WELL COMPLETION REPORT

FLOUNDER-5 684

Esso Australia Ltd. July,

ESSO AUSTRALIA LIMITED

WELL COMPLETION REPORT

FLOUNDER-5

P.C. SIPPE

July, 1975

ESSO AUSTRALIA LIMITED

WELL COMPLETION REPORT

FLOUNDER-5

LIST OF CONTENTS

SECTION

APPENDICES

NOTE: No F.I.T.'s run
No well log analysis carried out.

PLATES

ESSO STANDARD OIL (AUSTRALIA) LTD.

COMPLETION REPORT

I WELL DATA RECORD

Date July 1975

LOCATION

WELL NAME	STATE	PERMIT or LICENCE	GEOLOGICAL BASIN	FIELD
FLOUNDER-5	VIC. OFFSHORE	VIC/L11	GIPPSLAND	FLOUNDER

CO-ORDINATES	Lat.	Long.	X	Y	MAP PROJECTION	GEOGRAPHICAL DESCRIPTION
Surface	38°18'25.006"S	148°26'56.117"E	626,683M East	5,759,120M North	ATM Zone 55	About 1.1 miles north of Flounder-2.
~~Bottom Hole~~						

ELEVATIONS & DEPTHS

ELEVATIONS	WATER DEPTH	TOTAL DEPTH	Avg.Angle
~~Ground~~ M.S.L.	317'	M.D. 8553'	Straight Hole
KB 28'		~~XXXX~~.	
RT	PLUG BACK DEPTH	REASONS FOR P.B.	
Braden Head	392'	ABANDONMENT	
Top Deck Platform			

DATES

MOVE IN	RIG UP	SPUDDED
January 29, 1975	February 2, 1975	February 2, 1975
RIG DOWN COMPLETE	RIG RELEASED	PROD.UNIT - Start Rigging Up
February 18, 1975	February 19, 1975	
PROD.UNIT - Rig Down Complete		I.P. ESTABLISHED

MISCELLANEOUS

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

CONTRACTOR	RIG NAME	EQUIPMENT TYPE
Atwood Oceanics Pty.Ltd.	"Regional Endeavour"	Floating Drilling Vessel

TOTAL RIG DAYS	DRILLING AFE NO.	COMPLETION NO.	TYPE COMPLETION
21.49	235-001		

LAHEE WELL CLASSIFICATION		
	Before Drilling	Field Outpost
	After Drilling	Unsuccessful Outpost

P.C. SIPPE
Geologist

WELL

II	INITIAL PRODUCTION TEST				
Date	WELL COMPLETION AS: Oil Well _____ Gas Well _____ Dry Hole _____				
Choke size, inch			Calculated P.I.		
Length of Test			Calculated A.O.F		
Oil, BPD			Perforations		
Water, BPD			Shut-In BHP		
Gas, MCFD			Flowing BHP		
Gas Liquids,BPD			Shut-In Tubing Press		
Gas-Oil Ratio			Flowing-Tubing Press		
Gravity, API			Flowing Temperature		

III	PERFORATING RECORD (Prod.test, Completion, DST, FIT)					
INTERVAL	HPF	TOTAL SHOTS	SERV. CO.	DIFF. PRESS.	PERFORATION FLUID	SIZE AND TYPE GUN

Engineer

WELL FLOUNDER-5

IV CASING - LINER - TUBING RECORD

Type	Size	Weight	Grade	Thread	No. Joints	Amount	Dept
	KB	ELEVATION ABOVE CASING HEAD				336.00	336.(
	24"	PILE JOINT				35.25	371.2
	20"	129#	X52LP	JV-CC	1	43.78	415.(
	20"	94#	X52LP	JV	7	270.53	685.5
	20"	129#	X52LP	JV	1 & FLOAT SHOE	45.75	731.3
	KB	ELEVATION ABOVE MANGER				342.00	342.0
	13-1/8" - 10-3/4"				HANGER & X/OVER	2.18	344.1
	10-3/4"	40.5#	J-55	BUTTRESS	62 & 1 PUP JOINT	2470.71	2814.8
	10-3/4"				FLOAT COLLAR	2.57	2817.4
	10-3/4"	40.5#	J-55	BUTTRESS	1 & 1 FLOAT SHOE	42.92	2860.3

BASIC

V CEMENT RECORD

String	20"	10-3/4"	
Type of Cement	650 sks Aust N + 350 sks Aust N + 2% $CaCl_2$	725 sks Aust N + 250 sks Aust N+1%$CaCl_2$	
Number of FT^3	1180	1151	
Average weight of slurry	15.6 ppg	15.6 ppg	
Cement Top	Sea Floor	1360' (Calc.)	
Casing Tested with	500 psi	1500 psi	
Number of Centralizers	7	10	
Number of Scratchers	-	-	
Stage Collar etc.	-	-	
Remarks		Tested formation with 13.4 ppg equiv. mud.	

Engineer

WELL

VI	SUBSURFACE COMPLETION EQUIPMENT		
	DATE COMPLETED ______________		
Schematic	Equipment Description	Length	Depth

NOT APPLICABLE

____
Engineer

WELL FLOUNDER-5

VII SAMPLES, CONVENTIONAL CORES, SW CORES

INTERVAL	TYPE	RECOVERED	INTERVAL	TYPE	RECOVERED
830 -8553'	5 Sets of washed and dried cuttings and one sack unwashed cuttings every 10-30'		748 - 2881'	S.W.C.'s	29 out of 30
			2957-8464'	S.W.C.'s	57 out of 60
	One composite cuttings canned sample every 100'		NO CONVENTIONAL CORES		
Every 30'	800 - 6130'				
20'	6130-6600'				
10'	6600-8553'				

VIII WIRELINE LOGS AND SURVEYS Incl. FIT)

Type & Scale	From To	Type & Scale	From To
RUN 1			
ISF/Sonic	2914 - 729'		
FDC/GR	2914 -- 729'		
RUN 2			
At T.D.			
ISF/Sonic	8517' - 2857'		
FDC/CNL/GR	8519' - 2857'		
H.D.T.	8521' - 5915'		
VELOCITY SURVEY	9 LEVELS		
MUD LOG	809 - 8553'		
MUD LOG	5900 - 8553'		
NO F.I.T.'s run			

P.C. SIPPE

Geologist

WELL FLOUNDER-5

IX	FORMATION TOPS/Zones					
NAME	Tops		Gross Interval (ft)	Net Pay (ft).		REMARKS
	M.D. feet	Sub-sea feet		Gas	Oil	
SEA FLOOR		-317				
OLIGOCENE	6221'	-6193'	50'			
LATROBE GP. (Flounder Fm)	6271'	-6243'	1082'			
L.N. asperus	6271'	-6243'	45'			
P.asperopolus	6316'	-6288'	912'			
Upper M.diversus	7228'	-7200'	125'			
LATROBE GP. "Coarse Clastics"	7353'	-7325'	1200'+			
L.balmei	7353'	-7325'	988'			
T.longus	8341'	-8313'	212'+			
Pay Sand	8387'	-8359'				WATER WET
Field OWC		-8314'				
DRILLERS T.D.	8553'	-8525'				

INTERPRETATIVE

X GEOLOGIC ANALYSIS (Pre Drilling prognosis Vs actual results)

PRE-DRILL

Flounder-5 was drilled to provide structural and stratigraphic control on the seismically interpreted crestal part of the largest fault block of the intra-Latrobe Flounder structure. This well followed detailed re-mapping of the field using data from Flounder-4 and the G72A and G73A seismic surveys.

Flounder-5, planned to penetrate the top of pay about 120' high to the Flounder-3 well, was drilled to evaluate if a gas cap exists in the centre block, as a 47' gas cap above the oil leg was found in Flounder-4 in the most easterly block.

It was anticipated that the braided stream sand pay zone (T.longus section) would be intersected at -8160' subsea, 154' above the assumed field oil water contact.

POST DRILL

Flounder-5 penetrated the top of Latrobe Group at 6271' (-6243'), 88' low to prediction, and the top of the expected play at 8387' (-8359') 199' low to prediction and 45' below the field oil/water contact of -8314'.

A review of the seismic data indicates that the error in the predicted depth of the play is due to local velocity variations both within the channel prone section above the Latrobe and within the Latrobe section above the pay.

At the top of Latrobe a 0.28% error in time and a 1.41% error in velocity resulted in a 1.41% error in depth, while at the top of the pay a 0.33% error in time and a 1.28% error in velocity resulted in a 2.38% error in depth.

Flounder-5 has resulted in the lowering of the top of pay in the northern side of the central fault block. This has significantly decreased reserves in this central block.

In view of the velocity errors involved an additional intensive study of the field will need to be carried out to resolve this problem. Hence the enclosed structure map is preliminary and is based on the pre-drill picture amended only by well-control.

NOTE: Due to an error in the Schlumberger logging cable it was necessary to correct all log depths in this report by a factor of +2.5'/1000'.

P.C. SIPPE
Geologist

ESSO AUSTRALIA LIMITED

WELL COMPLETION REPORT

FLOUNDER-5

APPENDIX 1

SAMPLE DESCRIPTIONS

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
809-830	70	Shell and coral fragments - good mineral fluorescence
	30	Cement cavings
	Tr.	Quartz grains - clear, subangular.
830-860	80	Shell and coral fragments
	20	Cement cavings
860-890	65	Shell and coral fragments
	35	Cement cavings
890-920	80	Shell and coral fragments
	20	Cement cavings
	Tr.	loose sand
920-950	65	Shell and coral fragements
	35	Cement cavings
	Tr.	loose sand
	Tr.	Claystone - brown, very soft, calcareous.
950-980	50	Shell and coral fragments
	50	Cement cavings
	Tr.	loose sand and calcarenite.
980-1010	40	Shell and coral fragments
	60	Cement cavings
	Tr.	loose sandy calcarenite.
1010-1040	60	Shell and coral fragments
	30	Cement cavings
	10	calcarenite - very light grey, sugary texture, dark inclusions fairly firm.
	Tr.	Loose sand
1040-1070	75	Calcarenite - as above
	15	Cement cavings
	10	Shell and coral fragments.
1070-1100	65	Calcarenite as above
	25	Cement cavings
	10	Shell and coral fragments - as above.
1100-1130	70	Calcarenite - as above
	15	Cement
	15	Shell and coral fragments - as above.
1130-1160	90	Calcarenite - as above.
	5	Cement cavings
	5	Shell and coral fragments - as above.
1160-1190	75	Calcarenite - as above
	15	Shell and coral fragments - as above.
	10	Cement cavings.
1190-1220	70	Calcarenite - as above.
	15	Cement cavings
	15	Shell and coral fragments - as above.
1220-1250	15	Cement
	5	Shell and coral fragments - as above.
	80	Calcarenite, slightly finer grained.
1250-1280	80	Calcarenite - as above
	20	Cement
	Tr.	Shell and Coral fragments as above.

FLOUNDER-5

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
1280-1310	85	Calcarenite - as above
	15	Cement
	Tr.	Shell and coral fragments - as above.
1310-1340	95	Calcarenite - as above
	5	Cement
	Tr.	Shell and coral fragments.
1340-1370	100	Calcarenite - as above, finer accumulations, firm, slight increase in dark inclusion content.
	Tr.	Shell and coral fragments.
	Tr.	Cement
	Tr.	Quartz grains, clear, well rounded.
1370-1400	100	Calcarenite - as above.
	Tr.	Cement
	Tr.	Shell and Coral
[illegible]00-1430	100	Calcarenite - as above
	Tr.	cement
	Tr.	Shell and coral
1430-1460	100	Calcarenite - as above.
	Tr.	cement
	Tr.	Shell and coral fragments
1460-1490	100	Calcarenite - as above, smaller aggregates
	Tr.	cement
	Tr.	Shell and coral fragments.
1490-1520	100	Calcarenite - as above, decrease in dark inclusions.
	Tr.	cement
	Tr.	Shell fragments, little or no coral.
1520-1550	100	Calcarenite - as above.
	Tr.	cement
	Tr.	Shell and coral fragments.
1550-1580	100	Calcarenite - as above, aggregates quite firm.
	Tr.	cement.
	Tr.	Shell and coral fragments.
1580-1610	100	Calcarenite - as above.
	Tr.	cement
	Tr.	shell and coral fragments.
1610-1640	100	Calcarenite - as above
	Tr.	Cement
	Tr.	Shell and coral fragments
	Tr.	quartz - single grains, clear and frosted, rounded.
1640-1670		as above.
1670-1700	100	Calcarenite - as above, grains slightly larger
	Tr.	cement
	Tr.	Shell and coral fragments, quartz grains.
1700-1730	100	Calcarenite - as above
	Tr.	cement
	Tr.	shell and coral fragments.
	Tr.	quartz grains.

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
1730-1760	100	Calcarenite - as above, aggregates quite smaller, light grey.
	Tr.	cement
	Tr.	shell and coral fragments.
	Tr.	Frosty quartz grains.
1760-1790	100	Calcarenite - as above, aggregates fining.
	Tr.	cement, increased from previous sample
	Tr.	shell fragements, little or no coral.
	Tr.	quartz, clear and frosty grains, well rounded.
1790-1820	85	Calcarenite - as above.
	15	cement cavings
	Tr.	shell and coral fragments.
	Tr.	calcareous siltstone - light grey, soft.
1820-1850	70	Calcarenite - as above.
	30	cement cavings
	Tr.	shell and coral fragments
	Tr.	quartz grains.
	Tr.	calcareous siltstone - as above.
		NOTE: poor returns on shale shaker and high % cement cavings probably due to insufficient cleaning of hole by seawater.
1850-1880	30	calcarenite - as above.
	70	cement cavings
	Tr.	shell and coral fragments
	Tr.	quartz grains.
1880-1910	50	calcarenite - as above.
	50	cement cavings
	Tr.	calcareous siltstone - light - very light grey, slightly firm.
	Tr.	shell and coral fragments
	Tr.	quartz grains.
1910-1940	75	calcarenite - as above.
	25	cement cavings - as above.
	Tr.	shell and coral fragments
	Tr.	quartz grains.
	Tr.	calcareous siltstone - as above.
1940-1970	85	Calcarenite - as above.
	15	cement cavings
	Tr.	shell and coral fragments.
	Tr.	quartz grains.
	Tr.	calcareous siltstone - as above.
1970-2000	90	Calcarenite - as above.
	10	cement cavings
	Tr.	calcareous siltstone - very light grey, rounded, soft.
	Tr.	shell and coral fragments.
2000-2030	100	Calcarenite - as above.
	Tr.	cement cavings
	Tr.	shell and coral fragments
	Tr.	quartz grains.
2030-2060	100	Calcarenite - as above
	Tr.	calcareous siltstone - as above.
	Tr.	cement cavings
	Tr.	shell and coral fragments
	Tr.	quartz grains.

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
2060-2090		As above.
2090-2120	90	Calcarenite - as above.
	10	cement carvings
	Tr.	calcareous siltstone - as above.
	Tr.	shells and coral fragments
	Tr.	quartz grains.
2120-2150		As above. Up to 4000 ppm CO_2
2150-2180		As above. gas on hotwire
		50 units of gas at 2270 6000 ppm C_1 : Hotwire
2180-2210	85	Calcarenite - as above
	15	cement
	Tr.	quartz grains
	Tr.	calcareous siltstone, compacted, firm, brown-grey colour.
	Tr.	shell and coral fragments.
		- gas dropped off at 2432'
		- no sample returns for about 30 minutes; 2210'-2360' is first sample after the break.
2210-2360	100	calcarenite - as above
	Tr.	cement
	Tr.	calcareous siltstone - as above
	Tr.	shells and coral fragments.
2360-2390	100	calcarenite - as above, becoming finer in aggregate size.
	Tr.	cement
	Tr.	calcareous siltstone - as above.
	Tr.	clear quartz
	Tr.	shell and coral fragments.
2390-2420	100	Calcarenite - as above.
	Tr.	cement carvings
	Tr.	quartz grains
	Tr.	shell and coral fragments.
		bg. 10 units gas @ 2534'
2420-2450	100	Calcarenite - as above
	Tr.	cement cavings
	Tr.	shell and coral fragments
	Tr.	quartz grains.
2450-2480	100	Calcarenite - as above
	Tr.	cement cavings
	Tr.	shell and coral fragments
	Tr.	quartz grains
	Tr.	calcareous siltstone - as above.
2480-2510	90	Calcarenite - as above
	10	cement cavings
	Tr.	shell and coral fragments
	Tr.	quartz grains
	Tr.	calcareous siltstone - as above.
2510-2540	100	Calcarenite - as above
	Tr.	cement cavings
	Tr.	shell and coral fragments
	Tr.	quartz grains
	Tr.	pyrite

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
2540-2570		No returns
2570-2600		No returns
2600-2630		No returns
2630-2660		No returns
2660-2690		No returns
		Change over to gel mud at 2690'
2690-2720	90	Calcarenite - as above
	10	Cement cavings
	Tr.	Calcareous siltstone
	Tr.	Shell and coral fragments
	Tr.	quartz grains
2720-2750	85	Calcarenite - as above
	5	cement cavings
	5	Marl - white - very light grey, some dark inclusions, very calcareous, very soft.
	5	loose sand - caved, yellow - brown
	Tr.	Shell and coral fragments
2750-2780	90	Calcarenite - as above, grains are smaller
	10	Marl - as above.
	Tr.	loose sand - as above
	Tr.	quartz grains
	Tr.	shell and coral fragments
2780-2810	50	Calcarenite - as above
	50	Marl - as above
	Tr.	quartz grains and shell
2810-2840	40	Calcarenite - as above
	60	Marl - as above
	Tr.	shell and coral fragments
	Tr.	quartz grains.
2840-2870	80	Calcarenite, well consolidated and cemented, lesser sugary texture, dark inclusions, aggregate of finer grained materia
	20	Marl - as above
	Tr.	shell and coral fragments
	Tr.	quartz grains - clear and frosty, subrounded to rounded.
2870-2900	80	Calcarenite - as above
	20	Marl - as above
	Tr.	shell fragments
	Tr.	quartz grains - as above, some ferrugenised.
2910		Stopped drilling, circulated, POH to run logs, and run $10\frac{3}{4}$" casing.
		7.2.75 Bit #3 $9\frac{7}{8}$" X3A using gel - seawater
2910-2930	60	Calcarenite - light grey, fine grained aggregates, dark inclusions, firm
	20	Calcareous siltstone - light grey, slightly green, soft dark inclusions.
	20	cement cavings and shoe cavings
	Tr.	quartz grains - clear and milky, well rounded.

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
2930-2960	100	Calcareous siltstone - as above
	Tr.	Calcarenite - as above
	Tr.	cement cavings.
2960-2990	100	Calcareous siltstone, as above
	Tr.	Calcarenite - as above
	Tr.	Cement cavings.
2990-3020	100	Calcareous siltstone - as above.
	Tr.	Calcarenite, as above.
3020-3050	90	Calcarenite, as above gas on hotwire - 10 units C_1
	10	Calcareous siltstone, as above.
3050-3080	60	Calcareous siltstone, as above
	40	Calcarenite, as above.
	Tr.	Cement Cavings
80-3110	60	Calcareous siltstone - as above
	40	Calcarenite - as above
	Tr.	Cement cavings.
3110-3140	75	Calcareous siltstone - as above, calcareous content decreasing slightly.
	25	Calcarenite - as above, small aggregates.
	Tr.	Cement and shoe cavings.
3140-3170	80	Calcareous siltstone - as above
	20	Calcarenite - as above
	Tr.	cement cavings.
3170-3200	85	Calcarenite - as above
	15	Calcareous siltstone - as above
	Tr.	Shell fossils - forams.
	Tr.	Glauconite fragments
	Tr.	cavings
3200-3230	100	Calcarenite - light grey, firm, fine green aggregates, some glauconite in aggregates and dark inclusions.
	Tr.	Calcareous siltstone - as above
	Tr.	glauconite
	Tr.	shell fossils - forams.
	Tr.	cavings.
3230-3260	100	Calcarenite, as above, hard, coarser grained aggregates including glauconite and forams.
	Tr.	Calcareous siltstone - as above
	Tr.	Shell fossils - forams.
3260-3290	100	Calcarenite - as above
	Tr.	Calcareous siltstone
	Tr.	Shell fossils - forams.
3290-3320	90	Calcarenite - as above
	10	Calcareous siltstone
	Tr.	Shell fossils - forams.
3320-3350	50	Calcarenite - as above.
	50	Calcareous siltstone
	Tr.	Shell fossils - forams.
3350-3380	80	Calcarenite - as above.
	20	Calcareous siltstone - as above
	Tr.	Shell fossils - forams
	Tr.	lignite - from mud.

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
3380-3410	80	Calcareous siltstone - as above, very soft, sticky
	20	Calcarenite, as above
	Tr.	Shell fossils - forams
	Tr.	lignite - from drilling mud
		Change in lithology noted by driller~3450' - harder material
3410-3440	100	Calcareous siltstone - as above.
	Tr.	Calcarenite as above, fine grained aggregate.
	Tr.	Lignite - from mud
	Tr.	forams.
3440-3470	100	Calcareous siltstone - as above
	Tr.	Calcarenite - as above
	Tr.	Calcareous siltstone - light brown - grey, firm-hard
	Tr.	Lignite - from mud
3470-3500	100	Calcareous siltstone - as above
	Tr.	Calcarenite - as above
	Tr.	lignite from mud
	Tr.	cavings from shoe
	Tr.	Fossils - forams (planktonic?)
3500-3530	100	Calcareous siltstone - as above
	Tr.	lignite - from mud
	Tr.	calcarenite - as above
3530-3560	As above	
3560-3590	100	Calcareous siltstone - as above
	Tr.	lignite - from mud
	Tr.	calcarenite
3590-3620	85	Calcareous siltstone - as above
	15	Calcarenite - as above
	Tr.	lignite - from mud.
3620-3650	60	Calcareous siltstone - as above, some small fossils in the soft aggregate
	40	Calcarenite - light - medium grey, dark inclusions, firm.
	Tr.	lignite - from mud.
3650-3680	50	Calcarenite - as above, with trace of glauconite
	50	Calcareous siltstone - as above
	Tr.	lignite - from mud
	Tr.	Calcareous siltstone - brown grey - grey, hard (similar to calcareous siltstone at 3440-3470')
	Tr.	Pyrite
	Tr.	fossils - benthonic foram.
3680-3710	60	Calcareous siltstone - as above
	40	Calcarenite - as above, some traces of hard - very hard cemented aggregates and fragments, not distinguishable from rest by colour
	Tr.	Metal shavings
	Tr.	lignite from mud
	Tr.	fossils - foram
3710-3740	50	Calcarenite - as above, trace glauconite in it.
	25	Calcarenite - light grey, very hard - hard, well cemented
	25	Calcareous siltstone - as above
	Tr.	fossils - forams (loose)
	Tr.	loose glauconite - dark - medium green colour

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
3740-3770	20	Calcareous siltstone - as above
	80	Calcarenite - as above
	Tr.	Calcarenite - hard, cemented - as above
	Tr.	loose glauconite
	Tr.	Lignite
3770-3800	50	Calcareous siltstone - as above
	50	Calcarenite - as above
	Tr.	Calcarenite - hard, well cemented
	Tr.	Lignite- from mud
	Tr.	cavings from shoe
3800-3830	50	Calcarenite - medium grey, fine grained, aggregates, firm to hard, well rounded inclusions - and glauconite.
	50	Calcareous siltstone - light grey, soft to very soft, some glauconite.
3830-3860	70	Calcarenite - as above, firm
	30	Calcareous siltstone - as above
	Tr.	Calcarenite - grey, firm, aggregates, large inclusions.
	Tr.	Lignite - from mud
3860-3890	60	Calcarenite - as above, glauconitic inclusions.
	40	Calcareous siltstone - as above
	Tr.	Calcarenite - grey, as above.
	Tr.	Lignite - from mud
3890-3920	100	Calcareous siltstone - as above, very soft, sticky
	Tr.	Calcarenite - as above.
3920-3950		As above
3950-3980	90	Calcareous siltstone - as above
	10	Calcarenite - as above
	Tr.	Lignite - from mud
	Tr.	Calcarenite - light grey, coarser grained, glauconitic inclusior
3980-4010	100	Calcareous siltstone - as above
	Tr.	Calcarenite - as above
	Tr.	Lignite
4010-4040	100	Calcareous siltstone - as above
	Tr.	Calcarenite - as above
	Tr.	Lignite
4040-4070		As above
4100		70 units gas
4110		94 units gas
4070-4100	100	Calcareous siltstone - as above
	Tr.	Calcarenite
	Tr.	Lignite, glauconite
4100-4130		As above
4130-4160		As above No glauconite Tr. fossils
4160-4190		As above

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
4190-4220	85	Calcareous siltstone - as above, soft
	15	Calcarenite (i) medium grey, firm-very firm inclusions in aggregates.
		(ii) Very light grey, firm inclusions in aggrega
	Tr.	Lignite, fossils
4220-4250	80	Calcareous siltstone, as above
	20	Calcarenite (i) and (ii) as above
	Tr.	Lignite, fossils.
4250-4280	100	Calcareous siltstone - as above
	Tr.	Calcarenite (i) and (ii) as above
	Tr.	Lignite, fossils.
4280-4310		As above
		11.6 hours on bit #3
		4315 (TD) - circulated bottoms up, POH to change bit.
		8.2.75 New bit #4 $9\frac{7}{8}$" XIG.
4310-4340	100	Calcareous siltstone - light grey, soft, silt grain size, stic dark inclusions scattered thru out occasionally.
	Tr.	Calcarenite - medium grey, firm - very firm grain size, dark inclusions, trace fossils contained.
	Tr.	Loose fossils
	Tr.	Lignite from mud.
4340-4370	70	Calcareous siltstone - as above
	30	Calcarenite - as above, some pieces firm - hard, some have trace fossil content.
	Tr.	loose fossils
	Tr.	lignite - from mud, increased from before.
4370-4400	50	Calcareous siltstone - as above
	50	Calcarenite - as above
	Tr.	fossils - forams
	Tr.	pyrite
	Tr.	lignite
4400-4430	60	Calcareous siltstone - as above, very soft, sticky -
	40	Calcarenite - as above
	Tr.	lignite
4430-4460	90	Calcareous siltstone - as above, very soft
	10	Calcarenite - as above
		Gas kick 4460 25 units C_1:4500 7 units.
4460-4490	70	Calcareous siltstone - as above
	30	Calcarenite - as above
4490-4520	50	Calcareous siltstone - as above
	50	Calcarenite - as above
4520-4550	60	Calcarenite - as above
	40	Calcareous siltstone - as above
4550-4580	60	Calcareous siltstone - as above
	40	Calcarenite - as above
	Tr.	forams.

