWC 119	G/F (2)
2362	SWC 118	F (2)
2363	SWC 61	F (2)
2365	SWC 116	G/F (2)
2366	SWC 88	D-2 (1)
2367	SWC 115	F (1)
2368	SWC 60	F/D-2 (2)
2369	SWC 114	F/D-2 (2)
2370	SWC 59	high F(0)
2371	SWC 87	D-2 (0)
2372	SWC 58	E-2 (1)
2373	SWC 113	F (1)
2374	SWC 57	Indet
2375	SWC 85	D-2 (0)
2376	SWC 55	N.F.F.
2377.5	SWC 56	D-2 (0)
2385	SWC 82	D-2 (0)

* SWCs above 2025 to 940 are recrystallised canyon fill carbonate with non-diagnostic and/or indeterminate planktonic foraminifera.

The established sequence of biostratigraphic events did not emerge from any logical re-arrangement of the sample depths or sidewall core numbers. Thus the muddling was not due to pure inversion of sample depths.

It could be concluded that the Gippsland foraminiferal biostratigraphic scheme is "busted". If this is so, then so are all other early to mid Miocene schemes proposed by Blow, Stainforth et al, Bolli, Jenkins etc. For instance Blow's well established *Orbulina* bioseries is completely out of order in Halibut West with the ultimate form (*Orbulina universa* in D-2) occurring before the pentultimate morphotypes of *Praeorbulina* (in E-2), which in turn was recorded before the earlier forms of *Globigerinoides sicanus* and *G. trilobus* in F and G. Dismissing the above possibility, I put the following three explanations.

1. A catastrophic disturbance, such as a collapse of the continental shelf of early to mid Miocene sediments into a continental slope canyon during the mid Miocene. It is noted that a normal recrystallized canyon sequence was present above 2075. The sequence below could have been massive, rapid canyon fill.
2. The fatigued well site geologist incorrectly labelled the samples. Unlikely, as the depth muddling is far too great.
3. Mis-shooting of at least one and probably two guns of sidewall cores. This is by no means the first case of scrambled sidewall cores (e.g. Kingfish # 7, Paleontology Report, 1977/23).

If the catastrophic explanation is correct then it was of a scale described in *Psalms 46:2*, so that other geological and geophysical evidence should be very apparent. The possibility of mis-shooting cannot be dismissed, but if it were then the mid Miocene catastrophism was widespread. Obvious muddling of sequences are common in the Basin Deep portion of the Gippsland Basin and the biostratigraphy of a number of wells doesn't agree with other correlation methods (e.g. wells on the Kingfish structure).

As I have not been privy to any information or discussions that would throw further light on this problem, I remain ambivalent.

WEST HALIBUT # 1.

Side wall core depth in metres	240	264	283	309	336	357	371.5	401	425	445	468	485	506.5	525	542	557.5	581.5	597	520	640	660	685	704	727.5	753.5	769	802	825	842.5	860		
PLANKTONICS																																
<i>Globigerina bulloides</i>	°		N			°	°						I							N	N											
<i>Globorotalia inflata</i>	cfcf	O					°	cf												O	O											
<i>Globigerinelloides aequilateralis</i>																																
<i>Globorotalia crassaformis</i>			I	°	D		D	I	I			D	D																			
<i>Globorotalia cf. conomiozea</i>	P	L																		D	D											
<i>Globorotalia puncticulata</i>	A		°										I																			
<i>G. crassaformis - tosaensis</i>	N																			A	A											
<i>Orbulina universa</i>	K									D			I							G	G											
<i>Globorotalia acostaensis</i>	T																			N	N	°						I	I	I		
<i>Globigerina decoraperta</i>	O																															
<i>Globigerinoides</i>	N							?												S	S											
<i>Globorotalia continua</i>	I																			T	T											
<i>G. tosaensis</i>	C																			I	I											
<i>G. menardii</i>	S														cf					C	C											
<i>Globigerina falconensis</i>																																
<i>G. woodi</i>	F																															
<i>G. woodi connecta</i>	O																			I		F	F									
<i>Globigerinoides subquadratus</i>	U																															
<i>Globorotalia miotumida</i>	N																															
<i>Globigerina quinqueloba</i>	D																															
<i>Globorotalia cf. obesa</i>																																
<i>G. miozea conoidea</i>																																

SYMBOLS
 ° = 1-20 Specimens
 I = 20 specimens
 D = > 60% of planktonics

Depth in metres to base of ZONE	?	A-3	557.5	? ? ?	A-4	753.5	?
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SAMPLE DATA SHEETS
MICROPALAEONTOLOGICAL MATERIAL

WELL NAME AND NO. HALIBUT WEST # 1

DATE: 25/2/1979.

PREPARED BY: DAVID TAYLOR

SHEET NO. 1 of 6.

DRAW:

<u>DEPTH</u>	<u>SAMPLE TYPE</u>	<u>SLIDE</u>	<u>ADDITIONAL INFORMATION</u>
240	SWC 30		?? - bio calcar, 25% moll, 25% bry, 10% forams. count 800, 98% benthos with <i>D. Elphidium</i> .
264	SWC 29		?? 90% c. moll. frags. count 400, 95% benthos. <i>D. Cibicides</i> .
283	SWC 28		?? 95% indet calcareous grains. 100% benthos. <i>D. Elphidium</i> .
309	SWC 27		A-3(1). 90% bry & moll frags. 2000 count 10% planks incl. <i>Globorotalia crassaformis</i> Dom. benthos = <i>Elphidium</i> .
336	SWC 26		A-3(1) - 60% calcareous grains, 30% forams, 10% ech. spines. Count 1200, 50% planks incl. <i>G. crassaformis</i> . Dom. benthos <i>Euuvigerina mata</i> + <i>Elphidium imperatrix</i> & <i>Cibicides cygnorum</i> .
357	SWC 25		A-3(1) - 40% calcareous grains, 40% forams, count 500, 30% planks. Dom. benthos. as above.
371.5	SWC 24		A-3(2) - 60% calcareous frags. 10% c. ang. qtz., 30% forams. Count 200, 20% planks. Dom benthos. = <i>Cibicides</i> .
401	SWC 23		A-3(1). 60% calcareous frags. 40% forams, r. ang. qtz. Count. 1000 40% planks with Dom. <i>G. crassaformis</i> . <i>E. mata</i> Dom. benth.
425	SWC 22		A-3 (0) 70% calcareous frags, 30% forams, count 2500 60% planks, shelf edge benthos incl. <i>E. mata</i> & <i>Cassidulina carinata</i> .
445	SWC 21		A-3(1), 99% limonite stained & sometimes infilled forams. r.f. ang. qtz. count 6000 60% planks. shelf edge benthos. Dom. <i>Cassidulina carinata</i> . ? top canyon fill
468	SWC 20		A-3(2), 90% forams, count 2000, 40% planks. Canyon fill.
485	SWC 19		?? poor pres. 95% forams + limonite grains, count 4000, 20% planks, shelf edge benthos, Dom. <i>Cassidulina carinata</i> .
506.5	SWC 18		A-3(1), 95% forams + limonite grains. Count 8000, 70% planks. Benthos Dom. <i>Bolivina</i> spp & large Polymorphinids = upwelling.

SAMPLE DATA SHEETS

MICROPALAEONTOLOGICAL MATERIAL

WELL NAME AND NO. HALIBUT WEST # 1.

DATE: 28/2/1979.

PREPARED BY: DAVID TAYLOR.

SHEET NO.2 of 6.

DRAW:

<u>DEPTH</u>	<u>SAMPLE TYPE</u>	<u>SLIDE</u>	<u>ADDITIONAL INFORMATION</u>
525	SWC 17	A-3 (2),	85% forams - poor pres. - 15% ech. spines, count 1200, 20% planks Dom. <i>Globorotalia crassaformis</i> . Shelf edge benthos, Dom. <i>Cibicides subhaidingeri</i> with <i>E. mata</i> & <i>Siphouvigerina canariensis</i> .
542	SWC 16	A-3 (2).	45% vien. calcite, 45% ech, 10% forams. Count 200, 50% planks.
557.5	SWC 15	A-3 (0),	80% forams - good pres. 20% glauc. moulds. Count 3000, planks 50%. shelf edge benthos.
581.5	SWC 14	?	, 50% forams, 20% spics, 20% limonite, r. rd. qtz. <u>NB.</u> spiculite "balls". Count 400, 40% planks, Benthos. shelf edge + rafted adherent spp.
597	SWC 13	?? forams,	r. spics. r. ang. qtz. Count 300. 30% planks - most reworked.
620	SWC 12	?? forams with adherent limonite,	r. ang. qtz. r. ech. Count 1000, 20% planks, most reworked, shelf edge + rafted benthos.
640	SWC 11	?? Dom. indet carb.,	r. forams. r. glauc, r. ech. Count 10.
660	SWC 10	?? 50% c. bry. frags,	50% carb. count 50.
685	SWC 9	?? 40% carb,	40% forams, 20% bry. frags. common ost. Count 300, planks 50%, canyon fill with inner shelf benthos. <u>N.B.</u> <i>Rosalina mitchelli</i> .
704	SWC 8	?? Recrystallised carb.	
727.5	SWC 7	A-4 (2) 60% f. limonitic carb. sd.,	30% indet carb. r. forams, r. bry, r. ech, r. ost. Count 150. Planks 5% inner shelf + rafted benthos. <u>N.B.</u> limonitic infilled miliolids - canyon fill.
753.5	SWC 6	A-4 (2) <i>ibid</i>	
769	SWC 5	?? <i>ibid</i>	
802	SWC 4	?? Dom forams & spics,	limonite grains, Count 1000, 30% planks, displaced shelf benthos. Canyon fill.
825	SWC 3	?? <i>ibid</i>	

SAMPLE DATA SHEETS

MICROPALAEONTOLOGICAL MATERIAL

WELL NAME AND NO. HALIBUT WEST # 1.

DATE: 2/3/1979.

PREPARED BY: DAVID TAYLOR.

SHEET NO. 3 of 6.

DRAW:

<u>DEPTH</u>	<u>SAMPLE TYPE</u>	<u>SLIDE</u>	<u>ADDITIONAL INFORMATION</u>
842.5	SWC 2		?? Dom forams + common ost., limonite adhering. Count 1000, planks 30%. Displaced shelf + slope benthos. Dom. <i>Cassidulina carinata</i> .
860	SWC 1		?? <i>ibid</i> + rads.
880	SWC 81		?? Recrystallized canyon fill with poorly preserved indet planks & r. benthos. incl. <i>Cassidulina carinata</i> sponge spics. r. to abundant.
940	SWC 80		<i>ibid</i>
1000	SWC 79		<i>ibid</i>
1060	SWC 78		<i>ibid</i>
1180	SWC 76		<i>ibid</i>
1240	SWC 75		<i>ibid</i>
1305	SWC 74		<i>ibid</i>
1365	SWC 73		<i>ibid</i>
1425	SWC 72		<i>ibid</i>
1485	SWC 71		<i>ibid</i>
1605	SWC 69		<i>ibid</i>
1665	SWC 68		<i>ibid</i>
1698	SWC 67		<i>ibid</i>
1725	SWC 66		<i>ibid</i>
1750	SWC 65		<i>ibid</i>
1775	SWC 64		<i>ibid</i>
1800	SWC 63		<i>ibid</i>
1875	SWC 109		<i>ibid</i>
1900	SWC 108		<i>ibid</i>
1950	SWC 106		<i>ibid</i>
1975	SWC 105		<i>ibid</i>
2025	SWC 103		<i>ibid</i>
2050	SWC 102		<i>ibid</i>

SAMPLE DATA SHEETS

MICROPALAEONTOLOGICAL MATERIAL

WELL NAME AND NO. HALIBUT WEST # 1.

DATE: 2/3/1979.

PREPARED BY: DAVID TAYLOR.

SHEET NO. 4 of 6.

DRAW:

<u>DEPTH</u>	<u>SAMPLE TYPE</u>	<u>SLIDE</u>	<u>ADDITIONAL INFORMATION</u>
2075	SWC 132	D-2 (1)	fairly complete fauna.
2100	SWC 100	??	recrystallized lst + r. planks & <i>Cassidulina carinata</i> .
2125	SWC 99	??	<i>ibid</i>
2150	SWC 131	F(1)	- <i>Globigerinoides sicanus</i> & <i>G. trilobus</i> .
2175	SWC 97	D-1 (2)	recrystallized lst + <i>Orbulina universa</i> & <i>Globorotalia miozea conoidea</i> .
2220	SWC 96	D-1 (2)	<i>ibid</i>
2277.5	SWC 93	D-2 (1)	- <i>Orbulina universa</i> , <i>Globigerinoides sicanus</i> , <i>G. trilobus</i> , <i>Globorotalia miozea miozea</i> . Good pres.
2294	SWC 94	D-1(2)	- recrystallized lst + <i>Orbulina universa</i> & <i>Globorotalia miozea conoidea</i> .
2299	SWC 129	E-2 (2)	- ? <i>Praeorbulina glomerosa</i> , <i>G. sicanus</i> , <i>G. trilobus</i> .
2325	SWC 91	D-1(1)	rare <i>Orbulina universa</i> , <i>Globorotalia miozea conoidea</i> , otherwise poor fauna.
2350	SWC 90	D-2 (0)	almost complete association.
2351	SWC 128	F (1)	<i>Globigerinoides ruber</i> & <i>G. trilobus</i> <u>without</u> <i>G. bisphericus</i> & <i>Praeorbulina/Orbulina</i> .
2352	SWC 127	F (0)	Good preservation diverse association with <i>Globigerinoides ruber</i> & <i>Catapsydras dissimilis</i> but <u>no</u> <i>G. bisphericus</i> or <i>Orbulina</i> . Presence of <i>C. dissimilis</i> definitely implies sample below <i>Orbulina</i> Datum (i.e. below Zone E-1).
2353	SWC 126	F (1)	with <i>Globigerinoides bisphericus</i> but low diversity and no globorotalids.
2354	SWC 125	F (1)	<i>ibid</i>
2355	SWC 124	F (2)	poor fauna with <i>G. ? bisphericus</i> & <i>Catapsydrax dissimilis</i> .
2356	SWC 123	F (1)	<i>Globigerinoides bisphericus</i> & <i>G. ruber</i> but poor globorotalids.
2357	SWC 122	F (1)	<i>ibid</i> + <i>Catapsydrax dissimilis</i> .
2358	SWC 121	G/F (2)	<i>C. dissimilis</i> , <i>C. unicavus</i> , <i>Globigerinoides ? ruber</i> ; <u>no</u> <i>G. bisphericus</i> .

SAMPLE DATA SHEETS

MICROPALAEONTOLOGICAL MATERIAL

WELL NAME AND NO. HALIBUT WEST # 1.

DATE: 5/2/1979.

PREPARED BY: DAVID TAYLOR.

SHEET NO. 5 of 6.

DRAW:

<u>DEPTH</u>	<u>SAMPLE TYPE</u>	<u>SLIDE</u>	<u>ADDITIONAL INFORMATION</u>
2359	SWC 120	<i>ibid</i>	
2360	SWC 62	G.F (2) poor fauna and preservation with <i>G. trilobus</i> but no other zonal indicators.	
2361	SWC 119	<i>ibid</i>	
2362	SWC 118	F (2) poor fauna & preservation with <i>G. ? ruber</i> & <i>Catapsydrax dissimilis</i> .	
2363	SWC 61	F (2) poor fauna & preservation with <i>G. ? bisphericus</i> .	
2365	SWC 116	G/F (2) poor fauna & preservation with <i>G. trilobus</i> & <i>C. dissimilis</i> . Thus definitely early Miocene (= pre Zone E-1).	
2366	SWC 88	D-2 (1) <i>Orbulina universa</i> , <i>Globigerinoides trilobus</i> , <i>G. bisphericus</i> , <i>Globorotalia miozea conoidea</i> etc.	
2367	SWC 115	F (1) <i>G. bisphericus</i> & <i>G. ? ruber</i> , poor preservation.	
2368	SWC 60	F/D-2 (2) poor fauna & preservation <i>G. ruber</i> <u>no</u> <i>G. bisphericus</i> , <i>Praeorbulina/Orbulina</i> .	
2369	SWC 114	<i>ibid</i>	
2370	SWC 59	high F(0) <i>Globigerinoides bisphericus</i> , <i>G. ruber</i> , <i>G. trilobus</i> , <i>Catapsydrax dissimilis</i> , <i>Globorotalia miozea/praescitula</i> group.	
2371	SWC 87	D-2 (0) Small sample but diverse association including <i>Orbulina universa</i> , <i>Globigerinoides bisphericus</i> , <i>G. ruber</i> , <i>G. trilobus</i> , <i>Globorotalia miozea miozea</i> , <i>G. miozea conoidea</i> , <i>G. panda</i> , <i>G. peripheroronda</i> , <i>G. conia</i> .	
2372	SWC 58	E-2(1) Preservation poor. ? <i>Praeorbulina glomerata</i> (indet morphotype), <i>Globigerinoides ? bisphericus</i> , <i>G. ruber</i> , <i>G. trilobus</i> , <i>Globoquadrina dehiscens</i> (S.S.) <i>G. altispira</i> and on presence of <i>Catapsydrax dissimilis</i> and absence of <i>Orbulina</i> assumed to be early Miocene (i.e. pre. E-1).	
2373	SWC 113	F (1) <i>Globigerinoides ? bisphericus</i> , <i>G. ruber</i> , <i>Globoquadrina dehiscens</i> (S.S.), <i>Catapsydrax dissimilis</i> , <i>Globorotalia continuosa</i> . Definitely early Miocene.	