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
4580-4610	90	Calcareous siltstone - as above
	10	Calcarenite - as above
	Tr.	Shell fossils - forams
4610-4640	60	Calcareous siltstone - light grey, very soft, silt grain size, dark inclusions.
	20	Calcarenite - light grey, dark inclusions, hard to very hard, foram and glauconite inclusions.
	20	Calcareous siltstone - medium grey, silt - very fine, dark inclusions, firm.
	Tr.	Fossil - forams.
4640-4670	40	Calcareous siltstone - light grey, as above
	30	Calcarenite - as above
	30	Calcareous siltstone - medium grey, as above
	Tr.	pyrite.
4670-4700	60	Calcareous siltstone - light grey, as above
	20	Calcarenite - as above
	20	Calcareous siltstone - medium grey, as above
4700-4730	50	Calcareous siltstone - light grey, as above, sticky
	50	Calcareous siltstone - medium grey,as above, firm
	Tr.	forams.
4730-4760	60	Calcareous siltstone - medium grey, as above
	40	Calcareous siltstone - light grey, as above
	Tr.	calcite grains
	Tr.	Calcarenite as above.
4760-4790	80	Calcareous siltstone - as above, medium grey,
	10	Calcarenite - as above
	10	Calcareous siltstone - light grey, as above
	Tr.	Calcite crystals, forams.
4790-4820	80	Calcareous siltstone - medium grey, as above.
	Tr.	Calcarenite - as above
	20	Calcareous siltstone - light grey, as above.
	Tr.	Calcite crystals- forams.
4820-4850		As above
4850-4880	50	Calcareous siltstone - medium grey, as above
	50	Calcareous siltstone - light grey, as above
	Tr.	Calcarenite - as above
	Tr.	forams.
4880-4910	60	Calcareous siltstone - medium grey, as above
	40	Calcareous siltstone - light grey, as above
	Tr.	Calcarenite - as above
	Tr.	Calcite, forams.
4910-4940	85	Calcareous siltstone - medium grey, as above
	15	Calcareous siltstone - light grey, as above
	Tr.	Calcarenite - as above
	Tr.	forams.
4940-4970	80	Calcareous siltstone - medium grey, as above
	20	Calcareous siltstone - light as above, forams included.
	Tr.	Calcarenite - as above
	Tr.	forams.

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
4970-5000	85	Calcareous siltstone - medium grey, as above
	15	Calcareous siltstone - light grey, as above
	Tr.	Calcarenite - as above
5000-5030		As above
5030-5060	75	Calcareous siltstone - medium grey, as above
	25	Calcareous siltstone - light grey, as above
	Tr.	Calcarenite - as above
	Tr.	forams.
5060-5090	85	Calcareous siltstone - light grey, as above
	15	Calcareous siltstone - mediumgrey, as above
	Tr.	Calcarenite - as above
	Tr.	forams.
5090-5120	90	Calcareous siltstone - light grey, as above, very soft, sticky
	10	Calcareous siltstone - medium grey, as above, aggregates in sof sticky light grey, calcareous siltstone.
	Tr.	forams.
5120-5150	50	Calcareous siltstone - light grey, as above, very soft
	50	Calcareous siltstone - medium grey - as above, firm
	Tr.	Pyrite, forams
5150-5180	60	Calcareous siltstone - medium grey, as above, firm, blade like to plately, tabulate fragments; some fragments appear to show possible layering (fissile).
	40	Calcareous siltstone, light grey, as above, very soft
	Tr.	fossils including forams.
5180-5210	60	Calcareous siltstone - light grey - as above
	40	Calcareous siltstone - medium grey - as above
	Tr.	Calcarenite - light grey, hard, fine - medium grained aggregate including forams, glauconitic.
	Tr.	forams.
5210-5240	40	Calcareous siltstone - light grey - as above
	60	Calcareous siltstone - medium grey, - as above
	Tr.	Calcarenite - as above, forams.
5240-5270	50	Calcareous siltstone - light grey, as above
	50	Calcareous siltstone - medium grey, as above
	Tr.	forams.
5270-5300	50	Calcareous siltstone - light grey - as above, soft
	40	Calcareous siltstone - medium grey, as above
	10	Calcarenite - as above
5300-5330	50	Calcareous siltstone - light grey, as above
	50	Calcareous siltstone - medium grey, as above
	Tr.	Calcarenite - as above, forams.
5330-5360	60	As above
5360-5390		As above, no trace calcarenite
5390-5420	65	Calcareous siltstone - light grey - as above
	35	Calcareous siltstone - medium grey - as above
	Tr.	Calcite crystals.
	Tr.	forams and other fossils
	Tr.	Calcarenite - as above

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
5420-5450	60	Calcareous siltstone - light grey - as above
	40	Calcareous siltstone - medium grey - as above
	Tr.	forams.
5450-5480	85	Calcareous siltstone - medium grey - as above
	15	Calcareous siltstone - light grey, as above
	Tr.	forams and other fossils

DEPTH	%	DESCRIPTION
5480-5510	90	Calcareous Siltstone, medium grey, as above
	10	Calcareous Siltstone, light grey, as above
		Trace Forams
		Trace Loose Calcite crystals
5568		Bit Torqued up, POH to change bit
		New bit #5 X19 9-7/8"
5510-5540	75	Calcareous Siltstone, medium grey, as above
	25	Calcareous Siltstone, light grey, as above
		Trace Calcarenite, as above
		Trace Fossils- possibly forams
5550		75 units 9000 C_1)
		175 units connection) possibly trip gas
5540-5570	90	Calcareous Siltstone, medium grey, as above
	10	Calcareous Siltstone, light grey, as above
		Trace Calcarenite - as above, very light grey, finer grain aggregates
		Trace Forams, calcite crystals
5570-5600	80	Calcareous Siltstone, medium grey, as above
	20	Calcareous Siltstone, light grey, as above
		Trace Calcarenite, as above
		Trace Fossils including forams
5600-5630	50	Calcareous Siltstone, medium grey, as above
	50	Calcareous Siltstone, light grey, as above, very soft
		Trace Calcarenite, as above, glauconite inclusions
		Trace Fossil including forams
5630-5660	60	Calcareous Siltstone, medium grey, as above
	40	Calcareous Siltstone, light grey, as above
		Trace Calcarenite, as above, firm
		Trace Fossils including forams
5660-5690	70	Calcareous Siltstone, medium grey, as above
	30	Calcareous Siltstone, light grey, as above
		Trace Calcarenite, as above
		Trace fossils including forams
5690-5720	60	Calcareous Siltstone, medium grey, as above
	40	Calcareous Siltstone, light grey, as above
		Trace Forams
5720-5750	80	Calcareous Siltstone, medium grey, as above
	20	Calcareous Siltstone, light grey, as above
		Trace Calcarenite, as above
		Trace Calcite crystals
		Trace loose fossil fragments
5750-5780	85	Calcareous Siltstone, medium grey, as above
	15	Calcareous Siltstone, light grey, as above
		Trace fossil fragments and forams
5780-5810		As above.
		Trace pyrite
		Trace Calcite crystals

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
5810-5840	90	Calcareous Siltstone, medium grey, as above
	10	Calcareous Siltstone, light grey, as above, trace glauconite content
		Trace Fossil Fragments and forams
		Trace Glauconite
5840-5870	50	Calcareous Siltstone, medium grey, as above
	50	Calcareous Siltstone, light grey, as above
		Trace Fossil fragments and forams
5870-5900		As above
		Trace calcarenite, as above, glauconite content
5900-5930	60	Calcareous Siltstone, medium grey, as above
	40	Calcareous Siltstone, light grey, as above
		Trace Fossil fragments
5930-5960		As above
		Trace lignite
5960-5990	50	Calcareous Siltstone, medium grey, as above
	50	Calcareous Siltstone, light grey, as above, tending to firm slightly
		Trace fossils including forams, lignite
5990-6020	60	Calcareous Siltstone, medium grey, as above
	40	Calcareous Siltstone, light grey, as above
		Trace fossil fragments and forams, trace lignite
6020-6050	85	Calcareous Siltstone, medium grey, as above, some brownish fragr
	15	Calcareous Siltstone, light grey, as above
		Trace fossil fragments and forams
		Trace lignite
6050-6080	80	Calcareous Siltstone, medium grey, as above
	20	Calcareous Siltstone, light grey, as above
		Trace Calcareous Siltstone, green grey, particles fine glauconi*
		Trace fossils including forams
6080-6110	70	Calcareous Siltstone, medium grey, as above, foram inclusion
	30	Calcareous Siltstone, light grey, as above, firm
		Trace (large) Calcareous Siltstone - green grey, blade-like to tabulate, perhaps 5%+?
		Trace fossils including forams
		Trace lignite
6110-6130	35	Calcareous Siltstone, light grey, as above
	50	Calcareous Siltstone, medium grey, as above
	15	Calcareous glauconitic Siltstone, as above
		Trace fossil fragements and forams
6130-6150	20	Calcareous Siltstone, light grey, as above
	30	Calcareous glauconitic siltstone, green grey, as above)grading t
	50	Calcareous Siltstone, medium grey, as above)a shale
		Trace fossils fragments and forams
6150-6170	40	Calcareous Siltstone, light grey, as above
	30	Calcareous Siltstone, medium grey, as above)grading t
	30	Calcareous glauconitic Siltstone, green grey, as above) a shale
		Trace fossil fragements
		Trace lignite

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
6170-6190	10	Calcareous Siltstone, light grey, as above
	60	Calcareous glauconitic siltstone, green grey, as above)tend to b
	30	Calcareous Siltstone, medium grey, as above) shaley
		Trace dolomite
		Trace forams
		Trace Calcite crystals
		Trace pyrite
6190-6210	100	Calcareous Shale, medium grey to green grey, firm, platy, some glauconitic distinct grains, others very fine
		Trace Calcareous Siltstone, light grey, as above
6210-6230		As above
6230-6250	85	Calcareous Shale, as above
	15	Calcareous Siltstone, light grey, as above, very soft, sticky
6250-6270	90	Calcareous Shale, medium grey to green grey, as above
	10	Calcareous Siltstone, light grey, as above, some aggregates brow
		Trace quartz crystals
		Trace Forams
6270-6290		As above
		No trace quartz
6290-6310	90	Calcareous Shale, medium grey to green grey, more glauconitic
	10	Calcareous Siltstone, light grey, trace foram and glauconite content
		Trace loose glauconite
		Trace Calcareous Siltstone, weakly calcareous, medium brown colo silt grain size, soft, foram and dark inclusions
		Trace forams
6310-6330	85	Calcareous Shale, asabove
	15	Calcareous Siltstone, light grey, as above, soft, (occasionally firm)
		Trace Calcareous siltstone, brown, as above, loose and unconsoli ated (occasionally firm)
		Trace quartz crystals , clear and milky, sub-rounded
6330-6350	100	Calcareous Shale, as above
		Trace Calcareous Siltstone, brown, as above, firm aggregates darker in colour and more dark inclusions and trace glauconite content
		Trace Calcareous Siltstone, light grey, as above
		Trace Forams
		Trace quartz fragments - as above
		Trace Calcarenite, light grey, sugary texture, very fine grained glauconite content
6350-6370		As above
		No trace calcarenite
		No trace forams
		Calcareous shale, becoming less glauconitic, mainly medium grey colour
		Trace quartz, clear only, pyritic.
6370-6390	100	Calcareous Shale, as above
		Trace calcareous siltstone, light grey, as above
		Trace pyrite
6390-6410		As above, no light grey calcareous siltstone

DEPTH	%	DESCRIPTION
6410-6430	90	Calcareous Shale, as above
	10	Siltstone, brown, as above, slightly calcareous, hard aggregates, glauconite inclusions, dark inclusions
		Trace Calcareous Silstone, light grey as above, trace forams
		Negative drilling break
6430-6450	50	Calcareous shale, as above, trace glauconite content
	50	Dolomite /Dolimitic Siltstone, buff brown colour, hard, blade-like to plate-like fragments, carbonate overgrowths (possibly veins?) whitish and clear pink
		Trace pyrite
		Trace quartz, rounded
		Trace loose calcite, whitish and clear pinkish
		Trace forams
6450-6470	70	Dolomite /Dolomitic Siltstone, as above
	30	Calcareous shale, as above
		Trace loose calcite fragments, as above
		Trace fossil fragments and forams
		Trace Calcarenite, glauconitic, hard, sugary texture, fine grained
		Trace Calcareous siltstone, dark brown, soft, dark inclusion, as before
6470-6490	85	Calcareous shale, as above, trace glauconite content
	15	Dolomite /Dolomitic Siltstone, as above
		Trace Calcarenite, as above
		Trace calcareous siltstone, dark brown-brown (medium), as above
		Trace fossil fragments and forams
		Trace loose quartz, milky, rounded
		Trace loose calcite fragments, milky
		Trace calcareous Siltstone, light grey, as above, soft
6528 (IBP)		New bit #6 J22 105 units trip gas 16000C_1
6490-6510	85	Calcareous shale, as above
	15	Dolomite/dolomitic siltstone, as above
		Trace pyrite
6510-6530	100	Calcareous shale, as above
		Trace dolomite /dolomitic siltstone, as above
		Trace calcareous siltstone, dark brown, glauconite, as above
		Trace Calcite crystals, forams
6530-6550		As above, shale, green-grey, trace pyrite
6550-6570	100	Calcareous Shale, as above
		Trace Dolomite, as above
		Trace siltstone, dark brown, calcareous, as above
		Trace pyrite
6570-6590		As above
6590-6600	100	Calcareous shale, as above only weakly calcareous
		Trace Siltstone, dark brown, as above, weakly calcareous
		Trace calcarenite, fine to medium grained, glauconite inclusion, strongly calcareous
		Trace pyrite, large aggregates of fine grains; forams
6600-6610	100	Shale, as above
		Trace siltstone, as above, glauconitic
		Trace calcarenite, as above
		Trace pyrite

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
6610-6620	100	Shale, as above, tending to be slightly pyritic Trace siltstone, as above Trace calcarenite, as above Trace pyrite, forams
6620-6630		As above Trace fossil fragments
6630-6640		As above
6640-6650	90	Shale, as above
	10	Siltstone, brown to dark brown, as above
		Trace pyrite, fossils, calcarenite, as above
6650-6660	95	Shale, as above
	5	Pyrite, fine grain aggregates
		Trace Siltstone, brown, as above
		Trace fossils, quartzy
6660-6670	70	Shale, as above, weakly calcareous
	30	Dolomite, buff, some dark inclusions, very hard, weakly calcareou weak mineral fluorescence
		Trace Siltstone, dark brown, as above, large rounded glauconite grains inclusion
		Trace Calcarenite, light grey, glauconitic and pyritic
		Trace fossils, pyrite
6670-6680	70	Shale, as above
	30	Dolomite, as above, also glauconite inclusion
		Trace pyrite
		Trace shell fossils - forams
		Trace siltstone, dark brown, as above
		Trace calcarenite, light grey, glauconite inclusions
6680-6690	75	Shale, as above
	15	Dolomite, as above
		Trace pyrite
		Trace calcarenite, light grey, as above
	10	Siltstone, dark green, as above
		Trace fossils, forams, as above
6690-6700	75	Shale, as above
	25	Dolomite, as above as above
		Trace calcite
6700-6710	100	Shale, as above
		Trace Siltstone, dark brown, as above
		Trace Pyrite
		Trace Sandstone, light grey, fine grain, well rounded, tight, slight pale yellow fluorescence, slightly calcareous, no cut, well consolidated
		Trace Dolomite, as above
6710-6720	80	Shale, as above
	5	Siltstone, brown to dark brown, as above
	5	Sandstone, as above, some minor glauconite
		Trace pyrite, glauconite
	10	Dolomite, asabove
6720-6730	65	Shale, as above
	30	Dolomite, as above
		Trace Siltstone, brown to dark brown, as above
	5	Sandstone, as above
		Trace fossils, quartz

DEPTH	%	DESCRIPTION
6730-6740	60	Shale, as above
	30	Dolomite, as above
	10	Siltstone, brown to dark brown, as above, glauconite content
		Trace Siltstone, light grey, as above Top of Latrobe
		Trace fossil fragments, quartz
		Trace Sandstone
6740-6750	70	Shale, as above
	20	Siltstone, brown to dark brown, as above
	10	Dolomite, as above
		Trace Sandstone, as above, some pieces brownish, fine to very fir grain, hard
		Trace fossil fragments, trace pyrite
6750-6760		This sample from bottom of hole - stopped drilling and circulated up at this point
	60	Shale, as above
	20	Siltstone, dark brown, as above
	20	Sandstone, as above, (texture etc.), fine spotty fluorescence, pa yellow colour, no cut
		Trace Dolomite
		Trace fossil fragments
		Trace Calcarenite, as above, (light grey)
6760-6770	30	Shale, as above
	10	Sandstone, as above, quartz overgrowths? well cemented
	50	Siltstone, dark brown, as above
	10	Dolomite, as above
		Trace pyrite, fossils
6770-6780	50	Shale, as above, calcareous
	50	Siltstone, brown to dark brown, as above, calcareous, soft to fir
		Trace glauconite content
		Trace Siltstone, light grey, soft to firm, glauconite finely disseminated occasionally
		Trace Sandstone, as above, occasional glauconite crystal inclusic Calcareous cement
		Trace pyrite, fossil fragments
		Trace Dolomite, as above
6780-6790		As above
6790-6800	60	Shale, as above
	40	Siltstone, dark brown to brown, as above
		Trace fossil fragments
		Trace Sandstone, as above, weak very pale yellow fluorescence, nc cut
		Trace Siltstone, light grey, as above
		Trace Dolomite, as above, carbonate overgrowth (milky white) occa ionally
6800-6810		As above
		Trace pyrite
6810-6820		As above
		Trace fossil fragments
		Trace quartz fragments, rounded, milky
		No siltstone, light grey, as above

DEPTH	%	DESCRIPTION
6820-6830	60	Siltstone, brown to dark brown, as above, some very soft
	40	Shale, as above
		Trace dolomite, as above
		Trace pyrite
6830-6840	50	Shale, as above, very calcareous
	50	Siltstone, brown to dark brown, as above, non-calcareous
		Trace dolomite
		Trace Sandstone, as above, very calcareous
		Trace Mudstone, very light grey, soft to firm, non-calcareous
		Trace pyrite
6840-6850	70	Siltstone, as above, some glauconite inclusions
	30	Shale, as above
		Trace Mudstone, as above
		Trace pyrite, dolomite
6850-6860	50	Shale, as above
	50	Siltstone,
		Trace Mudstone
		Trace pyrite, dolomite
6860-6870		As above
6870-6880	50	Shale, as above, tends to be grey green
	50	Siltstone, as above, non-calcareous
		Trace Mudstone, as above, some very soft
		Trace pyrite, dolomite, fossils
6880-6890	50	Shale, as above
	50	Siltstone, as above
		Trace Calcite, pyrite
		Trace Mudstone, light brown to buff, very light grey.
6890-6900	60	Siltstone, as above
	40	Shale, as above
		Trace Calcite, pyrite, dolomite
		Trace Mudstone, very light grey, as above
		Trace Sandstone, caving?
6900-6910	60	Siltstone, as above
	40	Shale, as above
		Trace Calcite, pyrite, dolomite
		Trace Mudstone, very light grey
		Trace Sandstone, as above, caving
6910-6920	80	Siltstone, dark brown, as above
	20	Shale, as above
		Trace Calcite, pyrite (5%), dolomite
		Trace Mudstone, very light grey, buff.
6920-6930	70	Siltstone, as above
	20	Shale, as above
	10	Mudstone, pale yellow brown to buff, non-calcareous
		Trace dolomite

DEPTH	%	DESCRIPTION
6930-6940	80	Mudstone, pale yellow brown to buff, non-calcareous
	10	Shale, as above
	10	Siltstone, as above, glauconite inclusion
6940-6950	70	Mudstone, buff to yellow brown, as above, soft, unconsolidated
	30	Siltstone, dark brown to brown, as above
		Trace Sandstone, glauconitic, very fine to fine grained, well cemented, hard
		Trace Shale, as above
		Trace Mudstone, light grey, as above
		Trace pyrite, fossil fragments
6950-6960	80	Mudstone, buff to brown, as above
	20	Siltstone, dark brown, as above
		Trace Sandstone, as above, trace pyrite, fossils
		Trace shale, as above, trace mudstone, light grey, as above
6960-6970	20	Mudstone, light grey, as above
	60	Siltstone, dark brown, as above
	15	Mudstone, buff to brown, as above
	5	Shale, as above
		Trace pyrite, fossils, glauconite
6970-6980	75	Siltstone, dark brown, as above, non-calcareous
	10	Mudstone, buff, as above, non-calcareous
	10	Mudstone, light grey, as above, non-calcareous
	5	Shale, as above, non-calcareous
		Trace pyrite, fossils, glauconite
6980-6990	70	Siltstone, as above
	20	Mudstone, buff, as above
	10	Shale, as above, glauconite content
		Trace Sandstone, glauconite content, hard, cemented, very fine to fine grained, dark inclusion, non-calcareous cement (possibly siliceous cement)
		Trace pyrite, fossil fragments, dolomite
		Trace Mudstone, light grey, as above
6990-7000	70	Mudstone, buff to brown, as above, sticky, soft
	20	Siltstone, brown to dark brown, as above
	10	Shale, as above
		Trace sandstone, as above
		Trace pyrite, fossil fragments
		Trace dolomite, buff, hard
7000-7010	85	Mudstone, buff to brown, as above
	15	Siltstone, brown to dark brown, as above
		Trace Shale, as above, glauconite content
		Trace pyrite, fossil fragments
		Trace Sandstone, as above
		Trace Mudstone, light grey, as above
7010-7020	70	Siltstone, brown to dark brown, as above, no glauconite
	30	Shale, as above
		Trace Sandstone, as above
		Trace pyrite, fossil fragments
		Trace mudstone, light grey, as above
		Trace dolomite, as above

DEPTH	%	DESCRIPTION
7340-7350	70	Quartz grains, as above
	20	Siltstone, brown to dark brown, pyritic, firm
	10	Sandstone, medium to coarse angular grains, cemented with pyrite
		Trace sandstone, dirty friable, generally medium grain, contains some glauconite grains
		Strong trace pyrite
7350-7360	60	Quartz grains, very coarse clear to milky, subangular to well rounded
	15	Coal
	15	Siltstone, very fine sand light brown to medium brown
	10	Sandstone, honey brown, fine to medium grained, moderately well sorted but dirty
		Trace pyrite cemented angular, medium grained quartz grains
		One grain of tight sandstone had good gold fluorescence and good was a piece of black soft material which cut well - residual oil brown stain on plate
7360-7370	40	Siltstone, grey to dark brown, firm to fissile, pyritic
	30	Quartz grains, very coarse, moderately well sorted, angular to well rounded, clear to milky
	30	Coal
		Trace Sandstone, clean, poorly sorted, tight, fine to coarse gra
7370-7380	90	Siltstone, grading to very fine sandstone, grey to medium brown
	10	Quartz grains, as above
		Minor coal
		Trace medium grained, dirty sandstone, friable
		Trace sandstone, medium to coarse grain, heavily cemented with pyrite
		Trace mineral fluorescence
7380-7390	30	Sandstone, very fine to fine grained, grey to light brown, sub-rounded
	70	Siltstone, thinly interbedded with the sandstone, medium brown, pyritic
		Trace coal, pyrite, hard limestone
7390-7400	60	Siltstone, medium brown, pyritic, firm
	30	Quartz grains, very coarse, up to 3mm diameter, clear to milky, subangular to well rounded, well sorted
	10	Sandstone, fine to medium grained, moderate to well sorted, white grey, varying from clay choked to clean. These sands in thin la
7400-7410	95	Quartz grains, as above
	5	Interbedded siltstone and sandstone, as above
7410-7420	60	Quartz grains, as above
	20	Siltstone, coarse silt, grey to light brown, pyritic
	20	Coal, bleeding gas
		Trace sandstone, light grey, fine grained, moderate sorting
7420-7430	40	Quartz grains, coarse - 3mm, clear to milky, subangular to well rounded, moderately well sorted
	40	Siltstone, grading to very fine sandstone, light brown
	20	Sandstone, clear white, fine to medium grained, well sorted, sub-rounded, grading to dirty grey
7435 Drilling Break	40	Sandstone, very fine to medium grain, poor to good sorting, poor sorted lumps are clay choked, white to light grey to brown
	40	Siltstone, medium to dark brown, pyritic
	20	Quartz grains, very coarse, subangular to rounded, white
		Trace pyrite, trace coal. Weak gold fluorescence and very weak cut in tight sandstone lump

DEPTH	%	DESCRIPTION
7020-7030	50	Mudstone, buff, as above, sticky and soft, trace glauconite and dark inclusions)
	35	Siltstone, brown to dark brown, as above) weakly calcareous
	15	Shale, as above, glauconite disseminated)
		Trace pyrite, sandstone, as above,
		Note : pyrite content slowly increasing
7030-7040	80	Mudstone, buff, unconsolidated, as above
	10	Siltstone, dark brown, as above
	10	Shale, as above
		Trace pyrite, quartz
7040-7050	65	Siltstone, dark brown to brown, as above, mildly calcareous
	35	Shale, as above, increased calcarenite content, mildly calcareou
		Trace Mudstone, light grey, as above
		Trace pyrite, fossil fragments
		Trace dolomite, buff, hard
		Trace sandstone, as above
7050-7060	15	Shale, as above
	45	Siltstone, dark brown to brown, as above
	40	Mudstone, buff, as above, soft, sticky, occasionally firmer
		Trace pyrite
		Trace sandstone, as above
7060-7070	60	Siltstone, brown to dark brown, as above
	40	Shale, as above
		Trace pyrite
		Trace mudstone, light grey, as above, firm, becoming lighter in colour
		Trace Mudstone, buff, as above
7070-7080	40	Shale, as above
	10	Mudstone, buff, as above
	50	Siltstone, brown to dark brown
		Trace mudstone, light grey, as above
		Trace pyrite
7080-7090	60	Siltstone, brown to dark brown, as above, slightly calcareous
	40	Shale, medium grey to green grey, as above, calcareous
		Trace dolomite
		Trace mudstone, light grey, as above
		Trace sandstone, slight calcareous, as above, pyrite
		POH 7104' to change bit. Bit #6 22.4 hours. New bit #7 J33.
7090-7100	50	Shale, as above, mildly calcareous
	50	Siltstone, brown to dark brown, as above, mildly calcareous
		Trace Mudstone, buff, as above
		Trace pyrite
		Trace dolomite
		Trace mudstone, light grey, as above
		Trace sandstone, as above
7100-7110	90	Shale, medium grey, firm, calcareous
	10	Siltstone, brown to dark brown, firm, some very pyritic
		Trace mudstone, light grey, as above
		Trace sandstone, as above
		Trace pyrite
		Trace dolomite

DEPTH	%	DESCRIPTION
7110-7120	75	Shale, as above
	25	Siltstone, brown to dark brown, as above, occasional glauconit content and dark inclusion
		Trace sandstone, as above, very fine to fine grain size
		Trace quartz, pyrite; fossil fragments
		Trace mudstone, light grey, as above
		Trace dolomite, as above
7120-7130	80	Shale, as above, less glauconite, mildly calcareous
	20	Siltstone, brown to dark brown, as above, mildly calcareous,
		Trace sandstone, trace glauconite content, as above, hard, fine very fine grain size, mildly calcareous (cement).
		Trace pyrite, forams, quartz
		Trace dolomite
		Trace mudstone, buff, as above, slightly calcareous
		Trace Mudstone, light grey, as above
		Trace lignite
7130-7140	20	Shale, as above, lower glauconite content, mildly calcareous
	80	Siltstone, as above, dark brown to brown, non-calcareous, mainl brown, becoming occasionally fissile
		Trace Sandstone, as above, trace glauconite, hard
		Trace pyrite
		Trace dolomite, as above
		Trace mudstone, light grey to medium grey, as above, occasional glauconite, firm to hard
		Trace Mudstone, buff, as above, firm
7140-7150	10	Shale, as above, calcareous
	90	Siltstone, brown to dark brown, as above, mainly brown, calcarec
		Trace sandstone, as above, glauconite occasional pale yellow fluorescence, no cut
		Trace pyrite, forams, quartz
		Trace dolomite
		Trace mudstone, light grey, as above
7150-7160	70	Sandstone, brown to dark brown, fine to medium grain, dirty, glauconite, consolidated, quartz overgrowth, well rounded, sligh calcareous, minor pale yellow fluorescence, no cut
	20	Siltstone, dark brown, as above
	10	Shale, medium grey, as above, calcareous
		Trace pyrite, fossils, lignite from mud
		Trace mudstone, buff to brown, soft, as above
7160-7170	60	Siltstone to fine Sandstone, poorly sorted, dirty, dark brown to dark grey, well rounded, very fine to medium grained, glauconiti no fluorescence
	30	Sandstone, clear to yellow, well cemented, angular
	10	Mudstone, mid grey to buff, earthy, massive to sub-fissile, calcareous, glauconitic
		Trace shale, medium grey, calcareous, fissile
		Trace pyrite, lignite black grains, strong traces; quartz grains well rounded and frosted Q1 - 2 mm.

DEPTH	%	DESCRIPTION
7170-7180	70	Siltstone to fine Sandstone, brown to dark brown, dirty, poorly sorted, massive, occasionally glauconitic
	20	Mudstone, medium grey to buff, earthy, massive to sub-fissile, calcareous.
	10	Quartz grains, well rounded, and frosted, 0.1 - 1 mm. larger grains with pyritic intergrowths Strong traces pyrite good crystal growths Trace shale, medium grey, calcareous Trace sandstone, clean, as above
7180-7190	70	Siltstone to fine Sandstone, brown to dark brown, well rounded larger grains, fine to medium grained, 0.1-0.3mm well rounded, green glauconite, poorly sorted
	30	Mudstone, buff to medium grey, earthy, calcareous, occasionally glauconitic, massive. Strong traces quartz grains 0.1mm-0.5mm well rounded to sub-angul clear Strong traces pyrite, well rounded; black lignite
7190-7200	50	Quartz grains, pearly to clear, 0.1mm-4mm, frosted, occasional pyritic intergrowths
	40	Siltstone/fine Sandstone, brown to dark brown, as above
	10	Mudstone, buff to medium grey, calcareous, glauconitic, massive Traces pyrite; no fluorescence, on quartz grains
7200-7210	40	Siltstone/fine Sandstone, brown to dark brown, massive, well moderately to poorly sorted, fine grained
	30	Quartz Grains, clear to frosted, well rounded, 0.1mm-0.5mm
	30	Mudstone, buff to medium grey, calcareous, glauconitic, earthy, massive Trace pyrite, shale, light brown
7210-7220	60	Siltstone, light grey to dark brown, well rounded, massive, poorl sorted, glacuonitic
	40	Mudstone, light grey to grey, occasionally green, glacuonitic, soft to firm, massive, earthy Strong traces quartz grains, 0.1mm-3mm frosted Strong traces pyrite grains and black lignite grains
7220-7230	70	Siltstone, brown to dark brown, massive, moderately sorted, well rounded
	30	Mudstone, light grey to grey, firm, massive, earthy Strong traces quartz grains, 0.1mm-2mm, white to frosted Strong traces pyrite, well formed crystal intergrowths; strong traces shale, light grey, firm
7230-7240	40	Quartz grains 0.1mm-3mm, white, frosted, subangular to well round
	30	Siltstone, brown to dark brown, as above
	10	Limestone, brown, hard, highly reactive , unfossiliferous,
	10	Mudstone, light grey to grey, as above
	10	Sandstone brown to light grey, strongly cemented, poorly sorted, sub-angular to well rounded Trace pyrite and shale
7240-7250	60	Siltstone/fine Sandstone, light brown to dark brown, moderately sorted, well rounded
	20	Mudstone, light grey to grey, traces green, calcareous, massive, friable
	20	Limestone, brown, hard, highly reactive, no fossils, crystalline Trace quartz grain 0.1mm-0.5mm Trace pyrite and lignite

DEPTH	%	DESCRIPTION
7250-7260	70	Siltstone/fine Sandstone, brown, light to dark grey, moderately sorted, massive
	20	Limestone, honey brown, as above
	10	Mudstone, light grey to grey, calcareous, friable, massive
		Strong traces quartz grains, well rounded; strong traces pyrite; strong traces coal, black; gas seepage, slow and continuous
7260-7270	90	Quartz grains, pearly white to clear, both frosted and vitreous 0.1mm-3mm, well rounded to subangular, moderately well sorted, ve clean
Drilling 30 mins. Circulate	Break to 10	Siltstone, brown, as above
		Trace pyrite, fine grained, sandstone, well cemented, subangular poorly sorted, clean and glauconitic
7270-7280	50	Quartz grains, white to clear, subangular to well rounded, moder sorting, clean
	30	Siltstone, brown to dark brown, as above
	20	Sandstone, clear to buff grey, subangular, well cemented, medium grained
		Trace lignite, black, seeping gas, pyrite
7280-7290	70	Quartz grains, white to clear, subangular to well rounded, moder sorting to well sorted, clean
	30	Siltstone, brown to dark brown, as above
		Trace limestone, brown, hard, crystalline
		Sandstone, clear to yellow, well cemented, as above
		Pyrite
7290-7300	50	Quartz grains, white to clear, frosted, well rounded, well sorte clean, 0.1mm-1mm
	30	Sandstone, clear to yellow, clear, subangular, moderately sorted well cemented
	20	Siltstone, brown to dark brown, dirty, moderately sorted, massiv earthy
		Trace pyrite, no fluorescence on quartz
7300-7310	100	Quartz grains, white to clear, vitreous, pearly, well rounded, well sorted, clean, good porosity, no fluorescence
		Trace Siltstone, brown, as above
7310-7320	80	Quartz grains, white to clear, subangular to well rounded
	20	Siltstone, brown, dark brown, grey, massive, moderately sorted, firm, dirty
		Trace limestone, honey brown, pyrite
7320-7330	70	Quartz grains, coarse to very coarse, white to clear, subangular to well rounded, up to 3mm diameter
	20	Siltstone, brown to dark brown, firm
	10	Sandstone, fine to medium grained, poor to moderate sorting, cle to yellow, well cemented (calcite, weak yellow mineral fluoresce
		Trace pyrite
7330-7340	85	Quartz grains, as above
	5	Sandstone, fine to medium grained, generally subangular grains well cemented, moderate sorting
	10	Siltstone, brown to grey
		Trace fluorescence and cut in finer grained sandstone
		Trace pyrite

DEPTH	%	DESCRIPTION
7430-7440	50	Quartz grains, coarse to very coarse, milky, subangular to rou
	30	Siltstone, medium to dark brown, pyritic, firm to subfissile, grading to mudstone
	20	Coal, bleeding gas
		Minor Sandstone, fine grained, white, moderate sorting, rounde
		Trace pyrite, no fluorescence
7440-7450	60	Siltstone, grading to carbonaceous subfissile mudstone, brown very dark brown, hard, pyritic, some light grey
	30	Coal, bleeding gas
	10	Sandstone, light grey to fawn, very fine to fine grained, mode well sorted, looks tight
		Trace loose very coarse quartz grains, trace pyrite
		Trace mineral fluorescence - limestone
7450-7460	80	Siltstone, light grey and light brown to dark brown, pyritic grading to mudstone
	and to 20	Sandstone, grey to cream, very fine to fine, moderate sorting, subrounded
		Trace coal, pyrite
7460-7470	30	Coal, bleeding gas
	50	Siltstone, light grey to medium brown, pyritic, grading to
	20	Sandstone, very fine to fine, light grey to cream, poor to mode sorting
		Trace Sandstone, angular, medium grained, well cemented ($CaCO_3$)
		Trace very coarse quartz grains, as above
		Coals at 7465 and 7450 - gas kicks
		POH 7504. Did not circulate. Journal bit rotating too fast
7470-7480	90	Mudstone, grey green, calcareous, massive, earthy, green gives glauconitic residue, friable
	10	Siltstone, light grey to medium brown, moderate sorted, friable to firm
		Traces coarse quartz grains; coal; sandstone, light grey to cle poorly cemented, calcareous, subangular
7480-7490	50	Mudstone, grey green, massive, calcareous, as above
	40	Siltstone, light grey to medium brown, moderately sorted, firm hard, clean to dirty on colour
	10	Sandstone, clear to light brown, subangular, glauconitic, angula grains, calcareous cement, poorly to moderately sorted
		Traces Quartz grains, well rounded 0.1mm-0.3mm
7490-7500	60	Siltstone, light grey to brown, moderately to poorly sorted glauconitic, pyritic overgrowths, subangular, massive to subfiss
	30	Mudstone, grey/green, massive, soft to firm, massive, calcareous glauconitic
	10	Coal, black, lustreous, good fracture.
		Traces, quartz grains, frosted 0.1mm-2mm, pyrite, sandstone, cle to light grey, poorly sorted, subangular, calcareous cement
7500-7510	70	Siltstone, light grey to brown, slightly dirty, moderately sorted, massive, well rounded
	30	Mudstone, green to light grey, massive, firm to soft, calcareous glauconitic
		Traces quartz grains, sandstone, as above, coal
7510-7520	60	Siltstone, light grey to dark brown, as above
	40	Mudstone, light grey, soft to firm, massive, earthy, calcareous
		Traces pyrite, quartz grains, Sandstone, as above

FLOUNDER-5

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
7520-7530	60	Siltstone, grading to fine sandstone, grey - dark brown.
		as above
	30	Sandstone, white-grey, friable, moderately sorted, subangular
	10	Mudstone, light grey-green, firm to soft, massive, calcareous
		Traces pyrite
		Quartz grains 0.1mm- 3mm.
7530-7540	60	Siltstone, brown, soft, laminated.
	30	Coal, black, semi vitreous to vitreous, conchoidal fracture, bleeding gas.
	10	Siltstone, very dark brown, soft, laminated, carbonaceous.
		Trace sandstone, light grey as above, weak yellow fluorescence no cut.
7540-7550	60	Quartz grains, coarse white/clear , sorted, well rounded-sub-angular, moderate sorting, 0.1m - 3mm.
	20	Siltstone, grey-dark brown, lighter colour, clearer and harder than the dark dirty fraction.
	10	Mudstone, light grey, calcareous, massive.
	10	Coal, black semi vitreous, good conchoidal fracture.
		Trace pyrite.
7550-7560	80	Quartz grains, white/clear, as above.
	20	Siltstone, dark brown - light grey, glauconitic, well rounded, pyritic, moderate sorting.
		Trace pyrite
		Sandstone, clean-light grey as above.
		Coal, black as above
		Mudstone, grey, calcareous as above
		Poor white fluorescence on coals, no cut.
7560-7570	50	Quartz grains, white/clear, moderate sorting, well rounded-subangular, 0.1mm - 1mm,
	30	Siltstone, light grey-dark brown, pyritic, as above
	20	Sandstone, slight grey-white, siliceous cement, moderate sorting, well rounded.
		Trace coal, black
		Pyrite.
		Mudstone, grey, calcareous.
7570-7580	100	Quartz grains, white/clear, well rounded-subrounded, well sorted, 0.1 m - 2mm,
		Traces pyrite,
		Siltstone, grey-dark brown, as above
		Sandstone, clear-grey, as above
7580-7590	100	Quartz grains, white/clear, as above, 0.1mm - 3mm, same orange/smoky pyrite overgrowths, well sorted.
		Trace pyrite
		Siltstone, dark grey as above
		Coal, black
7590-7600	75	Quartz grains, white/clear, subangular - well rounded, 0.1 m - 3mm. Pyritic, orange grains, moderately-well sorted,
	20	Siltstone, brown-dark brown, as above.
	5	Sandstone, clear/grey, as above
		Trace pyrite
		Coal, black

FLOUNDER-5

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
7600-7610	60	Siltstone, grey/brown, massive, poorly sorted, well rounded, occasionally dirty dark brown sub-fissile.
	30	Sandstone, clear/grey, well rounded, silty, glauconitic, poorly sorted, firm, mod. cemented.
	10	Sandy Siltstone, dark brown, dirty, massive, poorly sorted.
		Traces Coal, black
		Quartz grains, white/clear 0.1m - 0.8mm.
		Pyrite.
7610-7620	30	Siltstone, grading to mudstone, medium brown, pyritic.
	40	Siltstone, coarse silt, grey, hard, poor sorting,
	25	Sandstone, very fine to fine grained, light grey, well cemented - dolomite cement?
	5	Coal
		Trace, Loose very coarse quartz grains, trace pyrite
7620-7630	70	Siltstone, light grey, coarse silt to very fine sand, poorly sorted, soft to firm.
	10	Siltstone, medium brown -dark brown, firm, pyritic.
	10	Loose quartz grains, very coarse, subangular to well rounded, well sorted, clear-milky.
	10	Sandstone, fine grained, well sorted, subrounded, light grey, fairly friable.
		Trace coal, pyrite. No fluorescence.
7630-7640	40	Siltstone, medium to dark brown
	35	Siltstone, coarse, light grey, firm, grading to
	20	Sandstone, very fine to fine, moderately well sorted but dirty, sub-rounded, grey.
	5	Loose quartz grains, as above
7640-7650	30	Siltstone, medium-dark brown
	30	Siltstone, coarse, grey, poorly sorted grading to
	40	Sandstone, very fine to medium grained, generally well sorted, subrounded, grey, friable.
		Trace loose, very coarse, quartz grains.
		Trace, very poorly sorted sandstone with some glauconite grains, medium grained, subrounded,
7650-7660	60	Siltstone, brown to light grey, fine to coarse silt, grading to
	40	Sandstone, light grey, very fine to medium grained, well sorted subrounded, friable.
7660-7670	50	Sandstone, very fine to medium, light grey to light brown, moderately sorted, subrounded grading to
	50	Siltstone, light grey-light brown, coarse silt, poor sorting, minor coal, trace calcite fluorescence
7670-7680	60	Siltstone, light grey to light brown to mudstone
	20	Sandstone, light grey, fine grained, well sorted, subrounded.
	20	Coal
7680-7690	95	Coal, pyritic, bleeding gas.
	5	Sandstone, fine grained, light grey-brown, well sorted, subrounded.
		Trace siltstone, brown.
7690-7700	95	Sand grains, unconsolidated quartz up to 3mm diam. subangular to well rounded, well sorted, clear.
		Minor sandstone and siltstone as above.
		Trace pyrite

FLOUNDER-5

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
7700-7710	100	Sand, unconsolidated, as above Trace siltstone and sandstone as above
7710-7720	100	Sand, unconsolidated, as above Trace sandstone and siltstone, as above
7720-7730	100	Unconsolidated Sand, very coarse - 3 mm, subangular to rounded, well sorted. Trace grey - light brown siltstone, pyritic, firm. Trace Sandstone, fine grained, well sorted, well rounded grey, friable, dull gold fluorescence, no cut, no reaction to acid on one large grain.
7730-7740	70	Sand, unconsolidated, very coarse, milky,well rounded, well sorted.
	30	Coal, black, dull to semi vitreous
		Trace, siltstone brown, sandstone very fine, light grey, calcareous. Trace calcite fluorescence in very fine sandstone, bright cut in coal.
7740-7750	60	Sand, milky, very coarse to coarse, loose subrounded to rounded.
	30	Siltstone, brown, carbonaceous, interlaminated.
	10	Sandstone, light grey, very fine.
		Siltstone,bleeding gas,no fluorescence, fairly good cut in some coal and siltstone.
7750-7760	90	Unconsolidated quartz sand as above
	5	Sandstone, very fine to fine, moderate sorting, friable, grey.
	5	Siltstone, dark brown, no fluorescence but weak gold cut.
7760-7770	90	Quartz sand, unconsolidated - as above
	5	Sandstone, as above
	5	Siltstone, as above, no fluorescence, weak cut.
7770-7780	85	Quartz sand, as above
	10	Siltstone, as above, cavings? no fluorescence, weak cut.
	5	Sandstone, as above,cavings?
7780-7790	80	Siltstone, medium to dark grey brown, pyritic.
	10	Sandstone, fine grained, light brown, moderate sorted, subangul well rounded, tight - friable.
	10	Unconsolidated quartz grains, very coarse, well sorted, well rounded-subangular, clear.
		Trace coal
7790-7800	70	Coal (at 7795')
	30	Siltstone, as above, coarse silt, no fluorescence, weak cut.
		Trace sandstone, as above
		Trace pyrite
7800-7810	70	Siltstone, coarse, light grey to medium brown, pyritic, firm.
	20	Sandstone, light grey to white, very fine to medium, well sorte subrounded in thin layers, interbedded with siltstone.
	10	Quartz grains, unconsolidated, as above.
		Trace coal - good cut.

FLOUNDER-5

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
7810-7820	40	Siltstone, as above
	30	Sandstone, as above
	30	Quartz grains, unconsolidated, as above.
7820-7830	80	Siltstone, light grey-dark brown, massive, moderately sorted, well rounded, glauconitic, darker the colour, the dirtier the sand.
	20	Sandstone, light grey to white, well sorted, subangular to well rounded, friable.
		Traces: mudstone, light grey, massive, calcareous, Quartz grains, white to clear, 0.1mm - 2mm. ,Pyrite.
7830-7840	100	Coal, black sub-vitreous, good conchoidal fracture, traces of pyrite, bleeding gas profusely.
		Trace sandstone, light grey as above
		Weak fluorescence, yellow. Slow yellow/white cut.
7840-7850	60	Siltstone, light grey/dark brown, as above
	30	Coal, black, sub-vitreous, bleeding gas.
	10	Sandstone, light grey-white, as above
		Traces quartz grains, 0.1 - 2 mm, clear/white,well rounded, sub angular. Pyrite.
7850-7860	60	Siltstone, light grey-dark brown, as above
	20	Sandstone, light grey /white, friable, well sorted, well rounded, weakly cemented.
	20	Pyritic siltstone, yellowish/brown, dense hard, well sorted, subangular.
		Trace: Mudstone, grey/green, soft, calcareous; Pyrite; Quartz grains, as above.
7860-7870	100	Coal, black, dull-sub-vitreous, conchoidal fracture, bleeding gas.
		Trace, siltstone, light grey/dark brown as above.
		No show.
7870-7880	70	Siltstone, light grey/dark brown, as above
	15	Coal, black, bleeding gas, Dull/sub-vitreous.
	15	Quartz grains, white/clear, subangular, clean, moderate sorting.
		Traces of: pyrite in coal and free nodules;
		Sandstone, light grey, as above.
7880-7890	90	Quartz grains, white/clear, sub rounded -very well rounded, well sorted, 0.1mm - 1mm.
	10	Siltstone, brown - dark brown, moderately sorted, well rounded, massive, friable.
		Traces, Siltstone, hard, pyritic, brown.
		Coal, as above
		No show.
7890-7900	90	Quartz grains, white/clear, moderately/well sorted, well rounded, 0.1mm - 2mm, clear.
	10	Siltstone, brown/grey, as above.
		Traces, mudstone, grey, calcareous, massive.
7900-7910	90	Quartz grains, white/clear. 0.1mm - 3mm, as above.
	10	Siltstone, brown, hard, well sorted, pyritic, massive.
		Traces, coal, black.
		Mudstone, as above

FLOUNDER-5

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
7910-7920	70	Quartz grains, white/clear, subangular-well rounded, moderately sorted, 0.1mm - 4mm.
	15	Coal, black, sub vitreous, bleeding gas.
	15	Siltstone, light grey/brown, pyritic, hard, massive weak yellow fluorescence, slow yellow cut.
7920-7930	100	Quartz grains, clear/white, well rounded, well sorted, 0.1mm - 2mm.
		Trace Coal, black as above, seeping gas.
		Siltstone, brown, as above
		No fluorescence, slow yellow cut.
7930-7940	70	Quartz grains, clear/white, occasionally smoky, as above
	30	Coal, black vitreous/sub-vitreous, seeping gas, pyritic
		Traces, Siltstone, brown as above, no show
7940-7950	100	Quartz grains, white/clear, some smoky, well rounded, well sorted.
		Trace of:Coal,
		Siltstone, brown as above.
		Pyrite.
		No fluorescence, slow yellow cut on quartz.
7950-7960	100	Quartz white/clear, orange, iron staining as on previous two sections, very well rounded/well rounded, well sorted.
		Traces of Coal, black
		Siltstone.
		No show
7960-7970	100	Quartz grains, white/clear iron stained, well rounded, well sorted, 0.1mm - 2mm.
		No show.
		Traces:Coal, black
		Pyritic brown shale
		Mudstone, grey, calcareous
7970-7980	100	Quartz grains, white/clear, iron stained, as above 0.1mm - 2mm.
		Traces Pyritic brown/grey siltstone.
		Coal, black
		Mudstone, grey/green, calcareous
		No show.
7980-7990	100	Quartz grains, white/clear, iron stained, subangular/well rounded well sorted, 0.1mm - 1.5mm.
		Traces:Coal, Siltstone, brown
7990-8000	90	Sandy quartz, milky to iron stained, medium to very coarse, moderately sorted, subangular to well rounded, mainly rounded
	10	Sandstone, coarse, angular to subrounded grains cemented by calcite.
		bright yellow mineral? fluorescence in sand grains, slightly calcareous.
		Trace Coal, fine sandstone, light grey
8000-8010	60	Quartz grains, white/clear, iron staining, 0.1mm - 3mm. moderate sorting, subangular/well rounded.
	40	Sandstone, clear, iron stained, calcareous cement, well cemented. Poorly sorted.
		Angular grains 0.05mm to 1mm. Pyritic intergrowths.
		Traces:Coal.
		Pyrite
		Siltstone, brown as above. Strong yellow fluorescence, yellow/white cut.