SAMPLE DATA SHEETS

MICROPALEONTOLOGICAL MATERIAL

WELL NAME AND NO. HALIBUT WEST # 1.

DATE: 8/3/1979.

PREPARED BY: DAVID TAYLOR.

SHEET NO. 6 of 6.

DRAW:

<u>DEPTH</u>	<u>SAMPLE TYPE</u>	<u>SLIDE</u>	<u>ADDITIONAL INFORMATION</u>
2374	SWC 57	Indet - iron stained recrystallized lst. with py. Indet "ghosts" of planks. Could be below "Cobia unconformity", thus J or older.	
2375	SWC 85	D-2 (0) Excellent preservation <i>Orbulina universa</i> abundant with <i>G. bisphericus</i> , <i>G. ruber</i> , <i>G. trilobus</i> , <i>Globorotalia</i> diverse including <i>G. miozea miozea</i> , <i>G. miozea conoidea</i> , <i>G. menardii</i> group, <i>G.</i> <i>peripheroronda</i> , <i>G. praescitula</i> , <i>G. obesa</i> , <i>G. mayeri</i> , <i>G. conica</i> .	
2376	SWC 55	N.F.F. f. qtz. sand.	
2376	SWC 56	D-2(0) as for 2375 (SWC 85)	
2377.5	SWC 84	D-2(0) <i>ibid</i>	
2385	SWC 82	D-2 (0) as for 2377.5 (SWC 56) and 2375 (SWC 85).	

ABBREVIATION KEY used by David Taylor on summary
date sheets.

R.C.	= rotary cuttings
S.W.C.	= side wall core
C.C.	= conventional core
U.C.	= unable to clean sample of drilling mud before washing, thus result may be spurious.
N.F.F.	= no fauna found
indet	= specifically indeterminate and/or biostratigraphically non diagnostic
J-2 (0)	= Zone J-2 planktonic fauna present and identification is of highest level of confidence.
B-1 (4)	= Zone B-1 suspected but lowest confidence indicated
Dom	= Dominant grain type - at least 90% of washed sample
r	= rare - less than 10 grains
60-40	= proportion of components
qtz	= quartz
py	= pyrite
glauc	= glauconite
lim	= limonite
sdst	= sandstone
siltst	= siltstone
mdst	= mudstone
calc sh	= calcareous shale
lst	= limestone
mic	= micritic limestone
calcar	= calcarenite
bio	= biogenic
bry	= bryozoa
moll	= molluscan fragments
plank	= planktonic foraminifera
calc benth	= calcareous benthonic foraminifera
aren	= arenaceous foraminifera
ost	= ostracods
spic	= siliceous sponge spicules
ech	= echnioid spines

2../

f	= fine grade
m	= medium grade
c	= coarse grade
f-c	= whole spectrum of grades
ang	= angular shape
subrd	= subround shape
rd	= round shape
ibid	= sample identical to that listed immediately above.

EXPLORATION DEPARTMENT PALYNOLOGY LABORATORY
PROVISIONAL REPORT

REPORTED TO:

D. M. MAUGHAN	
A. D. PARTRIDGE	

PHONED TO:

SEEN BY:

WELL: WEST HALIBUT-1

REPORT NO: 1

DATE: Sept. 19, 1978

SAMPLE No.	DEPTH (in feet)	RECEIVED	AGE	ZONE	DIVISION
CORE-1	2389.9m	15/9/78	Indeterminate	Sample barren	
CORE-1	2399.3m	15/9/78	Early Eocene	Lower <u>M. diversus</u>	
CORE-4	2427.2m	18/9/78	Indeterminate	Sample barren	
CORE-5	2438.6m	18/9/78	Early Eocene	Lower <u>M. diversus</u>	

COMMENTS: These samples are tentatively suggested to correlate with the interval below approximately 2560m in Fortescue-1. Additional samples are being run to check this.

**EXPLORATION DEPARTMENT PALYNOLOGY LABORATORY
PROVISIONAL REPORT**

REPORTED TO:

D. Maughan

WELL: *West Habbitt #1*

PHONED TO:

REPORT NO: *2*

SEEN BY:

A. Partridge
H. Stacy

DATE: *22-9-78*

SAMPLE No.	DEPTH (in feet)	RECEIVED	AGE	ZONE	DIVISION
<i>Core #6</i>	<i>2440 m</i>	<i>20-9-78</i>	<i>Early Eocene</i>	<i>Lower M. divinus</i>	
<i>Core #6</i>	<i>2453 m</i>	<i>20-9-78</i>	<i>Early Eocene</i>	<i>lower M. divinus</i>	
<i>Bottom Hb. Core</i>	<i>2577 m.</i>	<i>20-9-78</i>	<i>Paleocene</i>	<i>Upper L. balmis</i>	

COMMENTS:

**EXPLORATION DEPARTMENT PALYNOLOGY LABORATORY
PROVISIONAL REPORT**

REPORTED TO:

D. Mansham

WELL: West Halbut #1

PHONED TO:

REPORT NO: 3

SEEN BY:

A. Partridge
H. Stacy

DATE: 27-9-78

SAMPLE No.	DEPTH (in feet)	RECEIVED	AGE	ZONE	DIVISION
Core # 2	2403 m		Early Eocene	Lower <i>M. diversus</i>	
SWC-44	2479 m		" "	" "	
SWC-40	2510.5 m		" "	" "	
SWC 37	2522 m		Paleocene	Upper <i>L. helmeri</i>	

COMMENTS: Sample from Core 2 (2403 m) correlates with SWC 16 (2551 m) in Fortescue #1 based on occurrence of *Pact. tuberculiformis*, *W. homeomorphus* and *Defl. dartmouisi*

Last *M. diversus* sample at 2510.5 corresponds to 2655 m in Fortescue #1

The *L. helmeri* top in the interval between 2522 m and last *M. diversus* sediments at 2510.5 m has the equivalent section between 2666 m and 2655 m in Fortescue #1

ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC. V D M E
EXPLORATION DEPARTMENT PALYNOLOGY LABORATORY
PROVISIONAL REPORT

REPORTED TO:

D. MAUGHAN

WELL: *WEST HALIBUT-1*

PHONED TO:

REPORT NO: *4*

SEEN BY:

A. PARTRIDGE

DATE: *6/10/78*

SAMPLE No.	DEPTH (in feet)	RECEIVED	AGE	ZONE	DIVISION
<i>SWC 111</i>	<i>1825m</i>	<i>20/9/78</i>	<i>Indeterminate</i>	<i>Sample Barren</i>	
<i>SWC 55</i>	<i>2376m</i>	<i>"</i>	<i>Early Eocene</i>	<i>Lower M. diversus</i>	
<i>SWC 112</i>	<i>2381m</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>SWC 52</i>	<i>2411m</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>SWC 38</i>	<i>2518m</i>	<i>"</i>	<i>Paleocene</i>	<i>Upper L. balmei</i>	
<i>SWC 31</i>	<i>2565m</i>	<i>"</i>	<i>Paleocene</i>	<i>Upper L. balmei</i>	

COMMENTS: *The sidewall core at 1825m was a sand, with
 fluorescence, and thus obviously misplaced
 from somewhere in the Latrobe Group.
 Unfortunately insufficient fossils were recovered
 from the sample for age determination.*

APPENDIX 5

APPENDIX 5

LOG ANALYSIS

LOG ANALYSIS

EALOG INTERPRETATION OF WEST HALIBUT-1

1. Introduction

The interval interpreted is 2380.0-2540.0m. The interpretation method uses the density neutron combination as the porosity indicator and both the density-neutron combination and the gamma ray as clay indicators. A computer listing has been prepared for which the column headings are: -

DEPTH	-	metres
IL	-	resistivity taken from the induction log
SFL	-	spherically focussed resistivity log reading
MSFL	-	microspherically focussed resistivity log reading
GR	-	gamma ray, API units
FDC	-	density readings
CNL	-	neutron porosity, limestone units
VCL	-	percentage clay
DPOR	-	clay corrected density porosity
NPOR	-	clay corrected neutron porosity
POR	-	average porosity
SW	-	water saturation
SXO	-	residual water saturation

2. Log Quality

As in the logging of Seahorse #1 the SP curve has high frequency noise superimposed on it.

3. Formation Water Resistivity (RW)

An RW value of 0.06 @ 210°F which corresponds to 38,000 ppm NaCl was used. This was calculated from the SP in the interval 2100-2500m.

4. Formation Resistivity (Rt) and Depth of Invasion (Di)

A depth of invasion study carried out in the water bearing intervals 2465-70m and 2480-90m indicated that depth of invasion in the range 15-30" had occurred

.....2/

at the time of resistivity logging. This tends to suggest that true formation resistivity would be slightly overestimated when read directly from the induction log. This over estimation would have only a minimal effect on saturation calculation, hence the resistivity for water saturation calculation was taken directly from the induction log.

5. Clay Indicators (VCL)

The gamma ray curve and the density neutron crossplot were used to calculate percentage clay. The minimum value derived from the two methods was then used for further calculation.

6. Porosity (POR)

The density and neutron logs were used to calculate porosity. The clay corrected density and neutron porosities are corrected for light hydrocarbon effect to produce a "true" porosity. A 40% cut off has been imposed on Vcl in generating density and neutron porosities and a 10% minimum has been imposed on the porosity listing. The various coals which permeate the interpreted intervals have been removed from the listing.

7. Water Saturation (Sw)

The Indonesian shaley sand equation was used to calculate water saturation.

The parameters used in this interpretation are listed below:

GRmin = 15	a = 0.62
GRmax = 150	m = 2.15
pbcl = 2.55	n = 1.8
ØNcl = 0.30	pma = 2.65
Rcl = 2.4	
pfl = 1.0	Rw = 0.06 @ 210°F

The Rw value used in the interpretations produces very good water saturation balance in the interval 2350-2415m but is overbalanced in the sand in the interval 2523-2535m. This tends to suggest that Rw is overestimated in the lower sand interval and that connate water salinity may be increasing with depth.

8. Residual Water Saturation (SXO)

Residual water saturations are calculated over the entire interpreted interval. The Indonesian Shaley sand equation is again used in this calculation. Values for Rxo and Rmf used in this calculation are as follows:

Rxo = 0.8 Rmsf1
Rmf = 0.325

The residual water saturations in the oil bearing sands are markedly higher than the normal water saturation indicating definite hydrocarbon movability.

Please consult the computer listing for more detail.

S. Patniyat
S. Patniyat

WELL LOG ANALYSIS REPORT

OPERATOR Esso Australia Ltd

WELL West Halibut #1

DATE 28 September, 1978

STATE Victoria

ELEV. 25.0m

DEPTH INTERVAL (m) ISF DEPTHS	POROSITY	WATER SAT.	REMARKS
	ESTIMATE %	ESTIMATE %	
2384.0 - 2385.5 (1.5)	14 - 17	20 - 27	Shaley, Probably oil productive.
2388.0 - 2391.0 (3.0)	16 - 18	10 - 16	Oil Productive
2391.0 - 2396.5 (5.5)	19 - 22	9 - 23	" "
2399.0 - 2400.5 (1.5)	10 - 14	42 - 53	Very shaley, probably net
2401.0 - 2401.5 (0.5)	11 - 15	28 - 42	Shaley, Oil productive.
2401.5 - 2402.5 (1.0)	19 - 20	18 - 20	" " "
2402.5 - 2403.5 (1.0)	16 - 19	17 - 23	Oil Productive.
2403.5 - 2405.5 (2.0)	19 - 22	13 - 15	" "
2405.5 - 2407.0 (1.5)	22 - 23	13 - 19	Oil Productive
2407.0 - 2408.0 (1.0)	20 - 22	15 - 22	" "
2408.0 - 2408.5 (0.5)	23 - 24	12	" "
2408.5 - 2410.0 (1.5)	20 - 22	12 - 17	" "
2410.0 - 2410.5 (0.5)	17 - 19	17 - 19	" "
2410.5 - 2411.5 (1.0)	15 - 18	15 - 20	" "
2411.5 - 2412.5 (1.0)	18 - 20	13 - 19	" "
2412.5 - 2413.5 (1.0)	21 - 23	18 - 19	" "
2413.5 - 2414.5 (1.0)	23 - 24	18 - 20	" "
2414.5 - 2415.5 (1.0)	20 - 22	19 - 22	" "
2415.5 - 2420.0 (4.5)	17 - 20	11 - 17	" "
2420.0 - 2420.5 (0.5)	19 - 21	14 - 15	" "
2420.5 - 2421.5 (1.0)	18 - 19	17 - 19	" "
2421.5 - 2422.0 (0.5)	14 - 16	24 - 26	" "
2422.0 - 2422.5 (0.5)	12 - 13	26 - 27	Silty, Oil Productive
2422.5 - 2423.0 (0.5)	18 - 21	16 - 19	" " "
2423.0 - 2426.0 (3.0)	22 - 24	12 - 18	" " "
2426.0 - 2426.5 (0.5)	21 - 22	14 - 15	" " "

P.T.O

TESTS:

The intervals of interest were extensively cored, FIT and RFT tested.

FORMATION:

LATROBE

LOGS:

ISF-SONIC-GR-SP
FDC-CNL-GR

COMMENTS:

The density neutron cross plot and gamma ray curve were used to calculate the percentage clay over the entire interpreted interval. The density and neutron logs were used to calculate porosity. The clay corrected density and neutron porosities are corrected for light hydrocarbon effect to produce a "true porosity". The value for RW used in the interpretation is 0.06 @ 210°F which is equivalent to 38,000 ppm NaCl. The OWC contact occurs between 2436.0 - 2438.0m. The indefinite nature of the contact is caused by the shaliness of the formation in this interval.

S. Patniyot
BY S. PATNIYOT.

WELL WEST HALIBUT #1

DEPTH INTERVAL (m)	POROSITY ESTIMATE %	WATER SAT. ESTIMATE %	REMARKS
2429.5 - 2431.5 (2.0)	17 - 20	19 - 35	Oil Productive
2431.5 - 2432.0 (0.5)	19 - 21	35 - 40	" "
2432.0 - 2433.0 (1.0)	17 - 18	42 - 45	" "
2433.0 - 2434.0 (1.0)	15 - 16	45 - 46	" "
2434.0 - 2435.0 (1.0)	13 - 15	32 - 50	" "
2439.0 - 2440.5 (1.5)	14 - 18	67 - 98	Shaley, Water productive.
2449.0 - 2449.5 (0.5)	12 - 16	100	" " "
2452.0 - 2452.5 (0.5)	10 - 13	100	" " "
2452.5 - 2455.5 (3.0)	17 - 19	100	" " "
2460.5 - 2463.5 (3.0)	22 - 24	100	Water Productive.
2463.5 - 2469.0 (5.5)	20 - 21	100	" "
2464.0 - 2466.0 (2.0)	15 - 18	100	" "
2466.0 - 2467.0 (1.0)	19 - 21	100	" "
2467.0 - 2469.5 (2.5)	18 - 20	100	" "
2469.5 - 2470.5 (1.0)	21 - 22	100	" "
2479.5 - 2480.5 (1.0)	10 - 14	100	" "
2480.5 - 2484.5 (4.0)	18 - 21	100	" "
2484.5 - 2485.5 (1.0)	21 - 23	100	" "
2485.5 - 2486.5 (1.0)	18 - 21	100	" "
2486.5 - 2487.0 (0.5)	16 - 19	100	" "
2487.0 - 2488.0 (1.0)	21 - 24	100	" "
2488.0 - 2489.5 (1.5)	15 - 17	100	" "
2489.5 - 2491.0 (1.5)	22 - 24	100	" "
2491.0 - 2493.0 (2.0)	17 - 20	100	" "
2493.0 - 2498.0 (5.0)	20 - 23	100	Shaley, Water Productive
2498.0 - 2499.0 (1.0)	18 - 20	100	" " "
2499.0 - 2500.0 (1.0)	14 - 16	100	Very Shaley, Water Productive
2500.0 - 2501.0 (1.0)	13 - 16	100	" " " "
2501.0 - 2502.5 (1.5)	14 - 15	100	" " " "
2503.5 - 2505.5 (2.0)	11 - 12	100	" " " "

APPENDIX 6

APPENDIX 6

VELOCITY SURVEY

VELOCITY SURVEY

Well .WEST-HALIBUT # 1

Basin .GIPPSLAND

INTRODUCTION

Esso personnel .ALAN JAMES

Contractor .VELOCITY DATA

Supplied (1) Instruments

(2) Personnel

Seismic Observer .John Larson

Marine Shooter .Ray Doyle

Dynamite -

(3) Seismic Souce

~~(3) Licenced Shooting Boat~~

Gas Gun

name

Gas Pressures

date loaded

Oxygen .90 psi

date released

Propane 50 psi

Agent

amount of powder lbs

size of cans lbs

number of cans

number of caps

number of boosters

Personnel and Instruments

assembled at Sale date 15.9.78

boarded (rig). Ocean Endeavour date 18.9.78

date of survey... 19.9.78

casing depth. 13-3/8" @ 862m

T.D. when shot. 2577m FTD 2577m

water depth... 68.3m KB = 25.0m

SURVEY PROCEDURE

Weather: sea Slight

rig movement Slight

rig noise Moderate

Hydrophones: number Two on gun. One in moonpool

depth below sea level 12.2m

position -

~~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~~

~~amount of powder used lbs~~

Gas gun

Number of pops per level: 2-4

amount of powder dumpedlbs.