FLOUNDER-5

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
8010-8020	50	Quartz grains, clear/white, iron stained 0.1mm - 1mm. as above
	50	Sandstones, clear/orange/grey, calcareous cement, subangular - subrounded, tight. Traces: Siltstone, brown as above. Pyrite Coal, black, Strong yellow fluorescence, faint yellow white cut.
8020-8030	70	Sandstone, clear/orange/grey, subangular/subrounded, tight, strongly cemented, moderate sorting, iron staining, calcareous cement.
	30	Quartz grains, white/clear, iron staining as above Traces: Siltstone, grey/brown Coal Strong yellow fluorescence, moderate yellow/white cut in cemented sandstone.
8030-8040	85	Sandstone, clear-buff, fine to coarse grained, poorly sorted, subangular to angular, well cemented with dolomite strong mineral fluorescence, no cut.
	10	Quartz grains, unconsolidated, very coarse, subangular to well rounded, milky, moderate sorting.
	5	Siltstone, brown to grey, pyritic
8040-8050		1st SAMPLE AFTER POH AND CHANGING BITS. THIS SAMPLE NOT CIRCULATED UP
		Cavings
	90	Siltstone, 50% coarse silt, medium brown, pyritic. 40% light to medium grey grading to mudstone.
	5	Sandstone, white to buff, fine to coarse grained, poorly sorted, subangular to angular, mineral fluorescence, well cemented with dolomite, glauconitic grains.
	5	Loose quartz grains, very coarse, milky subangular to well rounded, well sorted. Trace pyrite.
8050-8060	80	Sandstone, white to buff, fine to coarse, poorly sorted, subangular to rounded, dolomitic cement, rare rock fragments
	10	Loose quartz grains, as above. Cavings?
	10	Siltstone, as above Trace pyrite.
8060-8070	100	Sandstone, as above, dull yellow mineral fluorescence. Trace loose quartz grains, as above) Trace siltstone, as above) Cavings.
8070-8080	100	Sandstone, fine to coarse, predominantly fine to medium grained, moderate sorting, white to buff, subangular to rounded, slight dolomitic cement, rare rock fragments; minor cavings; siltstone and grey calcareous mudstone. No mineral fluorescence.
8080-8090	100	Sandstone, predominantly fine grained, well sorted, rounded, white to buff, friable to moderately hard. Sandstone, minor, medium to coarse grained, subangular to angular hard - dolomitic cement. Cavings, minor siltstone and mudstone as above Trace pyrite.

FLOUNDER-5

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
8090-8100	90	Sandstone, fine grained, as above. Minor coarser angular sandstone, as above - hard but little dolomitic cement.
	10	Siltstone, medium brown, coarse silt, pyritic, Cavings? minor grey mudstone cavings. 15% porosity some secondary crystal growth.
8100-8110	100	Sandstone, white to buff, fine grained, well rounded, well sorted, occasional rock fragments, dolomitic cement, occasional coarse grained softer and more friable. Traces of: coal Siltstone, brown as above. Pyrite
8110-8120	100	Sandstone, white to buff, as above, poor yellow fluorescence, moderate yellow cut, tight, clay choked.
8120-8130	80	Sandstone, white to buff, as above
	20	Siltstone, grey-dark brown, massive, moderate sorting, well round brown chips dirty, pyritic, dense, hard. Traces: Quartz grains. Mudstone, grey calcareous. Shale, borwn, fissile - sub fissile, carbonaceous material, firm - hard.
8130-8140	80	Sandstone, coarse siltstone, clear to grey, well sorted, well rounded, dirtier than previously, dolomitic cement, hard to firm, micaceous.
	10	Siltstone, grey - dark brown, as above
	10	Shale, brown, good fissility, dirty, firm Traces: Coal, black Mudstone, grey, calcareous Quartz grains. Pyrite, large 1 m nodules, argillaceous, no fluorescence, moderate yellow cut.
8140-8150	70	Sandstone, light grey, as above, clear fraction, well rounded, dolomitic cement, moderate sorting, traces of mica
	20	Siltstone, brown-grey as above
	10	Mudstone, grey/green, calcareous, massive, earthy, soft to firm, fossil wash (cavings?). Trace of: Quartz grains white/clear 0.1mm - 2mm. Coal, black Slight yellow fluorescence, moderate yellow/white cut.
8150-8160	70	Sandstone, coarse Siltstone, light grey/clear as above. Some very hard, pyritic, argillaceous, dark micaceous. Fine sand size, chips, very hard.
	20	Mudstone, grey, calcareous (as above, cavings)
	10	Siltstone, brown-grey, as above, well rounded, glauconite. Coal Quartz grains.
8160-8170	80	Sandstone - coarse siltstone, light grey/clear, poor - moderate sorting, well rounded, firm - hard, micaceous, pyritic,
	10	Siltstone, grey, dense, massive, pyritic, very hard,
	10	Siltstone, dark brown as above Traces; Coal Quartz grains, well rounded, green glauconite, Mudstone, grey calcareous, no fluorescence, slow yellow cut.

FLOUNDER-5

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
8170-8180	60	Siltstone - fine sandstone, grey/yellow grey, dense, massive, hard - firm, carbonaceous, some cleaner, pyritic, as in samples from 8120', moderate to poor sorting.
	30	Siltstone, dark brown, massive, well rounded, dirty, glauconitic, moderate sorting.
	10	Sandstone, clean, well rounded, moderate sorting, iron staining, glauconitic. Traces; quartz grains. Coal Fluorescence, slow yellow cut.
8180-8190	80	Siltstone-fine sandstone, dark grey/yellow grey, carbonaceous well rounded, moderate sorting, micaceous, massive, firm-hard, pyritic.
	20	Siltstone, dark brown, as above. Traces: Sandstone, clear. Quartz grains Coal
8190-8200	90	Siltstone/fine sandstone, dark grey/yellow grey, as above
	10	Siltstone, dark brown, massive, well rounded, dirty, glauconitic, well rounded, green particles, calcified root replacement. Trace of: Quartz grains. Coal
8200-8210	60	Siltstone - very fine sandstone, grey, firm-hard, moderately sorted, pyritic, carbonaceous, micaceous, massive, well rounded larger grains.
	40	Siltstone, dark brown, glauconitic, massive, soft-firm, dirty, well rounded glauconite, poorly sorted. Trace: Quartz grains 0.1 mm - 0.5 mm Coal, black No fluorescence, slow yellow cut
215		HW C1 C2 C3 35 1900 700 Tr.
	90	Siltstone, grey, carbonaceous, mica muscovite, biotite, pyrite.
	10	Coal, black, dull soft No fluorescence, quick bright yellow cut from coal.
8210-8220	100	Siltstone;—very fine sand, light grey to buff, well sorted, subrounded, friable, carbonaceous, micaceous, clay chips, poor to moderate porosity. Trace siltstone, medium brown, soft Trace Coal
8220-8230	90	Siltstone- very fine sand, light grey to buff, well sorted, subrounded, firm to friable, carbonaceous, micaceous, pyritic, clay choked.
	10	Siltstone, grading to coal, dark red brown to very dark brown, carbonaceous to very carbonaceous, black wood fragments in siltst some glauconitic grains. Trace pyrite.

FLOUNDER-5
SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
8230-8240	90	Siltstone - very fine sandstone, subrounded, well sorted, clay choked, friable. Trace chlorite grains, grey to buff, carbonaceous, pyritic,
	5	Coal
	5	Siltstone, dark brown, pyritic, firm. Trace brick red cherty type material. One loose coarse quartz grain had this red coating. Trace pyrite.
8240-8250	90	Siltstone to very fine sandstone, as above
	10	Siltstone, dark brown, pyritic, as above Trace pyrite.
8250-8260	90	Siltstone to very fine sandstone, subrounded, moderately sorted, clay choked, friable, chlorite/glauconite? grains common carbonaceous pyrite, grey to medium brown
	10	Siltstone, medium to dark brown, pyritic. Trace pyrite.
8260-8270	100	Siltstone, -very fine sandstone, medium grey to brown, poor to moderate sorting, subrounded, clay choked, friable, chlorite and round glauconitic grains, carbonaceous, pyritic. Minor dark brown siltstone, small gastro pod replaced by pyrite included in this siltstone. Trace pyrite.
8270-8280	100	Siltstone - very fine sandstone, grey to medium brown as above. Trace pyrite. Trip: change bits from J33 to XV. Did not circulate.
8280-8290	90	Siltstone to fine sandstone, dark brown/brown, massive, friable, micaceous, dirty, moderately sorted.
	10	Siltstone to fine sandstone, well rounded, pyritic, carbonaceous grey/brown, light grey, moderate sorting. Traces; coal black, sub vitreous; Quartz grains, white/clear well rounded; Pyrite nodules, hard, argillaceous.
8290-8300	100	Siltstone -very fine sandstone, grey/dark brown, massive, friable glauconitic, moderately well rounded, poorly sorted, pyritic. Traces; Pyrite, fine crystals with argillaceous material, Calcite vein, pyrite well formed distinct crystal intergrowths, Quartz grains, Coal black. No fluorescence, moderate white cut.
8300-8310	90	Siltstone to fine sandstone, grey/dark brown, as above The grey rock has ≈30% glauconite, well rounded, 0.1mm- 0.3mm grains, moderately hard.
	10	Siltstone, brown-dark brown, massive, dirty, little pyrite, soft to firm, finer than above sandstone, moderately sorted. No fluorescence, moderate white cut. Traces: coal, quartz grains, pyrite. Calcite vein filling.

FLOUNDER-5

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
8310-8320	100	Siltstone to fine sandstone, light grey, massive, well rounded, poorly sorted, up to 50% glauconite well rounded grains, deep emerald green, average 25% glauconite, pyrite, fine graine some smoky orange quartz grains, firm to hard, fine grained. No show. Traces: Quartz grains Coal, black.
8320-8330	100	Siltstone to fine sandstone, grey to dark brown, glauconite as above. Traces: quartz grains. Coal, black No fluorescence, weak yellow slow cut.
8330-8340	80 20	Siltstone to fine sandstone, grey, glauconitic as above Fine Sandstone, clear to light grey, massive, subangular to well rounded, moderate sorting, carbonaceous, otherwise clear, pyrite bands, running though chips. Trace: quartz grains. Coal
8340-8350	70 30	Fine sandstone, light grey, massive, subangular to well rounded, carbonaceous, pyritic, clean. moderate sorting. Fine Sandstone to coarse Siltstone, grey, massive, poorly sorted, glauconitic, well rounded, becoming coarser, smoky quartz traces. Trace: quartz grains. Coal No fluorescence, moderate white/yellow cut.
8350-8360	70 30	Very fine sandstone to coarse siltstone, light grey, carbonaceous as above, pyritic. Fine sandstone to coarse siltstone, grey, highly glauconitic as above. Strong trace: of Argillaceous pyrite nodules Quartz grains Coal
8360-8370	90 10	Fine sandstone to coarse siltstone, light grey, carbonaceous, pyritic, massive, subangular - well rounded, clear, moderate sorting, occasional pale glauconite. Fine sandstone to coarse siltstone, grey, highly glauconitic, as above. Strong traces: argillaceous pyrite nodules Quartz grains Coal
8370-8380	90 10	Fine Sandstone to coarse siltstone, light grey, carbonaceous, as above. Fine sandstone to coarse siltstone, highly glauconitic, as above. Drilling Break 8389 '.
8380-8390	50 50	Quartz grains, clear/white, subangular to subrounded, moderate sorting, 0.1mm - 1mm clean. Fine Sandstone to coarse siltstone, light grey to dark, poor to moderate sorting, subrounded, glauconitic. Traces Coal, black, pyritic No fluorescence, slow white cut.
8390-8400	80 20	Quartz grains, clear to white, subangular to subrounded, clean, 0.1mm- 4mm, coarse, moderate to well sorted. Fine sandstone to coarse siltstone, light to dark grey, as above Trace coal. No fluorescence, slow white cut.

FLOUNDER-5

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
8400-8410	90	Quartz grains, clear to white, very clean, as above
	10	Fine sandstone to siltstone, light grey, as above (cavings)
		Trace: Pyrite.
		Coal
8410-8420	90	Quartz grains, clear to white, very clean, as above
	10	Fine sandstone to siltstone, light grey as above
		Trace of Coal, black, bleeding gas.
8420-8430	60	Quartz grains, clear to white, subangular to well rounded, 0.1mm- 5mm, poor to moderate sorting.
	35	Siltstone to fine sandstone, grey to brown, massive, pyritic, carbonaceous, bleeding gas. fair to moderate sorting, glauconitic - coarser and poor sorting.
	5	Coal, black, sub-vitreous bleeding gas.
		The carbonaceous bands of the siltstone are bleeding gas.
		Trace Pyrite.
8430-8440	70	Quartz grains, white to clear, 0.1mm- 3mm as above
	30	Siltstone; very fine sandstone, brown to grey, moderate to well sorted, massive, carbonaceous, glauconitic, occasionally pyritic, friable.
		Trace shale, dark brown fissile, friable.
		Pyrite nodules and intergrowths.
8440-8450	90	Quartz grains, white to clear, moderate to well sorted, sub-rounded to well rounded, pyrite, growths good definite crystals acting as cement, clean.
	10	Siltstone to very fine sandstone, brown grey as above
		Traces Coal, black, subvitreous, good conchoidal fracture.
8450-8460		First sample up after halt in drilling.
		Mud pumps repaired
		Predominantly sandstone, white to buff, medium to coarse, subangular to subrounded, tight, hard, clay choked, and cemente with carbonate and pyrite, rare chlorite, minor loose quartz grains very coarse plus, subangular to well rounded, well sorte clear to milky to frosted.
		Trace Coal - 10 units gas
		Trace siltstone to very fine sandstone, light grey brown, well sorted, subrounded, clay choked.
		Siltstone, dark brown, pyrite, sandy - cavings?
8460-8470		Unconsolidated quartz grains. Mostly very angular platy grains with frosted edges - fractured large grains (diam. 4 mm)
	90	Sandstone, white to buff, medium to very coarse, subangular to subrounded, hard and tight to loosely cemented by clay and carbonate.
		Grains described are part of sandstone loosely cemented and fractured
		Trace Coal - 55 units at 8463'
	10	Siltstone, dark brown, pyrite, carbonaceous, sandy in parts, soft to firm.

FLOUNDER-5

SAMPLE DESCRIPTIONS

DEPTH	%	DESCRIPTION
8470-8475	70	Sandstone, as above
	20	Siltstone, as above
	10	Very fine sandstone to siltstone, buff - medium grey, subrounde
	mod	moderate sorting, clay cement, friable, often considerable medi grained glauconite grains and some brown siltstone grains inclu Trace Coal, pyrite.
		Pulled out Hole.
8475-8480	80	Sandstone, medium to very coarse (4 mm) white - buff, grains, poor to moderate sorting, subangular to well rounded. Finer parts cemented well by carbonate and clay and minor pyrite. Coarser grains held more loosely. Minor fluorescence.
	20	Siltstone, dark brown, carbonaceous, pyritic.
8480-8490	90	Sandstone, as above but more friable, coarse (unshattered) grains becoming less cemented.
	10	Siltstone, as above, coarse siltstone Trace pyrite, siltstone, brown with very common glauconite grain (cavings?)
8490-8500	90	Sandstone, as above - predominantly loose grains, many well rou
	10	Siltstone, brown - caving?
8500-8510	100	Unconsolidated quartz, well sorted, well rounded, coarse to very coarse, strong trace sandstone, medium grained, subangular to subrounded in parts, iron stained, cemented with pyrite, carbonate and clay - hard stringers. Minor siltstone, brown as above - cavings?
8510-8520	100	Sandstone, clear/mid grey, subangular to subrounded, pyrite veins of cement, carbonate cement, grains fracturing across crystals, medium grained - coarse. ≈ 30% Quartz grains, well rounded, frosted, medium grained, sand stringers.
8520-8530	100	Sandstone, clear/mid grey, medium grained as above 20% Quartz grains, well rounded, as above. Traces: well rounded, glauconite; Coal, black
8530-8540	100	Sandstone, white/clear, very clean, as above. ≈ 40% well rounded quartz grains, many frosted 0.3mm- 1mm, medium sorting, fractured grains mainly clean, predominate.
8540-8550		Sample quality poor.
	100	Quartz loose grains, coarse, angular. 95% rounded white grading into as above. 5% white, angular, cemented, coarse sandstone, above
		TD 8553' at 22.30pm on 14/2/75

GEOLOGISTS: R. Bellis, S. Benedek, W. Fischer,
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APPENDIX 2

SIDEWALL CORE DESCRIPTIONS

FLOUNDER-5 CST RUN 1

SWC -1	2881'	
	Siltstone -	light green-grey, very calcareous, firm, well cemented, fossiliferous - appear to be forams, some carbonaceous matter, dark very fine grained inclusions.
SWC -2	2787'	
	Siltstone -	light green-grey, very calcareous, almost total rock dissolves in HCI, fossiliferous including forams, some carbonaceous matter, dark very fine grained inclusions; firm.
SWC -3	2722'	
	Siltstone -	light greenish grey, very calcareous, fossiliferous including forams, very fine grained carbonaceous matter and other dark inclusions, trace of muscovite flakes - very fine; firm.
SWC -4	2651'	
	Siltstone -	green-grey, well cemented, very calcareous, trace glauconite - fine grained; firm; trace very fine grained muscovite flakes, trace fine carbonaceous matter, fossiliferous including forams.
SWC- 5	2581'	
	Siltstone -	greenish grey, well cemented, firm, very calcareous, almost totally carbonate, fossiliferous, trace very fine grained glauconite, very fine flakes of muscovite dark inclusions - probably fossils and minor carbonaceous matter.
SWC -6	2507'	
	Siltstone -	greenish grey, well cemented, firm, fossiliferous, trace amount of very fine muscovite flakes, trace amount of very fine pyrite associated with carbonaceous matter, dark inclusions - carbonaceous matter and fossils; very calcareous.
SWC -7	2423'	
	Siltstone -	greenish grey, well cemented, firm, very calcareous, almost totally carbonate, fossiliferous, trace amount of very fine pyrite, dark inclusions - carbonaceous matter & fossils.
SWC-8	2351'	
	Siltstone -	greenish grey, very calcareous, well cemented, firm, fossiliferous; trace of very fine flakes of muscovite, trace of very fine pyrite; dark inclusions - mainly fossils.
SWC-9	2273'	
	Siltstone	greenish grey, very calcareous, very well cemented, firm, fossiliferous, dark inclusions - mainly well rounded fossils and some streaky carbonaceous matter.
SWC-10	2200'	
	Siltstone	green grey, very calcareous, firm, very well cemented, fossiliferous, trace of very fine flakes of muscovite, very fine streaks of carbonaceous matter.
SWC-11	2114'	
	Siltstone	green grey, very calcareous, firm, fossiliferous, trace of very fine pyrite; trace of very fine muscovite dark inclusions - well rounded fossils and some streaky carbonaceous matter.

Depths shown above have been corrected by an increase of 2·5' per 1000' when compared to the original logs. This was done to correct a measurement error in Schlumberger's cable.

SWC-12	2023' Siltstone	green grey, very calcareous, firm, fossiliferous, trace to very fine muscovite, dark inclusions - well rounded fossils.
SWC-13	1947' Siltstone	green grey, very calcareous, firm, well cemented, fossiliferous, trace of dark inclusions - well rounded fossils, gas odour.
SWC-14	1860' Siltstone	green grey, very calcareous, firm, well cemented, fossiliferous, trace of very fine muscovite, dark inclusions - mainly fossils and some carbonaceous matter.
SWC-15	1797' Siltstone	deep green to green grey, very calcareous, firm well cemented, fossiliferous, dark inclusions - fossils and carbonaceous matter, strong gas odour.
SWC-16	1724' Siltstone	green - grey, very calcareous, firm, well cemented, fossiliferous, trace of very fine flakes of muscovite, trace of very fine pyrite, dark inclusions well rounded fossils, strong gas odour.
SWC-17	1654' Calcarenite	light olive grey, very calcareous, soft to firm, very fine to gine grained, subangular to angular, moderate sorting, grains well cemented, fossiliferous, almost totally carbonate dark inclusions, mainly fossils.
SWC-18	1585' Calcarenite	green grey, very calcareous, firm, fine grained, angular grains, poor to fair sorting, well cemented grains, fossiliferous, almost totally carbonate, dark inclusions - fossils.
SWC-19	1508' Calcarenite	light olive grey, very calcareous, soft to firm, very fine to fine grained, angular, poor to fair sorting well cemented grains, fossiliferous, almost totally carbonate, trace very fine muscovite flakes, dark inclusions - fossils.
SWC-20	1410' Calcarenite	light olive grey, very calcareous, soft to firm, very fine to fine grained, subangular to angular, moderate sorting, well cemented grains, slightly fossiliferous, almost totally carbonate, trace glauconite, trace of carbonaceous matter.
SWC-21	1324' Calcarenite	light olive grey, very calcareous, firm, very fine to fine grained, subangular to angular grains, poor to fair sorting, large amount of cement, almost totally carbonate, trace glauconite.
SWC-22	1266' Calcarenite	green-grey, moderately calcareous, firm, very fine - fine grained, subangular grains, moderate sorting, fossiliferous, trace muscovite, dark inclusions - dark well rounded fossils.

Depths shown above have been corrected by an increase of 2·5' per 1000' when compared to the original logs. This was done to correct a measurement error in Schlumberger's cable.

3..

SWC-23	1225' Calcarenite	light olive grey, moderately calcareous, soft to firm, very fine to fine grained, subangular grains, moderate sorting, large amount of soft carbonate cement, fossiliferous, dark inclusions - fossils and carbonaceous matter.
SWC-24	1171' Calcarenite	light olive grey, moderately calcareous, firm very-fi grained, subangular to subrounded grains, moderate sorting, fossiliferous, trace pyrite, dark inclusions fossils and carbonaceous matter.
SWC-25	1104'	No recovery.
SWC-26	1061' Calcarenite	green grey, very calcareous, soft, very fine to fine grained, subangular grains, moderate sorting, fossiliferous, trace pyrite, dark inclusions - fossils and carbonaceous matter.
SWC-27	1003' Calcarenite	light olive grey, very calcareous, soft, very fine to fine grained, subangular to subrounded grains, poor to moderate sorting, large percentage of carbonate cement, dark inclusions - fossils, some carbonaceous matter.
SWC-28	889' Calcarenite	light olive grey, very calcareous, fine to medium grained, subangular grains, poor sorting, large percentage of carbonate cement, dark inclusions - fossils, some carbonaceous matter.
SWC-29	825' Calcarenite /	Skeletal limestone - green grey, very calcareous, very soft, fine to very coarse grained, subrounded to angular grains, very poor sorting, fossiliferous - shell fragments up to 8mm, large percentage of carbonate cement, trace pyrite, dark inclusions - fossils.
SWC-30	748' Calcarenite/Cement -	olive grey, moderately calcareous, firm to hard, fine to very coarse, subangular grains, poor sorting, fossiliferous, trace pyrite, moderate percentage of cement.

RUN 2

SWC-31	8464'	No Recovery
SWC-32	8461'	No Recovery
SWC-33	8455'	Siltstone, grey-white, friable, very sandy, poorly sorted, clay choked, pyritic, carbonaceous, rare chlorite grains, moderately calcareous, spotty faint yellow fluorescence over about 20% of the sample, slow faint white cut.
SWC-34	8428'	Sandstone, grey-white, unconsolidated, medium coarse grained, well sorted, subangular to subrounded clean, slightly calcareous. No fluorescence or cut.
SWC-35	8414'	Sandstone, grey, unconsolidated, fine to medium grained, moderately sorted, subangular to well rounded, common pyrite (disseminated) and rare chlorite fair visible porosity. No fluorescence or cut.

Depths shown above have been corrected by an increase of 2'5' per 1000' when compared to the original logs. This was done to correct a measurement error in Schlumberger's cable.

Chromatograph C_1. —

SWC-36	8405'	Sandstone, white - grey, unconsolidated, fine to medium grained, moderate to well sorted, subangular to well rounded, clean, good visible porosity, pyritic very faint weak yellow fluorescence. No cut. Chromatograph C_1 200 ppm C_2 -.
SWC-37	8394'	Sandstone, white to grey, friable, fine to coarse poorly sorted, clay choked - up to 25% clay grains subangular to subrounded, carbonaceous, rare chlorite. Mudstone, pyrite, dark grey at top of sample. No fluoresence and cut. Chromatograph C_1 2200 C_2 2500 C_3 1200 ppm.
SWC-38	8244'	Siltstone dark grey - brown, firm friable, very fine, sandstone stringers with common associated chlorite, sand moderately sorted, subrounded. No fluorescence or cut.
SWC-39	7905'	No Recovery
SWC-40	7896'	Sandstone, light grey, unconsolidated, fine to very coarse grained, predominantly fine grained, subangular to well rounded, coarse grained, well rounded, slightly calcareous, moderate sorting, trace pyrite. No fluorescence or cut. Chromatograph C_1 100 ppm C_2 -.
SWC-41	7705'	Sandstone, light grey, unconsolidated, medium pebbly, predominently medium grained, subrounded, to well rounded, moderately calcareous, fair visible porosity, trace pyrite. No fluorescence or cut. Chromatograph C_1 200 ppm C_2 -.
SWC-42	7697'	Sandstone, white to grey, unconsolidated, medium to very coarse, predominently medium grained, well sorted subrounded - well rounded, clean, good visible porosit slightly calcareous, trace mica. No fluorescence or cut Chromatograph C_1 -.
SWC-43	7408'	Sandstone, dark grey - brown, friable - unconsolidated fine to coarse grained, predominently medium, well sorted, subrounded to well rounded, very calcareous, No fluorescence or cut.
SWC-44	7360'	Siltstone, medium - dark grey, firm, sandy, micaceous, pyritic.
SWC-45	7332'	Siltstone to very fine sandstone, medium grey - brown, soft - friable, common muscovite, pyrite. No fluorescence, slow yellow cut.
SWC-46	7285'	Sandstone light grey, friable to unconsolidated, very fine - fine grained with some coarse grains, well sorted, sub angular - subrounded, trace mica, pyrite, minor clay, Chromatograph C_1 -.
SWC-47	7278'	Sandstone, light grey, friable, very fine - fine grained with common very coarse grains, well sorted, subangular - well rounded, slightly calcareous, 5% clay in pores, trace mica, carbonaceous matter. No fluorescence or cut Chromatograph C_1 -.

Depths shown above have been corrected by an increase of 2·5' per 1000' when compared to the original logs. This was done to correct a measurement error in Schlumberger's cable.

5..

SWC-48	7173'	Siltstone, dark brown, firm, sandy, micaceous, carbonaceous, pyritic, trace chlorite. No fluorescence or cut. Moderately calcareous.
SWC-49	7030'	M udstone, light - medium brown, soft, silty, micaceous, trace chlorite, very calcareous. No fluoresence or cut.
SWC-50	6877'	Siltstone, very dark brown, firm, moderately calcareous, micaceous, carbonaceous, pyritic, trace chlorite, sandy in very fine lenses. No fluorescence or cut.
SWC-51	6717'	Siltstone, dark brown firm, very calcareous, micaceous pyritic, carbonaceous trace chlorite, very slightly sandy. No fluorescence or cut.
SWC-52	6566'	Siltstone, very dark brown, firm, muddy, very fine sand lenses, micaceous, carbonaceous, very calcareous, pyritic. No fluorescence or cut.
SWC-53	6416'	Siltstone, dark brown, firm, slightly calcareous, very fine, buff, sand lenses, micaceous, pyritic. No fluorescence or cut.
SWC-54	6328'	Siltstone, brown - black, firm, very glauconitic, large grains make up 30% sample. Very pyritic, slightly sandy, quartz grains iron stained. No fluorescence or cut.
SWC-55	6278'	Siltstone, very dark brown, firm, sand lenses, glauconitic, pyritic, micaceous. No fluorescence or cut.
SWC-56	6268'	Mudstone, light brown, soft, very sandy - fine grained, subrounded to well rounded grains, glauconitic, very calcareous. No fluorescence or cut.
SWC-57	6187'	Calcareous mudstone, medium grey, firm, trace pyrite – needles. No fluorescence or cut.
SWC-58	6117'	Calcareous Mudstone, medium grey, firm, trace mica pyritic. No fluorescence or cut.
SWC-59	6021'	Calcareous Mudstone, grey, soft, trace muscovite and biotite, trace pyritic needles. No fluorescence or cut. Trace quartz grains.
SWC-60	5915'	Calcareous mudstone, grey, firm, trace small calcite crystals. No fluorescence or cut.
SWC-61	5815'	Calcareous mudstone, grey, firm, trace small calcite crystals, pyritic. No fluorescence, or cut.
SWC-62	5714'	Calcareous mudstone, grey, firm, hard, trace small calcite crystals. No fluorescence, or cut.
SWC-63	5614'	Calcareous mudstone, grey, firm, trace small calcite crystals, pyritic. No fluorescence or cut.
SWC-64	5519	Calcareous mudstone, grey, firm, trace small calcite crystals, pyritic, weak mineral fluorescence. No cut.
SWC-65	5414	Calcareous mudstone, grey, firm, trace pyrite, occasional calcite crystals, Mineral fluorescence, no cut.

Depths shown above have been corrected by an increase of 2·5' per 1000' when compared to the original logs. This was done to correct a measurement error in Schlumberger's cable.

6..

SWC-66	5308'	Calcareous mudstone, grey, firm, trace small calcite crystals, pyritic. No fluorescence or cut.
SWC-67	5213'	Calcareous mudstone, grey, firm, trace calcite crystals, pyritic. No fluorescence or cut.
SWC-68	5111'	Calcareous mudstone, grey, firm, trace small calcite crystals, pyritic - mainly in small pockets associated with carbonaceous matter. No fluorescence or cut.
SWC-69	5015'	Calcareous mudstone, grey, firm - hard, trace small calcite crystals, pyritic, no fluorescence or cut.
SWC-70	4917'	Calcareous mudstone, medium-dark grey, soft-firm, trace glauconite, calcite, trace pyrite, mainly in small pockets. No fluorescence or cut.
SWC-71	4812'	Calcareous mudstone, medium grey, firm, trace calcite crystals, pyritic, no fluorescence or cut.
SWC-72	4714'	Calcareous mudstone, grey, firm, trace pyrite, no fluorescence or cut.
SWC-73	4559	Calcareous mudstone, grey, firm, trace pyrite, trace small calcite crystals, no fluorescence or cut.
SWC-74	4456'	Calcareous mudstone, grey, firm, trace small calcite crystals, pyritic and micaceous. No fluorescence or cut.
SWC-75	4347'	Calcareous mudstone, grey, firm - hard, trace mica, No fluorescence or cut.
SWC-76	4231'	Calcareous mudstone, light grey, soft, common well formed calcite crystals. No fluorescence or cut.
SWC-77	4106'	Calcareous mudstone, light grey, firm - hard trace well rounded medium grained quartz, trace mica, No fluorescence or cut.
SWC-78	4004'	Calcareous mudstone, light grey, firm, trace well rounded, medium grained quartz, trace mica, pyritic, no fluorescence or cut.
SWC-79	3908'	Calcareous mudstone, light grey, firm - hard, trace well rounded medium grained quartz, trace mica, No fluorescence or cut.
SWC-80	3810'	Calcareous mudstone, light grey, friable - firm, silty, trace carbonaceous , trace glauconite grains, trace pyrite calcite. No fluorescence or cut.
SWC-81	3709'	Calcareous mudstone, light grey, firm, silty, trace glauconite, calcite. No fluorescence or cut.
SWC-82	3609'	Calcareous mudstone, light grey, firm, trace silt, trace glauconite, calcite, black carbonaceous material. No fluorescence or cut.
SWC-83	3509'	Calcareous mudstone, light grey, firm, trace silt, calcite, pyritic, glauconitic. No fluorescence or cut.
SWC-84	3453'	Calcareous mudstone, light grey, firm - soft, very sandy and silty, common glauconitic, trace calcite. No fluorescence or cut. Trace fossils.
SWC-85	3423'	Calcareous mudstone, light grey, firm - hard, sandy and silty, trace calcite, pyrite, No fluorescence or cut.

SWC-86	3372'	C alcareous mudstone, light grey, firm, silty, trace calcite, pyrite. No fluorescence or cut.
SWC-87	3266'	Calcareous mudstone, light grey, firm, silty, trace glauconite, calcite, pyrite, fossils. No fluorescence or cut.
SWC-88	3158'	Calcareous mudstone, light grey, firm, common black grains, pyrite stained, very silty, trace c alcite, glauconitic. No fluorescence or cut.
SWC-89	3058'	Calcareous mudstone, light grey, firm, silty, pyrite stained grains, trace calcite. No fluorescence or c
SWC-90	2957'	Calcareous mudstone, light grey, firm, silty, pyrite stained grains, layer of calcite, trace glauconite. No fluorescence or cut.

Depths shown above have been corrected by an increase of 2·5' per 1000' when compared to the original logs. This was done to correct a measurement error in Schlumberger's cable.

PAGE 1 OF 4 ATT 30 REC 29 DATE 6.2.75

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

IES RUN NO 1 SWC RUN NO 1

SERVICE CO Schlumberger

GEOLOGIST Bellis/Fischer/Liggins

WELL FLOUNDER-5

NO.	DEPTH	REC	ROCK TYPE	MODIFIERS	CAL	COLOR	INDUR DEG	GRAIN SIZE	SRTG	RND	DISS CLAY	STAIN	FLOURESCENCE % RK	FLOURESCENCE DISTR	FLOURESCENCE INTEN	FLOURESCENCE COLOR	CUT FLUOR. INTEN	CUT FLUOR. COLOR	CUT RESIDUE QUAN	CUT RESIDUE COLOR	SHOW	PROB PROD	REMARKS - GAS
1a	1	2	3	4	5	6	7	8	9	10	11	12		14	15	16	17	18	19	20	21	22	23
1	2881	1.1/8"	Slst		very	gn-gy	frm	slt	W												NS		gas odour
2	2787	1½"	"		"	gn-gy	"	"	"												"		"
3	2722	1¼"	"	foss. Q	"	gnsh-gy	"	"	mod W												"		"
4	2651	1¼"	"		"	gn-gy	"	"	W												"		"
5	2581	1¾"	"	Q	"	gnsh-gy	"	"	"												"		"
6	2507	1¼"	"		"	gnsh-gy	"	"	"												"		"
7	2423	1⅜"	"	dk inclus.	"	gnsh-gy	"	"	"												"		"
8	2351	1¼"	"	dk inclus.	"	gnsh-gy	"	"	mod W												"		"
9	2273	2"	"	dk inclus.	"	gnsh-gy	"	"	mod W												"		"
10	2200	2¼"	"	Q dk inclus.	"	gn-gy	"	"	mod W												"		"
11	2114	2¼"	"	Q	"	gn-gy	"	"	W												"		"
12	2023	2¼"	"	Q	"	gn gy	"	"	"												"		"
13	1947	2"	"	Q dk inclus.	"	gn-gy	"	"	mod W												"		"
14	1860	2¼"	"	dk inclus.	"	gn-gy	"	"	W												"		"
15	1797	2⅛"	"	dk inclus.	"	gnsh-gy	"	"	W												"		"
16	1724	"	"	dk inclus.	"	gnsh-gy	"	"	mod W												"		"
17	1654	2¼"	calcarenite	dk inclus.	"	l.ol.gy	fr	m-f	mod												"		"
18	1585	2¼"	"	Q dk inclus.	mod	gn-gy	"	f	"												"		"
19	1508	2¼"	"	dk inclus.	very	l.ol.gy	fr	"	"												"		"
20	1410	2¼"	"	dk inclus.	mod	l.ol.gy	fr	"	W												"		"
21	1324	2⅛"	"	dk inclus.	"	l.ol.gy	fr	"	"												"		"
22	1266	2⅜"	"	dk inclus.	"	gn-gy	fr	"	mod W												"		"
23	1225	2¼"	"	dk inclus.	"	l.ol.gy	v.fr	"	mod W												"		"
24	1171	2⅜"	"	dk inclus.	"	gn-gy	v.fr	"	mod W												"		"
25	1104	0	-																		-		-
26	1061	1"	calcarenite	dk inclus.	"	gn-gy	v.fr	f-m	mod P												NS		gas odour H_2S?
27	1003	1¾"	"	Q dk inclus.	"	l.ol.gy	v.fr	f-m	M-P												"		gas odour
28	889	1¼"	"	Q dk inclus.	"	l.ol.gy	v.fr	f-m	P												"		"

FORM R 257 3-72

PAGE 2 OF 4 ATT 30 REC 29 DATE 6.2.75

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

IES RUN NO 1 SWC RUN NO 1

WELL FLOUNDER-5
GEOLOGIST Bellis/Fischer/Liggins
SERVICE CO Schlumberger

NO.	DEPTH	REC	ROCK TYPE	MODIFIERS	CAL	COLOR	INDUR DEG	GRAIN SIZE	SRTG	RND	DISS CLAY	STAIN	FLOURESCENCE %	FLOURESCENCE DISTR	FLOURESCENCE INTEN	FLOURESCENCE COLOR	CUT FLUOR. INTEN	CUT FLUOR. COLOR	CUT RESIDUE QUAN	CUT RESIDUE COLOR	SHOW	PROB PROD	REMARKS - GAS
1a	1	2	3	4	5	6	7	8	9	10	11	12	RK	14	15	16	17	18	19	20	21	22	23
29	825	1¼"	calcarenite	Q dk inclus.	very	gn-gy	v.fr	f	mod												NS		weak gas odour
30	748	2⅛"	"	dk inclus.	mod	ol gy	fr	f-vf	mod P												"		"
31	8464		NO REC.																				
32	8461		NO REC.																				
33	8455	¾"	Siltst	clay choked sandy.py.carb	mod	gy	fr	slt-vf	p.	sa-sr.	25%		<20	spty	fnt	wk yel	slow	fnt.wh	-				
34	8428	1⅛"	SST	-	S1	gy-wh	Uncons	m-cse	wp	sa-sr.	-		-				-						
35	8414	1	SST	chlorite,	S1	gy	Uncons	f-m	mod	sa-wr	<5%		-				-						Gas Anal -
36	8405	1¼	SST	siltst.frags pyr.	-	wh-gy	Uncons	f-m	mod	sa-sr	<5%				V fnt.	wk yell							" " 200 C_1
37	8394	1	SST	v.dirty,chl siltst.interbeds	-	wh-gy	firm	f-cse	v.p	sr	25		-				-						" " C_1 2200 C_2 2500 C_3 1200
38	8244	1	Siltst	chlorite sandy, carb.	-	gy-br	fri	slt	p-mod	sa-sr			-				-						
39	7905	NO	REC.																				
40	7896	¾"	SST	occas cse gr.	sl-m	lt.gry	Uncons	s.f-m	W	sr-wr.	<5		-				-						Gas Anal C_1 100 pp
41	7705	½	SST	pebbly smm pyr	mod	lt.gy	Uncons	s.m-peb	W	sr-wr	<5		-				-						" " C_1 200 C_2
42	7697	¾"	SST	-	sl	wh-gy	Uncons	s.m-cse	W	sa-sr	<5		-				-						" " -
43	7408	1⅛"	SST	mgr sst & vf sst in pores	V	dk br.	Uncons	vf-m	W bimodal	sr													" "
44	7360	⅜"	Siltst	Sandy micac	-	med gy	soft	slt	-	-			-				-						
45	7332	1¼"	Siltst	Sandy micac	-	med br	soft	slt	-	-			-				slow	yell					
46	7285	1	SST	rare cse gr	sl	lt gy	fri-unc	vf-f	W	sa-sr	~5		-				-						Gas Anal -
47	7278	1¼'	SST	rare cse gr	sl	lt gy	fri-unc	vf-f	W	sa-sr	<5		-				-						" " -
48	7173	1	Siltst	chlorite sandy, micac	mod	dk br	soft	slt	-	-			-				-						
49	7030	2	Mudst	silty, micac chlor	V	lt br	soft	-	-	-			-				-						
50	6877	1¼"	Siltst	micac, chl carb	mod	vdk br	firm	-	-	-			-				-						
51	6717	1¼"	Siltst	mic. chl	V	dk br	firm	-	-	-			-				-						
52	6566	1	Mudst	silty, micac	V	dk br	firm	-	-	-			-				-						
53	6416	1½"	Siltst	sandy, micac	sl	dk br	firm	-	-	-			-				-						
54	6328	2	Siltst	chlor,glauc pyr, sandy	-	med br	soft	-	-	-			-				-						
55	6278	1½"	Siltst	chlor,glauc, sandy	-	med br	firm	-	-	-			-				-						
56	6268	1¼"	Mudst	chlor, glauc calcite Xals	V	lt br	soft	-	-	-			-				-						

FORM R 257 3-72

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL FLOUNDER-5 | IES RUN NO 1 | SWC RUN NO 1 | DATE 6.2.75
GEOLOGIST Brooks/Tucker | ATT 30 | REC 29
SERVICE CO Schlumberger | PAGE 3 OF 4

NO.	DEPTH	REC	ROCK TYPE	MODIFIERS	CAL	COLOR	INDUR DEG	GRAIN SIZE	SRTG	RND	DISS CLAY	STAIN	FLOURESCENCE %	FLOURESCENCE DISTR	FLOURESCENCE INTEN	FLOURESCENCE COLOR	CUT FLUOR. INTEN	CUT FLUOR. COLOR	CUT RESIDUE QUAN	CUT RESIDUE COLOR	SHOW	PROD	REMARKS - GAS
1a	1	2	3	4	5	6	7	8	9	10	11	12	RK	14	15	16	17	18	19	20	21	22	23
57	6187	2¼"	Mudst		V	med gy	soft-firm	-	-	-			-										
58	6117	2"	Mudst		V	med gy	firm	-	-	-			-										
59	6021	1¾"	Mud	chloritic	V	grey	soft	-	-	-			-										
60	5915	1"	Mud		V	grey	soft	-	-	-			-										
61	5815	1"	Mud		V	grey	soft	-	-	-			-										
62	5714	1"	Mudst		V	Grey	soft-firm	-	-	-			-										
63	5614	1¼"	Mud		V	grey	firm						-										
64	5519	1¼"	Mud		V	grey	firm						Mineral Fluorescence										
65	5414	1¼"	Mud	occ w formed V calcite Xystals		grey	firm						Mineral Fluorescence										
66	5308	1⅜"	Mud		V	grey	soft						-										
67	5213	1¼"	Mud	occcalcite xystals	V	grey	soft						-										
68	5111	1"	Mud		V	grey	firm						-										
69	5015	1¼"	Mud	vf Xystals of calcite	V	grey	firm						-										
70	4917	2"	Mud		V	grey	soft						-										
71	4812	1⅜"	Mud		V	grey	soft						-										
72	4714	1½"	Mud		V	grey	soft						-										
73	4559	¾"	Mud		V	grey	soft						-										
74	4456		Mud		V	grey	soft						-										
75	4347	1⅛"	Mud		V	grey	firm						-										
76	4231	⅝"	Mud		V	grey	soft						-										
77	4106	2"	Mud		V	grey	firm						-										
78	4004	1⅞"	Mud	Pyrite & calcite	V	grey	firm						-										
79	3908	2¼"	Mud		V	grey	firm-hard						-										
80	3810	1"	Mud	Silty & calcitic	V	grey	firm						-										
81	3709	1"	Mud	Silty	V	grey	firm						-										
82	3609	⅝"	Mud	Silty - glauconitic	V	grey	firm						-										
83	3509	1¼"	Mud	Silty	V	grey	firm						-										
84	3453	1"	Silt	glauconite micaceous	V	grey	firm	fine	p-m	sa-sr	<30%		-										

FORM R 257 3.72

PAGE 4 OF 4

ATT 30 REC 29

DATE 6.2.75

IES RUN NO 1 SWC RUN NO 1

ESSO AUSTRALIA LTD.

SIDEWALL CORE DESCRIPTIONS

WELL FLOUNDER-5

GEOLOGIST Brooks/Tucker

SERVICE CO Schlumberger

NO.	DEPTH	REC	ROCK TYPE	MODIFIERS	CAL	COLOR	INDUR DEG	GRAIN SIZE	SRTG	RND	DISS CLAY	STAIN	FLOURESCENCE % RK	FLOURESCENCE DISTR	FLOURESCENCE INTEN	FLOURESCENCE COLOR	CUT FLUOR. INTEN	CUT FLUOR. COLOR	CUT RESIDUE QUAN	CUT RESIDUE COLOR	SHOW	PROB PROD	REMARKS - GAS
1a	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
85	3423	1¼"	Mud	Silty	V	grey	friable						-				-						
86	3372	1¼"	Mud		V	grey	friable						-				-						
87	3366	1"	Silt	glauconitic	V	grey		fine	W	sr	<30%												
88	3158	7/8"	"	"	"	"		"	"	"	< "												
89	3058	1¼"	Mud		V	grey																	
90	2957	1¼"	Silt		V	grey	friable	fine	W	sr	<20%		Mineral Fluorescence										

FORM R 257 3/72

ESSO AUSTRALIA LIMITED

WELL COMPLETION REPORT

FLOUNDER-5

APPENDIX 3

PALAEONTOLOGICAL REPORT

FORAMINIFERAL SEQUENCE

FLOUNDER # 5

by DAVID TAYLOR

Paleontology Report 1975/8 May 27, 1975.

SUMMARY

The FLOUNDER # 5 sample has proved to be vital in understanding the late Neogene foraminiferal sequence of the Gippsland Basin; both biostratigraphically and environmentally. This is the first section of deeper water sediments to be extensively shot with side wall cores above the $13^3/8$" casing. As a result the two highest Zones of Taylor's (1966) scheme can be fragmented into five, or theoretically six Zones of greater biostratigraphic precision. This report summarizes the results, whilst more detailed discussion will appear in a complete revision of the Gippsland Basin biostratigraphic scheme in preparation.

The biostratigraphic sequence in FLOUNDER # 5 is summarized below:-

AGE	Minimal Depth Zone	Multi Association Zones	Depth in Flounder # 5 Top	Base
PLEISTOCENE		A-1	not sampled	
	A	A-2	?	889
PLIOCENE		A-3	1003	1860
		A-4	1947	3266
--?--?--?--?--?	B	B-1	3372	3509
LATE		B-2	3609	4347
MIOCENE	C		4456	5614
LATE	D	D-2	5714	6021
MIOCENE	E	E-1	not sampled	
		E-2	6117	6117
EARLY		F-1	6187	6187
MIOCENE	F	F-2	not sampled or absent	
LATE	I	I-1-a	6268	6268
OLIGOCENE				
MID to EARLY EOCENE			6416	7332

INTRODUCTION

Seventy-four side wall cores were examined, with twenty-nine coming from between the 20" casing shoe and the $13^{3}/_{8}$" casing shoe. Side wall cores at 6278 and 6328 were barren of fauna, whilst those at 6416, 6717, 7173, 7278 and 7332 contained no planktonic foraminifera. No rotary cutting samples were examined.