Well-phone positioning :

T-bar

number of depths ..21.....

Time: first shot ...1605.....

last shot1905.....

rig time3.75 hours.....

RESULTS

Quality of records (good
(fairFAIR.....
(poor
(not used

Comparison of Interval Times
with sonic log

/Δ/average18.17.....microsec/m

/Δmax/90.9.....microsec/m

CONCLUSION

Reliability of T-D curveGOOD.....

COMMENTS:

Trace 1,8 - time break geophone
Traces 2,3,4,5 well geophone with varying gain settings.
Trace 6 - moonpool geophone
Trace 7 - dead

Records 1,2,3,4 reverse polarity.
General record quality fair.

VELOCITY SURVEY ERROR CHECK

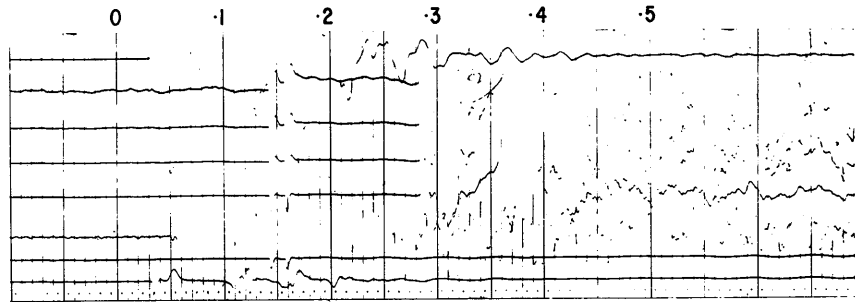
Depth Rel. S.L.	Av. Vertical Travel Time (check shots)	Ti Check Shots (sec.)	Ti Sonic Log (sec.)	Δ (Millisecs.)		Depth Interval (m)	Error (Microsec. per m)
				Ti Sonic	Ti Check		
543	.258	.068	.068	0.0		202	-
745	.327						
745	.327	.035	.033	-2.0		106	18.8
851	.362						
851	.362	.043	.042	-1.0		127	7.9
978	.405						
978	.405	.038	.036	-2.0		115	17.4
1093	.443						
1093	.443	.040	.039	-1.0		127	7.9
1220	.483						
1220	.483	.043	.041	-2.0		147	13.6
1367	.526						
1367	.526	.043	.043	0.0		156	-
1523	.569						
1523	.569	.045	.042	-3.0		148	20.3
1671	.614						
1671	.614	.026	.026	0.0		84	-
1755	.640						
1755	.640	.033	.031	-2.0		96	20.8
1851	.673						
1851	.673	.040	.040	0.0		126	-
1977	.713						
1977	.713	.045	.040	-5.0		129	38.8
2106	.758						
2106	.758	.033	.034	+1.0		104	9.6
2210	.791						
2210	.791	.050	.046	-4.0		142	28.2
2352	.841						
2352	.841	.004	.003	-1.0		11	90.9
2363	.845						

WEST HALIBUT - 1

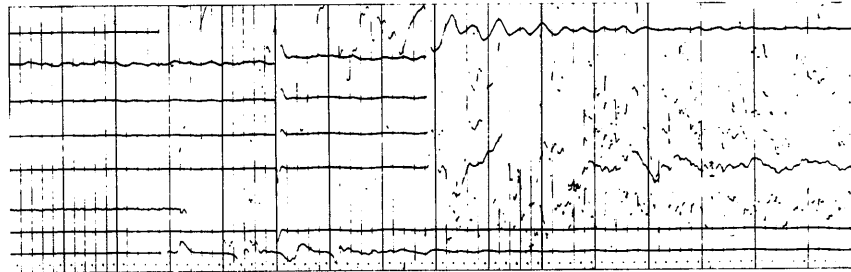
WELL VELOCITY RECORD

19-9-78

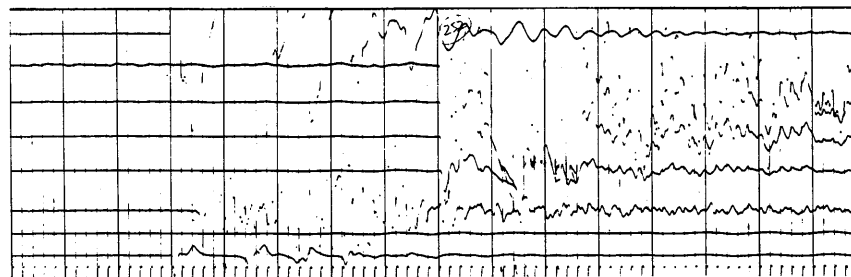
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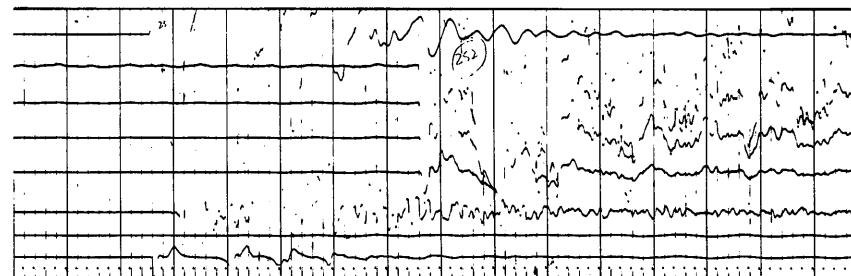
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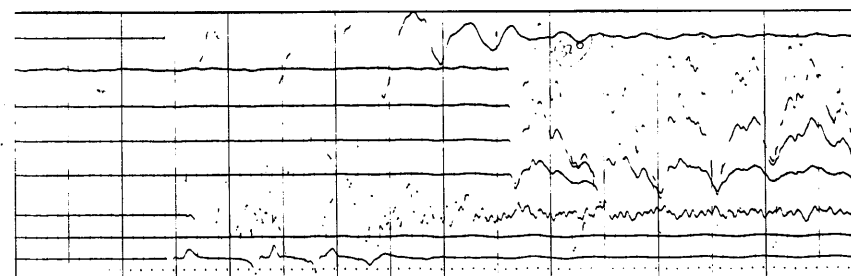
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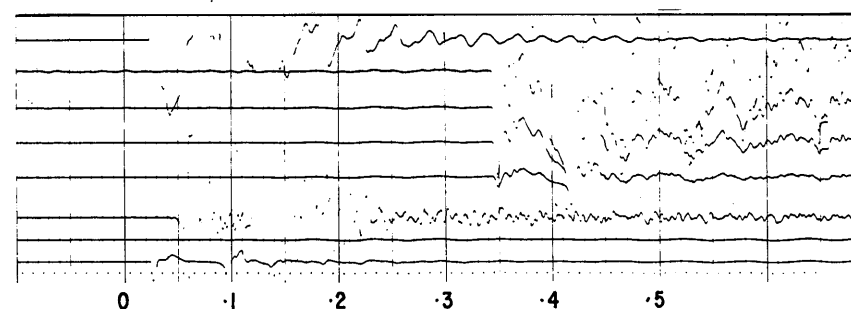
Rec. N° 44
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T 1950 hrs



Rec. N° 41
770 m KB
T 1939 hrs



Rec. N° 42
770 m KB
T 1939 hrs

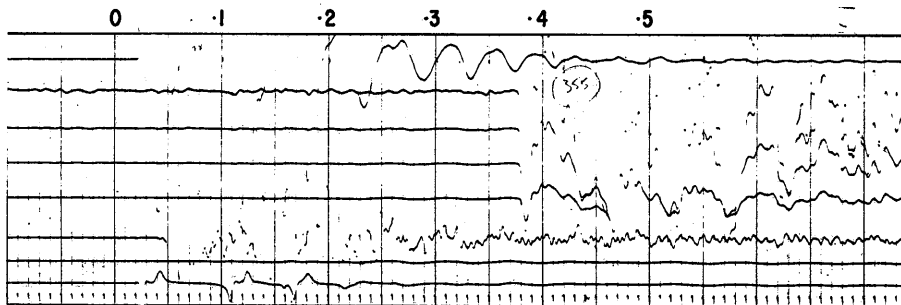


WEST HALIBUT - 1

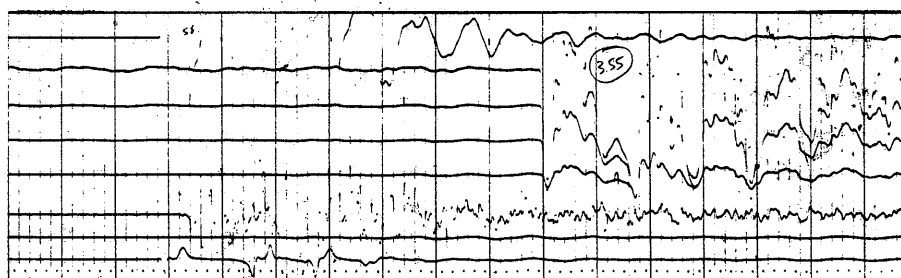
WELL VELOCITY RECORD

19-9-78

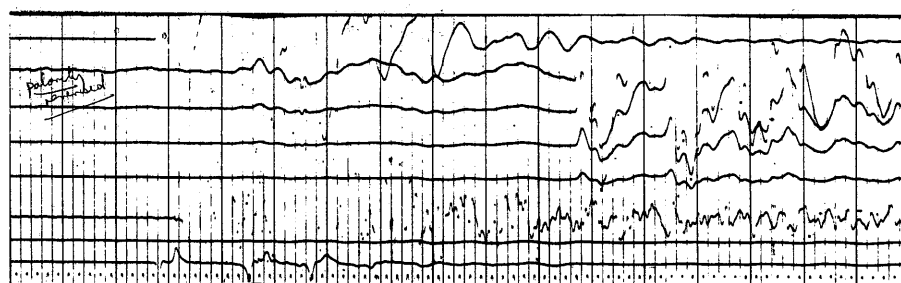
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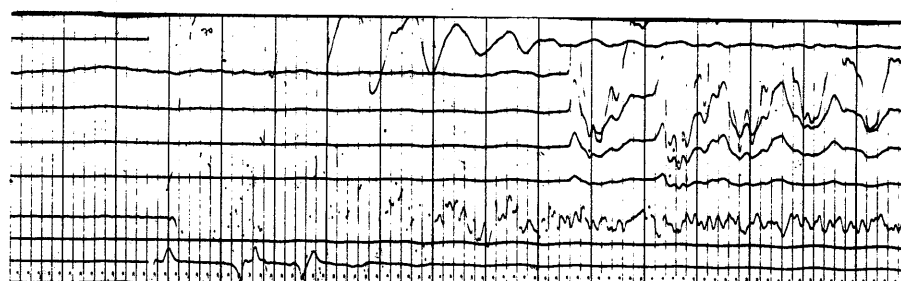
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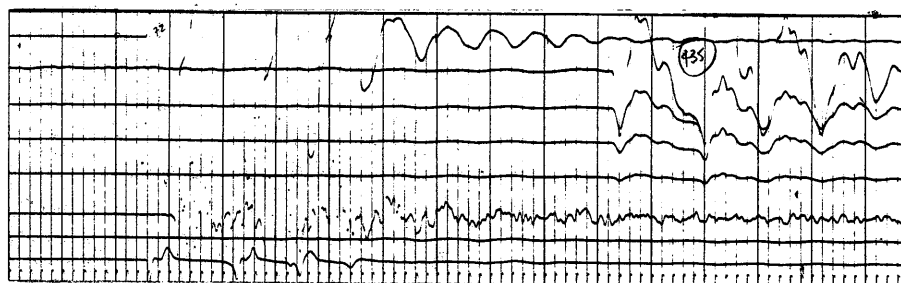
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T 1621 hrs



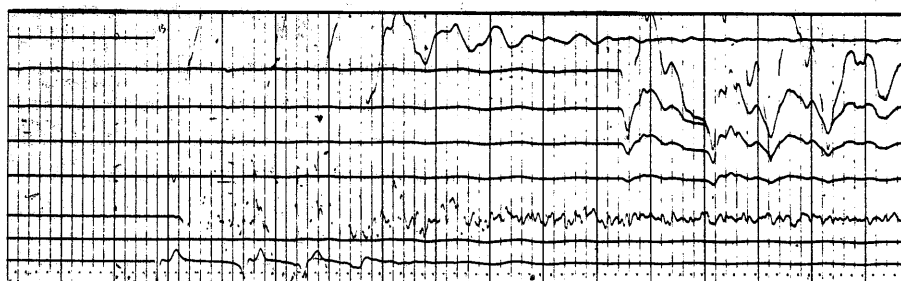
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T 1621 hrs



Rec. N^o 37
1118 m KB
T 1919 hrs



Rec. N^o 38
1118 m KB
T 1919 hrs

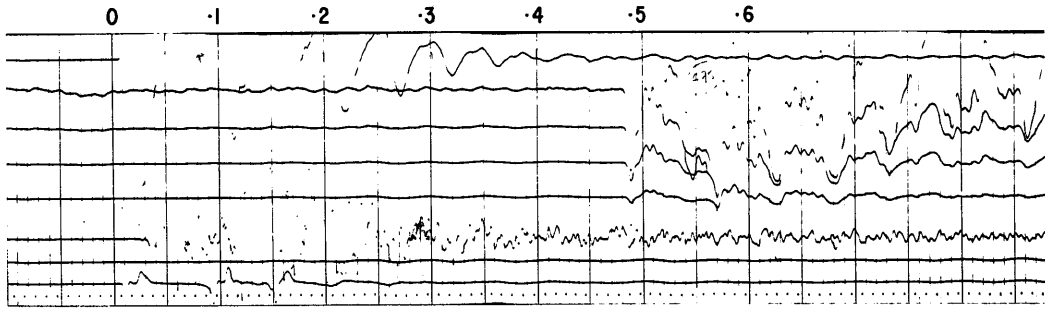


WEST HALIBUT - 1

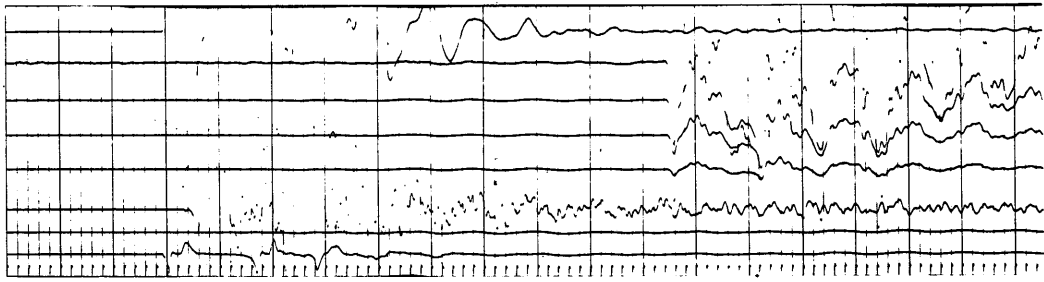
WELL VELOCITY RECORD

19 - 9 - 78

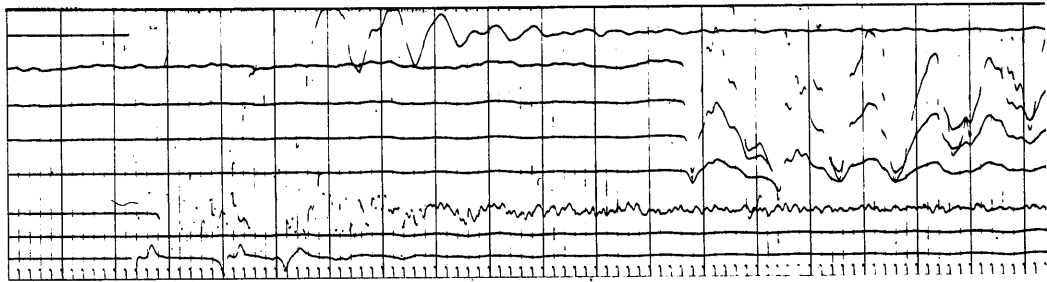
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T 1632 hrs



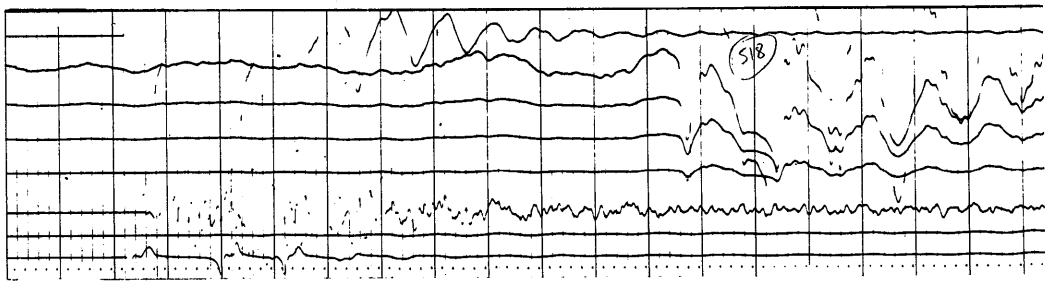
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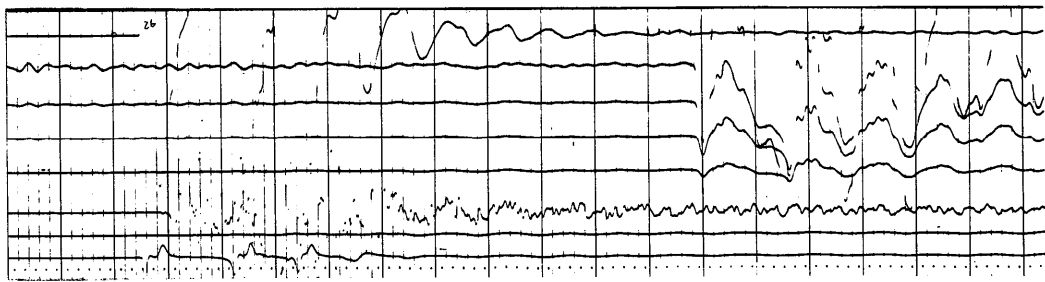
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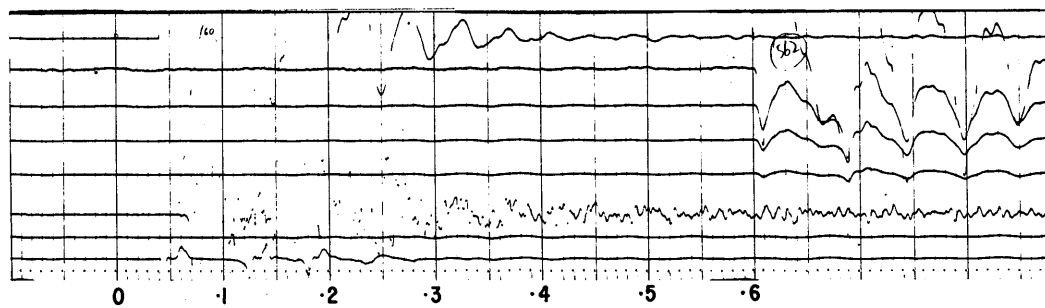
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Rec. N^o 36
1392 m KB
T 1906 hrs