Three sheets of Distribution Charts accompany this report.
Sheet 1 shows the distribution of planktonic foraminifera with the basis of biostratigraphic breakdown and a relative graph of fluctuations in water temperature during most of the Pliocene.
Sheet 2 shows distribution of benthonic foraminifera.
Sheet 3 gives an environmental summary with relative statistics.
Symbols on the charts are as follows:-

°	=	1 - 20 specimens
I	=	over 20 specimens
[°] or [I]	=	reworked planktonics or reworked or misplaced benthonics
?	=	dubious identification
cf	=	similar but not identical

All depths cited in report and listed on charts are corrected depths in feet below datum of +30' M.S.L. Water depth to sea floor of 353' are included in this depth.

BIOSTRATIGRAPHY

Formal definition of newly erected zones will be established in a forthcoming report to Esso.

EARLY to MID EOCENE - 7332 to 6416:- The fauna within this interval is almost entirely composed of arenaceous foraminifera dominated by *Bathysiphon* spp. and *Haplophragmoides* spp. The age is based on *Truncorotaloides collacteus* which is the only diagnostic planktonic species which occurs only in the sample at 6877.

HIATUS:- The late Eocene and early Oligocene is apparently missing.

LATE OLIGOCENE - 6268:- The fauna dominated by *Globigerina euapertura, G. woodi woodi* and *Globoquadrina dehiscens* (S.L. plexus) is at the very top of the Zone of *G. euapertura* (= Zone I-1), probably constituting a further zonal fragmentation marking the association of the initial appearance of *Globoquadrina dehiscens* (S.L.) and *Globigerina woodi woodi* with the upper part of the range of *G. euapertura*. This Zone I-1-a is designated the Zone of *Globoquadrina dehiscens* (S.L.) and is probably the equivalent of the *G. dehiscens* Zone in New Zealand (Jenkins, 1975). It should be noted that the initial appearance of *G. dehiscens* (S.L.) is diachronous and this may explain the apparent hiatus of this Zone reported by Jenkins (l.c.) in D.S.D.P. Site 282 (west of Tasmania). This Zone in the Gippsland is one of association and range overlap, rather than based on a Datum Event.

LATE OLIGOCENE to EARLY MIOCENE HIATUS:- Although there is a sample gap of 81', it is assumed that the uppermost part of the Oligocene (= Zone H-2) and the two lowermost Miocene Zones H-1 and G are absent in this section.

EARLY MIOCENE - 6187 to 6117:- At 6187 the diagnostic features are the association of *Globigerinoides* spp; especially *G. trilobus, G. bisphericus* and *G. subquadratus* (= *G. rubra* of Carter, 1964 et. al.). *Globorotalia* spp. include *G. praemenardii, G. peripheroronda* and *G. miozea miozea* (S.S.). This association enables the splitting of Zone F into lower Zone F-2, the Zone of *G. bisphericus*, and upper Zone F-1, the Zone of *G. subquadratus*. The sample at 6187 represents Zone F-1. Zone F-2 may be present in the sequence but not sampled. Zone F-1 is the equivalent of Carter's (1964) onshore Gippsland

Faunal Unit 8 and Jenkins' (1960) *G. menardii praemenardii* Zone in the Lakes Entrance Oil Shaft.

The presence of the nominate species, *Praeorbulina glomerosa curva*, indicates Zone E-2 (= top of early Miocene) at 6117'.

LATE MIOCENE - 6021 to 5714:- The sample gap of 96' probably includes Zone E-1, the Zone of *Orbulina suturalis*.

Zone D-2, characterised by the association of *Globorotalia peripheronda, G. conica, G. mayeri mayeri* and *G. mayeri barisaensis* with *Orbulina universa* and *Globigerinoides* spp.

HIATUS within the LATE MIOCENE:- The usually thickly developed Zone D-1 (without *Globorotalia peripheroronda* but with *G. mayeri barisaensis*) is absent in the sequence. Also, D-2 is apparently abbreviated. Evidence of the erosional nature of this hiatus is obtained from the presence of Zone D species of *Globorotalia* spp. within the Pliocene sequence. Examples of such reworking are *Globorotalia peripheroronda, G. curva* and *G. mayeri mayeri*. There are also preservation differences in that the reworked specimens are dark coloured, which enables the distinction of two groups of *Orbulina universa*; a dark coloured group of larger, allochthonous specimens and a well preserved group of small, autochthonous specimens (see Distribution Chart, Sheet 1).

LATE MIOCENE - 5614 to 3609:- The interval between 5614 and 4456 contains *Globorotalia mayeri mayeri* without *G. mayeri barisaensis* and *G. conica*. *G. miotumida miotumida* and *G. miotumida conoidea* are well developed and *G. lenguanensis* appears at the top of the interval at 4456. The association is typical of Zone C, the Zone of *G. mayeri mayeri* as originally defined by Taylor (1966).

At and above 4347 the fauna is nondescrips, dominated by *Globigerina* spp. The *miotumida* and *conoidea* morphotypes of *G. miotumida* intergrade, suggesting mixing of water masses in a deep water situation as expressed by Chaproniere (1973, text fig. 2). The association fits the original definition of Zone B (Taylor, 1966) but *G. miotumida miotumida* extends above 3609 and the initial appearance of *G. miotumida conomiozea* at 3509. Thus the Zone can be fragmented into a lower unit B-2, the Zone of *G. miotumida miotumida*, and an upper unit B-1, the Zone of *G. miotumida conomiozea* above the appearance of the nominant taxa. Thus, in Flounder # 5, Zone B-2 extends from 4347 to 3609 which is below the initiation of the *conomiozea* morphotype of *G. miotumida* (refer Chaproniere, 1973).

The top of Zone B-2 is assumed to correspond approximately with the Mio/Pliocene boundary of the Italian stratotype. A following discussion shows that the "traditional New Zealand" Mio/Pliocene boundary is higher than that accepted in the Mediterranean by Cita (1973), Cita & Ryan (1973) and Berggren & van Couvering (1974). However, exact correlation with the Mediterranean cannot be achieved because of the extra-tropical nature of the Flounder # 5 and other Gippsland sequences. Southwest Pacific correlation of Zone B-2 is shown on Table 1.

PLIOCENE and PLEISTOCENE - 3509 to 748 to ? :- This interval can be divided into two parts:-

(2) The Minimal Layer Zone A above 3266 which is discussed later in detail.

(1) The deeper water Zone B-1 from 3509 to 3372.

DEEPER WATER ZONE B-1

The base of this interval is marked by the initiation of *G. miotumida conomiozea* in the *G. miotumida miotumida* → *G. inflata* lineage of Chaproniere (1973) and Kennett & Watkins (1974). The earlier morphotypes of the lineage, *G. miotumida miotumida* and *G. miotumida conoidea* persist into the Zone. The rest of the *Globorotalia* fauna is nondescript and sporadic, probably because of the cold water influence during much of the Zone (refer Distribution Chart, Sheet 1).

The top of the Zone is immediately before the appearance of *G. puncticulata* morphotypes.

Because of the dominantly cold water masses, pan-tropical species, such as *G. margaritae*, are absent, making exact correlation impossible. In the Mediterranean, *G. margaritae* extends below *G. puncticulata*, and would thus be expected within this Zone. Thus, by extrapolation, Zone B-1 is placed within the basal Pliocene. Further discussion of this point is made under "Correlation of Minimal Layer Zone A".

MINIMAL LAYER ZONE A

The original definition of this Zone (Taylor, 1966) was a negative one, due to the total absence of diagnostic planktonic species in the shallow water Barracouta # 1 sequence. Later, Taylor (Esso Paleont. Rep. 1972/01) redefined the base as the initial appearance of *Globorotalia inflata* in the deeper water sequences. However, the interval above the $13^3/_8$" casing shoe was seldom sampled by conventional core or side wall core until the Flounder # 5 sequence was especially sampled with 30 side wall cores. Now it is realised that the species at the base of the Zone is, in fact, *G. puncticulata* which is the evolutionary precursor of *G. inflata* (Kennett, 1973 and Kennett & Watkins, 1974).

The diverse Flounder # 5 planktonic foraminiferal sequence contains members of the following evolutionary lineages:-

1) *Globorotalia miotumida miotumida* → *G. miotumida conomiozea* → *G. puncticulata sphericomiozea* → *G. puncticulata puncticulata* → *G. inflata* (Kennett & Watkins, 1974 and Chaproniere, 1973).

2) *Globorotalia acostaensis* → *Neogloboquadrina humerosa* → *N. dutertrei* (Lamb & Beard, 1972).

3) *Globorotalia tosaensis* → *G. truncatulinoides* (Kennett, 1973).

4) *Globorotalia aemiliana* → *G. crassacrotonensis* → *G. crassaformis* (Lamb & Beard, 1972).

Lineage 1 is the most useful and allows correlation with the Southwest Pacific and New Zealand (Kennett, 1973, Kennett & Vella, 1975 and Jenkins, 1975), whilst fragmentation of the other lineages verify the reliability of the *G. inflata* lineage. From these lineages the broad Zone can be fragmented into three deep water Zones with a fourth Zone present but unsampled at the top of the sequence (i.e. above the 20" casing).

These Zones in descending order are:-

Zone A-1	The Zone of *GLOBOROTALIA TRUNCATULINOIDES*
Zone A-2	The Zone of *GLOBOROTALIA TOSAENSIS*
Zone A-3	The Zone of *GLOBOROTALIA INFLATA*
Zone A-4	The Zone of *GLOBOROTALIA PUNCTICULATA*

AGE *	offshore GIPPSLAND ZONES	NEW ZEALAND ZONES Jenkins, 1975	SOUTHWEST PACIFIC ZONES - Jenkins, 1975	TASMAN SEA cool sub-tropical Zones Kennett, 1973	TASMAN SEA informal Zones & N.Z. Stages - Kennett & Vella, 1975
PLEISTOCENE	A-1 *Globorotalia truncatulinoides*	*Globorotalia truncatulinoides*	*Globorotalia truncatulinoides*	*Globorotalia truncatulinoides* ----?----?----?----?--- *G. truncatulinoides* *G. tosaensis* overlap	1 Hautawan
1.85 m.y.					
late PLIOCENE	A-2 *Globorotalia tosaensis* 889**	*Globorotalia inflata*	*Globorotalia inflata*	*Globorotalia tosaensis*	2 Mangapanian Waipipian
? 3.2 m.y.	A-3 *Globorotalia inflata* 1860**			*Globorotalia inflata*	
early PLIOCENE	A-4 *Globorotalia puncticulata* 3266**	*Globorotalia puncticulata*	*Globorotalia puncticulata*	*Globorotalia crassaformis* ----?----?----?----?--- *Globorotalia puncticulata*	3 Opoitian
4.3 m.y.		*Globorotalia miozea sphericomiozea*	*Globorotalia miozea conomiozea*		
	B-1 *Globorotalia conomiozea* 3509**			*Globorotalia conomiozea*	4 Kapitean
5 m.y.	----?----?----?----?--	----?----?----?----?--	----?----?----?----?-	----?----?----?----?--	----?----?----?---
late MIOCENE	B-2 *Globorotalia miotumida*	*Globorotalia miotumida miotumida*	*Globorotalia miotumida miotumida*	*Globigerina nepenthes*	5 Tongaporutuan

TABLE 1. Correlation of offshore Gippsland late Neogene Zones with temperate Southwest Pacific Zonations.

* Paleomagnetic and radiometric time scale from Cita & Ryan (1973), Kennett & Watkins (1974) & Berggren & van Couvering (1974).

** Depth in feet of base of Zone in Flounder # 5.

Zone A-4

The base of the Zone of *G. puncticulata* is marked by the initial appearance of the nominant species with an evolutionary transition from *G. miotumida conomiozea*. The latter species continues almost to the top of the Zone. The top of the Zone is immediately below the transition between *G. puncticulata* and *G. inflata*.

The associated species are similar to those of Zones A-3 and A-2, except for the following biostratigraphic events:-

G. crassaformis extends, sporadically, from just above the base of the Zone.

Neogloboquadrina humerosa is not present in the Zone.

The initiation of *Globorotalia crassacrotonensis* is within the Zone, though its precursor, *G. aemiliana*, is either absent or too difficult to distinguish morphologically.

Neogloboquadrina pachyderma, though present sporadically higher in the sequence, is abundant at several intervals, but this is a paleohydrological effect rather that a biostratigraphic one.

The extinction of *Globigerina nepenthes*, *G. continuosa* and *Globoquadrina dehiscens* occurred within the Zone and they become most noticeable towards the base. *G. dehiscens* obviously has a diachronous extinction as suggested by Kennett & Watkins (1974) and not a sharp one of biostratigraphic and chronological significance as inferred by Berggren & van Couvering (1974, p.77).

Globorotalia tumida and *Sphaeroidinellopsis subdehiscens* were rare itinerant visitors from more tropical climes as they are associated with an abundance of sub-tropical species, such as *Globigerinella aequilateralis*, *Globigerina falconensis* and *Globigerinoides trilobus*.

The *sphericomiozea* morphotype of *Globorotalia puncticulata* is most distinct at the base of the Zone and becomes increasingly difficult to distinguish from *G. puncticulata* (S.S.) towards the top of the Zone.

A thick tested form resembling the morphology of *G. margaritae* occurs in the lower part of the interval (at and below 2423' in Flounder # 5). Associated with it is *G. cibaoensis*.

In Flounder # 5 small specimens of *Orbulina universa* are ubiquitous and distinct from the larger, dark coloured, frosted specimens of *O. universa* which were evidently reworked. Associated reworked species from Zone D-2 are *Globorotalia conica*, *G. mayeri* and *G. peripheroronda*. The presence of remaine fossils may explain the anomalously fast deposition rate during Zone A-4. The mechanism which produced this rapid sedimentation was probably slumping and high energy bottom currents.

The designated standard section is in Flounder # 5 between side wall core at 3226' to side wall core at 1947'.

Zone A-3

The base of the Zone of *G. inflata* heralds the appearance of the nominant species which has developed from *G. puncticulata*. The initial evolutionary appearance of *Neogloboquadrina humerosa* apparently coincides with the base of the Zone.

The top of the Zone is immediately below the initial appearance of *G. tosaensis*. Associated species are the same as for Zone A-2 except for the gradual extinction of *G. puncticulata, G. crassacrotonensis* and *G. acostaensis*. The distribution of the latter three species is erratic but could be useful in identifying the Zone on rotary cuttings. *Neogloboquadrina humerosa* is present though some specimens blend with *Globorotalia acostaensis*. *G. woodi woodi* has a sharp extinction and *G. decoraperta* occupied its niche but the two species are unrelated.

The designated standard section is in Flounder # 5 from the side wall core at 1860' to side wall core at 1003'.

Zone A-2

The base of the Zone of *G. tosaensis* is represented by the initial appearance of the nominant species and the evolutionary transition of *Neogloboquadrina dutertrei* from *N. humerosa* (both present in basal part of Zone).

The top of the Zone is the evolutionary appearance of *Globorotalia truncatulinoides* and not the extinction of *G. tosaensis*.

Associated species are *G. inflata, G. crassaformis, Globigerina decoraperta* (often abundant), *G. bulloides, G. falconensis* and with occasional occurrences of *Orbulina universa, Globigerinoides trilobus, G. ruber* and *Globigerinella aequilateralis*.

The designated standard section for this Zone is in Flounder # 5 from side wall core at 889' upwards above the sampled interval in the sequence. A sample for the top of the Zone has yet to be designated, as disussed below for Zone A-1.

Zone A-1

The base of the Zone of *G. truncatulinoides* is marked by the initial appearance of the nominant species.

The top of the Zone is the present day assemblage on the Gippsland sea floor with *G. truncatulinoides* still present.

The Zone could be further subdivided as the basal part is characterised by the evolutionary transition between *G. truncatulinoides* and its ancestoral form *G. tosaensis*. However, this has not been attempted because of a low

correlateable reliability due to the rarity of *G. tosaensis* and its gradual rather than sharp extinction. Associated species are *G. inflata, G. bulloides, G. falconensis, Neogloboquadrina dutertrei* and *N. pachyderma. Globorotalia crassaformis* may be present in the lower part of the Zone. At the top of the Zone the influx of warm water species is evident with the penetration of the East Australian Current but these influxes are sporadic both vertically and laterally and are of no stratigraphic significance. The warmer water species include *Orbulina universa, Pulleniatina obliquiloculata, Globigerinoides ruber, G. trilobus trilobus, G. trilobus sacculifer* and occasionally *Sphaeroidinella dehiscens.* In all examples *Globorotalia inflata* is the dominant species even in the modern Gippsland sea floor samples where the warm water element may comprise up to 20% of the planktonic fauna.

The standard section for this Zone has not, as yet, been designated and will probably be assigned to a cored interval in one of the foundation test wells. The example for the top one metre of the Zone is the gravity core San Pedro Bay-1 from 2,000 metres of water off the eastern extremity of Gippsland.

Correlation of Deep Water Zones which comprise Minimal Layer Zone A.

Taylor, 1966, originally regarded the base of this Zone as being on the Mio/Pliocene boundary but later (unpublished report to Esso) revised this, in light of the opinion of Blow (1969) that *Globorotalia inflata* originated in Zone N.17 which he regarded as late Miocene. Lately there has been much published discussion regarding the biostratigraphic significance of the evolution of *G. inflata* and its ancestoral form *G. puncticulata.* The form referred to by Taylor as *G. inflata* in earlier reports is obviously *G. puncticulata.*

The fourfold division of Zone A is now in partial agreement with the biostratigraphic division of the cool sub-tropical region during the Plio/Pleistocene as proposed for the Tasman Sea by Kennett (1973). The Gippsland zonation is in closer agreement with the revised scheme of Kennett & Vella (1975), in that *Globorotalia crassaformis* extends almost throughout the *G. puncticulata* Zone and does not characterise a separate Zone. Also, the division corresponds with that established by Jenkins for New Zealand and the ocean to the south (Leg 29), except that Jenkins' *G. puncticulata* Zone does not extend from the initial appearance of the nominant species. Comparison of the Southwest Pacific, New Zealand and Gippsland Zones for this biostratigraphic interval is shown on Table 1. The major difficulty in correlating

between the temperate areas and the warmer water sequences is the differences in fauna and different times of initial appearance of biostratigraphically important forms. For instance, in Kennett's (1973) warm sub-tropical zonation, the appearance of *G. puncticulata* is not an evolutionary one and it probably migrated north from the cooler waters of New Zealand and the Gippsland where the appearance is evolutionary (Kennett, l.c.). *G. margaritae* appears before *G. puncticulata* in warmer water, yet Kennett (1973) and Kennett & Watkins (1975) correlate the *G. margaritae* Zone with the basal part of the *G. puncticulata* Zone in cooler waters, where sporadic occurrences of *G. margaritae* correspond with the range of *G. puncticulata*. As Kennett (1973) points out, correlation of the Pliocene is difficult as in the tropics "*G. puncticulata* and *G. inflata* are virtually absent, while *G. tumida*, *S. dehiscens* and *P. primalis* increase even more in importance" in selecting the base of the Pliocene. The extinction of *Globoquadrina dehiscens* was given significance by Blow (1969) and Berggren & van Couvering (1974) but this must be regarded as a predominantly cold water species and tends to linger on in cooler waters, being reported from Zone A-4 in Flounder # 5.

Kennett & Watkins (1974) speak of the first appearance of *Globorotalia puncticulata sphericomiozea* marking the traditionally accepted Miocene/Pliocene boundary in New Zealand and find that this occurs at 4.3^{+}_{-} 0.1 m.y. on the paleomagnetic time scale. However, what is "traditional Pliocene" in New Zealand, may well not correspond with the Pliocene stratotype in Italy. Berggren & van Couvering (1974) and Cita (1973) place the boundary between 4.9 and 5.1 m.y. Furthermore, Cita & Ryan (1973) place the first appearance of *G. puncticulata* in the Mediterranean at 4.2 m.y. which is within the scope of Kennett & Watkins' (1974) 4.3^{+}_{-} 0.1 m.y. for this event in New Zealand. Also, Cita (1973) shows that *G. margaritae* occurs before *G. puncticulata*, but Kennett & Watkins (1974) dispute this on the grounds that there is no evidence that the appearance of *G. puncticulata* is an evolutionary one in the Mediterranean area. Despite Kennett & Watkins' assertions, the consistency of paleomagnetic dates between New Zealand and the Mediterranean suggests that the "traditional Pliocene in New Zealand" is above the base of the Pliocene stratotype. Therefore, the base of Gippsland Zone A-4 is within and not at the base of the Pliocene. This Zone probably corresponds with either Cita's (1973) *G. margaritae margaritae* or *G. margaritae evoluta* Zones and is not equivalent to her basal Pliocene Zone, the *Sphaeroidinellopsis* Acme-Zone. Confusion regarding the Mio/Pliocene boundary may be due to the fact that the concept of a synchronous flooding of the Mediterranean at the boundary is

apparently incorrect as the D.S.D.P. Leg 13 results show a diachronous transgression from west to east (Cita, l.c.).

Exact correlation with Lamb & Beard's (1972) scheme for the Caribbean, Gulf of Mexico and Italian stratotypes is as difficult as with other schemes based on tropical faunas, especially as they do not designate the range of *G. puncticulata*. However, the presence of and overlap between *G. crassacrotonensis* and *G. crassaformis* in Zone A-4 would indicate a position between the top of Beard & Lamb's *G. margaritae* and *P. obliquiloculata* Zone in the mid Pliocene. Tying in with Blow's zonation cannot be achieved but a position for Zone A-4 would be within N.19/N.20. Berggren's (1972) placement of the initiation of *G. puncticulata* at the base of the Pliocene (within N.18 at 5 m.y.) is, in all probability, too low.

The Zone of *G. inflata* (= A-3) and *G. tosaensis* corresponds to the same nominal zones in New Zealand and the Southwest Pacific (Kennett, 1973, Kennett & Vella, 1975 and Jenkins, 1975), although Kennett & Vella (1975) found that the sporadic appearance of *G. tosaensis* did not justify a separate zone for a cool temperate zonation. All the above authors accept the appearance of *G. truncatulinoides* (Zone A-4) as marking the Plio/Pleistocene boundary and corresponding with the base of Blow's (1969) Zone N.22, as is followed by Berggren & van Couvering (1974) who place this Datum Plane at 1.85 m.y. However, Lamb & Beard (1972) do not follow this convention and place the event within the Pleistocene, so that their *G. tosaensis* Sub Zone and the initial appearance of *Neogloboquadrina dutertrei* is within the Pleistocene; based on paleoclimatic reasons (Lamb & Beard, 1972, p.50, footnote). In this paper the convention is followed to coincide with opinions of New Zealand and Southwest Pacific workers so that the initiation of *G. truncatulinoides* corresponds with the Plio/Pleistocene boundary.

Thus:- Zone A-4 The Zone of *G. truncatulinoides* = Pleistocene to Recent
and Zone A-3 The Zone of *G. tosaensis* = late Pliocene

In conclusion, the Minimal Layer Zone A extends from early or mid Pliocene to the Recent, but not from the base of the Pliocene as inferred by Taylor (1966). Nicholls' (1968) "Faunal Unit 14" is characterised by *Globorotalia "inflata"* (in all probability in part = *G. puncticulata*) and *G. crassaformis*, so is the onshore Gippsland Basin equivalent of Zone A. An interpretation of Nicholls' work suggests that the "Kalimnan Stage" (stratotype - Lakes Entrance - Gippsland) and the underlying "Cheltenhamian Stage" (stratotype - Cheltenham, south of

Melbourne) are within Zone A though further fragmentation is impossible due to restricted, low diversity, planktonic faunas. Therefore, the base of the Cheltenhamian is above the Mio/Pliocene boundary but approximates the base of the "traditional New Zealand Pliocene" (Kennett & Watkins, 1974) as correctly inferred by Nicholls (1968). Zone A is above the highest Lakes Entrance Oil Shaft sample at 212' (Jenkins, 1960).

PALEOHYDROLOGY

The fauna in any one planktonic sample reflects all the water masses above the site at time of deposition. Thus a combination of warm and cold assemblages can be present in a single sample. Therefore a warmer water assemblage with a cool temperate assemblage can imply that a warm surface water mass penetrated into the region and does not necessarily imply that the whole water column or mass overlying the region was warm. For this reason, paleohydrology is used rather than paleooceanology, as paleohydrology infers more than one mass.