Rec. N^o 7
1548 m KB
T 1642 hrs

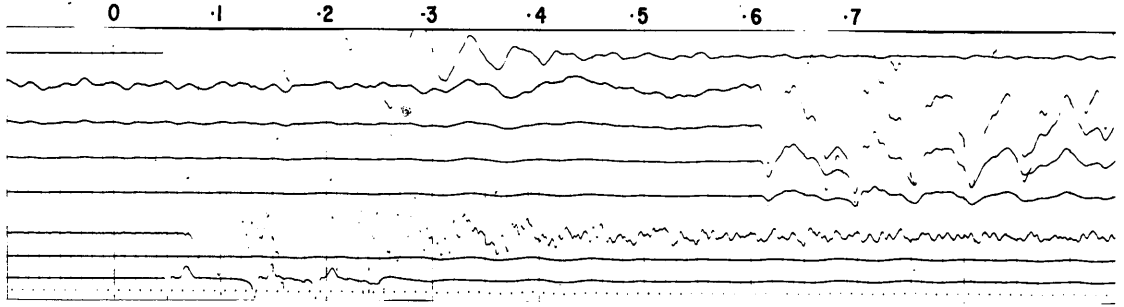


WEST HALIBUT - 1

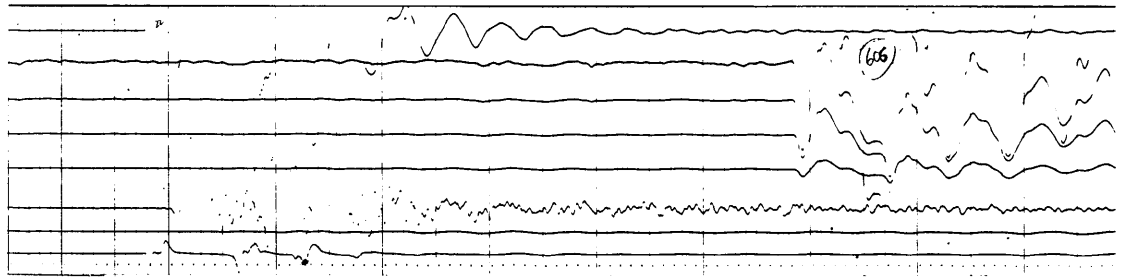
WELL VELOCITY RECORD

19 - 9 - 78

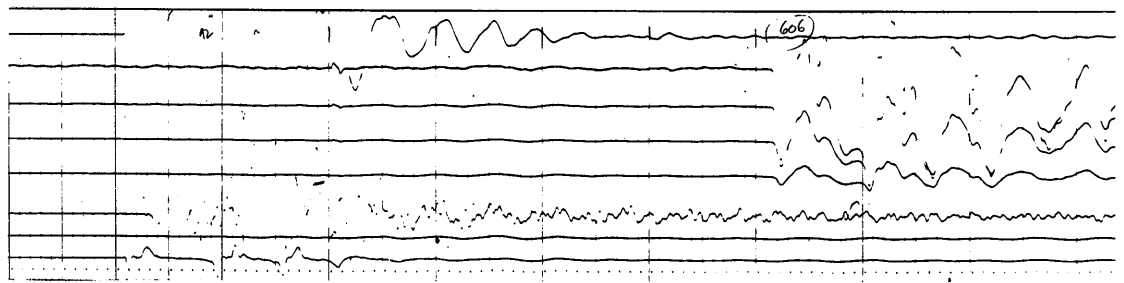
Rec. N°8
1548 m KB
T 1642 hrs



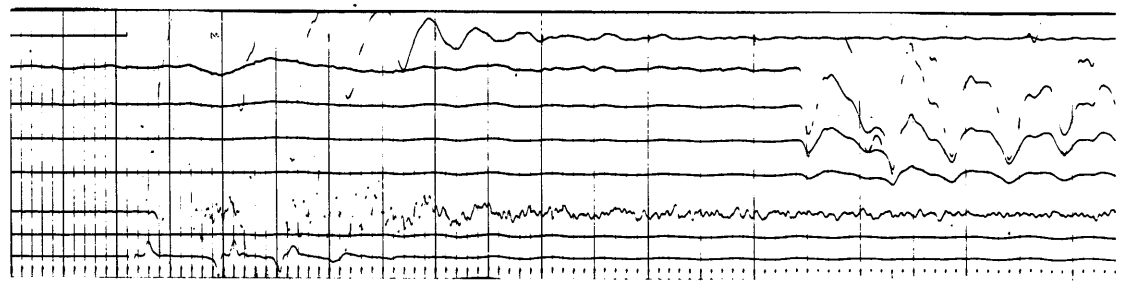
Rec. N°32
1696 m KB
T 1853 hrs



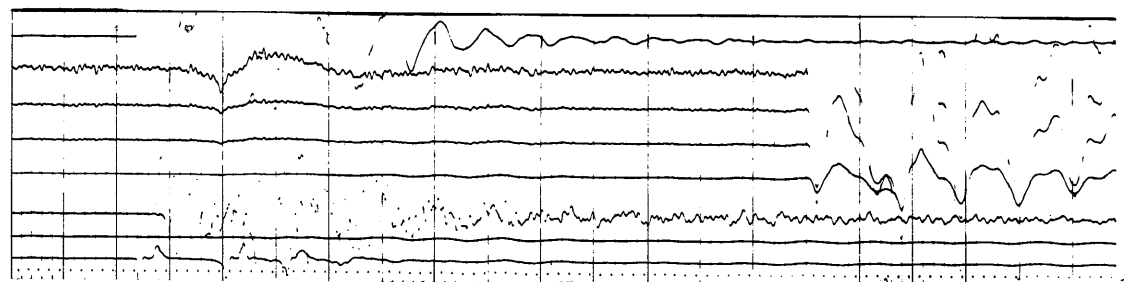
Rec. N°33
1696 m KB
T 1853 hrs



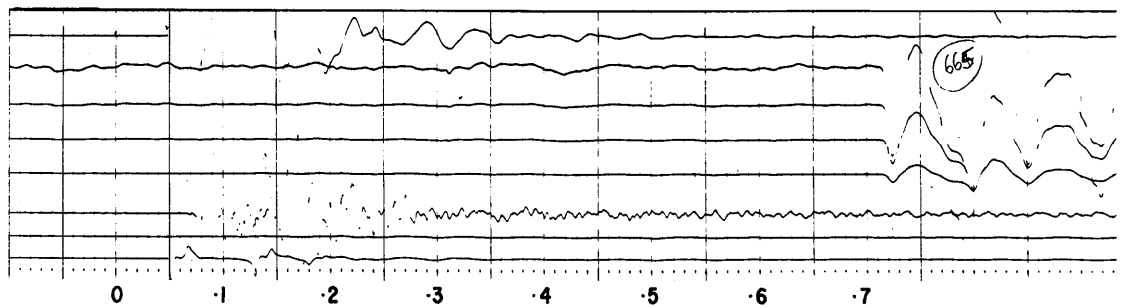
Rec. N°8
1780 m KB
T 1654 hrs



Rec. N°9
1780 m KB
T 1654 hrs



Rec. N°30
1876 m KB
T 1845 hrs



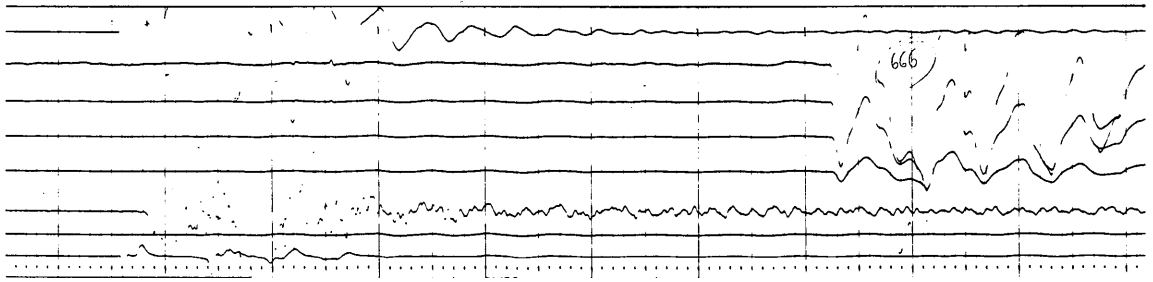
WEST HALIBUT - 1

WELL VELOCITY RECORD

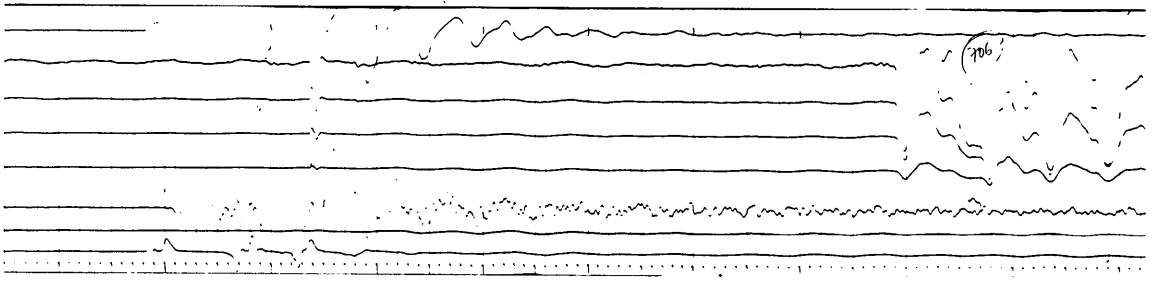
19 - 9 - 78

0 .1 .2 .3 .4 .5 .6 .7

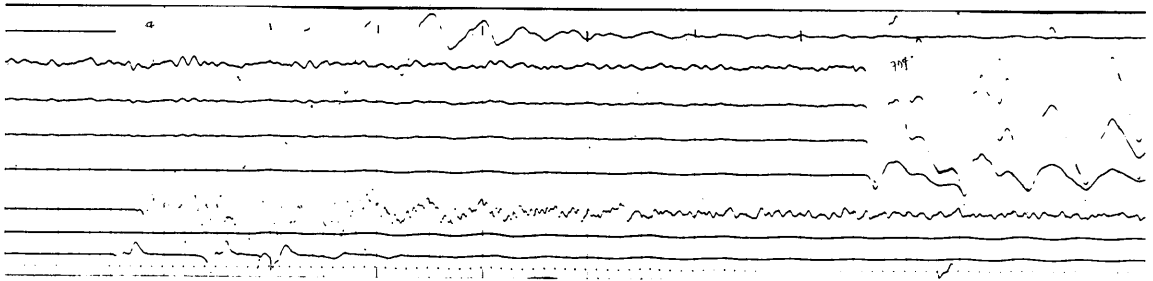
Rec. N^o 31
1876 m KB
T 1845 hrs



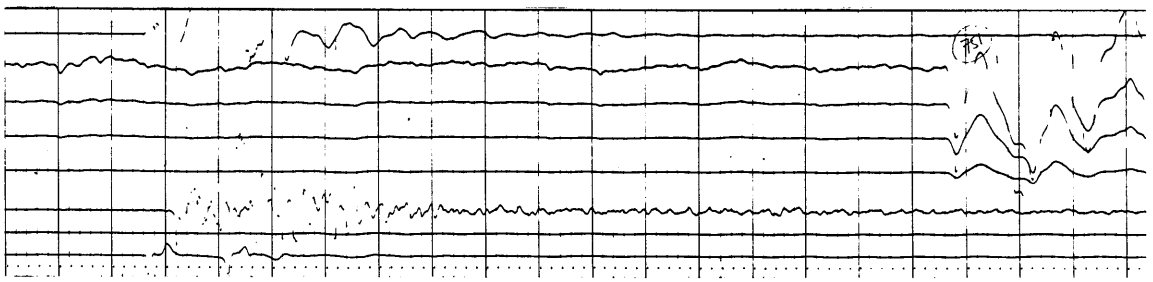
Rec. N^o 10
2002 m KB
T 1705 hrs



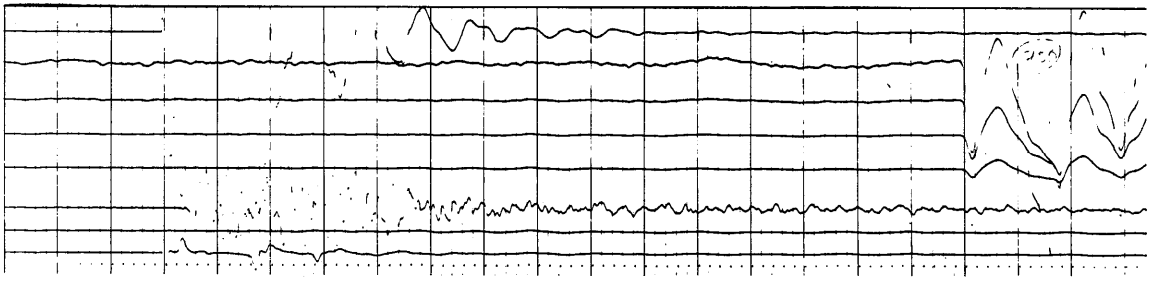
Rec. N^o 11
2002 m KB
T 1705 hrs



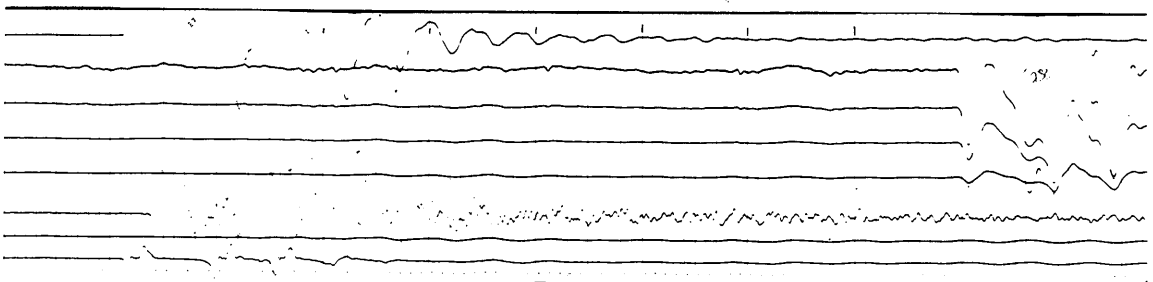
Rec. N^o 28
2131 m KB
T 1830 hrs



Rec. N^o 29
2131 m KB
T 1830 hrs



Rec. N^o 12
2235 m KB
T 1715 hrs



0 .1 .2 .3 .4 .5 .6 .7

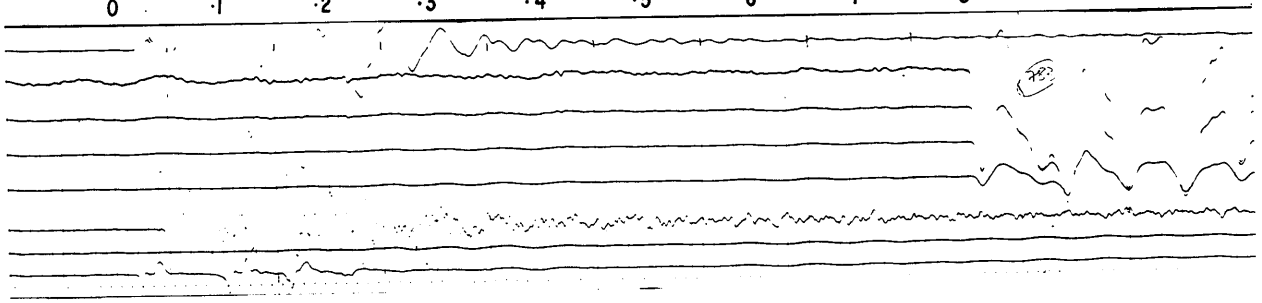
WEST HALIBUT - 1

WELL VELOCITY RECORD

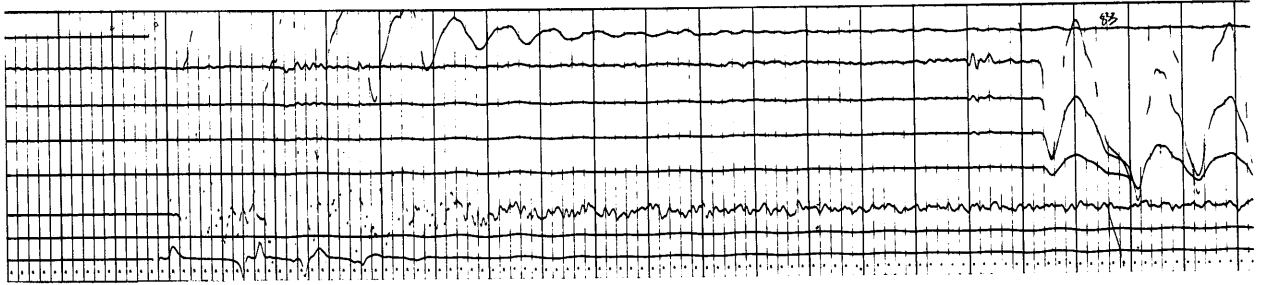
19 - 9 - 78

0 .1 .2 .3 .4 .5 .6 .7 .8

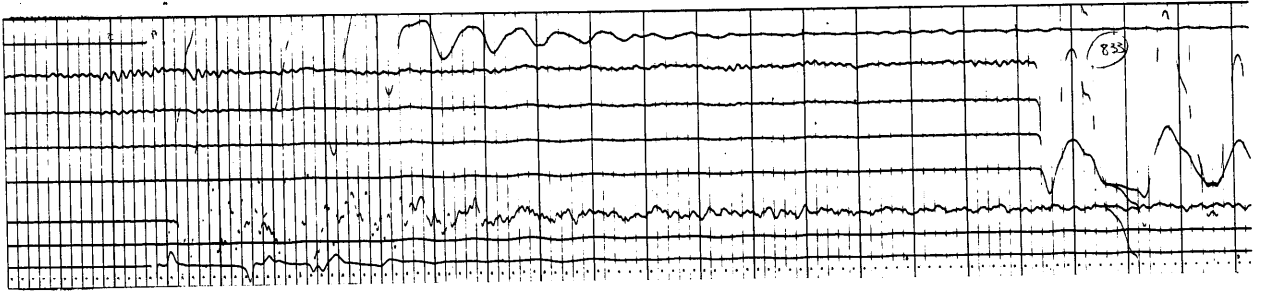
Rec. N°14
2235 m KB
T 1715 hrs



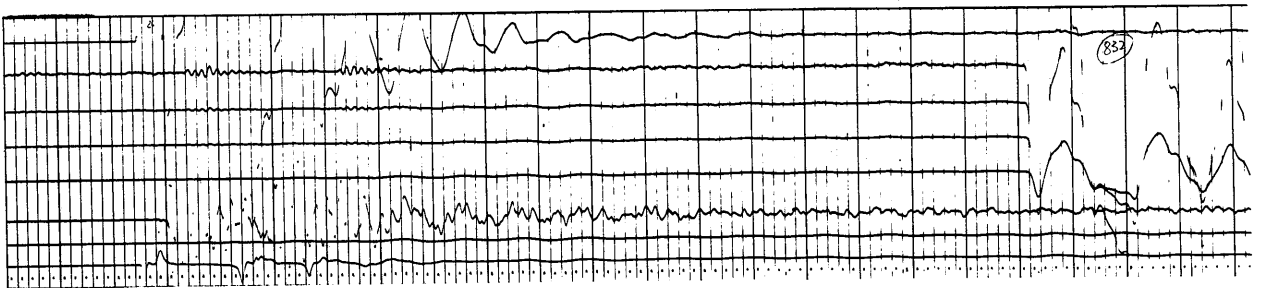
Rec. N°25
2377 m KB
T 1820 hrs



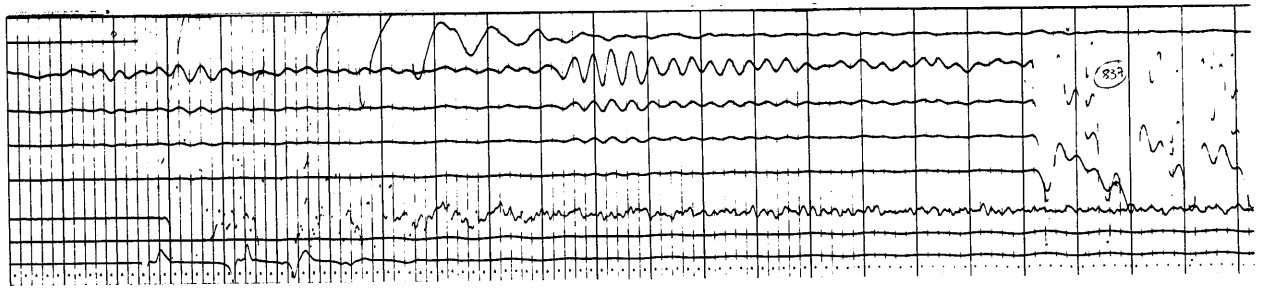
Rec. N°26
2377 m KB
T 1820 hrs



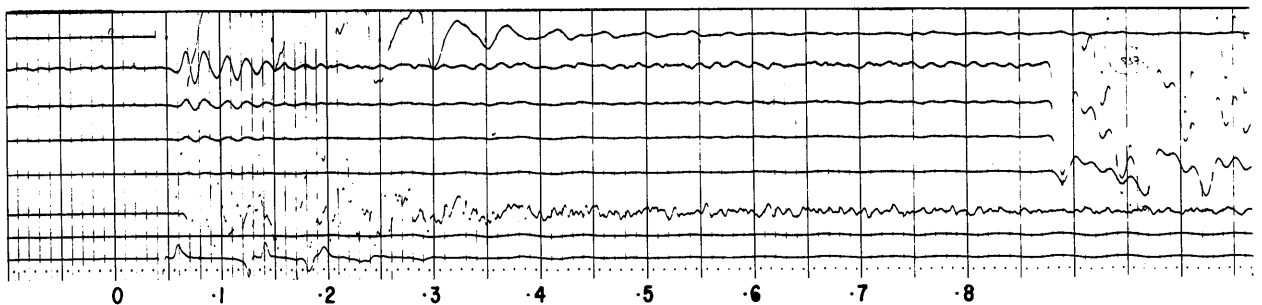
Rec. N°27
2377 m KB
T 1820 hrs



Rec. N°22
2388 m KB
T 1804 hrs



Rec. N°23
2388 m KB
T 1804 hrs



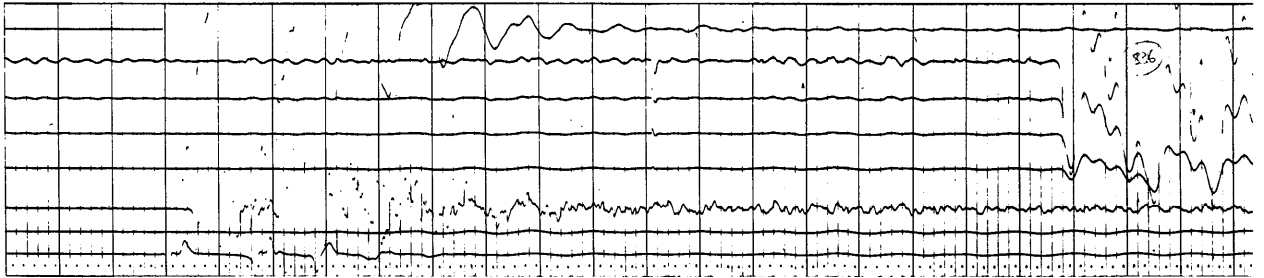
WEST HALIBUT - 1

WELL VELOCITY RECORD

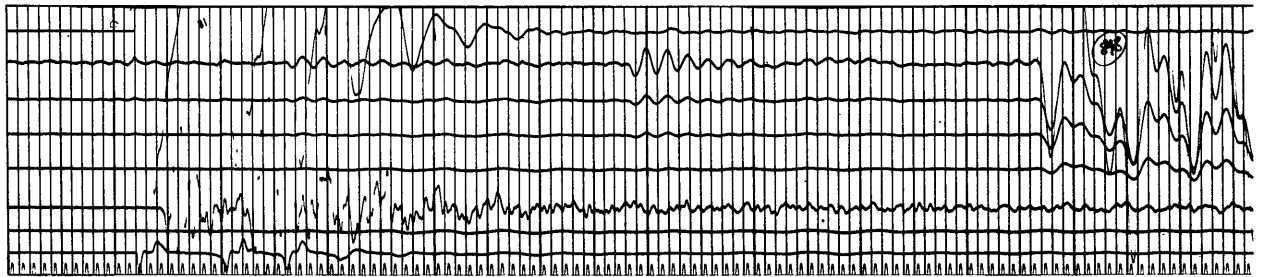
19 - 9 - 78

0 .1 .2 .3 .4 .5 .6 .7 .8 .9

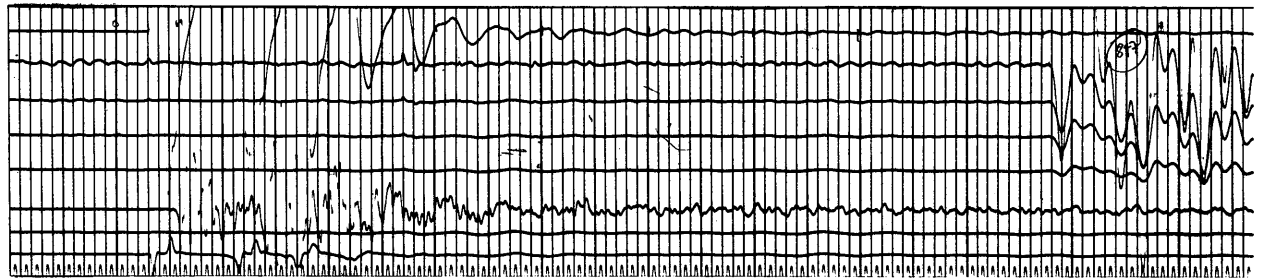
Rec. N^o24
2388 m KB
T 1804 hrs



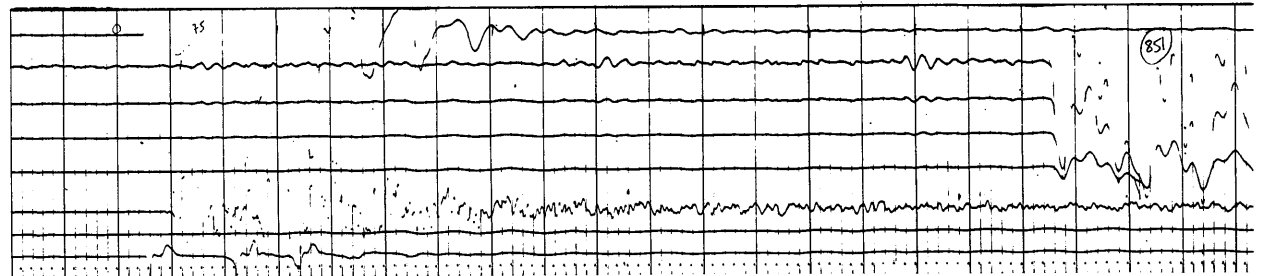
Rec. N^o14
2421 m KB
T 1730 hrs



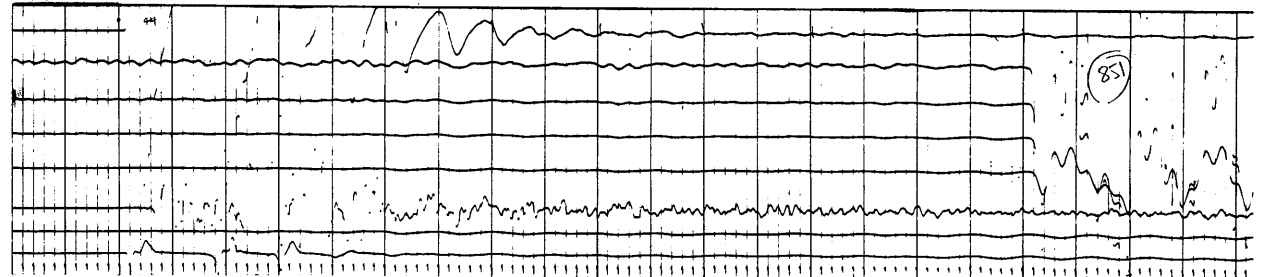
Rec. N^o15
2421 m KB
T 1730 hrs



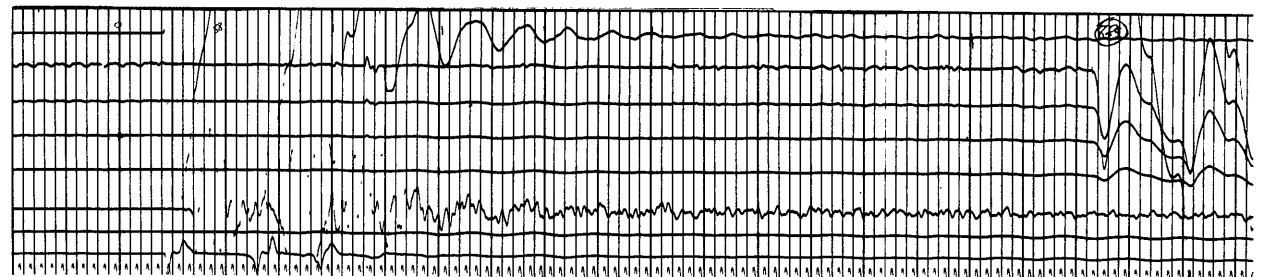
Rec. N^o20
2436 m KB
T 1755 hrs



Rec. N^o22
2436 m KB
T 1755 hrs



Rec. N^o16
2525 m KB
T 1740 hrs



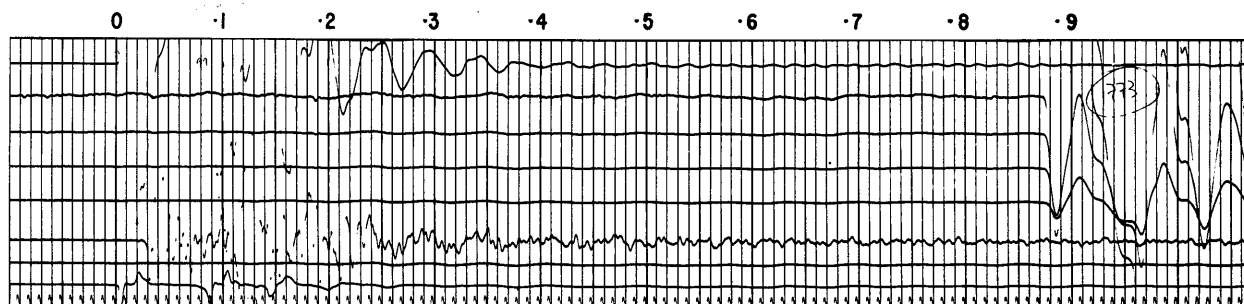
0 .1 .2 .3 .4 .5 .6 .7 .8 .9

WEST HALIBUT - 1

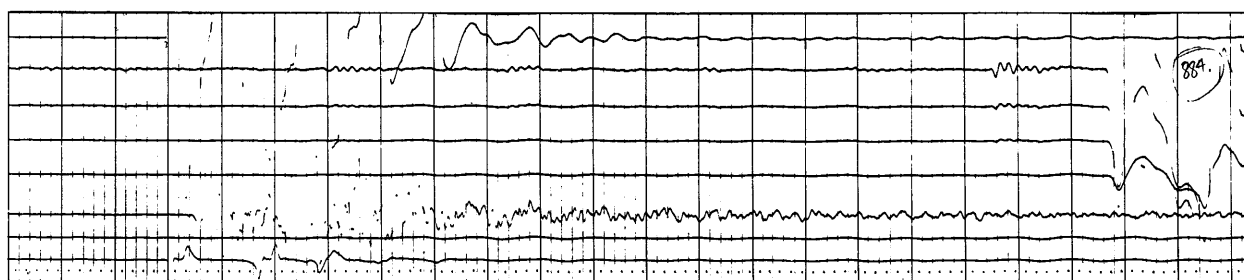
WELL VELOCITY RECORD

19 - 9 - 78

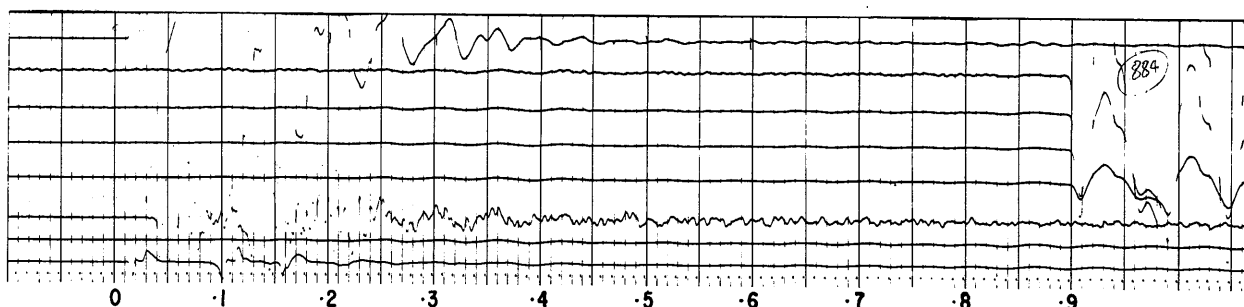
Rec. N^o17
2525 m KB
T 1740 hrs



Rec. N^o18
2566 m KB
T 1747 hrs



Rec. N^o19
2566 m KB
T 1747 hrs



APPENDIX 7

APPENDIX 7

FORMATION TEST DATA

WEST HALIBUT-1 PRESSURE BUILD-UP ANALYSIS

<u>TEST NO.</u>	<u>DEPTH</u> (M.MDKB)	<u>FLUID</u> <u>RECOVERY</u>	<u>FINAL S.I.</u> <u>PRESSURE</u> PSIG (MPag)	<u>EXTRAPOLATED</u> <u>PRESSURE</u> PSIG (MPag)	<u>PERMEABILITY*</u> (MD)
FIT-2	2433	Oil	3299.9 (22.752)	3330.9 (22.966)	2170
FIT-4	2430.5	Formation Water	3309.0 (22.815)	3310.9 (22.828)	520
FIT-5	2392	Oil	3260.0 (22.477)	3262.5 (22.494)	940
FIT-6	2405	Oil	3271.6 (22.557)	3273.1 (22.567)	1380
RFT 13	2385	Formation Water	3356.0 (23.139)	3359.0 (23.16)	370
RFT 15	2456	Formation Water	3412.1 (23.526)	3413.1 (23.533)	1090

* Assumed h = 0.5 ft.

SEAT NO.	DEPTH (M)	INITIAL HYDROSTATIC PRESS.		PRETEST PRESSURE		FINAL HYDROSTATIC PRESS.		HP CALIBRATION		COMMENTS HEWLETT PACKARD GAUGE NO. 318
		HP	SCHLUMBERGER	HP	SCHLUMBERGER	HP	SCHLUMBERGER	PRESSURE	TEMPERATURE	
1	2461.5	27.70 (4017.31)		23.63 (3427.78)		27.70 (4017.26)		22.89 (3320)	85°C	
2	2453	27.61 (4004.63)		23.55 (3416.23)		27.61 (4003.78)		"	"	
3	2439	27.46 (3983.00)		23.59 (3421.52)		27.45 (3981.26)		"	"	Pressure is too high (See Seat 14).
4	2453	27.58 (4000.50)		23.54 (3414.15)		27.58 (4000.32)		"	"	Repeat of Seat 2 in order to check an apparently anomalous pressure.
5	2433	27.37 (3969.62)		-		-		"	"	Seal failure.
6	2432	27.35 (3966.28)		23.53 (3412.83)		27.33 (3963.83)		"	"	
7	2430.5	27.30 (3960.06)		23.50 (3407.93)		27.24 (3950.31)		"	"	
8	2428	27.27 (3954.87)		23.47 (3404.04)		27.26 (3954.21)		"	"	
9	2423.5	27.21 (3946.35)		23.43 (3397.77)		27.20 (3944.81)		"	"	
10	2411	27.07 (3926.59)		23.33 (3383.71)		27.06 (3925.16)		"	"	
11	2405	26.99 (3915.28)		23.28 (3376.79)		26.99 (3914.28)		"	"	
12	2392	28.86 (3895.39)		23.19 (3362.72)		26.85 (3894.55)		"	"	
13	2385	26.78 (3883.40)		23.13 (3355.43)		26.76 (3880.91)		"	"	Full test details elsewhere.
14	2439	27.35 (3966.09)		23.53 (3412.10)		27.36 (3968.51)		"	"	

SEAT NO.	DEPTH (M)	INITIAL HYDROSTATIC PRESS.		PRETEST PRESSURE		FINAL HYDROSTATIC PRESS.		HP CALIBRATION		COMMENTS
		HP	SCHLUMBERGER	HP	SCHLUMBERGER	HP	SCHLUMBERGER	PRESSURE	TEMPERATURE	
15	2456	27.55 (3995.55)	26.95 (3909)	-	-	-	-	23.79 (3450)	75°C	Seal failure.
16	2456	27.55 (3995.51)	26.95 (3909)	23.52 (3410.74)	22.98 (3333)	27.54 (3994.18)	26.94 (3907)	"	"	Full test details elsewhere.
17	2561	28.73 (4166.69)	28.08 (4072)	24.68 (3579.78)	24.06 (3490)	28.72 (4165.80)	28.06 (4070)	24.65 (3575)	90°C	
18	2525	28.33 (4108.60)	27.70 (4017)	24.25 (3517.60)	23.67 (3433)	28.32 (4107.72)	27.70 (4017)	"	"	Seal failure.
19	2485	27.88 (4043.90)	27.27 (3955)	-	-	-	-	"	"	
20	2485	27.88 (4043.84)	27.27 (3955)	23.85 (3459.11)	23.85 (3377)	27.88 (4043.53)	27.27 (3955)	"	"	Seal failure.
21	2469	27.67 (4012.84)	27.10 (3930)	-	-	-	-	24.13 (3500)	80°C	
22	2469	27.67 (4012.88)	27.10 (3931)	23.65 (3430.24)	23.10 (3351)	27.67 (4012.55)	27.09 (3929)	"	"	
23	2456	27.53 (3993.12)	26.95 (3909)	23.53 (3412.18)	22.99 (3335)	27.53 (3992.84)	26.95 (3909)	"	"	
24	2448.5	27.44 (3979.13)	26.88 (3899)	23.46 (3402.71)	22.95 (3329)	27.43 (3978.78)	26.89 (3900)	23.27 (3375)	75°C	
25	2439	27.32 (3963.03)	26.78 (3884)	23.52 (3410.90)	22.99 (3335)	27.32 (3962.98)	26.78 (3885)	"	"	Dry test.
26	2435	27.29 (3957.42)	26.74 (3879)	-	-	-	-	"	"	Seal failure.
27	2435.5	27.29 (3958.64)	26.74 (3879)	-	-	-	-	"	"	Dry test.
28	2434.5	27.28 (3956.66)	26.74 (3878)	-	-	-	-	"	"	
29	2432	27.25 (3952.71)	26.70 (3873)	23.48 (3404.94)	22.95 (3329)	27.25 (3952.28)	26.70 (3873)	"	"	

Continued/....

WEST HALIBUT-1

RFT 2

PRETEST PRESSURES IN MPa-g (& Psig)

SEAT NO.	DEPTH (M)	INITIAL HYDROSTATIC PRESS.		PRETEST PRESSURE		FINAL HYDROSTATIC PRESS.		HP CALIBRATION		COMMENTS HEWLETT PACKARD GAUGE NO. 318
		HP	SCHLUMBERGER	HP	SCHLUMBERGER	HP	SCHLUMBERGER	PRESSURE	TEMPERATURE	
30	2415	27.06 (3925.42)	26.53 (3848)	23.35 (3386.68)	22.84 (3312)	27.06 (3925.44)	26.52 (3846)	23.27 (3375)	78°C	
31	2390	26.80 (3886.56)	26.25 (3807)	23.17 (3360.37)	22.66 (3287)	26.80 (3886.57)	26.25 (3807)	"	"	

R.F.T. RECORD

WELL NAME: WEST HALIBUT-1 RUN NO: 1 GEOLOGIST/S: R.C.N. THORNTON DATE: 21/9/78

Time: 00:00:00 = 1900 hours.
Seat No: 13 Depth: 2385m Result of Test: Pretest: 3355.43 Chamber: 23.13 MPa-g
Seat No: Depth: Result of Test: Pretest: Chamber:
Seat No: Depth: Result of Test: Pretest: Chamber:
Seat No: Depth: Result of Test: Pretest: Chamber:
Seat No: Depth: Result of Test: Pretest: Chamber:

TIMES: CHAMBER 1

Depth: 2385m Tool Set: 00:52:27 Pretest Open: 00:52:36 Min.Open: 03:17
Chamber Open: 00:55:53 Min.Fill: 17:18 Chamber Full: 01:13:11
Buildup Starts: 01:13:12 Min.Buildup: 17:18 Seal Chamber: 01:30:30
Pull Off Tool: - Total Time: 38:03

CHAMBER 2

Depth: 2385m Tool Set: - Pretest Open: - Min.Open: -
Chamber Open: 01:32:14 Min.Fill: 00:44 Chamber Full: 01:32:58
Buildup Starts: 01:32:58 Min.Buildup: 01:19 Seal Chamber: 01:34:17
Pull off Tool: 01:35:12 Total Time: 02:58

RECOVERY: CHAMBER 1

Surface Pressure: 0 kPa
Gas: L. Filtrate: 22 L.
Oil: L. Mud: L.
Formation Water: L. Others: L.

RECOVERY: CHAMBER 2

Surface Pressure: kPa
Gas: L. Filtrate: L.
Oil: L. Mud: L.
Formation Water: L. Others: L.

PROPERTIES: CHAMBER 1

Table with 8 columns: GAS (PPM), C1, C2, C3, C4, C5, C6, H2S. Rows are blank for data entry.

OIL: API @: F, Colour: , Fluorescence:
G.O.R.: Other Observations:

WATER/FILTRATE: RESISTIVITY: 1.4 Ohm @ 16 C, Equivalent Na. Cl.: 4600 ppm
Titration Cl-: 2200 ppm., NO3: 25 ppm

PROPERTIES: CHAMBER 2

Table with 8 columns: GAS (PPM), C1, C2, C3, C4, C5, C6, H2S. Rows are blank for data entry.

OIL: API @: F, Colour: , Fluorescence:
G.O.R.: Other Observations:

WATER/FILTRATE: RESISTIVITY: Ohm @ C, Equivalent Na. Cl.: ppm
Titration Cl-: ppm., NO3: ppm

WELL NAME: WEST HALIBUT-1 RUN NO: 1 GEOLOGIST/S: R.C.N. THORNTON DATE: 21/9/78

MUD IN HOLE: Weight: 9.3 Sp gr. Calculated Hydrostatic: 2780.71 MPa

26.07

Titration Cl⁻ 2500 ppm NO₃ 110+ ppmPRESSURES IN MPa-g

<u>CHAMBER 1</u>	Schlumberger Psig	MPa-g	MPa-g	Hewlett Packard* Psig
Hydrostatic Initial			26.77	3883.39
Pretest			25.13	3355.44
Sampling Range			8.58-16.01	1243.83-2321.55
Final Shut-in			23.13	3354.56
Hydrostatic Final				-
Formation Pressure (Horner)			23.16	3359.0

PRESSURES IN MPa-g

<u>CHAMBER 2</u>	Schlumberger Psig	MPa-g	MPa-g	Hewlett Packard* Psig
Hydrostatic Initial				-
Pretest				-
Sampling Range			2.86-8.68	414.85-1259.60
Final Shut-in			23.13	3354.50
Hydrostatic Final			26.76	3880.91
Formation Pressure (Horner)				

TEMPERATURES

Maximum Recorded 92 °C Formation Temperature (Horner) 92 °C
 Depth Tool Reached 2461.5 m
 Time Since Circulation 27½ Hrs

REMARKS: Segregator not opened: No. 3008.
 HP Gauge No. 318
 Calibration Pressure: 3320 psig; 22.89 MPa-g
 Calibration Temperature: 85 °C.

R.F.T. RECORD

WELL NAME: WEST HALIBUT-1 RUD NO: 2 GEOLOGIST/S: R.C.N. THORNTON DATE: 23/9/78

Time: 00:00:00 = 1845 hours.

Seat No: 16 Depth: 2456m Result of Test: Pretest: 3410.74 Chamber:
23.52
Seat No: Depth: Result of Test: Pretest: Chamber:
Seat No: Depth: Result of Test: Pretest: Chamber:
Seat No: Depth: Result of Test: Pretest: Chamber:
Seat No: Depth: Result of Test: Pretest: Chamber:

TIMES: CHAMBER 1

Depth: 2456m Tool Set: 00:40:54 Pretest Open: 00:41:03 Min.Open: 02:10
Chamber Open: 00:43:13 Min.Fill: 11:59 Chamber Full: 00:55:12
Buildup Starts: 00:55:12 Min.Buildup: 25:41 Seal Chamber: 01:20:53
Pull Off Tool: - Total Time: 39:59

CHAMBER 2

Depth: 2456m Tool Set: - Pretest Open: - Min.Open: -
Chamber Open: 01:20:54 Min.Fill: 00:06 Chamber Full: 01:21:00
Buildup Starts: 01:21:00 Min.Buildup: 02:37 Seal Chamber: 01:23:37
Pull off Tool: 01:30:00 Total Time: 00:09:06

RECOVERY: CHAMBER 1

Surface Pressure: 0 kPa

Gas: L. Filtrate: L.
Oil: L. Mud: L.
Formation Water: 22.5 L. Others: L.