An attempt has been made to delineate the maximum water temperature, although only the relative designates "warm" and "cool" are used, as on Distribution Chart, Sheet 1.

The reliability of the assumptions decreases with time. During the Pleistocene and Pliocene, taxonomic criteria are used, whilst in older samples taxonomic diversity and generic or sub-generic occurrence are employed.

The late Oligocene hydrological column was obviously cool water without tropical forms. Initial occurrences are consistent with New Zealand, but not with region west of Tasmania (i.e. D.S.D.P. Site 282 and Nautilus # 1 in the Otway Basin) and suggest a circum-Tasman Sea current consistent with the reconstruction by Kennett et. al. (1975, fig. 10).

The uppermost early Miocene (Zones F-1 and E-2) in Flounder # 5 as in other Gippsland wells, shows increasing specific diversity and abundance of *Globigerinoides* spp. with *menardii* Group *Globorotalia*. These criteria, according to Jenkins (1968) and others, suggest warmer waters. Jenkins (l.c.) would place "the temperature peak" in Zone E-2. However, this "peak" in Flounder # 5 and other Gippsland sections is not reached till Zone D-2 in the late Miocene.

The base of the late Miocene (Zone D-2) demonstrates an increase in diversity and warm water supra-specific groups from the top of the early Miocene, but there is a decline in diversity and occurrence through D-2. This suggests that the "paleotemperature peak" or influx of warm water was most pronounced at the Zone D/Zone E boundary in Flounder # 5.

There is a distinct drop in temperature during Zone C and extending into Zone B-2, as is evident by decline in taxonomic diversity and rarity of *Globigerinoides* and *Globorotalia menardii* Group. Furthermore, *G. miotumida conoidea* is dominant whilst *G. miotumida miotumida* has a patchy distribution; a factor that suggests cool, deeper water by inference from Chaproniere (1973). Towards the top of Zone B-2, there is an increase in warm water, as evident from the dominance of *G. miotumida miotumida* over the *conoidea* morphotype.

Criteria used to determine temperature fluctuations during the Pliocene and Pleistocene are similar to those used by Kennett & Vella (1975) for D.S.D.P. Site 284 in the eastern Tasman Sea. These criteria include:-

1) Ratio of *Globigerina bulloides* to *G. falconensis*. Dominance of the latter is taken to infer warmer conditions.

2) High percentages of *Neogloboquadrina pachyderma* (both morphotypes) imply cooler conditions, though this criterion decreases, with time, in reliability (Kennett & Vella, i.c.).

3) Presence of *Globigerinoides* spp. and *Globigerinella aequalateralis* suggest warmer water.

4) There are at least two morphotypes of *Globorotalia inflata* off Gippsland today. The conical form inhabits warmer water, whilst the more abundant spherical form frequents the cooler Bass Strait water mass. Therefore, the ratio of the morphotypes should reflect fluctuating warm and cold water. This criterion was not applied by Kennett & Vella (1975).

From these criteria the relative water temperature graph on Distribution Chart Sheet 1 was constructed. Although similar criteria have been used, there is little correspondence between this graph and those for D.S.D.P. Site 284 (Kennett & Vella, l.c. and Shackleton & Kennett, 1975). In places the Flounder

5 graph is the reverse of those for Site 284. The major discrepancy is during Zone A-3, the Zone of *G. inflata*, where warm conditions are postulated in Flounder # 5, but marked cooling has been suggested for the equivalent level (= the Waipipian Stage) at Site 284 and in New Zealand (Kennett & Vella, 1975 and Shackleton & Kennett, 1975). This discrepancy has already been noted by Beu (1975) who postulates a warm Waipipian Stage in New Zealand on molluscan evidence. The explanation may be that Kennett & Vella (1975) are incorrect in assuming widespread warming and cooling at particular times, especially regarding spread of the Antarctic Sea ice. The Gippsland is a hydrologically transient region, dependent on the vagaries of the East Australian Current (Anon, 1975). It has been evident that there have been sporadic penetrations of a warm current into the Gippsland Basin during the Neogene and these warm influences were probably due to a proto-East Australian Current. The warm eddies of this proto-East Australian Current either did not reach or were dissipated by the time they reached Site 284.

ENVIRONMENT

Data relating to this environmental interpretation is shown on Distribution Chart Sheet 3.

The early to mid Eocene faunas, dominated by arenaceous forms, indicate an embayment or tidal marsh environment with anaerobic and polyhaline conditions prevailing. Sporadic planktonic faunas indicate occasional oceanic flooding.

The almost complete dominance of planktonic specimens in the one late Oligocene sample is evidence of a deep water, probably continental rise, deposition. This deep water environment persists on the other side of the late Oligocene to early Miocene hiatus in Flounder # 5. The deep water environment continues to the close of the late Miocene. The hiatus may be due to erosion or no deposition due to deep water boundary currents, similar to those postulated to explain the Oligocene unconformity in many D.S.D.P. sites in the Southwest Pacific (Kennett et. al., 1975).

The late Miocene section indicates physical disturbance on a steep continental slope. Slumping may have been responsible for the absence of much of Zone D

and continued instability and exposure of Zone D sediment is evident from the reworking of Zone D planktonic species into the Pliocene sediments.

Slumping, reworking and canyon activity is pronounced in the early Pliocene (Zones B-1 and A-4). Inner continental shelf species were misplaced into deeper water sediment, suggesting high energy current activity on the shelf edge. This high energy activity persisted through the late Pliocene into the Pleistocene where the sediment is rich in worn bryozoal fragments. There is a gradual progradation of the continental shelf throughout the Pliocene culminating in a mid-shelf environment, at the top of the Pliocene, analogous with the modern sea floor at the Flounder # 5 location.

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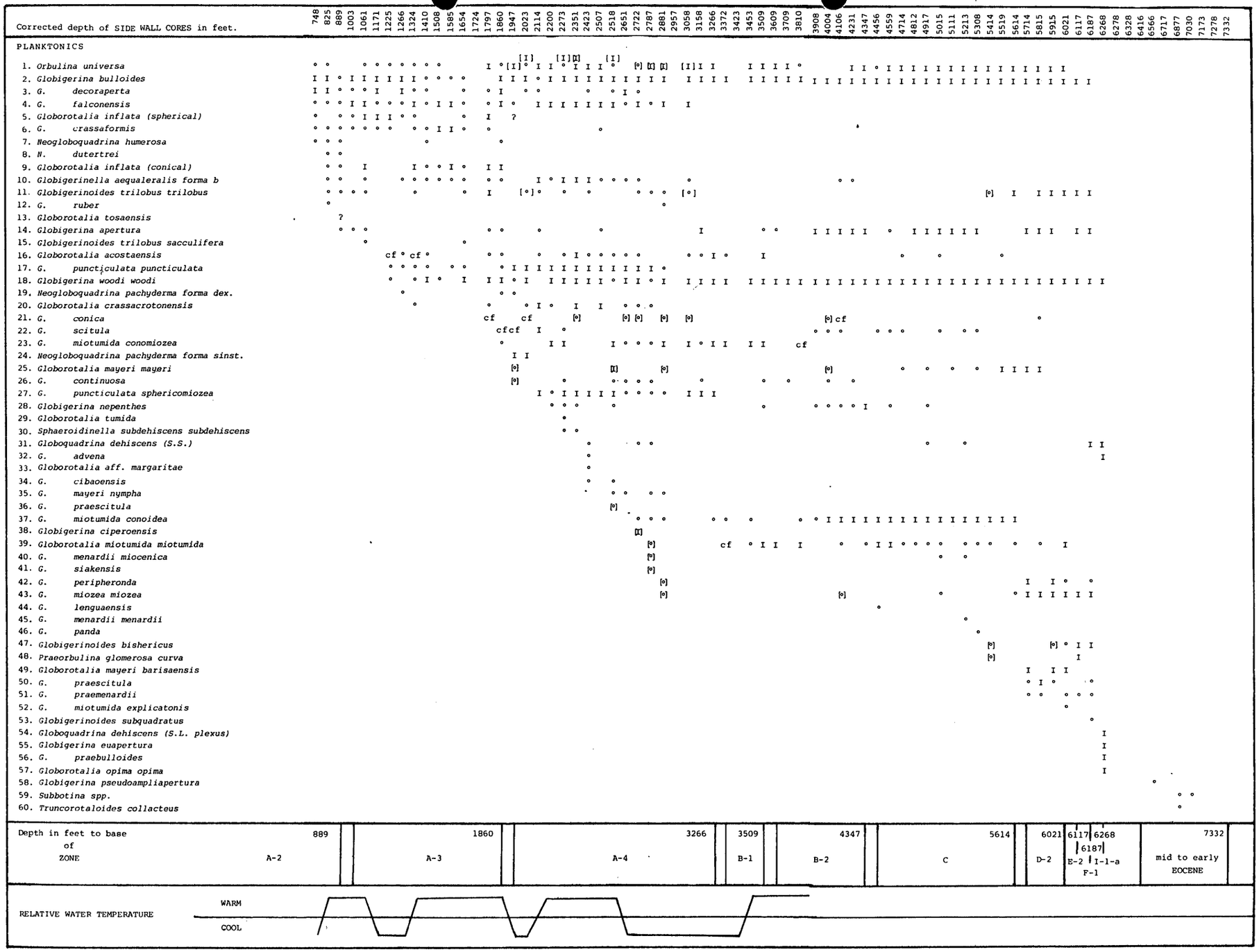
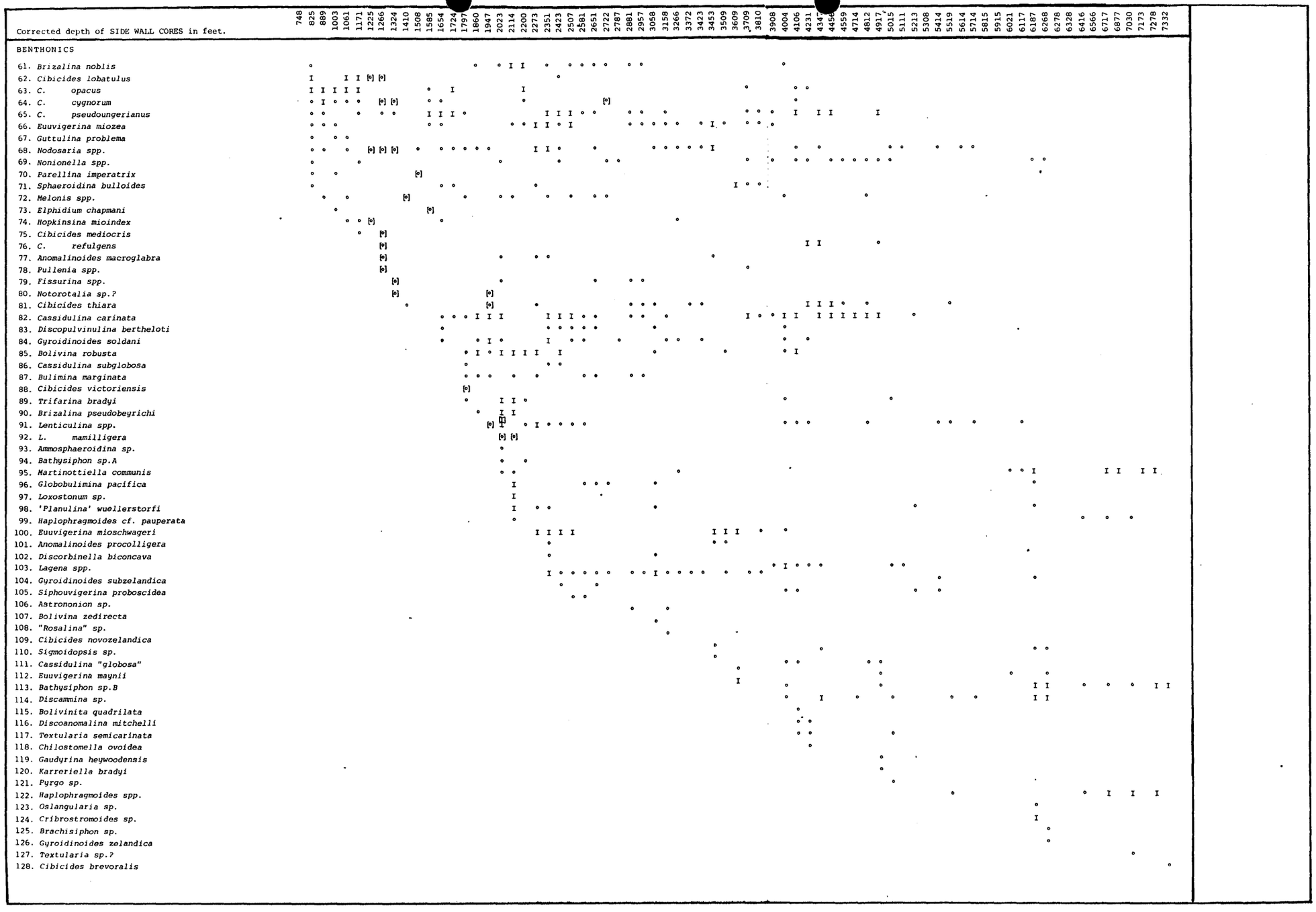

Corrected depth of SIDE WALL CORES in feet.
748 825 889 1003 1061 1171 1225 1266 1324 1410 1508 1585 1654 1724 1797 1860 1947 2023 2114 2200 2273 2351 2423 2507 2518 2651 2722 2787 2881 2957 3058 3158 3266 3372 3423 3453 3509 3609 3709 3810 3908 4004 4106 4231 4347 4456 4559 4714 4812 4917 5015 5111 5213 5308 5414 5519 5614 5714 5815 5915 6021 6117 6187 6268 6278 6328 6416 6566 6717 6877 7030 7173 7278 7332
PLANKTONICS
1. Orbulina universa
2. Globigerina bulloides
3. G. decoraperta
4. G. falconensis
5. Globorotalia inflata (spherical)
6. G. crassaformis
7. Neogloboquadrina humerosa
8. N. dutertrei
9. Globorotalia inflata (conical)
10. Globigerinella aequaleralis forma b
11. Globigerinoides trilobus trilobus
12. G. ruber
13. Globorotalia tosaensis
14. Globigerina apertura
15. Globigerinoides trilobus sacculifera
16. Globorotalia acostaensis
17. G. puncticulata puncticulata
18. Globigerina woodi woodi
19. Neogloboquadrina pachyderma forma dex.
20. Globorotalia crassacrotonensis
21. G. conica
22. G. scitula
23. G. miotumida conomiozea
24. Neogloboquadrina pachyderma forma sinst.
25. Globorotalia mayeri mayeri
26. G. continuosa
27. G. puncticulata sphericomiozea
28. Globigerina nepenthes
29. Globorotalia tumida
30. Sphaeroidinella subdehiscens subdehiscens
31. Globoquadrina dehiscens (S.S.)
32. G. advena
33. Globorotalia aff. margaritae
34. G. cibaoensis
35. G. mayeri nympha
36. G. praescitula
37. G. miotumida conoidea
38. Globigerina ciperoensis
39. Globorotalia miotumida miotumida
40. G. menardii miocenica
41. G. siakensis
42. G. peripheronda
43. G. miozea miozea
44. G. lenguaensis
45. G. menardii menardii
46. G. panda
47. Globigerinoides bishericus
48. Praeorbulina glomerosa curva
49. Globorotalia mayeri barisaensis
50. G. praescitula
51. G. praemenardii
52. G. miotumida explicatonis
53. Globigerinoides subquadratus
54. Globoquadrina dehiscens (S.L. plexus)
55. Globigerina euapertura
56. G. praebulloides
57. Globorotalia opima opima
58. Globigerina pseudoampliapertura
59. Subbotina spp.
60. Truncorotaloides collacteus
Depth in feet to base of ZONE
889 A-2
1860 A-3
3266 A-4
3509 B-1
4347 B-2
5614 C
6021 D-2
6117 6187 6268 E-2 F-1 I-1-a
7332 mid to early EOCENE
RELATIVE WATER TEMPERATURE
WARM
COOL


Corrected depth of SIDE WALL CORES in feet.
748
825
889
1003
1061
1171
1225
1266
1324
1410
1508
1585
1654
1724
1797
1860
1947
2023
2114
2200
2273
2351
2423
2507
2581
2651
2722
2787
2881
2957
3058
3158
3266
3372
3423
3453
3509
3609
3709
3810
3908
4004
4106
4231
4347
4456
4559
4714
4812
4917
5015
5111
5213
5308
5414
5519
5614
5714
5815
5915
6021
6117
6187
6268
6278
6328
6416
6566
6717
6877
7030
7173
7278
7332
BENTHONICS
61. Brizalina noblis
62. Cibicides lobatulus
63. C. opacus
64. C. cygnorum
65. C. pseudoungerianus
66. Euuvigerina miozea
67. Guttulina problema
68. Nodosaria spp.
69. Nonionella spp.
70. Parellina imperatrix
71. Sphaeroidina bulloides
72. Melonis spp.
73. Elphidium chapmani
74. Hopkinsina mioindex
75. Cibicides mediocris
76. C. refulgens
77. Anomalinoides macroglabra
78. Pullenia spp.
79. Fissurina spp.
80. Notorotalia sp.?
81. Cibicides thiara
82. Cassidulina carinata
83. Discopulvinulina bertheloti
84. Gyroidinoides soldani
85. Bolivina robusta
86. Cassidulina subglobosa
87. Bulimina marginata
88. Cibicides victoriensis
89. Trifarina bradyi
90. Brizalina pseudobeyrichi
91. Lenticulina spp.
92. L. mamilligera
93. Ammosphaeroidina sp.
94. Bathysiphon sp.A
95. Martinottiella communis
96. Globobulimina pacifica
97. Loxostonum sp.
98. 'Planulina' wuellerstorfi
99. Haplophragmoides cf. pauperata
100. Euuvigerina mioschwageri
101. Anomalinoides procolligera
102. Discorbinella biconcava
103. Lagena spp.
104. Gyroidinoides subzelandica
105. Siphouvigerina proboscidea
106. Astrononion sp.
107. Bolivina zedirecta
108. "Rosalina" sp.
109. Cibicides novozelandica
110. Sigmoidopsis sp.
111. Cassidulina "globosa"
112. Euuvigerina maynii
113. Bathysiphon sp.B
114. Discammina sp.
115. Bolivinita quadrilata
116. Discoanomalina mitchelli
117. Textularia semicarinata
118. Chilostomella ovoidea
119. Gaudyrina heywoodensis
120. Karreriella bradyi
121. Pyrgo sp.
122. Haplophragmoides spp.
123. Oslangularia sp.
124. Cribrostromoides sp.
125. Brachisiphon sp.
126. Gyroidinoides zelandica
127. Textularia sp.?
128. Cibicides brevoralis

Corrected depth of SIDE WALL CORES in feet.

748 825 889 1003 1061 1171 1225 1266 1324 1410 1508 1585 1654 1724 1797 1860 1947 2023 2114 2200 2273 2351 2423 2507 2581 2651 2722 2787 2881 2957 3058 3158 3266 3372 3423 3453 3509 3609 3709 3810 3908 4004 4106 4231 4347 4456 4559 4714 4812 4917 5015 5111 5213 5308 5414 5519 5614 5714 5815 5915 6021 6117 6187 6268 6278 6328 6416 6566 6717 6877 7030 7173 7278 7332

OTHER FAUNA

Worn bryozoal frags

Echinoid spines

Mollusca frags

Ostracods

Pterapods

Sponge spicules

INORGANIC MATERIAL

Angular quartz

Limonite

Pyrite

Glauconite

Mica

Orange stained quartz

Rock fragments

REWORKED PLANKTONIC FAUNA

MISPLACED BENTHONIC FAUNA

SHAPE SORTING

SIZE SORTING

PERCENTAGE PLANKTONIC FORAMINIFERA

100%

50%

0%

RELATIVE SPECIMEN COUNT = ∘-∘-∘ and BENTHONIC DIVERSITY = x-x-x

3000 2000 1000 0

15 10 5

DOMINANT BENTHONIC GROUP

CIBICIDES
BOLIVINA
CASSIDULINA
EUUVIGERINA
NODOSARIDS
ARENACEOUS

ENVIRONMENTAL INTERPRETATION	HIGH ENERGY MID SHELF	OUTER SHELF or CANYON HEAD	CANYON or SHELF SLUMPING with HIGH ENERGY CURRENTS	UPPER SLOPE with HIGH ENERGY CURRENTS and SLUMPING with REWORKING	SHELF SLUMPING down SLOPE	UNSTABLE STEEP SLOPE	CONTINENT RISE GLOB.OOZE	?	EMBAYMENT or TIDAL MARSH	

Depth in feet to base of ZONE	889 A-2	1860 A-3	3266 A-4	3509 B-1	4347 B-2	5614 C	6021 D-2	6117 | 6187 | 6268 E-2 | I-1-a F-1	7332 mid to early EOCENE

BASIN GIPPSLAND BY David Taylor

WELL NAME FLOUNDER # 5 DATE 30-4-75 ELEV. _____

Foram Zonules

		Highest Data	Quality	2 Way Time	Lowest Data	Quality	2 Way Time
MIOCENE	A	S.L.	0		3266	1	
	Alternate				3158	0	
	B	3372	0		4347	0	
	Alternate						
	C	4456	1		5714	1	
	Alternate						
	D_1						
	Alternate						
	D_2	5815	1		6021	0	
	Alternate	5915	0				
	E	6117*			6117	0	
	Alternate						
	F	6187	0		6187	0	
	Alternate						
	G						
	Alternate						
	H_1						
	Alternate						
	H_2						
	Alternate						
OLIGOCENE	I_1	6268**	0		6268	0	
	Alternate						
	I_2						
	Alternate						
	J_1						
	Alternate						
	J_2						
	Alternate						
EOC.	K						
	Alternate						
	Pre K	6400	2		7314	2	
		6860	0		6860	0	

* Basal part of Zone = E-2

** On boundary between I and H

COMMENTS: All depths corrected.

Note: If highest or lowest data is a 3 or 4, then an alternate 0, 1, 2 highest or lowest data will be filled in if control is available.

If a sample cannot be interpreted to be one zonule, as apart from the other, no entry should be made.

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

Date Revised _____

By _____

ESSO AUSTRALIA LIMITED

WELL COMPLETION REPORT

FLOUNDER-5

APPENDIX 4

PALYNOLOGICAL REPORT

PALYNOLOGICAL ANALYSIS OF FLOUNDER-5

by Alan Partridge

Palaeontology Report 1975/7 March 27, 1975.

SUMMARY

The following eight spore-pollen zones are recognized in the Flounder-5 well. The youngest two of the important *Wetzeliella* dinoflagellate zones are also identified in the Flounder Formation which is most similar to the sequence through the Flounder Formation penetrated in Flounder-1.

Most depths quoted in this report are from sidewall cores and these have all been corrected for the error in the logging cable.

Age	Zone	Data and Rating (Depth in feet) Highest	Lowest
Miocene	*T. bellus*	6021 (1)	6187 (2)
	DISCONFORMITY		
Oligocene	*P. tuberculatus*	6268 (0)	6268 (0)
	DISCONFORMITY		
Middle Eocene	Lower *N. asperus*	6278 (2)	6278 (2)
	DISCONFORMITY		
Early Eocene	*P. asperopolus*	6328 (0)	7173 (1)
Dinoflagellate zones within *P. asperopolus* zone.			
	W. edwardsii	6328 (2)	6566 (1)
	W. thompsonae	7030 (1)	7030 (1)
Early Eocene	Upper *M. diversus*	7332 (1)	7332 (1)
	DISCONFORMITY		
Paleocene	Upper *L. balmei*	7360 (1)	7930 (3)
Paleocene	Lower *L. balmei*	8244 (1)	8244 (1)
Maastrichtian	*T. longus*	8394 (2)	8394 (2)

ANALYSIS

The *Triporopollenites bellus* Zone was identified at 6021 feet on the spores *Rugulatisporites micraulaxus* and *Klukisporites lachlanensis* and the grass pollen *Monoporites media*. The samples at 6117 and 6187 feet did not yeild diagnostic zone fossils but are nevertheless referable to the zone on the overall composition of the assemblages.

The *Proteacidites tuberculatus* Zone was identified at 6268 feet on the presense of the zone indicator species *Cyatheacidites annulatus*.

Flounder Formation

At the top of the Flounder Formation the rather poor sample at 6278 feet is referred to the Lower *Nothofagidites asperus* Zone because of the occurrence of the dinoflagellates *Areosphaeridium diktypoplokus* (Klumpp) Eaton and *Phthanoperidinum* n.sp. which have previously only been recorded from this zone. One specimen of *Wetzeliella thompsonae* was identified but this was interpreted as reworked. The age of the sample was unexpected because it comes from near the top of the Flounder Formation as interpreted from the logs. None of the other Flounder wells have this zone at the top of the Flounder Formation. However, in Flounder-4 (Partridge 1974/3) the greensand at the base of the Oligocene (*P. tuberculatus* Zone) contained reworked fossils from the Lower *N. asperus* Zone (i.e. Gurnard Formation equivalents) and in this well a similar interpretation of some reworking of the unconformity surface between the Flounder Formation and Lakes Entrance Formation must apply.

Within the Flounder Formation in this well only the *Proteacidites asperapolus* and Upper *Malvacepollis diversus* Zones are recognized.

The *P. asperopolus* Zone is at least 850 feet thick and represents the bulk of the formation. It also contains the *Wetzeliella thompsonae* and *W. edwardsii* dinoflagellate zones. The limits of these zones are restricted to those samples which actually contain the zone fossils, and the base of the zones are defined by the first occurrence of the designated fossils. In the sample at 6328 feet *W. thompsonae* and *W. edwardsii* occur together. In the earlier Flounder wells their occurrences were mutually exclusive. However, they do have overlapping ranges in New Zealand (Wilson 1967). It is therefore suggested that the entire *W. edwardsii* Zone may not be present, especially when comparing with Flounder-1, and that the upper portion containing the range of *W. edwardsii* without *W. thompsonae* is missing. The alternative hypothesis that *W. thompsonae* is reworked into the *W. edwardsii* Zone is considered unlikely considering the dominence of the former fossil. The base of the *P. asperopolus* Zone is identified on the occurrence of the indicator species, *Clavastephanocolporites meleosus* at 7173 feet.

The Upper *M. diversus* Zone identified in the sample at 7332 feet which is directly above the base of the Flounder Formation, represents only the highest portion of the zone as it contains the pollen *Santalumidites cainozoicus*. The sample contains abundant dinoflagellates and probably belongs to the *Wetzeliella ornata* Zone even though the zone fossil was not found in the material examined.

The entire Flounder Formation in this well is interpreted as shallow marine, on the basis of the samples examined, with the exception of the samples from 6717 to 6877 feet and 7278 to 7285 feet. Both these sets of samples were indeterminate because of the lack of fossils and interestingly enough lie at the interpreted zone boundaries. The samples lack or are low in dinoflagellates compared to the other samples in the Flounder Formation and are poorly preserved and it is therefore suggested that they represent slight regressive events with concurrent exposure and oxidation of the sediments.

Upper and Lower *Lygistepollenites balmei* Zones

Unfortunately the assemblages from these two zones are poor, and although they can be confidently assigned to the *L. balmei* Zone the determination of the Upper and Lower subdivisions is less certain and is mainly based on a comparison with the earlier Flounder wells.

Tricolpites longus Zone

Only the one sample at 8394 feet is referred to this zone and this is based on highest occurrences of *Tricolpites confessus* and *Proteacidites gemmatus*. All the sidewall cores below 8394 feet were of lithologies unsuitable for palynology.

REFERENCES

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Wilson, G.J. 1967 "Some species of *Wetzeliella* Eisenack (Dinophyceae) from New Zealand Eocene and Paleocene strata" N.Z.J. Botany 5 (4) 469 - 497.

SAMPLES ANALYSED

Sample	Depth in Feet Corrected	(Uncorrected)	Zone
SWC 59	6021 *	(6006)	*T. bellus* Zone
SWC 58	6117 *	(6102)	"
SWC 57	6187 *	(6172)	"
SWC 56	6268 *	(6252)	*P. tuberculatus* Zone
SWC 55	6278 *	(6262)	Lower *N. asperus* Zone
SWC 54	6328 *	(6312)	*P. asperopolus* Zone & *W. edwardsii* Zone
SWC 53	6416 *	(6400)	*P. asperopolus* Zone
SWC 52	6566 *	(6550)	*P. asperopolus* Zone & *W. edwardsii* Zone
SWC 51	6717	(6700)	Indeterminate
SWC 50	6877 *	(6860)	Indeterminate
SWC 49	7030 *	(7012)	*P. asperopolus* Zone & *W. thompsonae* Zone
SWC 48	7173 *	(7155)	*P. asperopolus* Zone
SWC 47	7278	(7260)	Indeterminate
SWC 46	7285	(7267)	Indeterminate
SWC 45	7332 *	(7314)	Upper *M. diversus* Zone
SWC 44	7360 *	(7342)	Upper *L. balmei*
SWC 43	7408 *	(7390)	"
Cuttings (Coal)	7830 - 40		"
Cuttings (Coal)	7930 - 40		"
SWC 38	8244	(8223)	Lower *L. balmei*
SWC 37	8394	(8373)	*T. longus*

* Dinoflagellates present in sample.

Well Name FLOUNDER-5 Basin GIPPSLAND Sheet No. 1 of 4

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	T	T	S	S								
DEPTHS / PALYNOMORPHS	6021	6117	6187	6268	6278	6328	6416	6566	6717	6877	7030	7173	7278	7332	7360	7408	7830-40	7930-40	8244	8394								
A. qualumis																												
A. acutullus							/				/																	
A. luteoides																												
A. oculatus																												
A. sectus																												
A. triplaxis																												
A. obscurus															/	/												
B. disconformis																												
B. arcuatus							/	/						/														
B. elongatus																												
B. mutabilis																												
B. otwayensis																												
B. elegansiformis														/														
B. trigonalis																												
B. verrucosus																												
B. bombaxoides																												
B. emaciatus							/																					
C. bullatus																												
C. heskermensis											/																	
C. horrandus																												
C. meleosus												/																
C. apiculatus																												
C. leptos																												
C. striatus																												
C. vanraadshooveni							/	/			/	/																
C. orthoteichus/major						/	/	/						/														
C. annulatus		/		/																								
C. gigantis																												
C. splendens								/			/								/									
D. australiensis															/													
D. granulatus					/		/	/							/	/												
D. tuberculatus						/	/	/	/	/	/	/																
D. delicatus														/														
D. semilunatus																												
E. notensis												/																
E. crassiexinus																												
F. balteus											/	/																
F. crater																												
F. lucunosus																												
F. palaequetrus																												
G. edwardsii																												
G. rudata															/					/								
G. divaricatus																												
G. gestus																												
G. catathus																												
G. cranwellae																												
G. wahooensis																												
G. bassensis																												
G. nebulosus																												
H. harrisii		/		/	/	/	/	/	/	/	/	/	/			/		/										
H. astrus						/							/															
H. elliottii															/				/									
I. anguloclavatus							/																					
I. antipodus															/													
I. notabilis												/		/														
I. gremius		/		/								/																
I. irregularis			/					/			/	/																
J. peiratus																		/										
K. waterbolkii														/														
L. amplus																												
L. crassus																												
L. ohaiensis																				/								
L. bainii																												
L. lanceolatus																												
L. balmei						R						R			/	/			/	/								
L. florinii		/	/		/	/		/			/	/			/													
M. diversus						/					/					/			/									
M. duratus					/							/																
M. grandis																												
M. perimagnus																												

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

Well Name FLOUNDER-5 Basin GIPPSLAND Sheet No. 2 of 4

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	T	T	S	S
DEPTHS / PALYNOMORPHS	6021	6117	6187	6268	6278	6328	6416	6566	6717	6877	7030	7173	7278	7332	7360	7408	7830-40	7930-40	8244	8394
M. subtilis					/	/	/	/		/	/			/						
M. ornamentalis			/																	
M. hypolaenoides																				
M. homeopunctatus																				
M. parvus/mesonesus	/											/								
M. tenuis						/	/					/		/						
M. verrucosus																				
M. australis																				
N. asperus																				
N. asperoides																				
N. brachyspinulosus					/			/				/			/					
N. deminutus					/															
N. emarcidus/heterus	/	/	/	/	/	/				/			/	/						
N. endurus																				
N. falcatus						/														
N. flemingii					/	/	/	/						/						
N. goniatus																				
N. senectus																				
N. vansteenisii																				
O. sentosa																				
P. ochesis																				
P. catastus					/															
P. demarcatus																				
P. magnus						/														
P. polyoratus																/				/
P. vesicus					/															
P. densus															/					
P. velosus																				
P. morganii/fubatus																				
P. mawsonii				/	/			/							/	/		/	/	/
P. reticulosaccatus															/					
P. verrucosus																	/			
P. crescentis																				
P. esobalteus																				
P. langstonii																				
P. reticulatus																				
P. simplex																				
P. varus													/							
P. adenanthoides (Prot.)					/		/							/						
P. alveolatus																				
P. amolosexinus																				
P. angulatus																		/		
P. annularis					/		/							/						
P. asperopolus					/															
P. biornatus																				
P. clarus																				
P. cleinei																				
P. confragosus																				
P. crassis						/				/										
P. delicatus																				
P. formosus						/	/													
P. grandis						/	/	/												
P. grevillaensis																				
P. incurvatus																				
P. intricatus																				
P. kopiensis					/		/				/									
P. lapis																				
P. latrobensis																				
P. leightonii						/		/			/	/		/						
P. obesolabrus																				
P. obscurus												/	/							
P. ornatus								/						/						
P. otwayensis																				
P. pachypolus					/	/	/	/	/		/	/	/	/		C			C	
P. palisadus																				
P. parvus																				
P. plemmelus						/														
P. prodigus					/	/		/						/						
P. pseudomoides						/						/								
P. recavus																				

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

Well Name FLOUNDER-5 Basin GIPPSLAND Sheet No. 3 of 4

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	T	T	S	S								
DEPTHS / PALYNOMORPHS	6021	6117	6187	6268	6278	6328	6416	6566	6717	6877	7030	7173	7278	7332	7360	7408	7830-40	7930-40	8244	8394								
P. rectomarginis																												
P. reflexus																												
P. reticulatus																												
P. reticuloconcavus																												
P. reticuloscabratus							/																					
P. rugulatus																												
P. scitus																												
P. stipplatus																												
P. tenuiexinus								/					/															
P. truncatus																												
P. tuberculatus																												
P. tuberculiformis														/														
P. tuberculotumulatus																												
P. xestoformis (Prot.)						/		/			/	/		/														
Q. brossus																												
R. boxatus								/																				
R. stellatus																												
R. mallatus					/	/		/			/	/																
R. trophus																												
S. cainozoicus					/	/	/	/						/														
S. rotundus					/	/																						
S. digitatoides																												
S. marlinensis																												
S. rarus																												
S. meridianus					/		/	/												/								
S. prominatus																												
S. uvatus																												
S. punctatus					/	/																						
S. regium																												
T. multistrixus (CP4)					/																							
T. textus																												
T. verrucosus															/				/	/								
T. securus																												
T. confessus (C3)																				/								
T. gillii															/					/								
T. incisus																												
T. longus																												
T. phillipsii														/														
T. renmarkensis																												
T. sabulosus																												
T. simatus																												
T. thomasii																												
T. waiparaensis																												
T. adelaidensis (CP3)					/	/					/	/																
T. angurium																												
T. delicatus																												
T. geraniodes																												
T. leuros																												
T. lilliei																												
T. marginatus																												
T. moultonii											/			/														
T. paenestriatus						/							/															
T. retequetrus																												
T. scabratus							/				/	/																
T. sphaerica																												
T. magnificus (P3)																												
T. spinosus																												
T. ambiguus						/																						
T. chnosus																												
T. helosus														/														
T. scabratus																												
T. sectilis																												
V. attinatus																												
V. cristatus																												
V. kopukuensis					/		/	/			/	/																
Rugulat. micraulaxus	/																											
Monoporites media	/																											
K. lachlanensis	/																											
C. subtilis		/																										
M. waitakiensis							/																					

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

Well Name FLOUNDER -5 Basin GIPPSLAND Sheet No. 4 of 4

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	T	T	S	S
DEPTHS / PALYNOMORPHS	6021	6117	6187	6268	6278	6328	6416	6566	6717	6877	7030	7173	7278	7332	7360	7408	7830/40	7930/40	8244	8394
C. glarius													/							
Amosopollis dilwynensis																	/	/		/
Prot. gemmatus																				/
DINOFLAGELLATES																				
Spiniferites spp.	/	/	/	/	/	/				/	/	/		/						
N. balcombiana	/		/																	
L. machaerophorum		/																		
O. centrocarpum		/		/		/														
C. vieta		/		/																
S. placacantha			/																	
P. fibrosum				/																
E. dictyoplokus				R	/															
Phthanoperidinium	sp.				/															
H. varispinosa					R						/	/								
W. thompsonae					R	/					/									
Areoligera sp						/	/							/						
S. morayensis						/						/								
W. edwardsii						CF	/													
S. essoii						/	/													
T. pellitum							/					/								
D. flounderensis							/	/				/								
D. longispinata							/	/				/							C	
W. homomorpha								/				/								
K. trabeculoides								/												
H. tasmaniense														/						
D. dilwynensis															/					
A. retiintextum															/	/				

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

BASIN GIPPSLAND DATE

WELL NAME FLOUNDER-5 ELEVATION

AGE	PALYNOLOGIC ZONES	HIGHEST DATA					LOWEST DATA				
		Preferred Depth	Rtg.	Alternate Depth	Rtg.	2 way time	Preferred Depth	Rtg.	Alternate Depth	Rtg.	2 way time
OLIG-MIO.	P. tuberculatus	6268	0				6268	0			
EOCENE	U. N. asperus										
	M. N. asperus										
	L. N. asperus	6278	0				6278	0			
	P. asperopolus	6328	0				7173	1	7030	0	
	U. M. diversus	7332	1				7332	1			
	M. M. diversus										
	L. M. diversus										
PALEOCE	U. L. balmei	7360	1				7930	3			
	L. L. balmei	8244	1				8244	1			
	T. longus	8394	2				8394	2			
LATE CRETACEOUS	T. lilliei										
	N. senectus										
	C. trip./T.pach.										
	C. distocarin.										
	T. pannosus										
EARLY CRETACEOUS											
RE-CRETACEOUS											

COMMENTS: Wetzeliella edwardsii Dinoflagellate Zone 6328' (2) to 6566' (1)
Wetzeliella thompsonae Dinoflagellate Zone at 7030' (1)

SWC depths quoted have all been corrected to account for error in logging tool cable.

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

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

DATA RECORDED BY: A.D. Partridge DATE March 14, 1975.

DATA REVISED BY: DATE

FORM No R 315 12/72

ESSO AUSTRALIA LIMITED

WELL COMPLETION REPORT

FLOUNDER-5

APPENDIX 5

VELOCITY SURVEY REPORT

VELOCITY SURVEY REPORT

WELL: Flounder-5

BASIN: Gippsland

INTRODUCTION

Esso Personnel:	C.J. Carty, D.J. Lee
Contractor:	Velocity Data Pty. Ltd.
Seismic Observer:	J. Larsen
Marine Shooter:	M. Reveleigh
Assembled at:	Sale, Victoria on 14/2/75
Boarded Rig:	"Regional Endeavour" on 14/2/75
Date of Survey:	15/2/75
Casing Depth:	2858' KB
T.D. When Shot:	8553' KB FTD: 8553' KB
Water Depth:	324' KB

SURVEY PROCEDURE

Weather:
Sea rough
Rig movement moderate
Rig noise moderate

Hydrophones:
Number: 4
Depth below sea-level: 20 ft.
Position: 2 in moonpool, 2 on gas gun

Seismic Source:
Gas Gun: Gas pressures 2:1 ratio
Oxygen 90 psi, Propane 45 psi

Shots:
Number of Levels shot: 9
Number of shots: 23
Number of shots per level: 2 or 3

Time:

Time of first shot:	1950 hrs.
Time of last shot:	2153 hrs.
Rig Time:	3 hrs.

RESULTS

Quality of Records
16 good
7 fair
0 poor
all used

Comparison of Interval Times with Sonic Log:
/Δ/ average = 3.0 microsec/ft.
/Δ/ maximum = 9.1 microsec/ft.
Refer to attached table for further details.

COMMENTS

The survey was virtually trouble free. On some shots the attenuation had to be increased in order to remove background noise from the records, but in general noise levels were good, and breaks on the records easily determined.

There was some discrepancy, however, between interval transit times measured from the check shots and those measured off the sonic log. The sonic was consistently giving shorter times (i.e. higher interval velocities). A check on the velocity survey instruments both before and after the survey revealed that the instruments were in excellent working order (error less than 2 msec in 10 sec) and hence cannot have contributed the observed doscrepancy.

SPECIAL NOTE

In logging this well Schlumberger used a cable with incorrectly spaced depth markers. This error was not discovered until some time after the completion of the well. The depths given in this report are corrected for this error by the factor of +2.5 ft/1000ft from KB (corrected depths greater than original depths).

VELOCITY SURVEY ERROR CHECK FLOUNDER-5

SHOT DEPTH (Ft.subsea) Corrected	Av.Vertical Travel Time (check shots)	Ti Check Shots (sec.)	Ti Sonic Log (sec.)	Difference (Millisecs.)	Depth Interval (ft.)	Error (Microsec.) per ft.
3150	0.413					
		0.068	.066	2	727	2.8
3877	0.481					
3877	0.481					
		0.062	.0605	1.5	669	2.2
4546	0.543					
4546	0.543					
		0.091	.089	2	896	2.2
5442	0.634					
5442	0.634					
		0.084	.0805	3.5	803	4.4
6245	0.718					
6245	0.718					
		0.081	.080	1	875	1.1
7120	0.799					
7120	0.799					
		0.021	.019	2	220	9.1
7340	0.820					
7340	0.820					
		0.056	.0545	1.5	631	2.4
7971	0.876					
7971	0.876					
		0.029	.029	0	390	0
8361	0.905					

Shothole information:- Elevation, Distance & Direction from Well

Company: ESSO EXPLORATION AUSTRALIA INC.

Well: FLOUNDER-5

Elevation (Derrick Floor): 28'

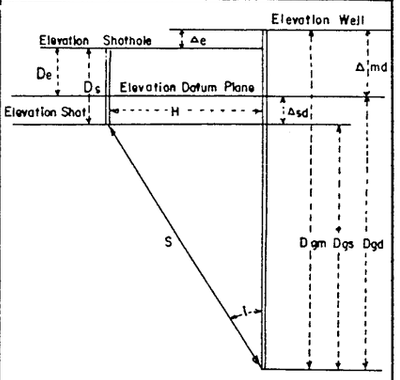
Total Depth: 8553' KB

LOCATION

Coordinates | Section, Township, Range | County | Area or Field: Gippsland Basin, Victoria.

DATUM : M.S.L.

Record Number	Shothole Number	Time of Shot	Dgm	Ds	tus	tr	T Reading	T Polarity	T Grade	Dgs	H	TAN i	Cos i	Tgs Avge	Δsd	Δsd/V	Tgd	Tgd Average	Dgd	ΔDgd	ΔTgd	Vi Interval Velocity	Va Average Velocity
1		1950	3178	35	.007	.026	.406	U	G	3115	135	.043	.9991	.406	35	.007		.413	3150				7627
2		1952	3178	35	.007	.027	.406	U	G														
										Offset not significant										727	.068	10,690	
22		2152	3905	35	.007	.027	.473	D	G					.474				.481	3877				8060
23		2153	3905	35	.007	.027	.474	D	G											669	.062	10,790	
20		2141	4574	35	.007	.027	.536	D	G					.536				.543	4546				8372
21		2142	4574	35	.007	.027	.536	D	G											896	.091	9850	
18		2126	5470	35	.007	.026	.628	D	G					.627				.634	5442				8584
19		2127	5470	35	.007	.027	.626	D	G											803	.084	9560	
15		2114	6273	35	.007	.027	.709	D	F					.711				.718	6245				8698
16		2115	6273	35	.007	.026	.711	D	G														
17		2116	6273	35	.007	.027	.712	D	G											875	.081	10,800	
12		2101	7148	35	.007	.026	.792	D	F					.792				.799	7120				8911
13		2102	7148	35	.007	.027	.792	D	G														
14		2103	7148	35	.007	.028	.793	D	G											220	.021	10,480	
9		2048	7368	35	.007	.028	.814	D	G					.813				.820	7340				8951
10		2049	7368	35	.007	.027	.813	D	G														
11		2050	7368	35	.007	.027	.813	D	G											631	.056	11,270	
6		2033	7999	35	.007	.027	.869	D	F					.869				.876	7971				9099
7		2034	7999	35	.007	.027	.868	D	G														
8		2035	7999	35	.007	.027	.869	D	G											390	.029	13,450	
3		2015	8389	35	.007	.027	.898	D	F					.898				.905	8361				9239
4		2018	8389	35	.007	.029	.899	D	F														
5		2022	8389	35	.007	.027	.896	D	F														



Dgm = Geophone depth measured from well elevation

Dgs = " " " " shot "

Dgd = " " " " datum "

Ds = Depth of shot

De = Shothole elevation to datum plane

H = Horizontal distance from well to shotpoint

S = Straight line travel path from shot to well geophone

tus = Uphole time at shotpoint

T = Observed time from shotpoint to well geophone.

tr = " " to reference geophone.

Δe = Difference in elevation between well & shotpoint.

Δsd = " " " " shot & datum plane

Δsd = Ds - De

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

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

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

Dgd = Dgm - Δmd

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

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

Surveyed by: Velocity Data P/L

Date: 25/2/75

Weathering Data :

Casing Record
2858 ft. KB

DWG 1107/OP/3

PE902288

This is an enclosure indicator page.
The enclosure PE902288 is enclosed within the container PE902287 at this location in this document.

The enclosure PE902288 has the following characteristics:

ITEM_BARCODE	= PE902288
CONTAINER_BARCODE	= PE902287
NAME	= Structure Map Top of T-1 Reservoir Well Control Only
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= SEISMIC
SUBTYPE	= HRZN_CONTR_MAP
DESCRIPTION	= Structure Map Top of T-1 Reservoir Well Control Only
REMARKS	=
DATE_CREATED	= 30/06/1975
DATE_RECEIVED	=
W_NO	= W684
WELL_NAME	= Flounder-5
CONTRACTOR	= ESSO
CLIENT_OP_CO	= ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902289

This is an enclosure indicator page.
The enclosure PE902289 is enclosed within the container PE902287 at this location in this document.

The enclosure PE902289 has the following characteristics:

ITEM_BARCODE	= PE902289
CONTAINER_BARCODE	= PE902287
NAME	= Simplified Cross Section A-A'
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= WELL
SUBTYPE	= CROSS_SECTION
DESCRIPTION	= Simplified Cross Section A-A'
REMARKS	=
DATE_CREATED	= 31/03/1975
DATE_RECEIVED	=
W_NO	= W684
WELL_NAME	= Flounder-5
CONTRACTOR	= ESSO
CLIENT_OP_CO	= ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902290

This is an enclosure indicator page.
The enclosure PE902290 is enclosed within the container PE902287 at this location in this document.

The enclosure PE902290 has the following characteristics:

ITEM_BARCODE	= PE902290
CONTAINER_BARCODE	= PE902287
NAME	= Time Depth Curve
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= WELL
SUBTYPE	= VELOCITY_CHART
DESCRIPTION	= Time Depth Curve
REMARKS	=
DATE_CREATED	= 30/09/1975
DATE_RECEIVED	=
W_NO	= W684
WELL_NAME	= Flounder-5
CONTRACTOR	= ESSO
CLIENT_OP_CO	= ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE601429

This is an enclosure indicator page.
The enclosure PE601429 is enclosed within the container PE902287 at this location in this document.

The enclosure PE601429 has the following characteristics:

ITEM_BARCODE	= PE601429
CONTAINER_BARCODE	= PE902287
NAME	= Well Completion Log
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= WELL
SUBTYPE	= COMPLETION_LOG
DESCRIPTION	= Well Completion Log
REMARKS	=
DATE_CREATED	= 16/02/1975
DATE_RECEIVED	=
W_NO	= W684
WELL_NAME	= Flounder-5
CONTRACTOR	= ESSO
CLIENT_OP_CO	= ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE904935

This is an enclosure indicator page.
The enclosure PE904935 is enclosed within the container PE902287 at this location in this document.

The enclosure PE904935 has the following characteristics:

ITEM_BARCODE	= PE904935
CONTAINER_BARCODE	= PE902287
NAME	= Well Velocity Record
BASIN	= GIPPSLAND
PERMIT	= VIC/L11
TYPE	= WELL
SUBTYPE	= VELOCITY_CHART
DESCRIPTION	= Flounder 5 Well Velocity Record. Plate 4 of WCR.
REMARKS	=
DATE_CREATED	= 15/02/75
DATE_RECEIVED	=
W_NO	= W684
WELL_NAME	= Flounder-5
CONTRACTOR	=
CLIENT_OP_CO	= Esso Australia

(Inserted by DNRE - Vic Govt Mines Dept)