RECOVERY: CHAMBER 2

Surface Pressure: kPa

Gas: L. Filtrate: L.
Oil: L. Mud: L.
Formation Water: L. Others: L.

PROPERTIES: CHAMBER 1

Table with 8 columns: GAS (PPM), C1, C2, C3, C4, C5, C6, H2S. Rows are blank for data entry.

OIL: API @: F, Colour: , Fluorescence:

G.O.R.: Other Observations:

WATER/FILTRATE: RESISTIVITY: .37 Ohm @ 16.6 C, Equivalent Na. Cl.: 19000 ppm

Titration Cl-: 11000 ppm., NO3: 25 ppm
Slightly oily and dark red brown.

PROPERTIES: CHAMBER 2

Table with 8 columns: GAS (PPM), C1, C2, C3, C4, C5, C6, H2S. Rows are blank for data entry.

OIL: API @: F, Colour: , Fluorescence:

G.O.R.: Other Observations:

WATER/FILTRATE: RESISTIVITY: Ohm @ C, Equivalent Na. Cl.: ppm

Titration Cl-: ppm., NO3: ppm

R.F.T. RECORD

WELL NAME: WEST HALIBUT-1B Well No: 2 GEOLOGIST/S: R.C.N. THORNTON DATE: 22/9/78

MUD IN HOLE: Weight: 9.3 Sp gr. Calculated Hydrostatic: 3882.9; 26.77 MPa

Titration Cl⁻ 2900 ppm NO₃ 110+ ppm

PRESSURES IN MPa-g

<u>CHAMBER 1</u>	Schlumberger Psig	MPa-g	MPa-g	Hewlett Packard* Psig
Hydrostatic Initial	3909	26.95	27.55	3995.51
Pretest	3333	22.98	23.52	3410.74
Sampling Range	-	-	22.06-22.74	3199.02-3298.48
Final Shut-in	3327	22.94	23.52	3411.43
Hydrostatic Final	-	-	-	-
Formation Pressure (Horner)	-	-	23.53	3413.05

PRESSURES IN MPa-g

<u>CHAMBER 2</u>	Schlumberger Psig	MPa-g	MPa-g	Hewlett Packard* Psig
Hydrostatic Initial	-	-	-	-
Pretest	-	-	-	-
Sampling Range	-	-	18.24-20.16	2645.98-2924.68
Final Shut-in	3327	22.94	23.52	3411.32
Hydrostatic Final	3907	26.94	27.54	3994.18
Formation Pressure (Horner)	-	-	-	-

TEMPERATURES

Maximum Recorded 84 °C Formation Temperature (Horner) 92 °C
 Depth Tool Reached 2561 m
 Time Since Circulation 7½ Hrs.

REMARKS: Using Choke Size: .020" and Flow Restrictor.
 HP Gauge: 318.
 Calibration Pressure: 3450 Psig; 23.79 MPa-g.
 Calibration Temperature: 75 °C

F.I.T. RECORD

GEOLOGIST/S: R.C.N. THORNTON

WELL: WEST HALIBUT-1 F.I.T. NO: 1 @ 2433 m (KB) DATE: 20/9/78

TEST RESULT: OIL TEST; HP PRESSURE GAUGE FAILURE; MAIN CHAMBER SEAL FAILURE.

FILING METHOD: NORMAL CHOKE SIZES: .030" TIME: 00:00:00 = 2215 hours.

TIMES: Tool Set: 00:43:30 Tool Open: 00:46:46 Min. Open: 23:09

Shaped Charge Shot: ~~Yes~~/No at: - Min. Open: - Full After: Approx. 10:30

Segregator Open: 01:09:55 Mins. Open: 03:09 Full After: -

Tool Closed: 01:13:08 Tool Off: 01:14:25

Segregator Type: - Number: -

Segregator opened/~~transferred~~ container No.: -

MUD DATA: In Hole

Resistivity Rmf .847 Ω @ 17 $^{\circ}$ C, Equiv. Na. Cl. 7500 ppm

Titration Cl⁻: 2500 ppm NO⁻3: 110+ ppm

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER

0 kPa Surface Pressure

L. Gas 10 L. Filtrate

2.5 L. Oil 1 L. Mud

L. Formation Water 6 L. ~~Other~~ Oil/Filtrate emulsion

PROPERTIES - MAIN CHAMBER

GAS	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	H ₂ S

OIL 44 $^{\circ}$ API @ 24 $^{\circ}$ C α K; Pour Point $^{\circ}$ F

dark reddish brown Colour; very pale yellow Fluorescent Colour

G.O.R.

RESISTIVITY WATER/FILTRATE .83 Ω @ 66 $^{\circ}$ F Equiv. Na. Cl. 7500 ppm

Titration Cl⁻: 3000 ppm NO⁻3: 25 ppm

PRESSURES - MAIN CHAMBER

MPa-g	Schlumberger	MPa-g	Hewlett Packard* Psig
Initial Hydrostatic		27.36	3968.63 (SUSPECT)
Sampling			
Final Shut-in			
Hydrostatic			
Formation Pressure (Horner)			
	Sampling Time Min.		
	Shut-in Time Min.		

(*Corrected for Atmospheric pressure)

TEMPERATURES: (max recorded) 74 $^{\circ}$ C 73.5 $^{\circ}$ C

MAX. DEPTH TOOL REACHED: 2425 m

HP GAUGE = 318

TIME SINCE CIRCULATION: 7 hrs

Calibration Pressures: 23.79 MPa-g

FORMATION TEMPERATURE (HORNER) 89.5 $^{\circ}$ C

3450 Psig

Calibration Temperature: 70 $^{\circ}$ C

REMARKS: Oil foamed when collected. HP Pressure Gauge failed during flow period of main chamber. Main chamber seal failed; hydraulic leak; some oil lost. Segregator filled with mud due to hydraulic leak.

F.I.T. RECORD

GEOLOGIST/S: R.C.N. THORNTON

WELL: WEST HALIBUT-1 F.I.T. NO: 2 @ 2430.5 m (KB) DATE: 21/9/78

TEST RESULT: OIL TEST

FIFING METHOD: NORMAL CHOKE SIZES: .030" TIME: 00:00:00 = 0130 hours

TIMES: Tool Set: 00:49:08 Tool Open: 00:51:35 Min. Open: 01:30:11

Shaped Charge Shot: XXX/No at: - Min. Open: - Full After: 09:39

Segregator Open: 01:21:46 Mins. Open: 02:01 Full After: 00:07

Tool Closed: 01:23:47 Tool Off: 01:24:41

Segregator Type: SFA-B Number: 16

Segregator ~~opened~~/transferred container No.:

MUD DATA: In Hole

Resistivity Rmf .847 Ω @ 17 °C, Equiv. Na. Cl. 7500 ppm

Titration Cl⁻: 2500 ppm NO⁻3: 110+ ppm

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER 20 psi 0.14x10³ kPa Surface Pressure

<u>2.55 Ft.³</u>	L. Gas	<u>14</u>	L. Filtrate
<u>7.5</u>	L. Oil	<u>1</u>	L. Mud
	L. Formation Water		L. Other

PROPERTIES - MAIN CHAMBER

GAS	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	H ₂ S
TOP	<u>107,691</u>	<u>68,992</u>	<u>50,626</u>	<u>94,195</u>	<u>1,598</u>	<u>2,494</u>	<u>0</u>
MIDDLE	<u>116,818</u>	<u>53,939</u>	<u>75,939</u>	<u>25,689</u>	<u>6,328</u>	<u>5,985</u>	<u>NOT TESTED!</u>
BOTTOM	<u>122,293</u>	<u>47,667</u>	<u>58,537</u>	<u>15,699</u>	<u>4,351</u>	<u>1,995</u>	<u>NOT TESTED!</u>

OIL 47 °API @ 26 °C α_K; Pour Point °F

dark reddish brown Colour; very pale yellow Fluorescent Colour

54 G.O.R.

RESISTIVITY WATER/FILTRATE .92 Ω @ 68 °F Equiv. Na. Cl. 6700 ppm

Titration Cl⁻: 2800 ppm NO⁻3: 30 ppm

PRESSURES - MAIN CHAMBER

	MPa-g	Schlumberger	MPa-g	Hewlett Packard*
			Psig	
Initial Hydrostatic			<u>27.26</u>	<u>3954.2</u>
Sampling			<u>23.19-23.23</u>	<u>3362.75-3368.7</u>
Final Shut-in			<u>23.37</u>	<u>3390.1</u>
Hydrostatic			<u>27.23</u>	<u>3949.69</u>
Formation Pressure (Horner)	<u>23.39</u> MPa-g	Sampling Time Min.	<u>09:39</u>	
	<u>3392.46</u> Psig	Shut-in Time Min.	<u>20:32</u>	

(*Corrected for Atmospheric pressure)

TEMPERATURES: (max recorded) 77 °C 79 °C

MAX. DEPTH TOOL REACHED: 2430.5 m

TIME SINCE CIRCULATION: 10½ Hrs

FORMATION TEMPERATURE (HORNER) 90 °C

REMARKS:

F.I.T. SEGREGATOR REPORT

GEOLOGIST/S: R.C.N. THORNTON

WELL: WEST HALIBUT-1 F.I.T. NO.: 2 @ 2430.5 m (KB) DATE: 21/9/78

SEGREGATOR TYPE: SFA-B NUMBER: 16

RECOVERY - SEGREGATOR _____ kPa Surface Pressure

_____	L. Gas	_____	L. Filtrate
_____	L. Oil	_____	L. Mud
_____	L. Formation Water	_____	L. Other

PROPERTIES - SEGREGATOR

<u>GAS</u>	<u>C₁</u>	<u>C₂</u>	<u>C₃</u>	<u>C₄</u>	<u>C₅</u>	<u>C₆</u>	<u>H₂S</u>
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

OIL _____ °API @ _____ °F, Pour Point _____ °F
 _____ Colour; _____ Fluorescent Colour
 _____ G.O.R.

RESISTIVITY WATER/FILTRATE _____ Ω @ _____ °F Equiv. Na.Cl. _____ ppm
 Titration Cl⁻ _____ ppm NO₃ _____ ppm

PRESSURES - SEGREGATOR

<u>MPa-g</u>	<u>Schlumberger Psig</u>	<u>MPa-g</u>	<u>MPa-g</u>	<u>Hewlett Packard* Psig</u>
Sampling	_____	_____	<u>23.28-17.41</u>	<u>3376.89-2524.51</u>
Final Shut-in	_____	_____	<u>24.07</u>	<u>3490.99</u>
Formation Pressure (Horner)	_____	_____	_____	_____
Sampling Time (Min)	_____	_____	_____	<u>00:17</u>
Shut-in Time (Min)	_____	_____	_____	<u>01:54</u>

REMARKS: Segregator not opened.
 HP Gauge No. 319
 Calibration Pressure: 23.79 MPa-g; 3450 psig.
 Calibration Temperature: 75°C.

F.I.T. RECORD

GEOLOGIST/S: R.C.N. THORNTON

WELL: WEST HALIBUT-1 F.I.T. NO: 3 @ 2423.5 m (KB) DATE: 21/9/78

TEST RESULT: OIL TEST; MAIN CHAMBER SEAL FAILURE.

FIRING METHOD: NORMAL CHOKE SIZES: .030" TIME: 00:00:00 = 0430 hours.

TIMES: Tool Set: 00:35:45 Tool Open: 00:37:59 Min.Open: -

Shaped Charge Shot: XXX/No at: - Min. Open: - Full After: 00:13:13

Segregator Open: - Mins.Open: - Full After: -

Tool Closed: - Tool Off: 00:54:00

Segregator Type: - Number: -

Segregator opened/transferred container No.: -

MUD DATA: In Hole

Resistivity Rmf .847 Ω @ 17 °C, Equiv. Na. Cl. 7500 ppm

Titration Cl⁻: 2500 ppm NO⁻3: 110+ ppm

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER 0 kPa Surface Pressure

	L. Gas	16	L. Filtrate
3.25	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 ₂ S

OIL 46 °API @ 28 °C ~~XX~~ Pour Point °F

very dark brown Colour; very pale yellow Fluorescent Colour

G.O.R.

RESISTIVITY WATER/FILTRATE .94 Ω @ 74 °F Equiv. Na. Cl. 6100 ppm

Titration Cl⁻: 3150 ppm NO⁻3: 20 ppm

PRESSURES - MAIN CHAMBER

MPa-g	Schlumberger	MPa-g	Hewlett Packard*
		Psig	
Initial Hydrostatic		27.17	3940.16
Sampling		9.01-10.86	1306.47-1574.80
Final Shut-in		10.74	1558.04
Hydrostatic			
Formation Pressure (Horner)	-	Sampling Time Min. 13:13	
		Shut-in Time Min. -	

(*Corrected for Atmospheric pressure)

TEMPERATURES: (max recorded) 80 °C 81 °C

MAX. DEPTH TOOL REACHED: 2423.5 m

TIME SINCE CIRCULATION: 13 Hrs

FORMATION TEMPERATURE (HORNER) 89.5 °C

REMARKS: Hydraulic Pressure failed during filling of main chamber. Main Chamber did not seal. Segregator filled with mud. HP Gauge No. 319. Calibration Pressure: 3300 psig; 22.75 MPa-g. Calibration Temperature: 77°C.

F.I.T. RECORD

GEOLOGIST/S: R.C.N. THORNTON

WELL: WEST HALIBUT-1 F.I.T. NO: 4 @ 2439 m (KB) DATE: 21/9/78

TEST RESULT: WATER TEST TIME: 00:00:00 = 0700 Hours.

PIPING METHOD: NORMAL CHOKE SIZES: .030"

TIMES: Tool Set: 00:38:11 Tool Open: 00:40:51 Min. Open: 30:42

Shaped Charge Shot: XXX/No at: - Min. Open: - Full After: 10:37

Segregator Open: 01:11:33 Mins. Open: 03:20 Full After: 00:27

Tool Closed: 01:14:52 Tool Off: 01:15:56

Segregator Type: SFA-B Number: 2908

Segregator opened/transferred container No.: _____

MUD DATA: In Hole

Resistivity Rmf .847 Ω @ 17 °C, Equiv. Na. Cl. 7500 ppm

Titration Cl⁻: 2500 ppm NO⁻3: 110+ ppm

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER 30 psi 0-21x10³ kPa Surface Pressure

_____	L. Gas	_____	L. Filtrate
_____	L. Oil	_____	L. Mud
<u>21</u>	L. Formation Water	_____	L. Other

PROPERTIES - MAIN CHAMBER

GAS	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	H ₂ S
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

OIL _____ °API @ _____ °F; Pour Point _____ °F
 _____ Colour; _____ Fluorescent Colour
 _____ G.O.R.

RESISTIVITY WATER/FILTRATE .52 Ω @ 74 °C 2.5 Equiv. Na. Cl. 11000 ppm

Titration Cl⁻: 6900 ppm NO⁻3: 15 ppm

PRESSURES - MAIN CHAMBER

	MPa-g	Schlumberger	MPa-g	Hewlett Packard*
			Psig	
Initial Hydrostatic	_____	_____	<u>27.29</u>	<u>3957.53</u>
Sampling	_____	_____	<u>1.11-17.69</u>	<u>161.7-2565.7</u>
Final Shut-in	_____	_____	<u>23.43</u>	<u>3398.78</u>
Hydrostatic	_____	_____	<u>27.31</u>	<u>3960.96</u>
Formation Pressure (Horner)	<u>23.46</u> MPa-g			
	<u>3402.56</u> Psig	Sampling Time Min.	<u>10:37</u>	
		Shut-in Time Min.	<u>20:05</u>	

(*Corrected for Atmospheric pressure)

TEMPERATURES: (max recorded) 82 °C 83 °C

MAX. DEPTH TOOL REACHED: 2439 m

TIME SINCE CIRCULATION: 15³/4 Hrs

FORMATION TEMPERATURE (HORNER) 90.5 °C

REMARKS:

F.I.T. SEGREGATOR REPORT

GEOLOGIST/S: R.C.N. THORNTON

WELL: WEST HALIBUT-1 F.I.T. NO.: 4 @ 2439 m (KB) DATE: 21/9/78

SEGREGATOR TYPE: SFA-B NUMBER: 2908

RECOVERY - SEGREGATOR _____ kPa Surface Pressure

_____	L. Gas	_____	L. Filtrate
_____	L. Oil	_____	L. Mud
_____	L. Formation Water	_____	L. Other

PROPERTIES - SEGREGATOR

<u>GAS</u>	<u>C₁</u>	<u>C₂</u>	<u>C₃</u>	<u>C₄</u>	<u>C₅</u>	<u>C₆</u>	<u>H₂S</u>
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

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

_____ Colour; _____ Fluorescent Colour

_____ G.O.R.

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

Titration Cl⁻ _____ ppm NO₃ _____ ppm

PRESSURES - SEGREGATOR

	<u>MPa-g</u>	<u>Schlumberger Psig</u>	<u>MPa-g</u>	<u>MPa-g</u>	<u>Hewlett Packard* Psig</u>
Sampling	_____	_____	_____	<u>0.72-5.70</u>	<u>104.22-826.14</u>
Final Shut-in	_____	_____	_____	<u>23.43</u>	<u>3398.68</u>
Formation Pressure (Horner)	_____	_____	_____	_____	_____
Sampling Time (Min)	_____	_____	_____	_____	<u>00:27</u>
Shut-in Time (Min)	_____	_____	_____	_____	<u>02:52</u>

REMARKS:

Segregator not opened.

HP Gauge No. 319.

Calibration Pressure: 22.75 MPa-g; 3300 Psig.

Calibration Temperature: 77°C.

WELL: WEST HALIBUT-1 F.I.T. NO: 5 @ 2392 m (KB) DATE: 21/9/78

TEST RESULT: GAS & OIL TEST

FIFING METHOD: NORMAL CHOKE SIZES: .030" TIME: 00:00:00 = 1000 Hours.

TIMES: Tool Set: 00:45:22 Tool Open: 00:48:30 Min. Open: 31:45
 Shaped Charge Shot: ~~XXX~~/No at: - Min. Open: - Full After: 10:52
 Segregator Open: 01:20:15 Mins. Open: 03:13 Full After: 00:15
 Tool Closed: 01:23:28 Tool Off: 01:24:29
 Segregator Type: SFA-B Number: 28
 Segregator opened/transferred container No.: _____

MUD DATA: In Hole

Resistivity Rmf .847 Ω @ 17 °C, Equiv. Na. Cl. 7500 ppm
 Titration Cl⁻: 2500 ppm NO⁻³: 110+ ppm

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER		150 psi 1.03X10 ³ kPa Surface Pressure	
5.6 Ft. ³	L. Gas	2	L. Filtrate
17	L. Oil	1	L. Mud
	L. Formation Water		L. Other

PROPERTIES - MAIN CHAMBER

GAS	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	H ₂ S
TOP	82,137	38,886	64,865	N 19,980 I 15,699	15,030	-	0
MIDDLE	133,245	64,602	85,432	57,088	17,403	-	0
BOTTOM	127,770	67,738	90,179	71,360	21,358	-	0

OIL 43 °API @ 22.5 °C ρ_x ; Pour Point _____ °F
 Dark green-brown Colour; very pale yellow Fluorescent Colour
 52.4 G.O.R.

RESISTIVITY WATER/FILTRATE 1.02 Ω @ 74 °F Equiv. Na. Cl. 5500 ppm
 Titration Cl⁻: 3200 ppm NO⁻³: 25 ppm

PRESSURES - MAIN CHAMBER

MPa-g	Schlumberger	MPa-g	Hewlett Packard* Psig
Initial Hydrostatic		26.78	3884.70
Sampling		13.61-17.98	1974.58-2607.18
Final Shut-in		23.10	3350.88
Hydrostatic		26.80	3886.30
Formation Pressure (Horner)	23.12 MPa-g 3353.65 Psig	Sampling Time Min. 10:52 Shut-in Time Min. 20:53	

(*Corrected for Atmospheric pressure)

TEMPERATURES: (max recorded) 81 °C 81 °C
 MAX. DEPTH TOOL REACHED: 2392 m
 TIME SINCE CIRCULATION: 19 Hrs
 FORMATION TEMPERATURE (HORNOR) 87.5 °C

REMARKS:

F.I.T. SEGREGATOR REPORT

GEOLOGIST/S: R.C.N. THORNTON

WELL: WEST HALIBUT-1 F.I.T. NO.: 5 @ 2392 m (KB) DATE: 21/9/78

SEGREGATOR TYPE: SFA-B NUMBER: 28

RECOVERY - SEGREGATOR _____ kPa Surface Pressure

_____	L. Gas	_____	L. Filtrate
_____	L. Oil	_____	L. Mud
_____	L. Formation Water	_____	L. Other

PROPERTIES - SEGREGATOR

<u>GAS</u>	<u>C₁</u>	<u>C₂</u>	<u>C₃</u>	<u>C₄</u>	<u>C₅</u>	<u>C₆</u>	<u>H₂S</u>
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

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

_____ Colour; _____ Fluorescent Colour

_____ G.O.R.

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

Titration Cl⁻ _____ ppm NO₃ _____ ppm

PRESSURES - SEGREGATOR

	<u>MPa-g</u>	<u>Schlumberger Psig</u>	<u>MPa-g</u>	<u>MPa-g</u>	<u>Hewlett Packard* Psig</u>
Sampling	_____	_____	_____	<u>0.78-22.88</u>	<u>113.54-3318.35</u>
Final Shut-in	_____	_____	_____	<u>23.10</u>	<u>3350.95</u>
Formation Pressure (Horner)	_____	_____	_____	_____	_____
Sampling Time (Min)	_____	_____	_____	_____	<u>00:15</u>
Shut-in Time (Min)	_____	_____	_____	_____	<u>02:58</u>

REMARKS: Segregator not opened.
 HP Gauge No. 319.
 Calibration Pressure: 22.61 MPa-g; 3280 Psig.
 Calibration Temperature: 80 °C.

F.I.T. RECORD

GEOLOGIST/S: R.C.N. THORNTON

WELL: WEST HALIBUT-1 F.I.T. NO: 6 @ 2405 m (KB) DATE: 21/9/78

TEST RESULT:

FIRING METHOD: NORMAL CHOKE SIZES: .030" TIME: 00:00:00 = 1340 Hours.
 TIMES: Tool Set: 00:26:50 Tool Open: 00:29:13 Min. Open: 30:37
 Shaped Charge Shot: Yes/No at: - Min. Open: - Full After: 10:25
 Segregator Open: 00:59:50 Mins. Open: 02:27 Full After: 00:11
 Tool Closed: 01:02:17 Tool Off: 01:03:25
 Segregator Type: SFA-B Number: 25
 Segregator ~~opened~~/transferred container No.:

MUD DATA: In Hole

Resistivity Rmf .847 Ω @ 17 °C, Equiv. Na. Cl. 7500 ppm
 Titration Cl⁻: 2500 ppm NO⁻³: 110+ ppm

SAMPLE TAKEN AT END OF LAST CIRCULATION

<u>RECOVERY - MAIN CHAMBER</u>		<u>90psi 0.62x10³</u> kPa Surface Pressure	
<u>5.3 Ft.³</u>	L. Gas	<u>6½</u>	L. Filtrate
<u>12</u>	L. Oil	<u>1</u>	L. Mud
	L. Formation Water		L. Other

PROPERTIES - MAIN CHAMBER

GAS	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	H ₂ S
TOP	<u>108,604</u>	<u>54,566</u>	<u>80,566</u>	<u>39,962</u>	<u>14,239</u>		<u>0</u>
BOTTOM	<u>131,420</u>	<u>74,636</u>	<u>97,297</u>	<u>74,214</u>	<u>25,313</u>		<u>0</u>

OIL 43 °API @ 22 °C [°]F; Pour Point °F

Very dark green to brown Colour; very pale yellow Fluorescent Colour
70 G.O.R.

RESISTIVITY WATER/FILTRATE .97 Ω @ 72 °F Equiv. Na. Cl. 6300 ppm
 Titration Cl⁻: 2700 ppm NO⁻³: 35 ppm

PRESSURES - MAIN CHAMBER

MPa-g	Schlumberger	MPa-g	Hewlett Packard*
			Psig
Initial Hydrostatic		<u>26.91</u>	<u>3902.27</u>
Sampling		<u>1.21-19.03</u>	<u>176.18-2760.74</u>
Final Shut-in		<u>23.19</u>	<u>3363.40</u>
Hydrostatic		<u>26.92</u>	<u>3904.19</u>
Formation Pressure (Horner)			
	Sampling Time Min.	<u>10:25</u>	
	Shut-in Time Min.	<u>20:12</u>	

/ (*Corrected for Atmospheric pressure)

TEMPERATURES: (max recorded) 86 °C - °C
 MAX. DEPTH TOOL REACHED: 2405 m
 TIME SINCE CIRCULATION: 21³/4 Hrs
 FORMATION TEMPERATURE (HORNER) 88.5 °C

REMARKS:

F.I.T. SEGREGATOR REPORT

GEOLOGIST/S: R.C.N. THORNTON

WELL: WEST HALIBUT-1 F.I.T. NO.: 6 @ 2405 m (KB) DATE: 21/9/78

SEGREGATOR TYPE: SFA-B NUMBER: 25

RECOVERY - SEGREGATOR _____ kPa Surface Pressure

_____	L. Gas	_____	L. Filtrate
_____	L. Oil	_____	L. Mud
_____	L. Formation Water	_____	L. Other

PROPERTIES - SEGREGATOR

<u>GAS</u>	<u>C₁</u>	<u>C₂</u>	<u>C₃</u>	<u>C₄</u>	<u>C₅</u>	<u>C₆</u>	<u>H₂S</u>
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

OIL _____ °API @ _____ °F, Pour Point _____ °F
 _____ Colour; _____ Fluorescent Colour
 _____ G.O.R.

RESISTIVITY WATER/FILTRATE _____ Ω @ _____ °F Equiv. Na.Cl. _____ ppm
 Titration Cl⁻ _____ ppm NO₃ _____ ppm

PRESSURES - SEGREGATOR

	<u>MPa-g</u>	<u>Schlumberger Psig</u>	<u>MPa-g</u>	<u>MPa-g</u>	<u>Hewlett Packard* Psig</u>
Sampling	_____	_____	_____	<u>0.62-1.46</u>	<u>89.44-212.33</u>
Final Shut-in	_____	_____	_____	<u>23.19</u>	<u>3363.48</u>
Formation Pressure (Horner)	_____	_____	_____	_____	_____
Sampling Time (Min)	_____	_____	_____	_____	<u>00:11</u>
Shut-in Time (Min)	_____	_____	_____	_____	<u>02:27</u>

REMARKS: Segregator not opened: No. 25
 HP Gauge No. 319.
 Calibration Pressure: 22.55 MPa-g; 3270 Psig.
 Calibration Temperature: 82°C

ENCLOSURES

PE902741

This is an enclosure indicator page.
The enclosure PE902741 is enclosed within the
container PE902740 at this location in this
document.

The enclosure PE902741 has the following characteristics:

ITEM_BARCODE = PE902741
CONTAINER_BARCODE = PE902740
 NAME = Structure Map Top of Latrobe Group
 Seismic Marker
 BASIN = GIPPSLAND
 PERMIT = VIC/L5
 TYPE = WELL
 SUBTYPE = HRZN_CNTR_MAP
 DESCRIPTION = Structure Map Top of Latrobe Group
 Seismic Marker for West Halibut
 REMARKS =
 DATE_CREATED = 28/02/79
 DATE_RECEIVED =
 W_NO = W706
 WELL_NAME = West Halibut-1
 CONTRACTOR = ESSO
 CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902742

This is an enclosure indicator page.
The enclosure PE902742 is enclosed within the
container PE902740 at this location in this
document.

The enclosure PE902742 has the following characteristics:

ITEM_BARCODE = PE902742
CONTAINER_BARCODE = PE902740
NAME = Time Structure Map Top of Latrobe Group
Seismic Marker
BASIN = GIPPSLAND
PERMIT = VIC/L5
TYPE = WELL
SUBTYPE = HRZN_CNTR_MAP
DESCRIPTION = Time Structure Map Top of Latrobe Group
Seismic Marker for West Halibut-1
REMARKS =
DATE_CREATED = 28/02/79
DATE_RECEIVED =
W_NO = W706
WELL_NAME = West Halibut-1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902743

This is an enclosure indicator page.
The enclosure PE902743 is enclosed within the
container PE902740 at this location in this
document.

The enclosure PE902743 has the following characteristics:

- ITEM_BARCODE = PE902743
- CONTAINER_BARCODE = PE902740
- NAME = Structural Cross Section Fortescue-
West Halibut- Halibut
- BASIN = GIPPSLAND
- PERMIT = VIC/L5
- TYPE = WELL
- SUBTYPE = CROSS_SECTION
- DESCRIPTION = Structural Cross Section Fortescue-
West Halibut- Halibut
- REMARKS =
- DATE_CREATED = 28/02/79
- DATE_RECEIVED =
- W_NO = W706
- WELL_NAME = West Halibut-1
- CONTRACTOR = ESSO
- CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE905509

This is an enclosure indicator page.
The enclosure PE905509 is enclosed within the
container PE902740 at this location in this
document.

The enclosure PE905509 has the following characteristics:

ITEM_BARCODE = PE905509
CONTAINER_BARCODE = PE902740
NAME = Time Depth Curve
BASIN = GIPPSLAND
PERMIT = VIC/L5
TYPE = WELL
SUBTYPE = VELOCITY_CHART
DESCRIPTION = Time Depth Curve (Basic) for West
Halibut-1
REMARKS =
DATE_CREATED = 31/10/78
DATE_RECEIVED =
W_NO = W706
WELL_NAME = WEST HALIBUT-1
CONTRACTOR =
CLIENT_OP_CO = ESSO EXPLORATION AND PRODUCTION
AUSTRALIA INC.

(Inserted by DNRE - Vic Govt Mines Dept.)

PE902744

This is an enclosure indicator page.
The enclosure PE902744 is enclosed within the
container PE902740 at this location in this
document.

The enclosure PE902744 has the following characteristics:

ITEM_BARCODE = PE902744
CONTAINER_BARCODE = PE902740
NAME = Sonic Calibration Curve
BASIN = GIPPSLAND
PERMIT = VIC/L5
TYPE = WELL
SUBTYPE = VELOCITY_CHART
DESCRIPTION = Sonic Calibration Curve for West
Halibut-1
REMARKS =
DATE_CREATED = 31/10/78
DATE_RECEIVED =
W_NO = W706
WELL_NAME = West Halibut-1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE603899

This is an enclosure indicator page.
The enclosure PE603899 is enclosed within the
container PE902740 at this location in this
document.

The enclosure PE603899 has the following characteristics:

- ITEM_BARCODE = PE603899
- CONTAINER_BARCODE = PE902740
 - NAME = Well Completeion Log
 - BASIN = GIPPSLAND
 - PERMIT = VIC/L5
 - TYPE = WELL
 - SUBTYPE = COMPLETION_LOG
- DESCRIPTION = Well Completeion Log (from WCR) for
West Halibut-1
- REMARKS =
- DATE_CREATED = 27/09/78
- DATE_RECEIVED =
 - W_NO = W706
 - WELL_NAME = WEST HALIBUT-1
 - CONTRACTOR =
 - CLIENT_OP_CO = ESSO EXPLORATION AND PRODUCTION
AUSTRALIA INC.

(Inserted by DNRE - Vic Govt Mines Dept)

PE905506

This is an enclosure indicator page.
The enclosure PE905506 is enclosed within the
container PE902740 at this location in this
document.

The enclosure PE905506 has the following characteristics:

ITEM_BARCODE = PE905506
CONTAINER_BARCODE = PE902740
NAME = Completion Coregraph
BASIN = GIPPSLAND
PERMIT = VIC/L5
TYPE = WELL
SUBTYPE = WELL_LOG
DESCRIPTION = Completeion Coregraph (from WCR) for
West Halibut-1
REMARKS =
DATE_CREATED = 23/09/78
DATE_RECEIVED =
W_NO = W706
WELL_NAME = WEST HALIBUT-1
CONTRACTOR = CORE LABORATORIES, INC
CLIENT_OP_CO = ESSO EXPLORATION AND PRODUCTION
AUSTRALIA INC.

(Inserted by DNRE - Vic Govt Mines Dept)